



Ekonomická
fakulta
Faculty
of Economics

Jihočeská univerzita
v Českých Budějovicích
University of South Bohemia
in České Budějovice

Proceedings of the 13th International Scientific Conference INPROFORUM

100 Years of the Koruna





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2019



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Faculty of Economics

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100 Years of the Koruna

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Foreword

The international scientific conference INPROFORUM is a traditional event held by the Faculty of Economics, the University of South Bohemia in České Budějovice since 2007. The conference is focused on the research achievements in the fields of Innovations, Enterprises, Regions, and Organizations. It is served as a platform to give academics, students, and practicing economists the opportunity to share their thoughts, debate issues, and exchange knowledge in relevant topics. The conference INPROFORUM 2019 has been organized under the auspices of Dagmar Škodová Parmová, Dean of the Faculty of Economics, the University of South Bohemia in České Budějovice.

The theme of the 13th Anniversary International Conference INPROFORUM 2019 has been “100 Years of the Koruna”, which has concluded the following topics:

- Circular Economy from the States, Regions, Companies and a Man Point of View
- Economic Impacts of Changes and Policies in the Fields of Finance, Accounting, and Taxation
- Economics of Agriculture
- Management of Small and Medium-Sized Enterprises
- Market Research and Sustainable Marketing in Trade and Tourism
- Mathematical-Statistical Modelling and Optimization in Practice
- SMART Region - Developing and Limiting Factors

Prof. Zbyněk Revenda (University of Economics, Prague) and prof. Ryozi Miura (Hitotsubashi University) opened the conference as keynote speakers, then about 100 participants could visit about 50 contributed talks.

We would like to thank all the conference participants, the members of the conference committee, keynote speakers, and organization staff. We also would like to express our thanks to the reviewers for valuable feedback for the authors.

We are looking forward to the 14th Anniversary International Conference INPROFORUM 2020 that will be held on November 5 - 6, 2020, at the same location. The topic for the upcoming meeting is “Business Cycles – more than Economic Phenomena”.

On behalf of organizing committee

Jana Klicnarová and Nikola Soukupová

Management of Small and Medium Sized Enterprise

Benefits of Long-Term Cooperation and Supplier Relationship Management

Pech Martin¹, Vaněček Drahoš²

Abstract: Effective supply chain management requires higher level of coordination activities to achieve mutual benefits from business relationships. Long-term relationships between buyers and suppliers bring benefits to suppliers and enable horizontal integration. The paper focuses on the main benefits of a long-term cooperation for suppliers and the assistance available to improve their performance. The research was carried out in 2016-2018 through a questionnaire survey of 252 enterprises. The results show that enterprises mostly provide benefits to their suppliers and usually organize regular meetings with them. The collaboration leads to strengthened relationship management functions and more efficient cooperation within the supply chain.

Keywords: supplier relationship management, supply chain, long-term cooperation, benefits.

JEL Classification: R41, M20, J54

1 Introduction

Effective supply chain management (SCM) requires higher level of coordination activities to achieve mutual benefits from business relationships. This process is expressed by supplier relationship management (SRM), which brings strategically determined, coordinated decisions about relationship needed with suppliers. SRM is organization-wide philosophy and an umbrella term connecting together concept of SPM, SCM, SI&D and SCR (O'Brien, 2014). Supplier relationship management "is the end-to-end process of managing a supplier through the entire sourcing life cycle, which includes first identifying the abilities of a particular company with regard to performing a service for the internal customer, completing a sourcing event, negotiating a contract, executing an order, and determining payment" (Monzczka, Handfield, Giunipero, & Patterson, 2016, p. 49).

The main purpose of SRM is to drive supplier behaviour, encompass the relationship between enterprises and enable a company to leverage its size by coordinating across different enterprise systems (Schuh, Stroemer, Easton, Hales, & Triplat, 2014). These authors state out that the true SRM does not vary by industry sector characteristics. Enterprises can use different outsource/insource activities in different degree, but the end objective remain the same: the long-term cooperation. To meet the purpose of supplier performance management (SPM) it is usually necessary to discuss performance requirements and provide a demonstration them in written or electronic form. Gordon (2008) recommend integrate supplier performance information into sourcing solution and other activities and decision making in the procurement life cycle. Enterprises can maintain effective alignment with their suppliers by exchanging reports about their performance. Reinforcing good business relationships with supplier takes some measure of attention to details to avoid future problems (Sollish, 2012). The possibility of assessment of supplier relationship management score describes Blokdyk (2018) in his framework based on seven domains of SRM.

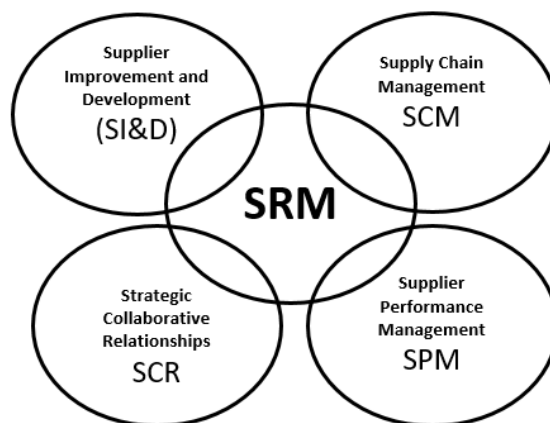
The importance of a long-term supplier relationship lies in sourcing stability and subsequent supply chain process. Cooperative supplier partnership differs from traditional supplier relationships in mutual trust, information/risk sharing, and joint problem solving (Min, 2015). Collaborative relationships mean dialogue between enterprises focused on investments of time / resource of the whole organisation with strategic focus to improve the performance of the whole supply chain in long term period (Emmett & Crocker, 2016). Successful supplier management in new century mandates that the relationship between buyer and supplier be increasingly conceived as a collaborative partnership. It means increasing requirements of supply chain collaboration with strategic sourcing focus and applying technology to the management process (Ross, 2010). In customer-supplier alliances, the completion of each negotiation is sealed with agreements based largely on trust. There are too many tasks, too many needed adjustments, and too much uncertainty for that (Lewis, 1995, pp. 257-258).

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The long-term cooperation, partnership, and relationships between buyers and suppliers brings according to Kalwani & Narayandas (1995) benefit to suppliers compared to employing a transactional approach. Partnership means mutual trust and cooperation that will benefit all enterprises in supply chain. Institute of Business Ethics report states that main benefits of SRM are: lower administration costs, little time spent on price wrangling, less time spent resolving problems, fewer meetings, a willingness to consider simple solutions to problems and an atmosphere that encourages innovation (Emmett, 2012). As part of long-term cooperation, it can be used to exchange confidential information about sales and inventory value at a manufacturing enterprise and a supplier who is ready for next delivery before receiving a new order. Supplier development occurs usually when there is a problem with supplier performance. To speed up the movement of goods and deliver them in small quantities can be use the Just-in-time method. The partnership with suppliers is not random. These relationships are either managed or haphazard, they are result of cause and effect (Moore, 2001).

Figure 1 Relationship among SCM, SRM, SCR, SPM and SI&D



Source: Own processing based on O'Brien (2014).

Our research in this area is focused on identifying the main benefits of long-term cooperation and how buyers support the improvement of processes and activities of their suppliers. One of the main benefit of long-term relationship with key suppliers is performance improvements through supplier development (Krause, Handfield, & Tyler, 2007). The main improvements of performance include product innovation (Bidault, Despres, & Butler, 1998), sharing know-how and experiences, increasing quality and higher flexibility. There is a win-win strategy in such a relationship. However, mutual relations between suppliers and customers do not always take place under these conditions. In addition to partnerships, we encounter the conclusion of one-off contracts, transactions, which may be repeated in the future. It depends on how advantageous the supplier's offer will be.

2 Methods

With regard to supply chain modelling, it is necessary to determine the importance of relationship factors within the network. Our research is focused on identifying the main benefits of long-term cooperation and how buyers support the improvement of processes and activities of their suppliers. The research question deals with the difference between enterprises in long-term relationships according to their characteristics. The partial objective of the research was to find out the differences in enterprises according to their size or sector industry. The results of the analysis facilitate models based on the theory of random and strategic networks.

In the years 2016-2018 we conducted a questionnaire survey in 252 enterprises, of which about half were in the South Bohemian Region. The second part consisted of enterprises in other parts of the Czech Republic. Most questions remained the same, but some were omitted in certain years. More than half of the companies concerned were engineering and electro technical industry (50.0%), 18% household goods industry and 15% food industry. The other two branches (chemical and non-metallic industry, agriculture) are represented only in some years (17.1%). The enterprises were further divided according to the number of employees into small (30%), medium (36%) and large (34%). The questionnaire was focused on the benefits of a long-term cooperation for suppliers and practices of improving the performance of suppliers.

The working hypotheses of the research are:

- H1: Buyers differ in their attitude to the benefits of long-term cooperation for suppliers according to buyers' sector or size.
- H2: Buyers differ in used benefits for long-term cooperation that give suppliers according to their sector or size.

- H3: Buyers differ in practices of improving the performance of suppliers according to their sector or size.

The working null hypotheses for H1, H2 and H3 are that “there is not difference between enterprises according to their sector or size”. The results are analysed by individual tests of equal and given proportions based on Chi-squared test statistics in software R.

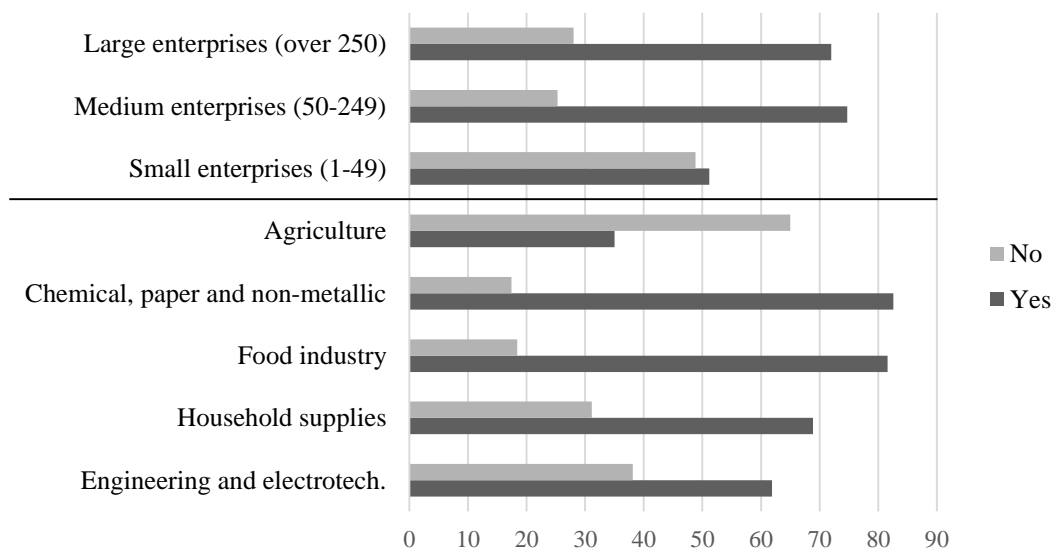
3 Research results

The results are divided into three main parts: the benefits of a long-term cooperation for suppliers, deeper analysis of these benefits and the assistance available to improve suppliers’ performance.

3.1 Benefits of a long-term cooperation for suppliers

Modern access to suppliers demands an active role of customers and creates between them a long-time partnership. Some forms of this aid are summarized in Figure 1. New relation in supply chains manifests higher thrust between individual links, what can develop till to partnership and sharing confidential information. This is noticeable in the branch of Industry of household goods, where there prevail regular meetings, visits and exchange of experience. On the other hand, retail branch forces its suppliers first of all to price decreasing.

Figure 2 Benefits of a long-term cooperation for suppliers (in %)



Source: Own processing

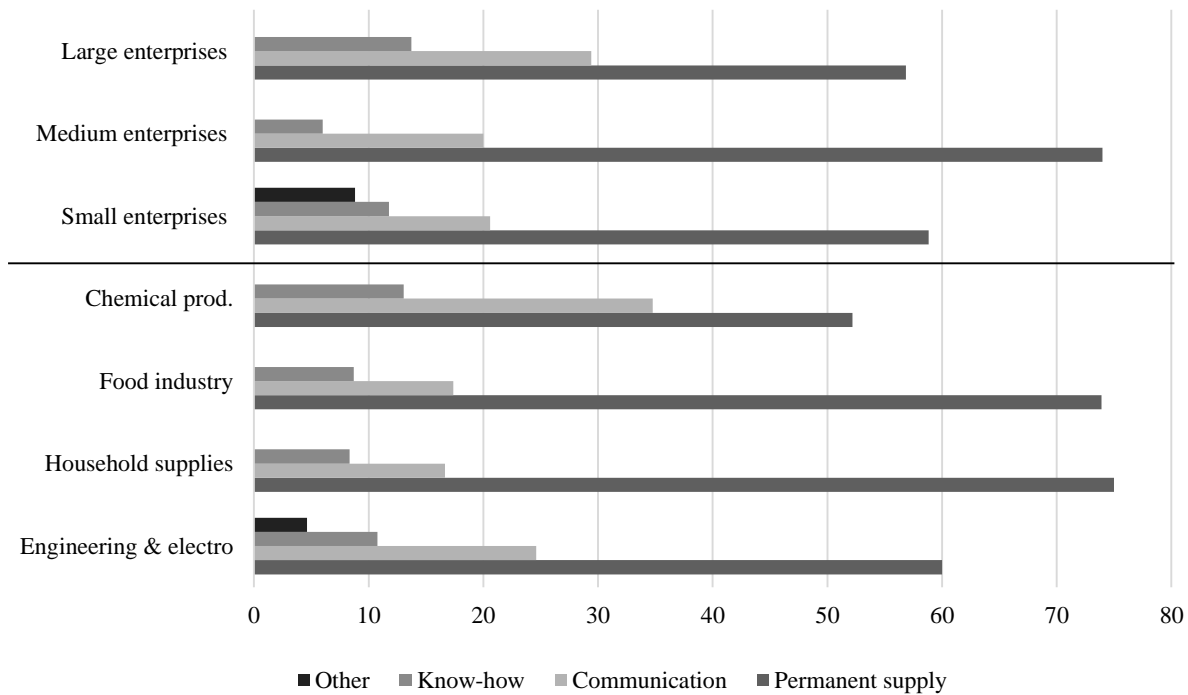
Research question: Is there a difference in enterprise attitude to the benefits of long-term cooperation with suppliers in terms of enterprise size / sector (industry)?

H1 evaluation: From perspective of sector industry, it is clear that enterprises differ in given benefits of the long-term cooperation. At the significance level $\alpha= 0.05$ (p-value = 0,0023), the null hypothesis of compliance of enterprises for hypothesis H1 according to sector (industry) characteristics is rejected. In particular, most differences are between chemical, agriculture and food industry enterprises. The differences between enterprises were proven in terms of enterprise size. At the significance level $\alpha= 0.05$ (p-value = 0,0017), the null hypothesis of compliance of enterprise for hypothesis H1 according to their size characteristics of enterprises is rejected. The benefits are more common in medium and large enterprises than in small enterprises.

3.2 Characteristics of benefits of suppliers

The main benefit provided by buyers to suppliers is a permanent supply perspective (50-75%), as well as assistance in improving mutual communication (15-35%), or know-how for the production or modification of supplied goods (5-15%). While food and household businesses prefer a sustained supply perspective (75%), engineering and chemical companies prefer to help improving communication (25-35%). Results are depicted in Figure 2.

Figure 3 Characteristics of benefits for suppliers (in %)



Source: Own processing

Research question: Is there a difference in used benefits for long-term cooperation that buyers give suppliers according to their sector / size?

H2 evaluation: From the point of view of the evaluation of the hypothesis H2, no statistically significant differences were found between enterprises from different sectors or by their size. At the significance level $\alpha = 0.05$, the null hypothesis for H2 of compliance of enterprises is not rejected. It can therefore be stated that if buyers use benefits to their suppliers, those benefits are granted equally by all categories of enterprises, irrespective of their size and the sector in which they operate.

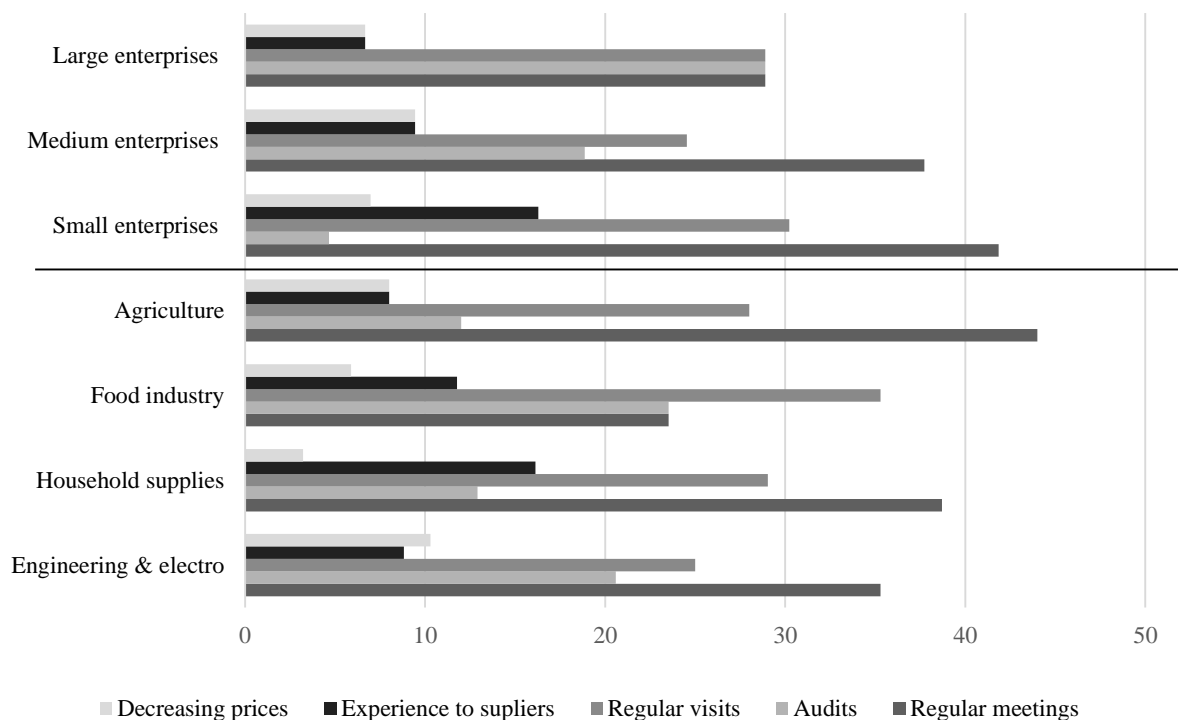
3.3 Practices of improving the performance of suppliers

In order to improve the work of suppliers, regular meetings with suppliers (20-45%) or corporate management visit of suppliers (25-35%) are used. In particular, SMEs usually hold regular meetings with suppliers (40%). The results also showed that around 10-30% of companies audit their main contractors. These are mainly large enterprises (28.9%) and enterprises in food and beverage industry (23.5%) and mechanical engineering enterprises (20.6%). Sharing experience with suppliers is also important, but is less common in all enterprises. Small enterprises (16.3%) and enterprises in sector of the household products (16.1%) are most willing to share their experience with suppliers. Results show Figure 3.

Research question: Is there a difference in buyers' practices of improving the performance of suppliers according to their sector / size?

H3 evaluation: The analysis of the results of hypothesis H3 did not reveal any significant differences between enterprises according to their affiliation to different sectors. At the significance level $\alpha = 0.05$, the null hypothesis of compliance of enterprises for hypothesis H3 according sector industry characteristics is not rejected. When comparing enterprises by size, statistically significant differences were found only in the question of auditing. At the significance level $\alpha = 0.05$ (p-value = 0,0114), the null hypothesis of compliance of enterprise for hypothesis H3 according size characteristics of enterprises is rejected for audits. In this case, large and small enterprises differ in usage of audits (p-value = 0.018). Large enterprises carry out audits at major suppliers more than small enterprises (p-value = 0.009).

Figure 4 Practices of improving the performance of suppliers (in %)



Source: Own processing

4 Conclusions

Research focused on the benefits that buyers provide suppliers to support long-term relationships and improve their performance. Research results indicate that there are differences in the usage of benefits to suppliers across sectors. The benefits are not provided to suppliers especially in agriculture. Similarly, it has been found that benefits are more common in medium and large enterprises. When comparing individual benefits, no differences were found between sectors. This implies that if businesses provide benefits, they prefer it to the same extent. It is mainly benefit of a permanent supply perspective and assistance in improving mutual communication.

In terms of the practices used to improve supplier performance, companies particularly prefer regular meetings with suppliers. The practices used do not differ for enterprises in different sectors. It was found that when comparing the enterprises in terms of their size, differences were found only in the audit of the main suppliers. Obviously, this type of improvement in supplier performance is used by large enterprises than small enterprises.

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Corporate Social Responsibility as a Motivation Driver for Employee Performance

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Abstract: Corporate Social Responsibility (CSR) plays a significant role in employee motivation management, especially when it comes to stipulating desired employee performance or behavior, such as work performance, job satisfaction, organizational commitment or retention. However, the academic literature offers very fragmented or partial answers to questions addressing this issue, as many scholars are focusing exclusively on e.g. one country-based or one industry-based sample only. This might cause a problem for human resource management practitioners when it comes to implicating gained results into practice. Therefore the objective of this paper is to summarize current trends in "state-of-the-art" academic literature using content analysis (narrative literature review). The results indicate positive causal relationship between CSR and desired employee behavior, with job satisfaction playing often the role of a mediator. However, to what extent this causal relationship is significant, is affected by employees' values, preferences and changes in both, the micro- and macro-level of environment. Therefore each employee must be addressed by managers individually, bearing in mind that the employees' values and needs are constantly changing not only due to the cost of time.

Keywords: corporate social responsibility, employees' values, job satisfaction, organizational commitment, retention.

JEL Classification: M12, M14

1 Introduction

Corporate Social Responsibility (CSR) can be understood as all decisions of an organization that go beyond its economic and technical interests (Carroll, 1991). The most commonly used and cited concept of CSR (e.g. Bauman & Skitka, 2012; Farooq & al., 2014; Kim & al., 2016; Kim & al., 2017; Zhang & al., 2019) is the model defined for the first time in 1979 by Carroll (1991, 2015). Carroll (1991, 2015) proposed a four-level CSR model that includes the economic, legal, ethical and discretionary (later referred to as philanthropic) level (dimension) of social responsibility.

According to CSR theory, an organization must satisfy different groups of people who would otherwise stop supporting or could not support the organization. The term "stakeholder" helps define and at the same time delimit responsibilities of an organization, which implies that the organization must engage in those CSR activities that its stakeholders consider important. Organizational stakeholders typically include customers, employees, investors, suppliers, and the community. The list of stakeholders may vary for each organization, but it is widely accepted that employees belong among the organization's key stakeholders. Their interest may be a legal claim, such as fulfillment of contractual terms, at other times a moral claim, such as the employee's ability to express his or her own opinion or fair and dignified behavior of the organization towards an employee (Carroll, 1991, 2015).

It becomes a challenge for managers of each organization to address the urgency or importance of the demands and claims made by different stakeholders. From a CSR point of view, the legitimacy of these claims or requirements is the most important. In terms of organizational efficiency, the power of the relevant stakeholder can have the greatest influence in the decision-making of the organization's management. It is therefore important for the management of the organization to ensure that the main stakeholders achieve their objectives, and the interests of other stakeholders are also satisfied. Although this desired outcome is not always possible, it is a legitimate and desirable goal that the management of the organization should pursue in the long term.

2 Theoretical background and formulation of research questions

Carroll (1991: 44) presents a conceptual approach to addressing the issue of conflict of interest of individual stakeholders and defines a series of questions that each manager should answer before taking appropriate action. This paper draws on this concept, based on a series of questions (Carroll, 1991: 44). These questions serve as a basis for analyzing current trends in academic research on CSR management in relation to employees as the organization's stakeholders.

Carroll's (1991: 44) questions are as follows:

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What are employees' interests?

What opportunities and challenges do employees present to the organization?

What social responsibility (economic, legal, ethical and philanthropic) should an organization have towards employees?

What strategies, practices or decisions should management undertake in order to best resolve responsibilities and obligations to employees?

Work motivation of employees is critical to their overall performance. Motivation affects what employees do, how they do it, and with what effort (Diller, 1999; Mayer & al., 2004; Kim & al., 2017; Graves & al., 2019). Graves et al. (2019) point out that many academics have confirmed the important role of individual components or CSR activities as motivating factors in meeting employees' needs and improving the quality of their working lives (QWL) (e.g. Cychota & al., 2016; Kim & al., 2017; John & al., 2019).

According to the Self Categorization Theory (SCT), employees seek to integrate and become workers of organizations that are compatible with their values, enabling them to satisfy their psychological desires and meaningfully fulfill their existence (John & al, 2019). Likewise, Social Identity Theory (SIT) argues that if people have positive feelings for a group, they tend to identify themselves with a social status of the group, and membership in that group affects their self-esteem and pride (Dutton & al., 1994; Maignan & Ferrell, 2001; Fu & al., 2014; Kim & al., 2017).

At the organizational level, it has also been found that organizations achieve better economic performance over the long term if more employees show a higher rate of commitment to organization (Graves & al., 2019; John & al., 2019). This argument can be supported by the Social Exchange Theory (SET); if one treats the other amicably, with kindness and appreciation, the other will repay him or her equally. This behavior is known as "limited" reciprocity (Peterson, 2004).

Organization's involvement in CSR activities can therefore significantly strengthen employer-employee relationship and lead to Job Satisfaction (JS) and employees' Organizational Commitment (OC), which in turn leads to voluntary employee Retention (R).

Based on the synergy of the above-described knowledge from the SCT, SIT, SET and motivational theories (e.g. Maslow, 1943; Deci & Ryan, 1985, 2000, 2008), we can define a causal relationship between CSR (as a motivation factor) and employee behavior as:

CSR → JS

CSR → OC

CSR → R

CSR → JS → OC

CSR → OC → R

CSR → JS → OC → R

Therefore, the original first, second and third question by Carroll (1991: 44) can be reformulated as follows:

What CSR dimensions affect employee satisfaction?

What impact (direct and indirect) has CSR on employee behavior (JS, OC, R)?

What is the strength of the relationship between CSR and employee behavior (JS, OC, R)?

The author of this paper believes that knowing the answers to the above-mentioned research questions is crucial to finding the right answer to the last, fourth Carroll's question (1991: 44). Therefore, this work aims to find answers to the first three research questions only.

3 Methodology

To conduct systematic search for academic studies dealing with the above-mentioned issues, the instructions of Voe-gtlin and Greenwood (2016) and Macke and Genari (2019) were followed. In accordance with their proposals, three research questions were formulated. The selection criteria below were to identify the studies that respond to the research questions. The studies were searched in Web of Science and Science Direct databases. The searches included combinations such as "CSR and employee motivation", "CSR and job satisfaction", "CSR and job performance", "CSR and labor

productivity", "CSR and retention", "CSR and employee loyalty". Due to a small number of works dealing directly with the causal relationship between "CSR and employee behavior", searches were expanded to include combinations such as "CSR and HRM", "CSR and HR practices", "CSR and IM", "CSR and Personnel Marketing" and "CSR and Employer Branding".

In each database, the searches were limited to peer-reviewed papers written in English and published between 2009 and now to fully reflect the current employees' interests. The original time span was set at 5 years, i.e. works published from 2014 till the present (October 2019). Due to a small number of searched works, the time range was later extended to a decade, i.e. from 2009.

Based on the analysis of abstracts, article titles and keywords, works that did not meet all of the above criteria were excluded. A total number of articles selected (TC = 67), final number of articles excluding non-compliant articles (FN = 45), final number of articles based on empirical research (42), final number of articles based on systematic literature review (3), final number of articles dealing directly with the relationship between CSR and employee behavior (20). Due to a very fragmented focus of individual works, the qualitative content analysis (narrative literature review) was used to analyze the current state of scientific knowledge of the causal relationship between CSR and employees as organizational stakeholders. To avoid bias judgment, two scholars were addressed to consult the obtained findings.

4 Results of a qualitative content analysis

The authors confirm positive causal relationship between CSR (economic, legal, ethical and philanthropic dimension) and employee behavior (e.g. Bauman & Skitka, 2012; Kim & al., 2016; Kim & al., 2017; Ong & al., 2018; Youn & al., 2018; John & al., 2019). In this context, employee behavior includes, for example, JS, OC, and R. The negative causal relationship was confirmed between CSR and the employee's Turn over Intentions (TI). Several types of employee behavior are used as a mediator to explain the indirect positive relationship between CSR and the resulting type of employee behavior. The most commonly used mediator is JS, which, based on motivational theories (e.g. Maslow, 1943; Deci & Ryan, 1985, 2000), explains the employee's interest in individual aspects of CSR (e.g. Bauman & Skitka, 2012; Youn & al., 2018; Graves & al., 2019). E.g. Kim et al. (2017) use QWL concept instead of a simple JS concept as a mediator between CSR and OC.

Sirgy et al. (2001) defined QWL as "employee satisfaction with meeting different needs through the resources, activities and results of participation in the work process" (Sirgy & al., 2001: 242). Based on the hierarchy of human needs (Maslow, 1943), the QWL of the 'lower order' includes JS with the satisfaction of needs such as health and the security of material or family needs through organizational resources, while the QWL of 'higher level' includes JS with social and aesthetic needs or satisfying the need for respect, self-realization and self-education (again through organizational resources). Such a QWL construct undoubtedly assumes the importance of CSR in an organization. Similar findings can be found in Franklin (2008) or Kim et al. (2017). Therefore we can conclude that CSR organizational activities providing "tangible" care to employees (e.g. fair pay, diversity, family support, fair compensation and employment security) create desirable working conditions, increasing the number of employees with a high QWL rate, which in turn leads to increasing employee loyalty and OC (Bohdanowicz & Zientara, 2009; Jakubczak & Gotowska, 2015; Kim & al., 2016; Kim & al., 2017).

Even if CSR activities are not directly focused on employees, they influence JS with QWL. In particular, ethical and philanthropic CSR activities have the potential to meet higher-level employee needs. CSR activities that allow employees to make meaningful contributions to addressing society issues appear to be essential for a higher-level QWL (Cycyota & al., 2016; Kim & al., 2017). This finding is confirmed by the results of Graves et al. (2019) who examined the influence of external and internal motivation (also Deci & Ryan, 1985, 2000) on employee pro-environmental behavior. Motivation, which is based on employees' internal values or on their effort to avoid guilt, has a positive impact on environment-friendly behavior. External motivation, on the other hand, has a negative impact, which suggests that employee incentives to pro-environmental behavior may be unnecessary (Graves & al., 2019).

Youn et al. (2018) conclude that it is important how employees perceive the industry in which they work. If employees know that the industry has little positive impact on the development of the community or society, the involvement of the organization in CSR activities does not affect the JS and OC. Therefore, according to Youn et al. (2018), it is important for the organization to continuously improve the overall employee awareness about organization's CSR activities, e.g. through effective communication and continuous education of employees.

5 Discussion of results and conclusions

Most academics (e.g. Youn & al., 2018, Yao & al., 2019), who deal with causal relationships between the various dimensions of CSR and employee behavior, state that most of the current work deals with the relationship between CSR and other organizational stakeholders, such as owners or customers. This paper also confirms the low incidence of works dealing with CSR and staff issues. Most of the work (supported by empirical quantitative research) is focused on the

service sector, especially the tourism and lodging industry. The service sector is dependent on employee performance which is essential for building customer confidence and loyalty. Employees interact directly with customers and their performance is often the only way to differentiate almost identical services (Youn & al., 2018: 329). Moreover, the lodging industry is characterized by high staff turnover, which leads not only to a weaker organization-employee relationship, but also to worse long-term economic situation of an organization. High employee turnover negatively affects the quality of services and customer satisfaction (Yao & al., 2019: 1).

Geographically, most of this research is located in Asia, which can be explained by a growing interest in the region as a tourist destination. This claim is confirmed by Voegtlin and Greenwood (2016), who point out an increased interest among academics in this world region (18% is almost identical to the percentage of research located in North America and Europe).

Authors confirm the positive causal relationship between the individual CSR dimensions and employee behavior. Employee behavior is most often understood as JS, OC and R. SCT, SIT and SET are most often used as theoretical bases for proving direct or indirect causal relationship between CSR and individual types of employee behavior. In case of an indirect relationship between CSR and employee ultimate behavior, the JS concept is used as a mediator. Yao et al. (2019) use the concept of loyalty from marketing theories and see loyalty as a "higher" form of OC. Based on marketing principles, they identified two dimensions of employee loyalty, affective and behavioral. To increase employee long-term R, it is necessary to "build" an employee-employer relationship based on mutual trust by making behavioral loyalty conditioned by affective loyalty.

Based on the synthesis of individual results, it is possible to deduce a positive causal relationship between CSR and increased R - ultimate employee behavior desired by an organization. This causal relationship can be described as:

$$V/N \rightarrow CSR \rightarrow JS \rightarrow OC \rightarrow R$$

where

V (Value) - values recognized by an employee, N (Needs) - needs of the employee,

CSR - individual CSR dimensions serving as motivational factors,

JS - employee satisfaction with work,

OC - employee commitment to an organization and

R - employee retention.

Rather than a "simple" JS concept, Kim et al. (2017) use a more comprehensive concept of satisfaction, QWL, which includes work-life balance. Similarly, Celma et al. (2018) use a three-level concept which, besides JS, includes Job Stress and Trust in Management.

Although individual authors' results differ in the degree of strength of these relationships, they are not contrary to the theoretical background. This difference can be explained by the geographical, economic and industry differences and by the diversity of the population samples examined (e.g. age, gender, social status, education). E.g. Duthler and Dhanesh (2018) mention the Islamic culture that prevailed in the sample as a possible explanation for the strong positive relationship between CSR philanthropic dimension and employee behavior. Also works on employer branding are primarily focused on CSR environmental and philanthropic dimensions, which are currently seen as the main motivational factors of knowledge workers and Y generation (e.g. Cycyota & al., 2016; Puncheva-Michelotti & al., 2018). Although the content analysis shows the importance of these two CSR dimensions, the introduction of CSR philanthropic and environmental dimensions into daily life of an organization does not make the organization socially responsible. It is primarily CSR ethical and legal dimension (e.g. observing contractual term, job security, not abusing a strong labor market position) that presents pitfalls for many organizations in business practice. Carroll (1991, 2015) who came to similar conclusions, proposes the introduction of ethical management as a solution for organizations (1991, 2015).

Based on the knowledge of the relationship between individual CSR dimensions and employee's target behavior, R, it is necessary to manage employee motivation through CSR aspects or attributes purposefully (through in-depth knowledge of employees and continuous monitoring of their changing needs) and comprehensively by human resources management, internal marketing and employer branding practices (such as regular labor market research, effective recruitment targeting, existing employee segmentation, employee development and talent management, allocation of competencies, resources as well as responsibilities, fair and transparent evaluation and remuneration system, and last but not least, two-directional symmetric communication). To ensure that all of these measures do not only represent sunk costs, their compatibility with other applicable principles within an organization, such as organizational structure, strategy, leadership, corporate culture and numerical flexibility of an organization, is a must.

Unfortunately the studies mainly focus on micro-level factors, omitting macro- or multi-level factors, which is hindering the full understanding of the CSR concept in regards to employees, as one of the major stakeholders groups. Majority of analyzed papers used only one-country and one-industry based sample. Although the number of respondents always met statistical criteria, we might speculate whether the obtained results are relevant and applicable to all practitioners. The author of this paper suggests that they are, because the above summarized results also indicate the importance for managers to view each employee as an individual due to constant changes in his/her motivation factor preferences and changes in both, the micro- and macro-level environment.

6 Conclusion

Going back to the starting point of this content analysis - research questions based on Carroll's conceptual approach to different organizational stakeholder groups (Carroll, 1991:44), it is essential to highlight that the CSR and employee behavior relationship is mutually influential. Appropriate management of this causal relationship thus positively affects all relations between organization and its stakeholders, which is in line with the holistic concept of organization.

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Innovation Management in Small and Medium-sized Enterprises - Financing, Cooperation, Barriers

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Abstract: At a time of the shortening of the product life cycles, the open economy and an environment, described as hyper-competitive, it is essential that the enterprises come up with innovations. Only then they are able to stay competitive. Innovation management is rather a complex field. This paper presents the results of a pilot research mapping innovative management in small and medium-sized enterprises of different industries. The research focuses on three aspects of innovation management that influence the success of innovation management. These are financing innovation, working with external actors and barriers to implementing innovation.

Keywords: innovation management, SMEs, financing, cooperation, barriers

JEL Classification: M10, L20

1 Introduction

Innovation in the paper is based on the definition used by the European Commission: “Innovation comprise the renewal and enlargement of a range of products and services and their associated markets; the establishment of new methods of design, production, supply and distribution; the introduction of changes in management, work organisation, and working conditions and skills of the workforce.” (Národní inovační strategie, 2004).

Innovation is closely linked to management. Innovation management is a very dynamic field that is not linear and repeatable. It is open to working together, from the level of the workers, through cooperation across the departments to cooperation between different market entities and branches (Morente & Ferras, 2017).

The definition above shows that there are different types of innovation. There are also different ways of classification of innovation. In terms of the degree of change that innovation brings, Pitra (2006) lists substantial innovations (such as a new product, a new product line) and continuous innovations (such as a change in product characteristics). Tidd, Bessant and Pavitt (2007), and Ghosh, Kato and Morita (2017) classify radical and incremental innovations. Dvořák (2006) defines similar types of innovations. He distinguishes between evolutionary and revolutionary innovations, considering also the size of the investment needed, the source of the motivation for innovation and the size of risk.

However, the classification of innovation can also be viewed from a substantive point of view. E.g. Košturiak & Chal’ (2008) present product innovation, process innovation and business system innovation. Francis and Bessant (2005) introduced the concept of the 4P innovation model. According to this model, there are product, process, positional and paradigm innovations. The paper uses the classification by the Oslo manual. According to this typology, innovation is divided into product, process, organizational and marketing type (OECD & Communities, 2005).

The Oslo Manual also lists the most important factors that can act as barriers to innovation. These include economic, business and other factors (OECD & Communities, 2005). Goepel et al. (2012) notices that the sources of innovation barriers are related both to internal organizational elements of the enterprise and to individual behaviour of the persons involved in innovation. Different barriers exist for different persons involved in innovation, at the level of groups of workers and business units, at the level of the whole enterprise, at the sector level, and also at regional and national level (Karlsson & Stetler, 2015).

The SMEs face particular challenges in managing innovation. Research suggests that financial and information factors are particularly important barriers to the effective implementation of innovation in SMEs. Financial barriers consist mainly in the difficulty of obtaining the necessary amount of funds (Goffin&Mitchell, 2005). Information barriers then relate both to the managers lacking the necessary education and experience (Hausman, 2005), and to certain information isolation, as also reported by Molnár and Bernat (2006).

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The enterprises implementing innovation firms need to decide how to fund such activities. Švejda (2007) states that there are private and public sources of funding. The private sources include the own funds of the enterprise, bank loans and investments from private entities. The public sources include the possibility of state aid, regional aid and subsidies from EU funds. Hottenrott and Peters (2012) state that the primary sources of financing innovation should be the internal resources. However, it may be appropriate to use the external sources.

The assessment of innovation performance is vitally important. Bartes (2006) recommends using a variety of methods such as the BCG matrix, innovation life cycle analysis, and BalancedScorecard. A number of authors (such as Dvořák, 2006; Hauschildt, 2014; Žižlavský, 2012) recommend to evaluate different effects of innovation separately, distinguishing between technical, economic and other effects. Other authors mention that innovation is seen as an investment and hence the same financial indicators are used to evaluate it (Erner & Presse, 2010; Kislinger, 2008). Žižlavský (2012) proposes to supplement the financial indicators with non-financial indicators of the internal processes.

2 Methods

The aim of this paper is to introduce three aspects of managing the innovation projects in small and medium-sized enterprises. Specifically, it aims to answer the following questions: 1. How innovation is financed by the SMEs? 2. Do the SMEs cooperate with external actors to implement innovation? 3. What are the most important barriers to managing innovation in the SMEs? Furthermore, the paper aims to assess the importance of the way of financing innovation and the importance of cooperation with external entities in the success of innovation.

Two working hypotheses are formulated:

H1: The enterprises using a combination of internal and external sources of innovation funding are more successful in innovation management than the enterprises using only their own resources.

H2: The enterprises working together with third parties to implement innovation are more successful in innovation management than the enterprises that do not work together with anyone.

The results in this paper are based on data obtained in the pilot research on SME innovation management. The data come from a questionnaire survey in which 31 small and medium-sized enterprises from various fields participated. Table 1 shows the distribution of the enterprises in the sample based on the number of employees.

Table 1 Sample

Number of employees	Number of enterprises in the sample
4-24	10
25-100	9
101-249	12

Source: Own processing

The questionnaire survey was carried out in March and April 2019. The questionnaires were distributed to the enterprises by the EF students of Change Management. The questionnaire contained a total of 67 questions, of which 59 were closed and eight were open. For the purposes of this paper, 21 specific questions focused on issues of financing, cooperation and barriers were used. The data were processed in MS Excel. The R programming environment was used for testing statistical hypotheses.

The hypotheses were tested using Welch's T-test of unequal variance. It is an adaptation of Student's T-test, used when there are two samples of different size and unequal variances. The test criterion value is based on the following formula (Welch, 1947):

$$t = \frac{\mu_1 - \mu_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}} \quad (1)$$

3 Results of the research

3.1 Financing of innovation projects

The Innovation Financing section examined how many percent of their turnover businesses invest in innovation, whether this ratio changes, whether they use external funding, what resources these are, and how much they make up in total innovation spending.

In average, the SMEs in our research sample invest 10% of their turnover in innovation activities. The percentage of invested turnover in the sample varies significantly - from 0.5% to 60%. There are 17 companies, i.e. more than half of the sample, reporting that their investment in innovation is regularly increasing; 13 companies reported that the amount of investment in innovation projects remained unchanged, and only one enterprise said that these investments were declining.

Approximately 60% of the sample enterprises finance their innovation activities from their own resources only. Other enterprises use a combination of their own and external resources. Most often, the SMEs use bank loans from external sources. A quarter of the enterprises using foreign sources for financing then use subsidies from the EU funds and state support. A complete overview of the financing of innovation projects is shown in Table 2.

Table 2 Financing of innovation projects

Resource of financing	Number of enterprises	Relative frequency
Their own only	19	61.3 %
Bank loans	10	32.3 %
Subsidies from EU funds	4	12.9 %
State aid (TAČR, MIT CZ)	3	9.7 %
Non-bank loans	2	6.5 %

Source: Own processing

Hypothesis 1 is focused on financing:

H1: The enterprises using a combination of internal and external sources of innovation funding are more successful in innovation management than the enterprises using only their own resources.

To test this hypothesis, two groups of enterprises were selected from the sample. Group A contained all enterprises that used a combination of own and external resources (n = 12). Group B included the enterprises using only their own sources of financing (n = 19). These groups were tested to match the mean values for the question “*How many percent of the total number of innovative ideas in your enterprise were successfully implemented?*” The test results are shown in Table 3.

Table 3 Testing of H1 hypothesis

Expected value A	Expected value B	Test criterion	Degree of freedom	P-value
58.33 %	37.11 %	2.0634	25.728	0.02465

Source: Own processing

As revealed by Table 3, the average value of Group A is more than 20 percentage points higher than that of Group B. In other words, the enterprises, using a combination of their own and external sources to finance innovative projects, successfully complete about one-fifth innovative projects more than the enterprises using only their own resources.

In accordance with the above mentioned H1, the null and alternative hypotheses are formulated in the following way:

$$H_0: \mu_A = \mu_B$$

$$H_A: \mu_A > \mu_B$$

Conclusion: Based on the data presented in Table 3, at the level of significance $\alpha = 0.05$, null hypothesis is rejected in favour of the alternative hypothesis.

Based on data from the sample, it is shown that the enterprises using a combination of external and internal sources of financing are more successful in the ratio of successfully completed innovations than the enterprises using only their own financing.

3.2 Cooperation with external entities

The results of the questionnaire survey showed that a quarter of the SMEs in our research sample do not cooperate with other entities in the management of innovation projects. On the other hand, 80% of the enterprises cooperating with external entities cooperate with at least two partners. In most cases, the enterprises cooperate in their innovation activities with their clients (65%), suppliers (52%) and other enterprises in the group of enterprises (52%). Cooperation with universities, other businesses and consultants is reported to a lesser extent. A complete overview of the entities which the SMEs cooperate with is shown by Table 4.

Table 4 Cooperation with external entities

Co-operator	Number of enterprises	Relative frequency
They do not cooperate with other entities	8	25.8 %
Clients and customers	15	48.4 %
Suppliers	12	38.7 %
Other enterprises in the group	12	38.7 %
Universities / other higher education institutions	5	16.1 %
Competitive and other enterprises in the sector	5	16.1 %
Consultants, commercial laboratories or private R&D institutions	4	12.9 %

Source: Own processing

The cooperation in the management of innovation projects is addressed by hypothesis 2:

H2: The enterprises working together with third parties to implement innovation are more successful in innovation management than the enterprises that do not work together with anyone.

To test this hypothesis, two groups of enterprises were selected from the sample. Group C contained all enterprises that cooperate with external entities in implementing innovation ($n = 23$). Group D included enterprises that do not cooperate with other entities in their innovation projects ($n = 8$). In these groups, the expected values were tested for the question “How many percent of the total number of innovative ideas are successfully implemented in your enterprise?” The test results are shown in Table 5.

Table 5 Testing of H2 hypothesis

Expected value C	Expected value D	Test criterion	Degree of freedom	P-value
47.09 %	40.25 %	0.45214	9.3352	0.3307

Source: Own processing

In accordance with the above mentioned H2, the null and alternative hypotheses are formulated in the following way:

$$H_0: \mu_C = \mu_D$$

$$H_A: \mu_C > \mu_D$$

Conclusion: Based on the data presented in Table 5, at the $\alpha = 0.05$ level of significance, **is not possible** to reject the null hypothesis of the compliance of the expected values.

Therefore, statistical testing did not show that the enterprises working together with external entities are more successful in managing innovation than the enterprises that do not cooperate with anyone.

3.3 Barriers in the management of innovation

In the questionnaire survey, the enterprises were asked to assess the impact of the limiting factors on their innovation activities and on the decision not to innovate. The results show that the decision not to innovate was mostly influenced by financial factors, such as too high costs of an innovation project (45% of the enterprises reported the factor as a strong influence, 32% average influence), lack of finance in general (23% strong influence, 45% average influence). Knowledge factors were also quite significant, such as the lack of skilled workers (19% strong influence, 45% average influence) and uncertain demand for an innovated product (19% strong influence, 45% average influence).

On the other hand, the enterprises most often chose no or slight influence of the external factors. Specifically, lack of funding outside the enterprise (48% of enterprises reported no influence, 26% as slight influence), difficulty in finding partner for innovation (52% no influence, 16% slight influence), market dominated by established enterprises (32% no influence, 42% slight influence). A complete overview of the significance of the limiting factors is given in Table 6.

Table 6 Barriers in innovation

Factor	No influence	Slight influence	Average influence	Strong influence
Lack of funds in the enterprise	5	5	14	7
Lack of funds outside the enterprise	15	8	5	3
High cost of innovation project	4	3	10	14
Lack of skilled workers	4	7	14	6
Lack of technology knowledge	7	17	6	1
Lack of market information	7	13	11	0
Problems finding a partner for innovation	16	5	7	3
Uncertain demand for an innovated product	6	5	14	6
Market dominated by established enterprises	10	13	4	4
There was no need to upgrade due to previous innovations	5	9	10	7
Innovations were not required	7	15	4	5

Source: Own processing

4 Conclusion

The paper was focused on innovation management in small and medium-sized enterprises. Special attention was paid to three aspects of the innovation process. These were financing of innovation, cooperation with external subjects in innovation projects and barriers to an effective innovation process. The results show that most enterprises use their own resources only to finance innovative activities. It was also proved that the enterprises using multiple sources of funding are successfully completing a higher percentage of innovative projects than the enterprises using only their own funding. Most of the enterprises in the survey also cooperate with external actors in introducing innovation. However, on the basis of the data, it was not proved that such cooperation would lead to higher success in innovation implementation.

The data presented in this paper result from a pilot survey whose primary purpose was to test the suitability of the questionnaire. Nevertheless, this survey produced quite interesting results. Research will continue after some modifications of questionnaire. More enterprises will be approached.

Acknowledgement

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Management of Receivables and their Monitoring in the Small and Medium Sized Farms in the Slovak Republic

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Abstract: The absence of adequate financial literacy is one of the key causes responsible for weak financial performance in farm management. Definition of a financial strategy, its appropriate instruments and methods are becoming a serious problem that often leads farms into considerable financial difficulties. Insolvency of agricultural businesses is often the result of late or no payment of receivables. Trade credit provided to buyers by sellers in the form of receivables causes certain risks which can be minimized through a range of financial instruments. The most common problem in this field is that farms do not pay enough attention to receivables in the prevention phase, but later in the recovery phase. Therefore, it is necessary to implement an effective system of receivables management and its regular monitoring in agricultural businesses. Its key role is to ensure the liquidity of receivables. Appropriate receivable management protects businesses against a high proportion of overdue invoices and minimizes the number of unpaid receivables. This paper deals with the receivables management of small and medium-sized farms. Our aim is to highlight obvious problems in the area of receivables management using selected indicators of receivables performance. With the help of a questionnaire survey conducted on a sample of small and medium-sized agricultural businesses (150 farms) we investigate state of receivables management in the praxis. Subsequently, based on the acquired theoretical and practical knowledge, we propose recommendations for effective receivables management and monitoring of receivables.

Keywords: management, receivables, small and medium sized farms, unpaid receivables

JEL Classification: M21, Q14

1 Introduction

Agricultural holdings are facing extensive pressure of competition in the market economy. As a result of this competition, these businesses are looking for new approaches to improve internal processes intended for a continuous response to emerging situations (Pataky, 2003). Vozárová and Kravčáková (2016) state that many scientific studies focus on the analysis of the economic performance of enterprises operating in the field of agriculture. According to these studies, not only natural conditions, the concentration of agricultural land, legal form of enterprise, but also individual work of specific companies' management is a determinant of agricultural holdings performance and efficiency. The analysis of methods and tools being applied, as well as the formation of the conceptual basis for financial management, is the first step on the way to the enhancement of financial management efficiency. Problems are often associated with the necessity to combine individual elements of financial management into a unified, well-adjusted system and to coordinate its functioning. Therefore, there is a growing need for the development of the financial management system that would be directly linked to the strategic goals of the company (Savina, Kuzmina-Merlino, 2015).

Cifranič (2006) adds that the elementary role of financial controlling is monitoring of the financial situation at the company at every moment. The most important part of the financial controlling is monitoring of receivables. The actual

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amount of receivables directly affects the ability of the company to pay its liabilities because the increasing level of receivables and the concurrent increase in revenues decreases the amount of disposable funds. Money is held by business partners and this fact then often leads to insolvency. Suhányiová, Suhányi, Mokrišová and Horváthová (2015) have the same opinion and describe in more detail, that a longer-term issue of the business environment is the delayed payment of invoices by the customer. The company must buy materials, pay employees wages, pay contributions to insurers, pay value-added tax on goods and services supplied and also pay income tax by the deadlines provided by law, while the income from sales of supplied goods and services is delayed. This makes it difficult to undertake the financial situation of these companies. In the end, this situation described may lead to secondary insolvency. The basic financial purpose of any enterprise is the maximization of its value. Management of trade credit should also contribute to the realization of this fundamental aim. An increase in the level of accounts receivables in a firm increases both net working capital and the costs of holding and managing accounts receivables. The decision to the trade credit terms is a compromise between limiting the risk of allowing for the payment postponement from unreliable purchasers and gaining new customers by the way of a more liberal enterprise trade credit policy. This decision shapes the level and quality of accounts receivable. (Michalski, 2010)

We focus on the evaluation of management of receivables and their monitoring in the small and medium-sized farms. Bondareva and Zatrochová (2014) claim, that in every country, the stable and successful market economy is based on the segment of the business sphere represented by small and medium-sized enterprises (SMEs). Sedliačiková, Šantová and Foltínová (2012) add that the use of financial controlling is an opportunity for small and medium businesses to streamline financial flow, if the information is used in real-time.

2 Methods

The aim of the paper is to present the results of a research study aimed at mapping the situation in the field of monitoring and management of receivables in business entities operating in the field of agriculture in Slovakia. The research study was conducted between February 2017 and December 2017 on the basis of qualitative and quantitative research. The object of the investigation were agricultural holdings. The selection of a representative sample has been limited by the size of the holding. In the center of our attention were small and medium-sized enterprises, which hold a significant share in the agricultural sector of the Slovak Republic. Previous studies are showing that (Foltínová and Dubcová, 2010; Šebej and Foltínová, 2011; Müller, 2014) small and medium-sized enterprises, which are currently developing dynamically, have a limited impact on the market. Therefore it is very important that these companies are able to adapt quickly to changes in the environment to remain competitive. According to the latest research, the most significant barrier that prevents above mentioned companies from implementing new approaches is their fear of innovation of established methods and modernization. (Sedliačiková, Šatanová and Foltínová, 2012; Bednárová, 2008).

We assessed how agricultural holdings in Slovakia handle receivables using selected financial indicators:

$$\text{Period of collection of receivables} = \frac{\text{trade receivables}}{\text{revenue}} * 365 \quad (1)$$

$$\text{Period of repayment of liabilities} = \frac{\text{trade payables}}{\text{costs}} * 365 \quad (2)$$

$$\text{Turnover of receivables} = \frac{\text{revenue}}{\text{trade receivables}} \quad (3)$$

$$\text{Share of receivables in assets} = \frac{\text{trade receivables}}{\text{assets}} \quad (4)$$

$$\text{Productivity of receivables} = \frac{\text{average balance of receivables}}{\text{revenue}} \quad (5)$$

$$\text{Insolvency} = \frac{\text{trade payables}}{\text{trade receivables}} \quad (6)$$

Subsequently, for a deeper insight into the issue, we conducted a survey using a questionnaire. We worked with a database that was provided by the Agricultural Paying Agency. In order to achieve a higher return on the questionnaires, all agricultural subjects in the sample were contacted by telephone. In total, we addressed 582 agricultural subjects asking them to fill in the questionnaire in the electronic form. 228 of 582 entities promised to complete it. After returning and selecting questionnaires that were incorrectly filled in or sent by micro-enterprises, we accepted 150 received questionnaires from small and medium-sized farms. The return on the questionnaires was almost

26%. Our main goal was to find out how farms approach receivables management and its monitoring. The research study focused on finding answers to the following questions:

- What is the standard maturity of your invoices?
- Do you provide different maturity of your invoices according to the creditworthiness of your customers?
- Do you give your customers a discount?
- Do you monitor the status and development of receivables during the billing process?
- Do you keep records of overdue receivables?
- If so, what are the oldest overdue receivables?

Questioned respondents answering questions in the questionnaire were business managers (controllers, heads of economic departments, directors). We followed the recommendations of the European Commission 2003/361 EC of 6 May 2003, taking into account adjustments made in the year 2005, when classifying observed companies according to their size.

In order to obtain the most accurate information, we also used the technique of semi-standardized interview, which we conducted with 18 farms. We started the interview only after the evaluation of the questionnaire survey in order to supplement and clarify the obtained answers. Middle and top management managers were approached, in order to obtain reliable information directly from the source.

Table 1 Structure of the researched enterprises

Classification criteria	Enterprise category	Total	Relative
Size of business	Small business	86	57 %
	Medium-sized business	64	43 %
Legal form of business	Limited liability company	74	49 %
	Collective	54	36 %
	Joint stock company	22	15 %
Length of market presence	More than 15 years	76	51 %
	More than 5 years	55	36 %
	Less than 5 years	19	13 %
Existence of controlling	Controlling is implemented	46	31 %
	Controlling isn't implemented	104	69%

Source: own processing

3 Research results

3.1 Analysis of selected financial indicators

In our paper, we focused on selected performance indicators of receivables of agricultural primary production enterprises in Slovakia. We investigated development in these companies during years 2008-2017 (table 2).

Table 2 Selected indicators of receivables performance of agricultural primary production enterprises in Slovakia

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Period of collection of receivables	100	126	110	106	99	110	113	119	145	144
Turnover of receivables	3,638	2,900	3,323	3,458	3,705	3,317	3,240	3,062	2,518	2,539
Share of receivables on assets	0,141	0,147	0,141	0,148	0,139	0,144	0,149	0,151	0,175	0,174
Productivity of receivables	0,275	0,345	0,301	0,289	0,270	0,301	0,309	0,327	0,397	0,394
Insolvency	1,272	1,315	1,384	1,303	1,474	1,508	1,434	1,362	1,187	1,114

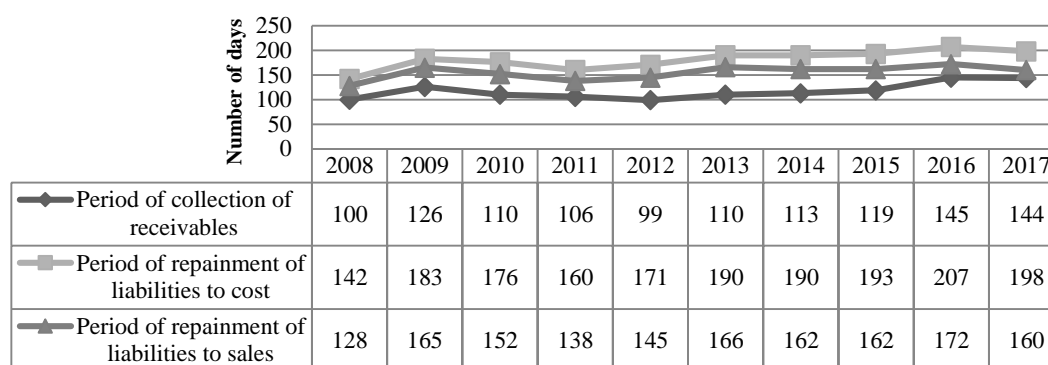
Source: Green Report, VUEPP, our processing

An important and highly appreciated indicator is the period of collection of receivables. This indicator indicates the average time for which farms grant commercial credit to their customers. While in 2008 businesses collected their receivables on average over 100 days, in 2017 it was 144 days. The development of this indicator indicates a reduced activity of enterprises. A supplementary indicator is the indicator of turnover of receivables, which expresses the number of turnovers of the average state of receivables for the reference period. The continuous decline in this indicator since 2012 is equally negative. The indicator share of receivables in assets expresses the volume of receivables of enterprises

bound in their assets. The growth in the value of this indicator in the last two observed years is not favorable and it indicates a problem with customers' ability to pay their liabilities. If the value of the indicator decreases, it is a positive signal for the company. As shown in the Tab. 2, the value of this indicator has been steadily increasing since 2012. Like other indicators examined so far, this indicator also indicates problems with receivables management in the last analyzed years. Insolvency, which refers to the debtor's inability to pay its liabilities, is divided into primary and secondary. When examining relevant data in the Tab. 2, we observed secondary insolvency in agricultural holdings. This kind of insolvency arises as a result of unpaid receivables from customers, which again raises questions about the management of receivables.

In order to maintain a favorable financial situation, it is desirable for business entities to settle their liabilities from cashed amounts in the form of claims, without having to draw interest-bearing resources. This means that the collection period should be less than the repayment period. Therefore, it is appropriate to analyze the development of this indicator with the development of the indicator of the repayment period. In the Fig. 1, we can see that in all analyzed years, primary agricultural holdings complied with this unwritten condition and collected their claims before repaying their obligations.

Figure 1 Comparison of the period of collection of receivables and the period of paying debts in years 2008-2017

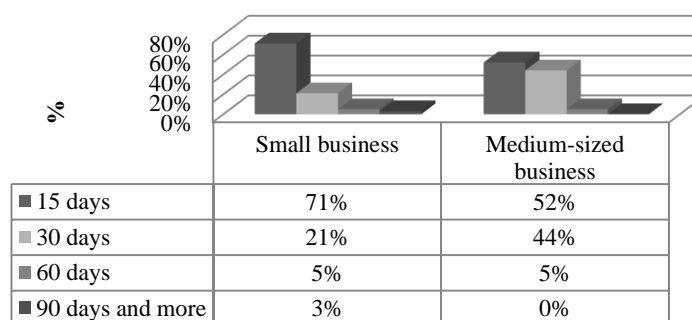


Source: Green Report, VUEPP, own processing

3.2 Evaluation of the questionnaire

Based on the analysis of selected indicators presented in the Tab. 2, we have observed that primary agricultural holdings have had obvious problems in managing receivables during investigated period of time. Therefore, we conducted a questionnaire survey on agricultural holdings. The effective conduct of this activity is a prerequisite for the existence of any undertaking. Receivables can not only be perceived as an accounting category, but mainly as an economic category. They have an impact on the property structure of the company and thus affect its liquidity. Their scope has a significant impact on the economic activity of the company. One of the important factors contributing to the effective management of receivables is paying attention to setting the payment conditions, especially the maturity of issued invoices. In general, the basic rule is that every business should collect debts first and then pay its liabilities.

Figure 2 Standard maturity of issued invoices

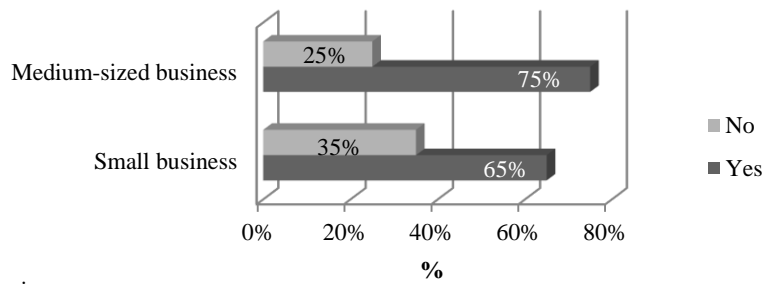


Source: own processing

The decision on the maturity of issued invoices should be a result of careful consideration. 61 (71%) of small farms have a standard maturity of issued invoices of 15 days. 18 (21%) small entities issue invoices to their customers for one month. 4 (5%) small business reported that the company they represent issues invoices to customers for two months and 3 (3%) businesses for 3 months or more. For medium-sized businesses, 33 (52%) companies issue customer invoices for a period of 15 days, 28 (44%) companies have invoice maturity set to one month and 3 (5%) companies two months.

Medium-sized enterprises do not issue receivables with a maturity of 3 months or more. This implies that medium-sized enterprises are in a better position than buyers compared to small enterprises. This is caused by better bargaining power.

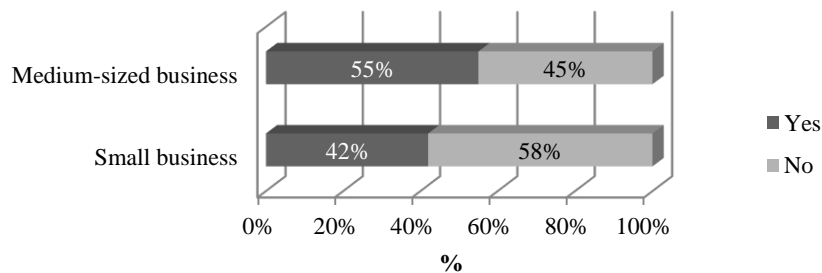
Figure 3 Different maturity of issued invoices according to the creditworthiness of customers



Source: own processing

For effective management of receivables, the most important step is to divide customers according to their creditworthiness. The next question of the questionnaire was dedicated to the question if companies provide business loans with different maturity according to the creditworthiness of customers. Our analysis showed that most, 48 (75%) medium-sized businesses set different invoice maturities for their customers. The remaining 28 (25%) businesses issue invoices to all customers equally regardless of their creditworthiness. As far as small businesses are concerned, the analysis has shown worse results because 56 (65%) small businesses provide business loans for various periods of time depending on the creditworthiness of their customers and remaining 30 (35%) businesses keep formal records of customers according to their payment discipline.

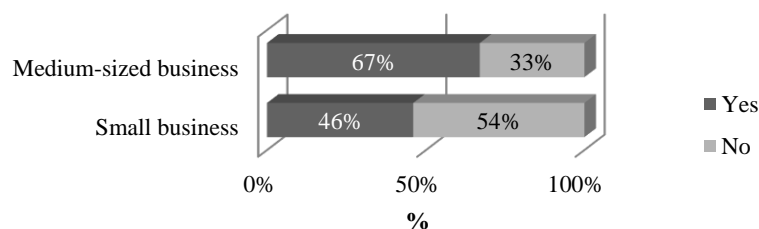
Figure 4 Tracking of receivables during billing process



Source: own processing

Effective receivable management cannot be achieved without regular monitoring of the receivables throughout the invoicing process. It is important to monitor the age structure of receivables, the structure of receivables according to the creditworthiness of customers and the development of bad debts or problematic customers. Another question in the questionnaire intended to reveal how small and medium-sized farms are interested in the development of receivables in the process of their implementation. From our questionnaire survey, we concluded that many farms are not continuously monitoring their receivables. In particular, 29 (45%) medium-sized and 50 (58%) small farms do not pay attention to this activity. From interviews with representatives of selected farms, we conclude that even those farms who stated that they are monitoring receivables do not do so on a regular basis. And even in most cases it is up to the invoice delay phase. In this respect, it is necessary for questioned companies to realize that receivables do not arise only at the stage of payment delay, but at the conclusion of the transaction, and therefore they must be in forefront of attention from the very beginning.

Figure 5 Providing a discount to customers

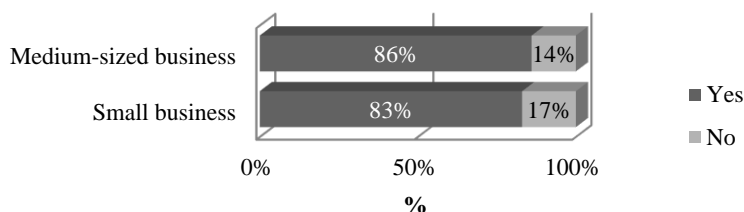


Source: own processing

Providing a discount (or so-called discount policy) can have positive and negative effects for the company, mainly related to the change in the cost of sales, which will ultimately lead to a decrease in the value of receivables collected. When deciding on the provision of a discount and its amount, it is important to investigate customer responses. It is necessary to assess each customer on a case-by-case basis and to estimate its behaviour, whether it will prefer a lower price at the expense of an earlier payment, or will rather benefit from the "commercial credit". Our analysis shows that

the discount policy, and therefore the provision of the discount, is more used by medium-sized than small businesses. While in medium-sized enterprises, the discount is applied in 67% (43 businesses) of all cases, in small enterprises its application is lower, at 46 % (40 businesses).

Figure 6 Record of everdue receivables

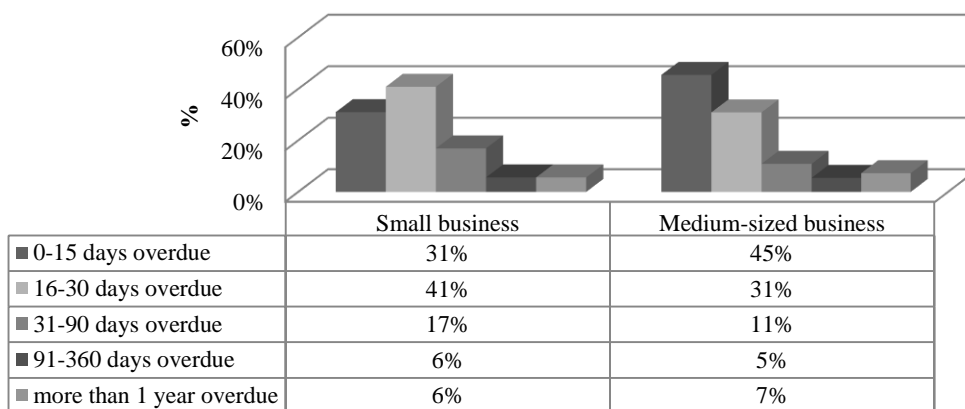


Source: own processing

A very important part of the monitoring of receivables is especially the monitoring of overdue receivables. Overdue receivables are a very important category. Their amount affects the liquidity and solvency of the business. Sometimes it can also have a liquidation effect. It is therefore necessary to monitor these receivables closely, inform company's management about their changes, and report to them. In the interview, we learned that in most cases, customers only pay their receivables after receiving a reminder. By doing so, customers seek to improve their own financial flows. In principle, businesses have two options. The first option is to send a reminder to a customer who has not paid a receivable in favour of the company's bank account, even repeatedly. The second scenario is represented by recovering of receivables by a court or passing them on to a factoring company.

Therefore, the next question we were looking for was whether farms register overdue receivables. A total of 71 (83%) of small farms register overdue receivables, while the remaining 15 (17%) do not register them. As for medium-sized farms, 55 (86%) of the medium-sized farm respondents reported that they had overdue receivables and a of 9 (14%) of questioned farms did not register them. The following question was aimed at revealing what are the most frequently recorded overdue receivables.

Figure 7 The most frequently recorded overdue receivables



Source: own processing

From the figure 7 it can be seen that most small farms, ie 29 (41%) entities, register receivables that are overdue by 16-30 days and most medium-sized farms, ie 25 (45%), monitor receivables overdue by 0-15 days. Within small enterprises, the second most recorded group are receivables that are overdue from 0-15 days (recorded by 22 or 31% of enterprises from the sample of small enterprises). The third group of the most frequently registered receivables are receivables that are overdue for 31-90 days and were experienced by 12 (17%) small enterprises. Regarding medium-sized enterprises, 17 (31%) companies of the medium-sized enterprises surveyed receivables that are overdue for more than 16-30 days and 6 (11%) receivables are overdue for 31-90 days. smallest number of unpaid receivables was experienced by examined companies in the territory of over 1 year. Shown data only confirms the responsiveness of the respondents we interviewed. They do not collect receivables from their customers within the agreed maturity dates, but in most cases with a time lag, whereby customers seek to improve their financial flows.

4 Conclusions

Small and medium-sized enterprises have to fight the ever-increasing competition on the market and therefore it is essential that they manage their economy as efficiently as possible and try to reduce their costs (Foltínová and Dubcová, 2010).

Receivables are an important component of assets that needs to be given due consideration. Their amount and the rate of repayment fundamentally affect the liquidity of the company. Our research concluded that in recent years the level of receivables in agricultural holdings has increased. This fact translated in the problematic development of receivables performance indicators. A questionnaire survey conducted on a sample of 150 small and medium-sized enterprises, supplemented by a semi-standardized interview, brought us closer to the situation in the area of receivables management in the agricultural sector. One of the most significant shortcomings in this area that we have realized is that most farms do not monitor the status of their receivables during the billing process, but start to address them only when the payment is delayed or not paid. This is one of the reasons why there are unpaid receivables. A similar conclusion was reached by Sedliačiková and Volčko (2012), who examined the controlling of receivables in the selected company. They state that the monitoring of receivables is very irregular and that the company focuses on the receivables mainly at the recovery stage and not at the prevention stage. In order to anticipate overdue receivables, one employee should be in charge of the management of the receivables from their inception to extinction. The questionnaire survey showed that many farms do not set different maturity of invoices based on the creditworthiness of their customers. In order to reduce the risk of bad debts, farms should maintain a detailed database of their customers with their payment discipline so that they can assess the customer's creditworthiness. The customer rating is used to assess the risk of insolvency. Based on this, customers should be divided into several groups and, depending on the risk of insolvency, different payment conditions for individual groups should be established. In addition to the aforementioned receivables, an integral part of the receivables management is the revision of the contractual conditions under which invoices are issued, the provision of a discount on the price before the due date, or the decision to change the due date. These decisions need to be treated sensitively, as Chodasová, Jacková and Tekulová (2014) emphasize that aggressive maturities of receivables reduce market competitiveness.

Our research suggests that medium-sized businesses have better bargaining abilities than small enterprise. This is as a result of their market position. Overdue receivables are a category that can significantly affect the company's solvency and overall financial position. Therefore, we consider further research in this area would be beneficial.

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The Decision Cause-Matrix - A tool to increase efficiency in the corporate communications of SMEs with a geographically limited business area

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Abstract: Companies today have to survive in a market environment that is increasingly characterised by complexity, dynamism and competition. These are the consequences of globalisation, which ultimately leads to increasing competitive pressure. This growing pressure is particularly true for small and medium-sized enterprises (SMEs). They are exposed to the risk of being driven out of the market by large companies. SME are therefore faced with the challenge of increasing their competitiveness to stand their ground against large competitors.

Marketing communication plays a key role here. Because without successfully addressing customers, it is not possible to generate vital sales. As a result of technical progress, corporate communication has a constantly growing range of instruments at its disposal. However, human and financial resources limit the use of possible communication channels. For SMEs, the necessity develops from it to provide a communication mix corresponding to their possibilities. The more efficiently this can be arranged, the larger is the contribution of the enterprise communication to the competitive ability of the enterprise.

This paper shows that the Decision Causes Matrix is a suitable tool for identifying efficient communication channels. It is a further development of the Problem Causes Matrix, which is part of process management. When evaluating communication channels using the Decision Causes Matrix, the effect of a channel on the formation of the opinion of a target group is taken into account. At the same time, the factors of cost, personnel expenditure and wastage that must also be considered for the aspect of efficiency are taken into consideration. This consideration allows the creation of a communication mix optimally adapted to SMEs with a regionally limited business area

Keywords: SME, communication mix, competition, customer relationship, CRM

JEL Classification: M31, M37, L11

1 Introduction

Marketing communication is subject to a strong change. In 2020, Volkswagen AG will spend almost 50 per cent of its media budget on digital communication channels. In 2015, this share was still 25 per cent. At the same time, the expectation of greater efficiency is linked to the reallocation. The aim is to increase marketing efficiency by 30 per cent. This goal is to be achieved even though the use of new communication channels requires around five times more campaign elements than before. (Volkswagen AG, 2018) Global corporations can streamline their processes to achieve such effects. At Volkswagen, for example, this is to be achieved by using only three agencies instead of 40 worldwide.

On the one hand, this will optimise the process, as there will be far fewer interfaces than before. On the other hand, there will be valuable synergy effects because the material can be used in different places. Both saves additional production costs. Volkswagen's approach at this point is exemplary for the current implementation of marketing communication. Currently, companies of different sizes use different communication models. The aim is to achieve an efficient customer approach through a suitable combination of different communication channels - i.e. the communication mix. Existing approaches are based on the model of the average customer. This average customer is modelled individually by companies and industries. As a rule, however, the database does not take into account any regional deviations in the behaviour of the recipients. However, it shows that customers in different geographical regions show different behaviours.

However, it is inconceivable for SMEs to use additional communication channels by simply shifting them to cost-neutral channels. There are no comparable budgets with hidden reserves. It is not to be expected that all possibilities can be used parallel without additional costs. Postler (2018) sees SMEs, therefore before the challenge to examine communication channels for their efficiency and to set priorities. (Postler, 2018)

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Concerning resource theory; however, it can be assumed that a more efficient design of marketing communication can even become a competitive advantage for SMEs with a regionally limited business area. Then namely, if by consideration of regional characteristics, a fitting customer speech becomes possible. A fitting customer speech could be realized with smaller Streuverlust in comparison to supraregional communication campaigns.

1.1 Definition SME

The Institut für Mittelstand Bonn (IfM) defines a company as medium-sized if at least 50 per cent of the company shares and the management of the company are in the hands of a maximum of two owner families. (Wolter, 2001) A doing like this is an attempt at a definition that can be applied to all sectors. However, Welter (2015) criticises that this definition does not take into account the diversity of SMEs. (Welter et al., 2015, p. 1) German SMEs are a heterogeneous group with special structural and procedural characteristics. (Icks, 2018) In addition to the economic side, the topic of small and medium-sized enterprises also has another facet. This point of view refers to the social contribution of a company or the entrepreneurial family behind it. (Becker & Ulrich, 2011) These diverging aspects are taken into account by a large number of definition approaches. Already in 1991, Kosminder registered more than 200 approaches for the description of medium-sized businesses. (Kosminder, 1991) Against this background, the idea of an appropriate definition has prevailed in individual cases over a generally valid definition. (Becker & Ulrich, 2011) Both qualitative and quantitative criteria are taken into account in practice and in scientific discourse. (Botzkowki, 2017, p. 39) Against this background, the present research work is oriented towards the definition of the European Union. An SME is a company with fewer than 250 employees and an annual turnover of a maximum of 50 million euros. Also, the business area is taken into account. An SME in the sense of this research work only operates in a geographically defined business area. The idea of a Europe of regions applies. Against this background, nationally active companies are not considered either.

1.2 Definition market climate

SMEs with a geographically limited business area are facing increasing competitive pressure. A development that can now be observed across all industries. (Škodová Parmová, Lišková & Kain, 2018) In their traditional market, SMEs, in particular, are being put under pressure by large companies. (Peters & Nauroth, 2019, p. 35) This is due to the economic and social environment in which companies operate today. This particularly strong competitive pressure is increasingly characterised by complexity, dynamism and ultimately competition. (Škodová Parmová, Lišková, Sdrolas & Kain, 2017) Small and medium-sized enterprises, in particular, run the risk of being forced out of the market by large enterprises. (North, 2007) Technological progress is having an impact here. Thanks to short distances and personal relationships, SME has so far been able to offer more individual solutions than large companies. In both the B2B and B2C sectors, however, national and international groups are now also achieving corresponding levels of service. (Peters & Nauroth, 2019) In addition to the growing number of competitors, demand is increasingly demanding. Here SMEs are faced with increasingly complex customer expectations. (Moeuf et al., 2019) This customer expectation ranges from faster reaction times to the complete transfer of product and process responsibility to suppliers. (Dust & Wilde, 2017, p. 37)

As Gunduz & Yetisir (2018), Neacșu (2017, p. 108), Moise (2015, p. 332) and Rau (2013, p. 92) agree with Porter (1999, p. 165), small and medium-sized enterprises are thus facing the challenge of optimising their processes and increasing their own competitiveness. (Eber, Hillebrand, Messner & Meyer-Stamer, 1990; Škodová Parmová et al., 2018)

2 Definition process management

Recent studies show that the topic of process management currently enjoys a high status in companies and organisations. (Komus, Gadatsch & Mendling, 2016, p. 27; Brucker-Kley, Kykalová & Keller, 2018; Harmon, 2018) This status increment is the result of a change in the structuring of companies. Wagner & Patzak (2015) define process management against this background as a sequence of coordinated activities to manage and steer the processes of a company. Process management comprises four phases. The first step is to develop or plan the process conceptually. Obvious improvement potentials should already be considered. The second phase comprises the implementation of the planned process. In this implementation phase, the process should be implemented quickly using the simplest possible means. The goal is to receive timely feedback. The third phase includes the measurement and verification of the process carried out. The final phase is the improvement phase. At this stage, optimisation potential derived from the measurement results is systematically incorporated into further planning.

2.1 Evaluation of process efficiency

Continuous performance measurement and transparency are the basis for lasting success. That applies to management in general as well as to process efficiency in particular. (Jobst, Coenen & Wangerin, 2015, p. 375) The mere existence of metrics and their measurement alone can lead to significant improvements, as they sharpen the awareness of those in-

volved. (Dukart, 2017) At the same time, empirical evidence has shown that many companies still have significant potential for increasing efficiency. And this although they have already implemented comprehensive process management. (Heimel, 2014, p. 43) In principle, two types of indicators can be identified. These are the financial performance indicators on the one hand, and the operational performance indicators on the other.

When assessing processes, one speaks of effectiveness on the one hand and efficiency on the other. There are numerous definitions for both terms. Some even use both terms synonymously. (Sauerwald, 2007; Sill, 2009) Not without good reason. After all, both terms aim at success research. At the same time, however, some differences need to be appreciated. Effectiveness thus focuses on the effectiveness of measures. Thus, the degree to which defined goals are achieved is described. Efficiency goes beyond this aspect. In addition to the degree of target achievement, the necessary effort is also taken into account here. Efficiency is thus an expression of the profitability of a process. (Wöhe, Döring & Brösel, 2016; Thompson, 2005; Simon, 1957) Against this background, process efficiency can be regarded as given if a defined goal can be achieved with the least possible effort.

In addition, process efficiency can be determined for a company as a whole. Liebert (2012) sees process efficiency as given here if the design of the organisation optimally supports the processes for achieving the primary corporate goals. This achievement is the case when it is possible to bring products or services to market in the shortest possible time with the least possible redundancy. (Liebert, 2012, p. 53) Consequently, a company acts efficiently if it uses the right means to achieve the desired goal. Efficient action, therefore, means acting according to economic principles. (Vahs, 2019, p. 14; Becker, 2019) Efficiency can be assessed utilizing indicators.

2.2 Criteria for process evaluation

Performance metrics are used to record and evaluate the effectiveness and efficiency of operating procedures. They also have the task of showing the effect of changes in performance on the economic result. The effectiveness criterion focuses on the usefulness, fulfilment of purpose or effectiveness of an activity. (Atzert, 2011, p. 38) According to Dyckhoff & Ahn (2015), an activity is considered effective concerning certain purposes if it causes a change of state that can fulfil these purposes. In distinction to this, efficiency is given if, in relation to a certain subset of the relevant objectives and alternative activities, if it brings about a change of state which, when choosing another alternative from the subset, does not permit an improvement in relation to any of the objectives selected in the individual case, without at the same time leading to a deterioration in relation to another of the selected objectives. (Dyckhoff & Ahn, 2015, p. 519) Kuhn & Winz (1999, p. 20) emphasise that due to these comprehensive requirements for performance parameters, a uniform and one-dimensional recording and evaluation of the different business processes within a company does not make sense. Instead, process-specific management variables must be defined.

There are numerous criteria in the literature that can be attributed to the influence of the performance of processes. (Ley, Jurisch, Wolf, & Krcmar, 2012, p. 4) These can be categorized according to their characteristics as time criteria, cost criteria and quality criteria. (Liman & Reijers, 2007; Münstermann & Weitzel, 2010) The classification of processes results in further criteria that influence the efficiency of processes. (Lillrank, 2003) Ley, Jurisch, Wolf & Krcmar (2012, p. 4) classify them into seven categories: time, costs, quality, capacity, flexibility, integration and complexity.

2.3 Problem-causes-matrix

The Problem Cause Matrix is used to determine and map the relationship between problems and possible causes. In the Problem Causes Matrix, the problems or causes are noted in the rows and columns. Then it is determined between which problems and causes a connection exists. Also, the strength of the connection is represented utilizing a numerical scale. Similar to the influence matrix, this must also be created before the matrix itself is created. The final summation shows where great influence is present. Their improvement potential can be assumed. On the other hand, a small value for influenceability shows that the cause of a problem has not yet been identified. (Horatzek, 2019a, p. 109)

2.4 Decision-cause-matrix

The Problem Cause Matrix allows you to identify the causes that have the greatest influence on existing problems. The basis of working with a Problem Causes Matrix is an evaluation key. This key indicates how large the influence of a cause is on a problem. (Horatzek, 2019b) This concept can be modified to evaluate the influence of a communication channel on the formation of the opinion of a target group. In the cause-and-effect matrix, each column represents an identified problem. In the Decision Cause Matrix, each column represents a specific target group. In the Problem Causes Matrix, each row represents a specific cause.

Similarly, each row in the Decision Cause Matrix shows a specific communication channel. The sum of a row is then subtracted in the column on the far right. In this way, you can see which communication channel has which influence. In

the bottom row, the values of each column are summed up. In this way, it is possible to identify which target group can be influenced to what extent.

With a problem-cause-matrix, the evaluation can take place according to an evaluation key specified by the user. (Horatzek, 2019b) However, this is not absolutely necessary. According to Schmidt (2009), the mere recording of content is sufficient to associate causes with deficiencies that had previously not been thought of at all. (Schmidt, 2009) Bach, Brehm, Buchholz & Petry (2017, p. 355), however, see the necessity of a qualitative, content-related discussion that goes far beyond this, especially in the analysis of communication media. Against this background, a self-chosen evaluation key is not sufficient to evaluate the efficiency of communication channels that can be used by SME.

Instead, existing studies can be used. These prove the general effectiveness of communication channels in customer communication. For example, the communication study "Best Service" by the German Institute for Service Quality (2017), the study on the effectiveness of customer service via social media by EBS Business School (Gräßler & Schäfers, 2013), the "long-term study on media trust" by Johannes Gutenberg University Mainz (Schemer et al., 2018) or the weighting study on the relevance of media for opinion formation in Germany (Kantar TNS, 2019) can be used.

The communication channel with the greatest influence on a target group receives the most points (Pmax). The maximum number of points results from the number of communication channels considered. The channel with the least influence receives only one point.

Table 7 Decision-cause-matrix

Influence of \ Influence to	Targetgroup 1	Targetgroup 2	Targetgroup 3	Impact strength
Communications Channel 1	3	3	1	7
Communications Channel 2	2	2	2	6
Communications Channel 3	1	1	3	5
Suggestibility	6	6	6	

Source: own representation

In principle, it should be noted that the value determined by the Decision Cause Matrix is not synonymous with a high or low degree of efficiency. When assessing efficiency, it is also necessary to consider personnel and financial expenses. For example, the most effective communication channel can be inefficient if it involves high costs. High scattering losses can also harm efficiency. These arise when a communication channel achieves a high reach - but largely meets recipients who are out of the question as customers.

2.5 Enrichment of efficiency factors

Against this background, it is necessary to supplement the Decision Cause Matrix with the costs of the factors (Kx), personnel intensity (PIx) and scatter loss (Sx). For evaluation, the author introduces a three-level evaluation key analogous to Horatzek (2019). This key is divided into the three selectable categories "high", "moderate" and "low". The classification of the communication channels according to this key is based on generally accepted empirical values. The category "low" is assigned a factor of 2, "moderate" a factor of 1 and the attribute "high" a factor of 0.5. The values determined by the customer survey are now multiplied one after the other by the three factors. Only the final score is included in the decision cause-matrix - which can reflect both the strength of influence and the efficiency of a channel.

Kantar TNS (2018), for example, found that the Internet is the most important of five communication channels among people aged 14 to 29. (Kantar TNS, 2019) At the same time, Internet advertising can be played out regionally and according to socio-demographic aspects. Compared to other communication channels, this ensures very low dispersion losses. At the same time, regional platforms can already be used sensibly with a small budget. (Praschma, 2019) The result is that the Internet communication channel in the target group of 14 to 29-year-olds has the attribute "low" for all three efficiency factors. The key figure of the decision-cause-matrix is calculated as follows:

$$Impact\ strength = P_{max} * K_x * PI_x * S_x$$

$$Impact\ strength = 5 * 2 * 2 * 2 = 40$$

In addition, it is also possible to add an availability factor (VX). This factor can be 1 for "available" or 0 for "not available". In this way, regional characteristics that differ from the general media landscape can also be taken into account. The formula for calculating the influence strength is then as follows:

$$\text{Impact strength} = P_{max} * K_x * PI_x * S_x * V_x$$

If a provider were to operate exclusively in a strongly rural region in which the Internet is not yet available, the formula for the prime example would have to be as follows:

$$\text{Impact strength} = 5 * 2 * 2 * 2 * 0 = 0$$

3 Discussion

The present work shows that SMEs faces great challenges. These result from increasing competitive pressure. At the same time, companies face consumers who are well informed and demand transparency. This development places increasing demands on corporate communications. That is increasingly demanded another reason. Due to technical progress, a constantly growing number of communication channels is available for marketing communication. If all these channels were to be used, communication budgets and staffing levels would have to be constantly expanded. This expanding is not feasible for economic reasons. After all, the costs for this would have to be passed on to the product. However, due to declining economic growth with constant production capacities, most suppliers are now operating in-demand markets. Knowing their market power, they will generally not accept price increases and change supplier. (Leimeister, 2012, p. 151)

3.1 Conclusion

In summary, it can be assumed that more efficient design of marketing communication can become a competitive advantage for SMEs with a regionally limited business area. This assumes when the communication process can be designed particularly efficiently by taking regional particularities into account.

Ley, Jurisch, Wolf & Krcmar (2012) state, however that there is no generally valid procedure for the determination of process efficiency. Rather, criteria are defined and applied inconsistently. (Ley et al., 2012, p. 10) A comparison of the approach of Harrington (1991) with Yen (2009) should be mentioned here as an example. In practice, this leads to numerous companies anchoring process objectives in their target agreements. At the same time, however, process monitoring is not included in regular controlling. (Fink, 2003, p. 47) Müller (2011) agrees that business process management is still in its infancy in the majority of companies. (Müller, 2011, p. 10) In general, there is a consensus that the efficiency of processes will become significantly more important. This consensus is because aspects such as an increase in quality or a reduction in costs make it possible to achieve strategic corporate goals (Müller, 2011, p. 17) and can thus lead to a competitive advantage. However, a distinction must be made between efficiency and effectiveness. In the long term, only efficient processes can give companies a lasting advantage. Effective but uneconomical processes, on the other hand, cannot contribute to securing the long-term success of a company. In control, it is therefore important to anchor performance targets that are aimed at efficiency.

To ensure efficient process management, internal metrics, so-called key performance indicators, must be defined. These allow the process to be viewed for the company. This view can be achieved with a manageable effort when planning the marketing communication mix by using the decision-origin matrix. Another advantage of this concept is its simplicity. Even entrepreneurs with little business experience can interpret the results of the matrix easily and without errors. However, the significance is strongly dependent on the extent to which regionally specific data material can be used.

3.2 The implication for further research

The research shows that a communication mix perfected concerning regional conditions could be developed into a competitive advantage for SMEs. To this end, it is necessary to align the marketing communication mix as closely as possible with the target groups of SMEs in geographically defined business areas. The core of the consideration utilising decision cause matrix is the medium use behaviour. If this aspect is fed only from nationally or globally collected secondary data, the possibility of generating a competitive advantage from the knowledge decreases. It is more appropriate to conduct an empirical study of media usage behaviour for the desired market. A study like this can be the subject of further research.

A prerequisite for the meaningfulness of such a project is that regional media consumption deviates significantly from that of an average recipient. The literature research provides clear indications for this. It proves that different recipients have different preferences. These different preferences suggest that not one communication concept can be optimal for everyone. Against this background, the hypothesis that media consumption in different regions shows significant differences seems justified. Whether it can be accepted or rejected must also be clarified within the framework of further empirical research projects.

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Effectiveness of working meetings in relation to time management

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Abstract: Work meetings are one of the basic tools of communication, decision-making at all levels of company management. The aim of the paper is to evaluate the effectiveness of work meetings as an attribute significantly affecting time management. The analysis was carried out based on the responses of managers of small and medium-sized food businesses in Slovakia with regard to their gender, age, level of management and the number of years of service in the company. In the questionnaire, respondents expressed the degree of agreement or disagreement on the 5-degree Likert scale. The survey was conducted between September 2018 and August 2019 on a sample of 286 respondents. The obtained data were processed and evaluated by SAS Enterprise Guide 7.1. We have used the mathematical-statistical methods Kruskal-Wallis test and Spearman test to investigate dependencies between variables. As we found out, business managers were mostly satisfied with the preparation of the meeting and adherence to its schedule. Indefinitely, they commented on the active involvement of all participants in the topic of the meeting. The efficiency of the meeting was evaluated as average, which was related to the proposal of respondents to use other methods of decision-making and discussion instead of working meetings. On the basis of the above, we conclude that the effectiveness of the work meetings in relation to time management can only be ensured if the objectives are set in advance, the timetable is observed and the participants are actively involved.

Keywords: work meetings, effectiveness, time management, management, small and medium enterprises

JEL Classification: M12, M50

1 Introduction

Work consultation is one of the basic forms of company decision-making and management. The workshop provides incentives to solve more complicated tasks and problems, so conscientious preparation is required before each meeting. A great deal of information is exchanged at the work meeting, so communication within the company is one of the most important and essential activities between managers and employees. The aim of the paper is to evaluate the effectiveness of work meetings as an attribute significantly affecting time management.

Despite different definitions, it is important for managers to realize that time is a unique resource, cannot be stored, consumed immediately, is irreplaceable and has no substitute. Time is not influenced by demand; it has no price curve or marginal utility curve. Above all, in modern working life there is always a lack of time, so time is always missing. (Tumbull, 2004)

Time management is mainly based on analysis and planning. For understanding and applying the principles of time management, it is important not only to know how to use time correctly, but also what problems we can encounter, what causes them and how to face them. Based on such knowledge, it is then possible to improve its efficiency and effectiveness through time management. (Haynes, 2009, p. 9) The effectiveness of a manager's work is influenced by numerous factors, methods and tools which are applied at the realization of managerial tasks. (Juríčková et al., 2018)

Work meetings can be characterized as a meeting of several competent people involved, organized to fulfill a coherent task and to achieve a predetermined goal (Šajbidorová, 2008). Meetings are common practice in most organizations to provide the means to make decisions and set goals, plan work, solve problems and disseminate information (McComas et al., 2007).

Several expert studies have found that teams spend more time on meetings than is acceptable. Some papers report that up to 50% of their working time. Furthermore, the meetings are not very popular and many participants even consider them to be one of the factors of waste of working time. The consultation will fulfill its purpose if its predetermined

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program is met at the required quality level. For this to happen, rules for planning, organizing, conducting and evaluating meetings must be followed. (Porvazník, 2007, p. 211)

While some meetings are highly productive and appreciated by participants, a significant number of them are not considered productive (Schell, 2010). In fact, meetings are seen as a source of inefficiency and underutilization of time (McManus, 2006). In terms of employee wages, the inefficiency of organizing time spent on unproductive / unnecessary meetings is a loss, while increasing opportunity and efficiency costs (ie, the inability of employees to participate in more productive activities) and potential organizational costs such as reduced morale (Rogelberg et al., 2012).

Working meetings can be considered as a suitable method of forming employees' working abilities. The benefits are exchange of experience, presentation of opinions and taking a position on work problems. One of the disadvantages is the problem of appointment of the working meeting, because calling it during working hours shortens the time for performing tasks. Arranging working meetings outside working hours is confronted by the unwillingness of employees to attend. (Křížek, & Neufus, 2014)

Participants recall meetings as successful based on whether or not the meeting contributes to their own learning and development. Learning was not only important to participants as an outcome, but the factors that enabled or inhibited participant learning also contributed to participants' perspectives. Attendees recalled meetings as successful when they were characterized by a learning environment of psychological safety, input from all stakeholders, and leadership that promoted participant learning. On the other hand, participants recalled meetings as unsuccessful when they were characterized by fear, a lack of necessary data, and poor organization, all of which hinder participant learning (Romney, Smith, Okhuysen, 2019).

1 Methods

The research was realized through the questionnaire, which was based on the 5-degree Likert scale, where the respondents expressed the degree of their agreement or disagreement with the particular statement. The respondent can answer individual statements using a five-point scale where 1 represents "definitely disagree" and 5 presents "definitely agree". Thanks to the application of Likert scale we get the respondent's agreement with the given statement. However, this scale allows us to identify not only the content of the attitude but also its approximate strength. (Horská et al., 2011, p. 86-87)

The research was realized from September 2018 to August 2019. Respondents were business managers from agro-food companies, which operate in the Slovak Republic. We have created the questionnaire based on the "How do you handle your time" test by Godefroy, Ch. H and Clark, J. Inspired by this test, we have expanded response options, and then we have also added some questions.

286 respondents from agro-food companies, which operates in the Slovak Republic participated in the research. Data processing was performed using statistical program SAS Enterprise Guide 7.1. The statistical relations and correlations between variables were performed using Spearman's test and Kruskal-Wallis' test.

The Kruskal-Wallis test represents a nonparametric form of single-factor analysis of variance to compare two or more independent samples. This test can be used to investigate the significance of differences in the mean values of independent files. (Markechová et al., 2011, p. 321-323) Correlation analysis is a statistical procedure that describes the relationship between numeric variables (Benda-Prokeinová, 2014, p. 175-176). The most commonly used sequence correlation coefficient is the Spearman coefficient. It can be calculated from the formula for calculating the Pearson coefficient, but their serial numbers are used instead of the original values. (Rimarčík, 2007, p. 69-70) Interpretation of Spearman correlation coefficient values was based on interpretation according to De Vaus (2002).

Table 8 Interpretation of correlation coefficient values

Correlation value	Dependence interpretation
0.01 – 0.09	Trivial or none
0.10 – 0.29	Low to medium
0.30 – 0.49	Medium to essential
0.50 – 0.69	Essential to very strong
0.70 – 0.89	Very strong
0.90 – 0.99	Almost perfect

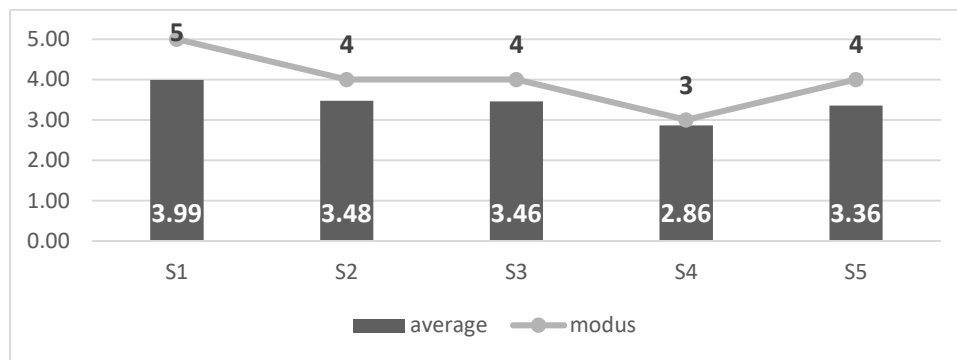
Source: De Vaus, 2002

2 Research results

A total of 286 respondents were involved in the questionnaire survey, of which 134 were men (46.8%) and 152 were women (53.2%). The largest group of managers was 38.3% at the age of 26-35 years and the second largest group of 27.1% was at the age of 36-45 years. They were followed by managers aged 46-55 (15.9%), up to 25 years (11.2%), 55-65 years (6.5%) and the least represented in the research sample were managers over 65 years. As we expected, managers at the lowest managerial level had the largest share of research, 42%. Middle management is represented by 31.8% and top management 26.2%. The structure of the research sample of managers according to the duration of their activity in the company is as follows. Most respondents (31.8%) work in the company for 2 to 3 years. 25.2% of the participating managers are 11 and more years in the business, 18.7% of the respondents are from 6 to 10 years in the company, 15% are 4 to 5 years in the company and the least (9.3%) of the respondents are in the company for less than 1 year.

Based on the studied literature we have set 5 statements related to this issue. The average answers and the most frequent answers are graphically shown in the figure 1.

Figure 1 Position characteristics evaluating work meetings



Source: own processing

S1 = There is always a predetermined aim and purpose of the working meeting

S2 = The working meeting start and end dates are always respected

S3 = All participants are actively involved in the working meetings

S4 = I often consider working meetings ineffective

S5 = Sometimes it would be more effective to use a different way of decision-making or discussion than a working meeting (eg mail, intranet, chat ...)

The first statement S1 "There is always a predetermined aim and purpose of the working meeting" reached an average response value of 3.99, which represents 4 - partially agree, and the most common answer was 5 - certainly agree. This means that in most cases one of the basic principles of effective working meetings is adhered to and therefore the purpose and purpose of the meeting is set, which can be evaluated very positively.

In the event of failure to meet the set start and end dates of the working meeting, this working meeting becomes in some way a time-thief, because for example, the next scheduled tasks or meetings are shifted, or they are completely omitted or postponed to another day. As a result, we set out the statement S2 "The working meeting start and end dates are always respected", which reached an average response of 3.48, which is between 3 - rather agree than disagree and 4 - partially agree. The most common answer was 4 - I partially agree. As in the previous statement, this can be viewed as positive, but the approval rate was lower in this case.

The statement S3 "All involved are actively involved in the meeting working" reached an average of 3.44, which is between 3 - I agree rather than disagree and 4 - I partially agree, and the most frequent response was 4 - I partially agree. This means that not all managers as participants in a working meeting are actively involved in, which may have a negative effect in some cases, as uninitiated participants can easily lose attention and consequently the effect of the meeting is lost.

The statement S4 "I consider meetings often ineffective" reached an average value of 2.86, which is close to 3 - I agree rather than disagree and the most common answer was 3. As in the previous statement, we have two groups of managers. One group does not consider meetings ineffective and the other considers them ineffective, which is ultimately not good for the managers because they consider these meetings like time thieves.

In practice, it sometimes happens that some managers only "meet", so their working day consists solely of attending different meetings. In this case, the efficiency is lost and the working meeting becomes a thief of time, and for this reason we set out the statement S5 "Sometimes it would be more effective to use a different way of decision-making or discussion than a working meeting (e.g. email, intranet, chat ...)". The average value of 3.36 indicates level 3 - I agree rather than disagree and the most frequent answer was 4 - partially agree. Such a result confirms our assumption and we would

recommend managers to review a number of realized working meetings and possibly choose another way of decision-making.

Like the next, we have realized Kruskal-Wallis test to examine differences between answers from questionnaire and respondents' age, position in the firm and length of time in company. Results are shown in Table 2. Value marked with "***" means that there is highly statistical significant difference on the level of significance 99% (Alpha = 0.01). And values marked with "*" means that there is statistical significant difference on the level of significance 95% (Alpha = 0.05).

Table 9 Results of Kruskal-Wallis test

Statement	Values of Kruskal-Wallis test by			
	respondents' gender	respondents' age	position in the company	length of time in the company
There is always a predetermined aim and purpose of the working meeting	0.0413*	0.0008**	0.0015**	0.3568
The working meeting start and end dates are always respected	0.0083**	0.0158*	0.0054**	0.0365*
All participants are actively involved in the working meeting	0.4003	0.2618	<.0001**	0.0412*
I often consider working meetings ineffective	0.7933	0.0011**	0.1215	0.0033**
Sometimes it would be more effective to use a different way of decision-making or discussion than a working meeting (e.g. mail, intranet, chat ...)	0.2418	0.0207*	0.0011**	0.1295

Source: own processing

From the realized research accrued that 70.98% of managers definitely or partially agree with statement S1. Only 8.4% of managers definitely or partially disagree with this. What does not represent a large share, but this indicates that in some companies working meetings are held that do not have a predetermined aim and purpose. Based on Kruskal-Wallis test, we can say, that there are statistically and highly statistically significant differences between managers according to their gender, age and position in the company in connection with a statement regarding the predetermined aim and purpose of the working meeting. So based on our research we can say that there are not statistically significant differences between managers' responses according to the length of time in the company.

In case of responses on the statement S2, there are statistically and highly statistically significant differences between responses of managers according to their gender, age, position in the company and the length of time in the company. Based on realized Kruskal-Wallis test by third statement (S3), we can say, that there are statistically or highly statistically significant differences in perception of actively involvement all participants in the working meeting between managers in terms of their position in the company and length of time in the company. These differences in responses may be due to the fact that managers in lower positions as well as managers who are in the company only for a short time may be less involved in working meetings or are not involved at all. Gender and age of managers does not affect the perception of actively involvement of all participants in the working meetings.

Based on our research, we can say, that there are highly statistically significant differences in considering working meetings ineffective between managers in terms of their age and length of time in the company. Managers' gender and position in the company does not affect the considering working meetings ineffective. In case of last statement (S5), there are statistically or highly statistically significant differences in using different ways of decision making or discussion than working meetings between managers in terms of their age and position in the firm. These differences in responses may be due to the fact that younger managers are accustomed to using information and communication technologies and may prefer them more in the workplace.

In the following table 3, there are shown all values of Spearman correlation coefficient for relationship of all questions between each other. Values marked with "***" mean, that they are highly statistically significant at the level of significance

Alpha= 0.01. Values marked with “pale grey” mean, that they represent medium to essential correlation due to interpretation of correlation according to De Vaus (2002).

Table 10 Spearman correlation coefficients

	S1	S2	S3	S4	S5
S1	1.00000	0.43278**	0.34001**	-0.17059**	-0.16894**
S2	0.43278**	1.00000	0.42886**	-0.08487	-0.17801**
S3	0.34001**	0.42886**	1.00000	-0.19752**	-0.18122**
S4	-0.17059**	-0.08487	-0.19752**	1.00000	0.42969**
S5	-0.16894**	-0.17801**	-0.18122**	0.42969**	1.00000

Source: own processing

S1 = There is always a predetermined aim and purpose of the working meeting

S2 = The working meeting start and end dates are always respected

S3 = All participants are actively involved in the working meetings

S4 = I often consider working meetings ineffective

S5 = Sometimes it would be more effective to use a different way of decision-making or discussion than a working meeting (e.g. mail, intranet, chat ...)

The highest dependence is between statement S1 and S2, which has the value 0.43278 and it is highly statistically significant and represents positive medium to essential correlation. It means, that managers, which agree with statement about predetermined working meeting aim and purpose at the same time agree with statement about respect of working meeting start and end dates. The second highest dependence is between statement S4 and S5. It has value 0.42969, it is highly statistically significant and represents also positive medium to essential correlation. It means, that managers, which consider working meetings often ineffective would welcome in some cases different way of decision-making or discussion instead of working meeting (e.g. mail, intranet, chat...). In the table 3, there are also negative correlations, but they are not as high as positive. The highest negative correlations is between statements S3 and S4, which has value -0.19752, it is highly statistically significant and represents negative low to medium correlation. It means, that managers, which agree with statement, that all participants are actively involved in the working meetings do not consider working meetings like ineffective. The reverse is also true. Managers, that do not agree with statement, that all participants are actively involved in the working meetings consider working meetings like ineffective.

3 Conclusions

Workshops can be interesting, stimulating or beneficial, but if they are ineffective, they can be a waste of time or a disincentive that, by its very nature, can undermine company prosperity. In some companies, working meetings are held once a week and elsewhere once a month. If the working meetings are effective, it is beneficial for the company, but if they are not effective, a large amount of precious time is wasted that could be better spent.

Based on the results of our research, our conclusions are:

- there are statistically significant differences between managers according to their gender, age and position in the company in connection with a statement regarding the predetermined aim and purpose of the working meeting.
- there are statistically significant differences between responses of managers according to their gender, age, position in the company and the length of time in the company about the statement if working meeting start and end dates are always respected.
- there are statistically significant differences in perception of active involvement all participants in the working meeting between managers in terms of their position in the company and length of time in the company.
- there are highly statistically significant differences in considering working meetings ineffective between managers in terms of their age and length of time in the company.
- there are statistically significant differences in using different ways of decision making or discussion than working meetings between managers in terms of their age and position in the firm.
- managers, which agree with statement about predetermined working meeting aim and purpose at the same time agree with statement about respect of working meeting start and end dates.
- managers, which consider working meetings often ineffective would welcome in some cases different way of decision-making or discussion instead of working meeting (e.g. mail, intranet, chat...).
- managers, that do not agree with statement, that all participants are actively involved in the working meetings consider working meetings like ineffective.

Based on the research we recommend adherence the following principles:

- The working meeting should always have a predetermined aim and purpose.
- The working meeting should always start and end at the set time.

- All participants in the working meeting should be actively involved.
- The presence of only those persons involved in the solution of the points really concerned.
- Careful preparation of the participants of the meeting on the basis of the submitted materials in advance.
- In order for the working meeting to be truly beneficial, it should be short, concise, brief, because in lengthy meetings, the attention of its participants often falls away.
- The information from working meeting should be summarized and concluded.

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Market Research and Sustainable Marketing in Trade and Tourism

THE HOUSING SEGMENT AS PART OF CZECH-OSLOVAK REAL ESTATE MARKET DURING 20'S AND 30'S

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Abstract: The paper explains the situation of real estate market during the period of first Czechoslovak Republic (1918 – 1938). It explores the prices of real estates and its structure. The main segments of real estate market during the period of first Czechoslovak Republic were flats for rent, family houses for sale, multi flat houses for sale and farmhouses for sale. The paper is specifically oriented to the segment of housing, so there will be analysed and searched the housing segment of real estate market specifically. The basic indicators of this market will be examined. As result of the paper there will be create the general real estate index. To construct the index there will be calculated the averages of real estate prices and averages of wages. To provide a wide analysis there are used a data saved from daily press.

Keywords: housing, price of houses, real estate market, ownership.

JEL classification: R30, P50

1 Introduction

The paper focuses on analyse of housing segment as part of first Czechoslovak Republic (1918 – 1938) real estate market. The real estate market of the first Czechoslovak Republic has not been searched too much. The main problem seems to be in lack of data source. The official data from the period are insufficient. On the other hand, if there would be sufficient data source, it would be interesting and worth to examine the changes of real estate prices and changes of real estate structure during this period. The time period of first Czechoslovak Republic is significant by the many of different influences which could affect even the real estate prices and real estate market structure. The circumstances of beginning of the first Czechoslovak Republic were influenced by the end of the WW I. The country dropped into the economic depression and the majority of population expected high increase of inflation as they could see from neighbouring countries (Germany, Austria). The middle period of the Czechoslovak first republic was influenced by the great depression. The sharp increase of unemployment was highly significant. The unemployment had increased up to 900 thousand of unemployed since 1929 as the result of great depression influence. The end period of Czechoslovak republic was influenced by political decisions made in Germany, Munich in 1938. As the result of this decisions the Czechoslovak republic had to undergo its borderland called Sudety.

It is seen the period of first Czechoslovak Republic was highly influenced by many of economic and political circumstances. The national economy increased and decreased due to the events. Of course, such dramatic situations should reflect in to the fluctuations of real estate market, which is highly sensitive to any economic changes. It would be also worth to find out how the level of housing has changed since the period. I would like to provide basic comparative study of first Czechoslovak republic real estate market to the present circumstances of Czech Republic real estate market.

To describe all the period from the point of real estate market I will focus the paper to the next four aims:

- to create a general real estate index describing real estate market of the first Czechoslovak Republic,
- to indicate market fluctuations and to explain possible reasons,
- to compare and analyse historical data with the contemporary situation of real estate market,
- to compare basic housing affordability.

To reach the aims, I will use the statistical data collecting mainly from daily newspapers. I expect the information got from daily newspapers seems to be like the dynamic mirror expressing all the requirements, wishes and troubles of society, where the employment and place to live has an important role. It simply shows the behaviour of society elements. According to the topic of paper the attention will be especially to the information from the field of real estate market payed.

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The increase or decrease of house prices together with decrease and stagnation of household incomes can influence the social level of households. It is necessary to pay attention to such indicators like real estate indexes because of its sensitiveness to the welfare of society. There has been published articles in such topics, Halaskova and Halaskova (2014) for instance.

There are many papers oriented to the housing market analysis as well. Many papers try to analyse basic housing affordability indicators using OLS models. Mainly they compare housing affordability indicators recorded from official statistical web pages of national governments Kasik, Slavata (2018). Some of web sources presents online real estate indexes calculated from real estate bid prices saved from online real estate servers. The server www.trzniceny.cz calculates every day level of VSB-UNI real estate index which is calculated by using bid prices of flats within the Czech Republic. The VSB – UNI real estate index is calculated as weighted average of every day bid prices and its every day level is compared with the start level of its 1000 points in the year of 2018. There are even some other possibilities to evaluate real estate market using of multicriteria evaluating methods. See Ardielli, (2015).

Under the condition of Czech Republic there are several authors who analyse the situation of house prices in Czech Republic. Cadil (2009) tries to analyse the real estate bubble in Czech Republic using the R/I ratio and regression analysis. He states the price bubble is the expectation of price acceleration of particular asset, which results in higher demand and such increase in demand is pushing prices up. The self – reinforcing mechanism is working until bubble bursts.

There are some other authors who try to analyse the Czech real estate market from the point of real estate bubble. Hlavacek and Komarek (2010) define real estate bubble as residual of housing price growth that cannot be explained by the aforementioned “standard” factors. The main factors for increase of real estate prices in national economy they define as:

1. a process of catching-up with the usual level in developed economies combined with macroeconomic convergence,
2. a correction in relative prices,
3. the development of the Czech housing market and
4. the constantly expanding mortgage market in the Czech Republic.

They analyse the property prices using three alternative approaches – an approach based on simple indicators of housing price sustainability (price-to-income and rental returns) and two simple econometric models (a time series model and panel regression).

Zemcik and Mikhed (2009) in their paper investigate the situation of decreasing of U.S. real estate market after the beginning of the financial crisis. They use the regression analysis to explain the main fluctuations.

Many of sources use for identification of price real estate bubble the simple housing market indicators. There are mainly compared the historical levels of indicators with the current level of indicators. The most typical indicator using by accredited institutions (national and international financial institutions such as Goldman Sachs, Czech National Bank etc.) is P/I ratio. The comparison of P/I can indicate potential real estate bubble.

The main simple real estate indicators can be divided into the four separate groups:

5. housing affordability measures
6. housing debt measures
7. housing ownership and rent indicators
8. housing price indexes

2 Material and Methods

To analyse the real estate market of the first Czechoslovak Republic there were data from historical daily press used. The data were primary saved from Lidove Noviny newspaper issued from 1918 - 1943. The data were taken from its advertisements. There has been inspected 31561 ads and saved into the excel database. Especially there was payed attention to the ads describing labour market and real estate market. All the price information was saved. The ads were sorted to get next sort of information:

- Bid price
 - Rent
 - Selling price
 - Yields
- Segment of real estate market
- Other specifics
 - Number of flats
 - Area of land
 - Number of flat rooms

Real estate market index describing the situation of historical real estate market in Czechoslovak Republic is calculated:

$$MI = (It1 + It2 + Itn) / n \quad (2.1)$$

$$It = 100 + ((Un - U1) / U1) \times 100 \quad (2.2)$$

$$Un = In / Pn \quad (2.3)$$

where

- MI..... Market index
- It..... Partial indexes of real estate markets (family houses for sale, farmhouses for sale, multiflat buildings for sale and flats for rent)
- U..... Price affordability of specific real estate segment
- P..... Average price of specific real estate segment
- I..... Average wage

As second, there was calculated supply real estate index, which shows the real value of supply expressed as ratio of nominal values of real estates to average of personal wage (income) calculated from historical ads.

$$Ivs = 100 + ((Rvsn - Rvs1) / Rvs1) \times 100 \quad (2.4)$$

$$Rvsn = NVMn / In \quad (2.5)$$

$$NVMn = (NA_{t1} \times AP1) + (NA_{t2} \times AP2) + (NA_{tn} \times APn) \quad (2.6)$$

$$APn = (P1 + P2 + Pn) / n \quad (2.7)$$

where

- Ivs..... Indexed value of real estate supply
- Rvs..... Real value of real estate supply
- NVM..... Nominal value of real estate supply
- NA..... Number of ads for partial real estate market (family houses for sale, farmhouses for sale, multiflat buildings for sale and flats for rent)
- AP..... Average price per specific real estate segment
- P..... Nominal price per real estate taken from the ad
- n..... Number of ads

3 Results and Discussion

The table 1 shows the comparison of basic indicators. It calculates the % of particular real estate segment supply during the first republic and its structure in present days. It is seen, flats for rents is the most represented segment during the period of first republic with its 28,55 % share on the real estate market of the first Czechoslovak Republic. In 2019 is the segment represented by 9,6 %. Multi flat houses for rents segment is unimportant (0,07) in 2019 in comparison with the

situation of first republic (4,1%). The segment family houses for rent represents more less the same share (17,25 in 2019 and 17,58% as average of 1918 – 1943). Other segments of real estate market except of the top five particular segments represented in the table 1 create 67,71% in 2019 and 38,77% during the period of the years 1918 and 1943. It indicates a much wider range of segments in present days with comparison of the period 1918 and 1943.

Table 1 The structure and comparison of real estate markets

Market segment	Year 2019	Average of 1918 – 1943 years
Flats for rent	9,6	28,55
Multi flat houses for sale	0,07	4,1
Family houses for sale	17,25	17,58
Farms for sale	0,41	1,3
Enterprise real estate for sale	4,96	9,7
Other	67,71	38,77

Source: Own calculations, www.trzniceny.cz, www.sreality.cz

The table 2 is more focused to the comparison of housing structure. The most representative in 2019 is flats for sale segment with its share of 37,25 %. It has been enabled to deal with the flat ownership since 1996 year while during the period of the first republic such law instrument had not existed yet.

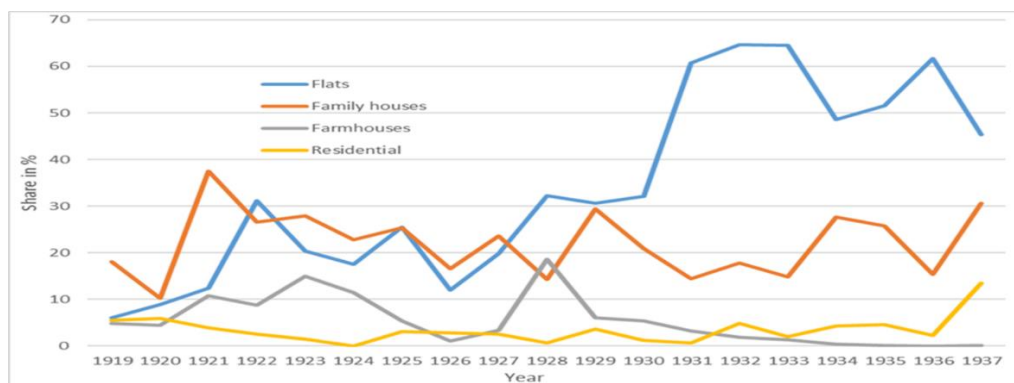
Table 2 Structure of housing market

Segment	2019	Average 1918 - 1943
Flats for sale	37,25	0
Family houses for sale	39,1	34,95
Flats for rent	21,77	65,05
Family houses for rent	1,88	0

Source: Own calculations, www.trzniceny.cz, www.sreality.cz

The development of each segment is presented in next picture 1. It can be seen the increase of segment flats for sale after the year 1928 and its increase within the period of great depression. It is clear the number of empty flats for rent increased because of crisis. It increased its share of real estate market.

Graph 1 Real estate segment share within 1919 – 1937 in %



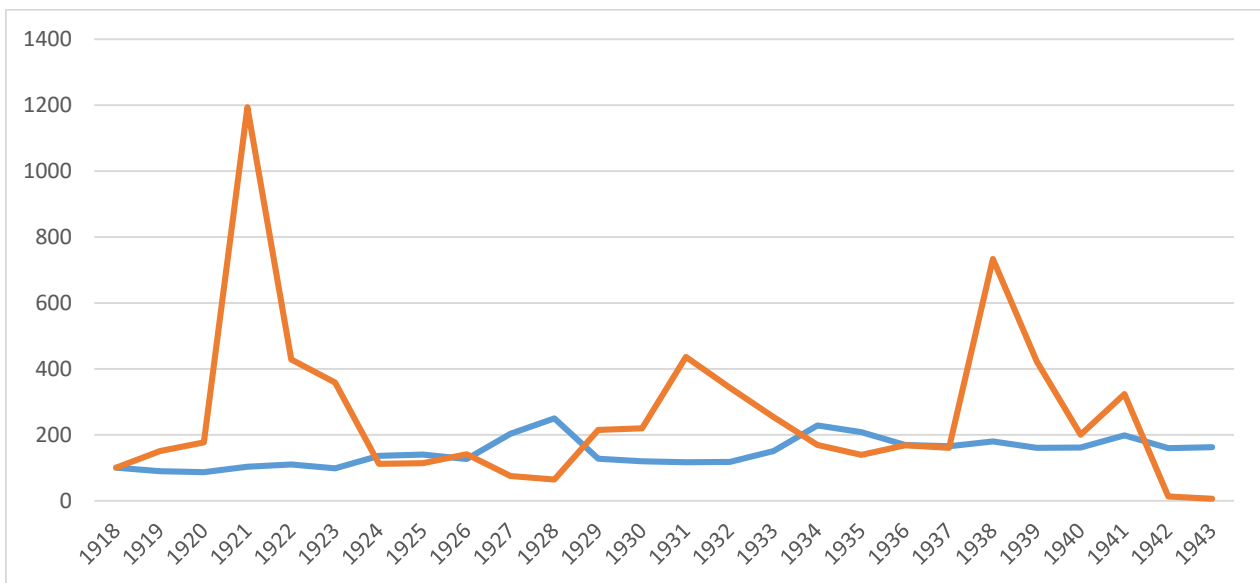
Source: Own calculations

The picture 2 presents calculation of MI (market index – line in blue colour) and Ivs (indexed values of supply – line in red colour). The blue line presents the level of market index within the period 1918 and 1943. It simply calculates the affordability of each segment in comparison to the level of 1918. The values are indexed and calculated per each segment. The result shows the average of all partial indexes. As higher the index is as better the affordability. There are two specific situations within the comparison of MI. The highest value it reaches in the year 1928 (MI = 249). The best affordability in general was reached in 1928, which is pre crisis period. After the beginning of great depression, the value of MI dropped to the level of 127. The second highest level it reached in 1934 which is the end of great depression. The worse value of MI was reached in 1920. The value of MI indicator was 86.

The second index which is indexed value of real estate market (red line) represents the indexed amount of supply expressed not in national currency, but in number of average wages. The index is constructed to the level of the year 1918, where its value was 100. The graph 2 shows the three peaks reached within the period of 1918 and 1943. The highest level was reached in 1921. Its value 1193. The period is typical by expected of high rate of inflation. The expectations influenced probably the increase of real estate supply to the level of average wages. The second peak was indicated in 1931. The value 436. The year 1931 is known as year of great depression. So there are expressed the possible executions of real estate properties of owners who were not able to cover their expenditures connected with the real estates. The third peak in 1938 represents the political crisis of first Czechoslovak Republic. The year of undergo of Czechoslovakian borderland called Sudety caused the instability of real estate market. Many of owners tried to restructuring their real estate capital. Some of them tried to change the properties situated in borderland, some of them tried to sell it as soon as possible to save the capital for the future. The value of Ivs reached in 1938 733 points.

On the other hands the lowest level of the Ivs was reached in precrisis period in 1928. The value of Ivs reached only 63% of the value of the year 1918. The supply of real estate was very weak in comparison of high level of real estate affordability expressed by the index MI. It is even seen the weakest supply of real estate market is indicated in 1942 and 1943 (its values 12,2 and 5,4) the Ivs index shows. During the WW II there were indicated nearly no ads for sale, which is comprehended due to the unstable political environment. Such period was not favourable for real estate market.

Graph 2 Average values of real estate market index and indexed value of real estate supply (MI index – in blue, Ivs index – in red)



Source: Own calculations

4 Conclusion

The results made by presented indexes MI and Ivs show the situation of real estate market during the period of 1918 – 1938 in Czechoslovakia and later during the protectorate Bohemia and Moravia. It can be seen the real estate market was under the influence of many economic and political circumstances. I would split all the circumstances into five specific periods:

1. Period of the years 1920 – 1923 is typical by high level of real estate supply. The highest level was reached in 1921 and was 12 times as higher as in 1918. Such period is typical by high inflation expectations and by restrictive monetary policy promoted by minister Rasin. The period is typical by emigration of Czechs to the USA, which was stopped by USA government in 1924.
2. Period of the year 1928 can be described as pre crisis period. It is typical by high labour demand. The wages increased higher than prices of real estates in the period. The affordability of real estates to the supply income was favourable on one hand, while the real estate supply was weak on the other side.
3. Period of the years 1929 – 1933 is typical crisis period. The supply of real estates increased as it is shown by the Ivs index. Its level was 4,3 times as higher as in 1918.
4. Period of the years 1938 – 1939 is influenced by political events. The end period of Czechoslovak republic was influenced by political decisions made in Germany, Munich in 1938. As the result of this decisions the Czechoslovak republic had to undergo its borderland called Sudety. Many of real estate owners tried to sell their properties as soon as possible. That is why the level of Ivs index increased up to 733 points which is more than seven times more in comparison to the level of year 1918.
5. Period of the years 1942 – 1943 is the time of real estate decline. The Ivs indicates sharp decrease of its values. It dropped to the 20% of the 1918 level. During the period of WW II the owners were not so willing to sell their real estate properties. Currency lost general confidence, so only the way how to save the value was to hold the real estate properties.

To compare the present situation with the historical state there are lots of differences to describe. The highest difference seems to stem from the change in legal instruments. While during the period of the first republic there were no law instruments to create a commonhold like kind of ownership, at the presence the civil code allows such kind of ownership.

The most distinctive characteristics of Czechoslovak real estate market follows:

- The supply of real estates is more diverse in present times
- The dominant real estate segment during 20's and 30's was flats for rent
- The price affordability of flats recalculated from prices of multiflat houses is worse in comparison of the 20's and 30's
- Affordability of flats for rent is a bit worse in comparison of 20's and 30's
- The most significant difference in real estate structure are flats for sale, which did not exist in 20's and 30's

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Aroma marketing and the concept of sustainable development

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Abstract: The world is still more visibly facing environmental problems and negative impacts of climate change as the consequence of human irresponsible behaviour and action, emphasizing steady economic growth, overproduction, and high support of consumerism. People are getting aware of these issues still more and they are focusing on combatting with this situation and protection of environment to ensure the life on Earth also for the future – while the distance of this future is getting shorter. Earth is going to survive but the question is whether it will be with humans or without. This problem is serious, and we are now in a vicious circle. Sustainable development concept highlights also other problems – social and economic, and their solving often brings practices which again increase production and consumption. In this context, marketing is coming with new innovative methods and tools how to support consumerism, sale etc. Aroma marketing belong among such tools. However, these practices mostly lead to the further abusing of environment. The aim of this article is therefore to find out what is the place of aroma marketing in the current society and whether it goes only against the ideals of sustainable development concept or they can work together to sustain the development within the limits of Earth. For this purpose, we will examine mainly the environmental area, and, in this context, examine and analyse the mutual impact on each other.

Keywords: aroma marketing, business environment, consumerism, environmental problems, sustainable development.

JEL Classification: M31, Q01, Q56

1 Introduction

Sustainable development is a concept which can be met during recent years still more often. It has been spreading mainly through various governmental and nongovernmental organizations and with deepening global problems it has been acquiring still higher importance. The current world is visibly globalized and this interconnectedness shows big differences among individual countries, but it also deepens them and endangers sustainability of the world. Therefore, the mankind has to face many new issues and take responsible, active and also effective attitudes toward them. The main goal of today's global society is to do everything for ensuring sustainable development inside and among the countries. Each person has to understand own role in this task, as everyone creates an integral part of global society. Every individual has an ability and opportunity to influence the world and those are higher than any time before. The biggest problem is that people are mostly not sufficiently aware about the problems that are harming the world, about their own responsibility and also opportunities how to contribute to the world to be able to survive with all living organisms to the future.

Sustainable development can be reached only through peoples' active attitude toward the positive change in the world and environment. It is therefore becoming increasingly important, leading to still more sophisticated strategies for achieving it not only at the country level but also at the level of international community as a whole. The issue of sustainable development is an essential requirement for whole mankind. We are highly endangered by the current, still insufficiently sustainable way of development (see more Suša – Sťahel, 2016). There is an increasing need to address the problems comprehensively, efficiently and responsibly, at all levels, from the individual to the global community – to transform the functioning of humanity and the world onto sustainable in all areas, especially in environmental, economic and social.

The very concept of sustainable development defines the fundamental groups of problems that need to be minimized or, if possible, solved, after which the development that is sustainable for the Earth in the future should be achieved. However, the problem is that the given groups of problems are often interconnected so, for example, removing some problems from one group may, to some extent, deepen the problems from another group. For example, combating poverty and raising peoples' standard of living require support for economic growth, consumption, production leading to overproduction, etc. For support of these purposes various marketing tools are being developed today, which should encourage people to buy more and influence this buying behaviour with different tools. Mainly neuromarketing is coming with various ways how to do so and aroma marketing belongs among such means. Its practices are based on the promoting

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consumption, the need for economic growth and constant overproduction which, after all mostly, lead to the further abusing of environment. The aim of this article is therefore to find out what is the place of aroma marketing in the current society and whether it goes only against the ideals of sustainable development concept or they can work together to sustain the development within the limits of Earth. For this purpose, we will explore mainly the environmental area, and, in this context, examine and analyse the mutual impact on each other.

1.1 Sustainable development concept

We can say that today, one of the greatest challenges for sustainable development (SD) is a globalizing world, strongly marked by poverty (Elliot, 2006). The very concept of sustainable development itself has undergone through intensive development during its existence. As its formal beginning we consider the year 1984, when the United Nations (UN) set up an official commission to identify long-term sustainable development strategies for the entire international community. The result was a report entitled 'Our Common Future', also known as the Brundtland Report, which was the first to officially define sustainable development "as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, p. 43).

The adoption of this report firmly incorporated this concept into the political sphere of ideas about international development (Elliot, 2006) and the importance of this concept increased at international level. The mentioned Commission has already remarked significantly that economic growth, social equality and environmental protection are three essential components of SD. The mutual relations between them create the basis of SD activities. For example, according to the report, economic development must proceed without compromising the environment and creating negative social consequences. Reducing negative impacts and making compromises are therefore essential for the implementation of SD strategies. Thus, the Commission already at that time defined sustainable development strategies as coordinated, participatory and chain-based processes of ideas and activities to achieve environmental, economic and social goals in a balanced and integrated way at national and local level. This is a cyclical and interactive process of planning, participation and action, with an emphasis on managing progress toward sustainability goals (World Commission on Environment and Development, 1987). It is precisely the SD that we understand as a way of developing human society that reconciles economic and social progress with the full-value preservation of the environment for future generations in the least changed form.

The main bearing on this issue has taken the UN from the beginning, and for decades it has been striving to lead individual countries to take the SD concept as a fundamental principle of the development of their societies. Environmental problems represent also an integral part of the SD concept, which are not only about environmental threats but have many other serious consequences, making many peoples' lives much more difficult (for example, by contributing to poverty and thus deepening other groups of global problems, etc. (see also Suša – St'ahel, 2016)). This is one of the reasons why the SD concept must consider all three mentioned aspects. But human beings are still in the centre of this concept because every individual has the right to a healthy and productive life in harmony with nature (United Nations, 1992b: Principle 1).

In this context very important was the document adopted on the occasion of the new millennium, which brought the Millennium Development Goals (MDGs). The document was adopted at the UN Millennium Summit in 2000, when a new partnership between individual nations was established with the primary intention – create a sustainable place from the world. These eight Millennium Goals (see **MDGMONITOR, 2015**) represented the most serious global challenges which should be resolved by 2015. Although the Goals have not been achieved, they have created an important basis for future efforts and successes, while considering the emphasis on the link between global challenges, sustainability and the principle of humanism.

Another important milestone in these efforts was the UN Development Summit in September 2015, where new Sustainable Development Goals (SDGs) were adopted as part of the 2030 Agenda for Sustainable Development. The document contains 17 goals and 169 targets (UNDP, 2015) that reflect the efforts to achieve sustainable development of the world community and, together with this sustainability agenda SDGs go much deeper than MDGs, emphasizing, in particular, the universal need for development that is directed at all. SDGs are focused primarily on SD, democratic governance, peacebuilding, as well as on the flexibility to deal with climate change and disasters in the world (UNDP, 2015). These goals, as well as the entire 2030 Agenda, represent today the highest priorities of the world community.

Similarly to the UN, nearly all important environmental, social or economic organizations, whether of a global, regional or national character, adopt this concept and define it as a priority in their direction. The challenge for individual countries is thus increasingly the need to bring the principles of SD into the daily life of individuals, to assess all planned and implemented activities according to SD principles and to evaluate the direction towards sustainability using measurable indicators of sustainable development (Úrad vlády SR, 2011).

We can state that all SDGs should also be the goals of responsible, conscious and active action of the current so-called global citizens. Within countries, direct strategies are required to achieve these jointly defined goals. Individuals, as global citizens, are required to respect these goals in their actions and intentions, and to behave in such a way that they do not act against their achievement.

1.2 Sustainable development strategies and human activities

The aim of sustainable development strategies is ensuring socially responsible economic development with simultaneous protection of the environment for future generations (United Nations, 1992a). Countries develop their strategic approaches to achieving SD according to their needs, priorities and available resources. However, any such strategy should be a living document that needs continuous monitoring and evaluation. Therefore, individual countries are at the different levels in these strategies. There is a constant focus on making the implementation of SD strategies a part of government policies. But these obligations cannot be left to governments alone. We agree with J. A. Elliot that SD can only be achieved by involving everyone through individual or collective efforts, starting from individuals, through groups, every sector of society, institutions, and governments pending the world community. A more prosperous, fairer and safer future depends on new standards of behaviour at all levels with involving everyone. SD is therefore a moral concept that seeks to define a fair development. If the environment is the basis of all economic activities and life itself, is evident that its quality and integrity must be ensured also for future generations (Elliot, 2006: 11).

The development of the world today has a destructive impact on the environment, therefore the environment cannot be perceived beyond human activities and ambitions. Thus, although the SD concept is not new at all, its content and the resulting strategies are continually evolving and adapting to the current situation and evolution of global problems, as well as to the approach to them.

SD strategies are mainly linked to the efforts to solve various problems that have gained global character and are strongly interrelated. These are various social problems, mainly related to poverty. The population of the world is increasing and this is hitting the Earth's capacity not only to feed so many people, but also to satisfy their needs and demands. There is also a problem of unequal distribution of wealth between countries, which is linked to unequal distribution of resources in the world. Social problems are necessarily linked to environmental problems such as drinking water shortages, climate change, water or air pollution, non-renewable energy sources, etc. (more in Payne, 2011). Global environmental crisis, as a result of human activities, inevitably deepens the social and economic crisis. We must not forget this connection in our decisions and actions. Poverty and other social problems lead people to continually damage the environment, and environmental problems turn people into still bigger poverty. It is a vicious circle to which a responsible and comprehensive approach must be taken (more in Suša – Sťahel, 2016). Consequently, the current dependence of people and the environment results in these environmental problems. The current way of the world development is becoming increasingly unsustainable for the future morally, economically and environmentally (Elliot, 2006).

The idea of SD has great influence in shaping many changes in the world development, towards the behaviour of individuals, how business interests are managed, and how communities are organized. Future progress depends on various factors, including government intervention in different spheres of society, as well as the awareness of all individuals to ensure the possibility of dignified life also for future generations. It is in this respect that we are faced with the problem of irresponsible behaviour by individuals who, despite increasing knowledge and information on global issues, are subject to marketing moves, and the business sphere, which exploits the vulnerability and weakness of these economic beings for their benefit and so economic growth, in the form of overproduction and consumption support, in particular through various new marketing tools, where people are no longer affected only by ordinary advertisements, but also by various neuro-stimuli that make them subconsciously buy more.

1.3 Neuromarketing tools

Currently marketing sphere uses many innovative tools to support the sale. They are examining consumers' behaviour to understand what guide them during the shopping. Today marketers use not only traditional means like surveys, focus groups, etc. but also new neuromarketing tools (neuromarketing is the application of neuroscience to the marketing) because the majority of peoples' thoughts are in the **subconscious mind** and according to the realized studies and researches consumers mostly do not choose products rationally. This is the biggest problem for achieving sustainable development and win for the market, trade and economy as a whole. Marketers and traders use neuroscience – brain research – to reveal subconscious consumer decision-making processes. They measure consumers' preferences and according to that they create more effective marketing campaigns, design products and services ([Neuroscience marketing 2019](#)).

Neuromarketing as consumer neuroscience refers to the measurement of physiological and neural signals to gain insight into customers' motivations, preferences, and decisions, which can help inform creative advertising, product development, pricing, and other marketing areas (HBR 2019). We can say that neuromarketing is the study of the brain's responses to advertising and branding, and the adjustment of those messages based on feedback to determine better responses (Marketing-Schools.org 2012). By this, marketers learn why consumers make the decisions they do, and what parts of the brain are motivating them to do so. Neuromarketing includes the direct use of brain imaging, scanning, or other brain activity measurement technologies to measure the response to specific product, pack, advertisement, or other marketing elements ([Neuroscience marketing 2019](#)). Using neuromarketing, the marketer can rethink the used strategies and create smarter marketing that will increase the effectiveness of his efforts. Consumers are subconsciously defining what they want, how much they will pay, and even what promotional activities appeal to them every day. To getting results marketers need to understand all this (Dube 2017).

In this field, aroma marketing (or scent marketing) has achieving still higher importance as there are many challenges and opportunities hidden under this part of neuroscience as the smell has unique advantage over other senses, because it stimulates human emotions immediately. By using scents, it is possible to comprise the connection with customers at a deeper emotional level, which will bring them a memorable experience.

In this world overfilled with advertisements, traditional marketing tools are losing the importance as the current trend is marketing oriented on human senses, which is represented exactly by this modern phenomenon. However, we have to say that beside the potential negative impacts of these marketing tools on raising the consumerism these methods are also quite expensive. That is why it has not been used so widely up to now despite its potential and it is more common in the global North countries. However, also people in global South want to gain the same living standard as those in developed ones. They have also their needs and desires, and are daily attacked with number of advertisements – which is also the problem. As we mentioned, the current situation and human level of consumption is mainly from environmental side unsustainable. And these tools and trends can even raise the consumption and also in parallel the production, and deepen the gaps among wealthier and poorer people.

1.4 Aroma marketing and its importance in the current business world

The problem of the removing poverty is connected with the demands of continual and in many parts of the world of raising economic growth. Therefore, the business environment is motivated to constantly provide the changes that support the growth of sales and customers' "happiness". Aroma marketing is an important tool here as smell is the only sense directly connected with human limbic system, which controls memory and emotions. People react emotionally to some scent before they can identify it. This has a subconscious effect on customers' behaviour and spending patterns. Scents in space have the strongest impact on influencing consumers' behaviour (Spectrio 2019).

It is known that nearly 75 % of the feelings experienced during the day are regulated by aromas and about 65 % of the aromas which human already felt in the past are kept in the brain for up to one year (Erenkol 2015). Smell is the most powerful of all the senses for business environment as aromas can attract new customers.

Aroma marketing becomes an essential part of marketing communication as it strongly influences customer's behaviour through reasonably selected aromas (Berčík et al. 2018, p. 590). J. Paluchová et al. (2016) stated, that the pleasant smell released into the air keeps the buyer longer in the sales area, positively affects his/her desire for the product or service and increases customer's willingness to pay more money.

However, the smell perception is a subjective matter and it involves many other factors, such as culture or individual preferences. The impact of cultural aspects can be characterized by the type of preferred fragrances – for example, in the USA, the sweet smells are preferred, such as vanilla, cinnamon, while in Finland they prefer the fragrance of berries or coffee (Berčík et al., 2018). In this context we can talk about a new type of instore communication tools to measure a consumer impact, a customer targeted influence and an interactivity. We can also say that aroma marketing is manipulating with the human senses, emotions and whole brain. On the other hand, customers are today very vulnerable to lead marketers do so. Some experts even state that the current customer could be identified as a demanding, hedonist, unstable and individualist. The place of sale is an area, where the customer is often looking for the new experiences, feelings and emotions. In order to satisfy these requirements, tools of aroma marketing are used today. According to H. Sikela (2015), sellers and service providers are aware of the human subconscious' influence on the consumer behaviour during the purchase and for this reason they combine external impacts attracted on all human senses not excluding the smell. Then, as Pajonk & Plevová (2015) present, aroma marketing includes a series of events where it is possible to stimulate customers in the shops through aroma to purchase, as well as lead employees to a higher work efforts.

Aroma marketing strongly influences the customer behaviour at the point of sale through carefully selected fragrances. In a global scale it can be generally noted that the use of biometric and neuroimaging methods is constantly growing. The reason is the fact that in many countries these methods are being taught so intensively that they are considered as a common standard today (Berčík et al. 2017, p. 736). Aroma marketing is more than just diffusing a nice aroma in a space. It is the way of creating the company's brand identity, marketing message, target audience, and creating an aroma that strengthens these values. When the smell is combined with other marketing signs, it can establish a continual connection with consumers (Air/Aroma 2019). Smell is quite a primitive sense, but it plays significant role in influencing our emotions and decisions. Therefore, aroma marketing has a great potential to raise the customers' desire to buy something, even if they do not need it.

2 Methods

This research study arises from the qualitative research coming from the content analysis of the available scientific studies and articles about the still more vital concept of aroma marketing as well as its position, threats and possibilities in the context of achieving sustainable development. We examine also their significance and relationship today in the time of environmental crises and rising needs of unequal growing world population. For this purpose, we use other scientific methods during our research as well. The paper examines and introduces the basis and importance of both concepts –

sustainable development as well as aroma marketing as a relatively new part of neuromarketing tools, what do we understand under these concepts, how significant are they in the current world and what are the basic pillars they are staying on. The article examines and analyse what is the place of aroma marketing in the current societies and whether its basis necessarily goes against the ideals and fundamentals of sustainable development concept, or they can work together to support the sustainability of the world within the limits of the Earth. In this regard we map, describe and identify the importance of aroma marketing in the globalized and harmed world as well as the concepts of sustainable marketing and sustainable consumption which have been arising from neuromarketing components (including aroma marketing) in the connection with sustainable development concept and needs. We examine and identify their role and position in the maintaining of the life on Earth for future generations. After this, we explore and analyse also the mutual impact of sustainable development concept and possible sustainable tools of aroma marketing. After the examination and analysis, we receive valuable information and evaluate potential common cooperation. In the end, we summarize our knowledge to underline the potential of both concepts and the necessity for change to gain sustainability and to preserve the nature. Received results enable us to see the current status in analysed area and to make own outcomes in examined issues to extend our scope as we assume that aroma marketing, if used rationally, can work together with the ideals of sustainability in conditions that people take the needed responsibility for their actions and decisions.

3 Research Results

3.1 Sustainable development concept and the basis of aroma marketing

We can see a significant interconnection among both our examined concepts. The growth of consumption at which the aroma marketing is mainly aimed leads to the development of world trade, which however has far reaching environmental consequences. This worldwide growth of consumption increases the demand for the use of resources – renewable as well as non-renewable. Consumption is thus the main driver of the global use of resources and following environmental impacts. The mass character of consumption force people to buy still better and newer products even if the products they already have are completely working and ok. We agree with P. Stachová (2018) that this fact leads to the overproduction, which is also supported by the effort for economic and welfare growth. Achieving the necessary reduction of these effects requires a significant change in habits, both private and public consumption, to complement the benefits of current modern technologies and production processes.

This problem is such serious that it is included in SDGs – concretely it is the goal no. 12 – Responsible consumption and production (UNDP, 2015). But it is not so clear, because Sustainable development goals and whole 2030 Sustainable agenda count with the continuing economic growth because of the interconnection of all three basic pillars of SD. This is stated also in the 12th goal where it is written that achieving economic growth and SD requires that people urgently reduce their ecological footprint (the Ecological Footprint is the only metric that measures how much nature we have and how much nature we use – it measures the demands made by a person or group of people on global natural resources) by changing the way they produce, buy and consume goods and resources. So, it is not specifically about reducing consumption. The efficient management of the shared natural resources, and the way people dispose of toxic waste and pollutants, are important targets to achieve this goal. There is underlined the need to encourage industries, businesses and consumers to move towards more sustainable patterns of consumption and recycle, as well as reduce waste and create more efficient production and supply chains (UNDP, 2015).

Global business, entrepreneurship and marketing must join together with the theory and practice of socially responsible marketing, social responsibility and sustainable development, if they want to offer benefits for local and global community development in addition to territorial expansion and growth strategy (Horská, 2015). In this context also W. Maathai (2010), the Nobel Peace Prize laureates, states that in order to ensure sustainable development multinational companies and international organizations should reflect on their responsibilities for the state and development of society in which they do business and ensure themselves economic development. This involve also companies and marketers using aroma marketing tools to attract people – customers to buy offered products using their personal feelings through various aromas. We can see that SD concept does not go against the big production and consumption. There is just the appeal to behave responsibly in doing so. On the contrary, the consumption, production and economic growth are even supported because, for example, the biggest problem defined in 2030 Agenda is poverty interconnected with supporting the welfare. Decreasing poverty and increasing the welfare of poor people lead to the growing production and consumption. However, in this context the terms sustainable marketing and sustainable consumption have started to be popular.

Sustainable marketing

Also, in business area we can nowadays see awaking ecological and environmental consciousness among consumers: they increasingly buy local food, Fair Trade products, recycled products, smaller packages, etc. This is the mentioned sustainable marketing. Today, marketing is not only about production, but mainly about the consumers and the prediction of the future, and it necessarily addresses the problem of sustainability. Consumers are getting used to learn to recycle waste, save water, electricity and other resources, and replace them with alternative renewable resources. And it is touching also the aroma marketing field. However, the economic and trade practices are increasingly deepening the division of the world to poorer and wealthier countries. The care should be therefore taken to promote fair trade between them. For

that purpose, many sustainable concepts are emerging also in the sphere of marketing, such as Fair Trade, which has emerged as a business partnership based on dialogue, transparency and respect. It contributes to SD by offering better trade conditions and safeguarding the rights of disadvantaged producers and workers (Paluchová, 2015). Marketing is using this strategy and people are actively supporting it.

The concept of sustainable marketing involves today every sphere of marketing – including aroma marketing and it is based on several steps: on analysis of socio-environmental issues, analysis of customers' behaviour, values and goals, as well as on strategy and development of sustainable marketing and its transformation. Sustainable marketing is the process of planning, implementing and managing the development, pricing, promotion and distribution of products in a way that fulfil three criteria: customers' needs are met, organizational goals are achieved, and the whole process is compatible with the ecosystem. If marketing is focused on meeting customers' needs and building beneficial relationships with them, sustainable marketing is the sustainable creation and consolidation of customers' relationships, sustainable creation of a social and ecological environment, and through creating these social and economic values it provides the added value to the customer (Belz – Peattie, 2009). Sustainable marketing heads for long-term goals in the field of obtaining resources from nature and returning them there. This is done in the form of ecological and environmental benefits or by encouraging the sale of green products through various marketing methods – also through the smell. This has a positive impact on current consumers, environment and the future generation of businesses and consumers (Wells, 2013, p. 108). The concept of sustainable marketing differs from the concept of marketing by the orientation of the marketing mix on defining sustainable products; setting sustainable prices; selecting sustainable distribution and building sustainable communication (Vasil'ová, 2011).

Sustainable consumption

As already indicated, the growth in consumption places greater demands on the use of resources, thus accelerating the economy, promoting its growth and also technological innovation and efficiency. Ideally, it also brings new solutions to environmental problems. Although, as we have mentioned, consumption growth and rising living standards are helping economies to grow, on the other hand, they are the cause of most environmental, social and economic problems, therefore, this has also become one of the SDGs (Stachová, 2018). If humanity wants to preserve at least the minimum quality of the environment, along with the anticipated growth of the world's population (by 2050 there should be almost 10 billion people on Earth), it must inevitably reduce its ecological footprint and starts to behave more responsibly (see also S'ahel, 2015). Responsible consumption and production mean, among other things, reduction in resource consumption, pollution and degradation in production cycles. However, it is necessary to involve every part of the process to this intention – from governments, through companies, traders to individual consumers.

Aroma marketing tools, as we mentioned, support in their core the consumption and production. But this does not have to be automatically wrong. There is a need just to involve the practices of sustainable consumption and production here. Sustainable consumption is based on the preference of organic products and the consumption of renewable natural resources and products. Furthermore, economic growth is no longer realistic without sustainable consumption (Paluchová, 2015). It needs to be elaborated as a category that starts the economic system. Sustainable consumption criteria should be defined at the beginning of the economic cycle and the needs to bring people a quality life should be met according to this. It is not only about consumption planning, but mainly about shaping the environment and conditions for sustainable development (Gubiniová, 2012). Sustainable consumption then means mainly a change in orientation when choosing from the offer on the part of the customer, towards a more sustainable lifestyle and purchasing decisions. Overall, this means applying the so-called. 3 “r” of ecological behaviour: Reduce – Reuse – Recycle (Horská – Siringoringo, 2012). So, sustainable consumption does not necessarily or exclusively mean the reduction of consumption but mainly differentiation and streamline of consumption, which has then an impact on improving the quality of life through the support of SD while minimizing the use of natural resources and toxic materials, as well as waste and pollutants and services, so that the needs of future generations are not endangered. Each individual bears own responsibility for his/her consumption habits. At the same time, their responsible behaviour can lead to sustainability in consumption. This highlights the importance of coordinating activities and collective approach to this problem.

3.2 Aroma marketing potential in achieving sustainability

According to several experts, neuromarketing can contribute in different ways to sustainability, such as to sustainable consumption, better awareness of the need for environmental management or to the adoption of green technologies, etc. The finding for explanations of neuroscience to understand the process of decision making can bring new perspectives also for sustainability studies and achieving sustainable development. It is involving aroma marketing as well – greater understanding of how to increase the emotional engagement of people through their smell and fragrance memories in favour of sustainable decisions is one of these possibilities. Neuromarketing as well as aroma marketing can work as a connection between the human and the right decisions in benefit of the use of, for example, green technologies, sustainable consumption, awareness on the environmental issues, like importance of recycling, etc. (Caldeira Oliveira, 2014). It is necessary to remember that environmental innovations must be combined with human aspects to be successful, and just the neuromarketing and aroma marketing are examining the factors that motivate humans' behaviour and reasons why

they make certain decisions over others. In this regard, these marketing tools can also be effectively used because they may support a new vision of how we react to various environmental campaigns and why do we still often disregard the environmental impacts of what we buy and how much waste we produce.

The main goal of aroma marketing is promoting products and services through using aromas and smell. But this can be in the same way use for promoting products and services helping sustainable development, or just promoting sustainable consumption, green products, etc. These are just few of the possibilities of aroma marketing supporting sustainability. The aroma marketing tools can also contribute to various researches and studies how to support sustainability through consumers' decision making or how to influence them through the aromas and emotions to buy environmentally friendly products, etc. They can help to allocate sustainable attributes that generate positive emotions of people in favour of selected environmental products or environmental feeling, awareness raising aimed at sustainable decisions, etc. They can make environmental products more attractive through selected aromas, or intensify customers' perceptions of sustainable products (Caldeira Oliveira, 2014). The possibilities and potential of aroma marketing in favour of sustainable development and consumption are much wider.

B. Tarczydło (2014) understands under the aroma marketing an art that uses scent in marketing campaigns, evoking the consumer's desired emotions and convincing him/her for the correctness of buying the product/service. This can be used extensively in favour of anything. The possibilities in favour of achieving sustainability are wide and they have not been fully examined yet.

Another important and different thing about the possibility of high unsustainability or sustainability connected with aroma marketing is the way of how the aromas are made. The production of aromas can be, on the one hand, realized through the chemical synthesis, which is low cost but not good for environment and does not have very high quality. On the other hand, aromas can be made through direct extraction from the nature. These are truly natural aromas, but they harm environment very much (for example, approximately 500 kg of pods of the aforementioned orchid are needed for 1 kg of essence). But there is also a third method – biotechnology. This is a promise for environmentally friendly approach also in the basis of aroma marketing work. “Technological development for the production of aromas using microorganisms is a promising idea from the point of view of the sustainable development, since it allows the inextricably approach of the three pillars of sustainability (environmental, economic and social)” (De Oliveira – De Oliveira & Lemos Bicas, 2017). This bio aroma production represents environmentally friendly approach which can have competitive prices with natural aromas, and it has a promising future in sustainable aroma marketing practices.

4 Conclusions

The change towards sustainable consumption and sustainable development as a whole can only be achieved if all stakeholders – customers, traders, marketers, organizations, governments, etc. – are interested. A barrier that slows the development of sustainable consumption is competition. National governments, respectively transnational clusters should play the role of the so-called visible hand market within the market in building sustainable development, marketing and consumption models. Future development must be oriented towards ways of providing goods and services that use less resources and produce less waste. However, in order to achieve this goal, it is necessary to raise awareness, stimulate the demand for environmentally acceptable products, and promote sustainable consumption and production (Paluchová, 2015). It is also necessary to look for alternatives to the current setting of our consumption patterns and current consumer lifestyles, which can be seen, for example, in the form of a circular or shared economy, preference of local products consumption or, for example, trends of the so called slow fashion, etc. (Stachová, 2018).

Although the first sight on the aroma marketing concept can lead us to the idea that it acts only and directly against the visions, basis and ideals of sustainable development concept and strategies, it is not like this. All the above-mentioned features, and many more, of the aroma marketing make it able to cooperate with sustainable practices, contribute to the sustainable consumption and even to the achieving of sustainable world development. Both these concepts can work together, and aroma marketing can strongly support sustainability, if it uses the right practices and those are used correctly. There is a need to support researches and studies to receive very useful information and results which can be used in favour of the way to preserve this world also for future generations along with other living organisms on Earth.

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THE IMPACT OF SEGMENTATION IN MARKETING COMMUNICATION IN A TOURISM ENTERPRISE

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Abstract: Overtourism is quickly becoming a substantial threat for the economic, environmental and socio-cultural sustainability of affected tourist destinations. Marketing is argued to be a significant tool in informing and educating the existing and potential destination visitors about the importance of respecting social and environmental needs of a destination. Simultaneously, in order to fulfil the continuously growing customer demands and needs, it is vital to study a destinations' customer segmentation. The aim of this study is to establish whether the targeting of a destination's Facebook group according to chosen segmentation has an impact on the demographic composition of the followers' base, what is the impact of this given segmentation on the reactions of the target groups to posted information online and whether and how is the phenomenon of community sharing reflected in the two selected segments.

Keywords: marketing, segmentation, tourism, sustainability, social media

JEL Classification: G32, G33, C35

1 Introduction

Many scholars have defined tourism, e.g. Gúčík (2011), Batta (2000), Buhalis and Darcy (2011). Tourism is therefore divided through various viewpoints and authors' definitions differ quite often – we can compare e.g. Ryglová, Burian and Vajčnerová (2011) in the Czech literature or Grönroos (1994); Lickorish and Jenkins (1997) and Goeldner and Ritchie (2012) in the foreign literature. Tourism fulfils various functions, the main function being the offer of the products of organisations on the tourism market (Šmída, 2007). For the purposes of successful launch of products to the market, it is essential to understand your customers and their needs (Hitl, 2009). The needs are generally mentioned e.g. by Lester (1995), Brooks (2003) or Kerzner (2009).

Among tourism's basic functions we may find the business function (using business opportunities to monetise own capital), economical function (operations connected to supply, production, consumption and service provision), organisational function (maximised utilisation and optimised internal arrangement of production factors in the destination and their relationships), environmental (expresses the standpoint and actions of the organisation in relation to its impact on the quality and protection of the environment), technical function (equipment with the basic production factors and creating the technical-technological conditions); and, lastly, the social function (not only the relationships between the main actors but also with local communities, as well as the impact on the economic and social development of towns, cities and regions (Kutshcherauer, 2007; Kučerová, Strašík and Šebová, 2010).

In past years, mainly its social function has been on the rise. It has become significant in the perspective of relationships between the local residents and the tourism participants. Contemporary tourists are increasingly arduous in their demands and often incline to getting better acquainted with the local culture and community as well (Yeoman, 2008). Given the amount of attractions in tourism, it is necessary to focus on marketing, Kotler (2012) that primarily focuses on the customer (Boučková et al., 2003). Marketing is often viewed as a summation of instruments of the marketing mix (Kotler, 2013 or Foret, 2003). Individual instruments are then the notoriously known marketing Ps in their various shapes. One of the crucial parts of the marketing mix is the product (Kotler, 2012). Kotler, Bowen and Makens (2010) and Gúčík (2000) focus on the definitions of tourism products and compartmentalise them into primarily and secondary offers.

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Palatková and Zichová (2011) suggest that the product must not only be produced by the individual destination organisations and that it can become a complete chain of services.

These services comprising a heterogeneous body of useful effects intended for satisfying the tourism participants' needs are the primary products offered by the destination organisations (Inman, 1985, Lipsey and Nakamura, 2006). Vajčnerová (2009) from the Czech authors and e.g. Bull (1991), Neal, Yusal and Sirgy (2007) from foreign scholars stress the importance of services in tourism. For further specification of the tourists' needs refer to e.g. Lester (1995), Brooks (2003) and Kerzner (2009) or Kučerová (1997), Plamínek (2008), ev. Gillernová (2006). To successfully satisfy customers' needs mentioned by Maslow (1943), which also apply to customers in tourism (Abdallah, Mohamed and Mekawy, 2007), it is vital to establish and study customer segments (Hitl, 2009).

1.1 Segmentation

Many companies have left the mass marketing towards targeted or even niche marketing. Segmentation is often defined as the process of dividing the customers into homogenous groups with similar needs, wishes and reactions (Vorlová, 2014). Each separate segment should be measurable, sufficiently numerous, accessible and actionable (Kotler et al., 2010). The task of segmented marketing communication is then to introduce the product to each segment in such a way that the product – the basis of any business – would be positively accepted (Kotler, 2007).

1.1 Overtourism and marketing

The continuously increasing amounts of tourists in certain destinations have already started to cause demonstrable negative effects on the spaces themselves not only in the physical environment but also for the life of local communities (Middleton and Hawkins, 1998). This combination greatly endangers future profit of affected tourist destinations and other local tourist organisations. According to Gilmore et al. (2007), this effect is mainly distinct in natural and cultural sites of The World Heritage. Socio-cultural aspects are, according to Lansing and De Vries (2007), only sparsely measurable. Apart from devastation of the natural and socio-cultural environment, also rising prices or social differentiation fall among the presumed outcomes of overtourism in the endangered destinations (Stonich et al., 1995).

It could be presumed that the aims of sustainable tourism and marketing are contrary, that marketing in the contemporary society only supports irresponsible consumption. Font and McGabe (2017) however argue that effective marketing is crucial for destination organisations and is mainly responsible for the numbers, kind and ethnicity of the visitors of a given destination. Middleton (1994) trusts that the basic stipulation of future destination organisations' profit lies in perfect marketing.

The main aim of any marketing communication is to support the product sales through a communication mix consisting of specific combination of advertising, personal selling, sales support, public relations and instruments of direct marketing (Kotler, 2012). For this study, the communication through social networks (Zamazalová et. al, 2010) will be crucial.

Social networks are based on users sharing their own content (Bednář, 2011). According to Kopecký (2013), the commercial sector uses social networks not only for communication but also for market research a monitoring. Users can utilise the social networks for expressing their opinions and wishes. Arguably, the most successful instrument of social networks is the word-of-mouth (Charlesworth, 2009). In order for the communication on social networks to be effective, one must, according to Přikrylová and Jahodová (2010), conduct it regularly and the content must be up-to-date (Jozífková, 2014. Social networks, unfortunately, do not adequately cover all age and social groups (Kučera, 2012).

Word-of-mouth is a phenomenon often used in tourism marketing when the customers share information among themselves. Such communication is increasingly trustworthy (Simpson a Siguaw, 2008) to the customers than any marketers' messages and therefore more effective. Currently, the most efficient avenue for sharing ones ideas and opinions is, of course, the Internet and social networks (Todd, 2014). As the basis for messages with the most potential of being shared seems to be its interesting content, original content itself rises above the form or placement of the message. The information then hopefully gets passed on from person to person without any additional marketers' input (Jakubíková, 2009).

Again, Gilmore, Carson, and Ascencao (2007) suggest that marketing can be used positively to inform, educate and communicate with the tourism participants as to the importance of respecting social and environmental needs of a destination. It is therefore crucial to find a much-needed equilibrium between social, economic and environmental sustainability.

Font and McGabe (2017) however warn that the research of sustainable tourism marketing is insufficient and that customer behaviour regarding sustainable practices has not yet been fully studied.

2 Methodology

While traditional segmentation methods could have in this case been used to discover significant segments, the authors of this study have seen it more pertinent to follow the segments chosen by the Český Krumlov destination organisation

as they are clearly already deemed most significant stakeholders of the destination. The first, vital segment is the local residents of the destination: the inhabitants of Český Krumlov and its near surroundings. Second chosen segment is then general tourist participants according to the targeting of the destination organisation. The aim of this study is to attempt to answer the following research questions:

- 1. Does the dedication of the Facebook Page to a certain segment have an impact on the demographic composition of the fan base?**
- 2. What is the impact of such segmentation on the reactions of both selected target groups online?**
- 3. How is the phenomenon of community sharing reflected in the two selected segments?**

The tourist destination of Český Krumlov is widely seen as one of the most evident examples of overtourism in Czech environment (Daňková, 2019). Thanks to author's affiliations with the just rebranding Český Krumlov destination organisation, it has been possible to obtain and analyse the data from the two organisation's Facebook Pages. The data has been chosen mainly for their ready availability as well as for their generally less invasive potential for studying the viewers' reactions. The Page 'Town of Český Krumlov' is mainly intended for the local community viewership while the Page of 'Český Krumlov Tourism' operates for the purposes of communication with existing and prospective tourist customer base.

A comparative analysis of the statistical data of both of these Pages will be performed. By semi-structured interviews with the PR and destination organisation managers, information on the followers of these Pages and the Pages' chosen targeting will be gleaned. Further, the followers' demographics, the viewership of the posts made public, their objective targeting regarding our two chosen segments and the reaction and sharing data obtained will be studied and compared in order to gain better insight and answer the research questions by the means of basic descriptive statistics, absolute and relative frequency and personal experience of the authors in the field of study. The authors follow both of the Pages and their content continuously for several years, but for the purpose of this study the posts were monitored in-depth for the duration of three weeks.

The data were to be analysed based on a comparative study of three Facebook Pages, however, during preliminary analyses, an irrelevance of data of discovered and therefore only two Facebook Pages will be included. The most significant values will be selected on the Town of Český Krumlov Page through frequency analysis and those will be compared to the values of Český Krumlov Tourism Page. Simple and weighted averages will be applied for comparison as well as basic mathematical functions, such as direct and indirect proportion. After data evaluation, basic approaches and tools for Facebook Pages in this dynamically evolving field will be proposed. Eventually, a proposal for further research and its limits will be established.

3 Research results

Accordingly to expectations, the Town of Český Krumlov communicates primarily with the local residents, which is a priority of any town. While there are separate Facebook Pages for the touristic and the local customer segment, the town's webpage services both of these segments together with other stakeholders as well.

3.1 The communication of Český Krumlov Tourism

The Page concentrates on recent or planned events suitable for town's visitors within the horizon of max. 1 month. According to the results of structured interviews, the target group of the Page are young families with children. According to Miroslav Březina, the project manager of the destination organisation, a congruent form or the frequency of shared messages for Czech or foreign visitors or the promotion of thereof has not been fully consolidated yet.

On the 5th of November, the Page had 3900 followers. By the analysis of last ten posts their dedication and the ratio have been appointed. The results can be found in Table 1.

Table 1 Post targeting, reaction and interest ratios for the Český Krumlov Tourism Page

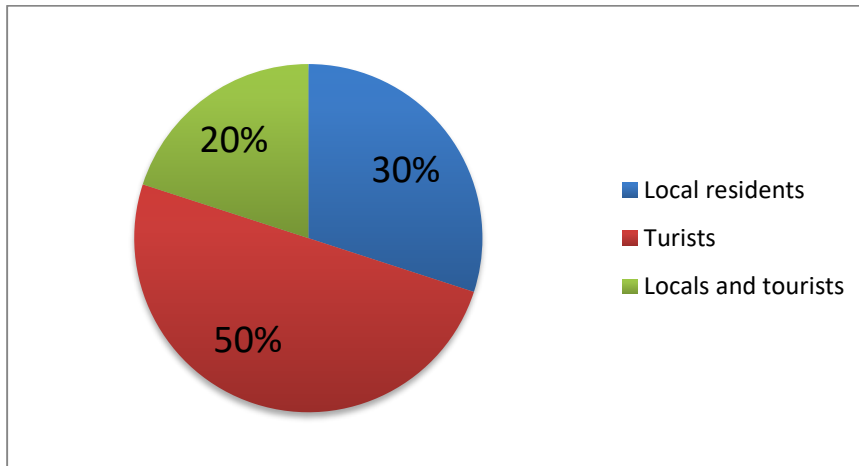
Český Krumlov Tourism	followers	share of posts	average interest reatio	all reactions	like	%	super	%	wow	%	haha	%	angry	%	sharing	% to the fan base
Local residents	3900	30%	2,7%	35	33	94,29	2	5,71	0	0,00	0	0,00		0,00	8	0,21
Tourists		50%	6,0%	172	156	90,70	10	5,81	5	2,91	0	0,00	1	0,58	22	0,56
Locals and tourists		20%	5,0%	34	29	85,29	3	8,82	2	5,88	0	0,00		0,00	1	0,03

Source: Own processing

The posts were found to be mainly targeting the tourists, which is in accordance with the Page's owner's dedication. The biggest interest and most reactions have been found in these types of posts. Although the posts for mixed audience are sparser, a reasonably high amount of interest ratio is found. The lowest interest ratio can them be seen with posts that are targeting mainly local residents. The posts targeting the tourists, then residents hold the biggest sharing ratio and the lowest ratio is for the mixed audiences. In all of the cases, the sharing reaches values that are, compared to other Facebook Pages, satisfactory.

The share of individual posts in the monitored timeframe can be seen in Figure 1. Most of the posts on the Page target Tourists (50% in the monitored timeframe). There were 20% of posts targeting both of the segments and 30% dedicated to the residents.

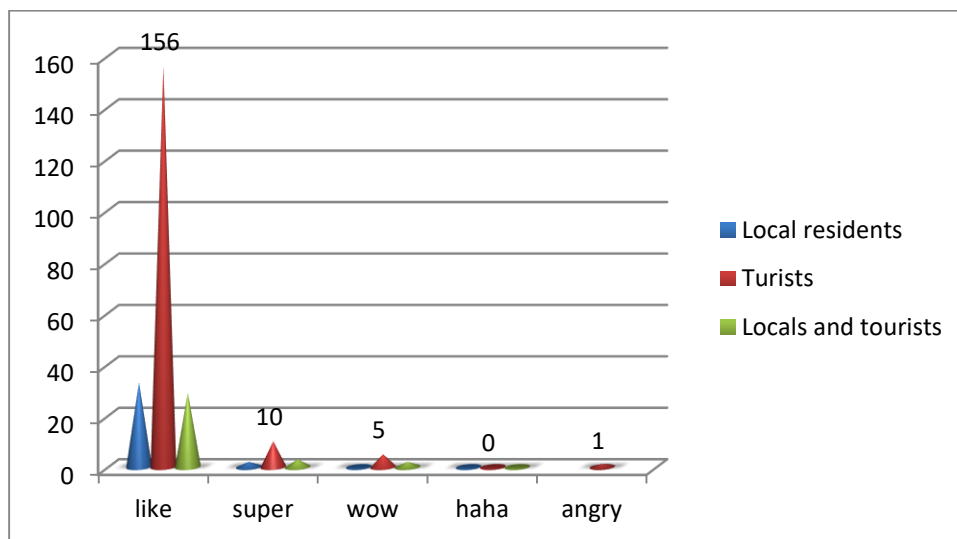
Figure 1 Český Krumlov Tourism Page's post share



Source: Own processing

Figure 2 shows the post reaction ratio. By comparison of the amount of reactions it is clear that most reactions were limited to simple 'liking'. More emotional reactions (super, wow) are seen in the posts targeting the tourists. No significant negative reactions can be seen among the posts for the locals and only one negative reaction has been given to a post for tourists. The unofficial hypothesis of there being stronger negative emotions from the locals among the posts for tourists has not, according to Figure 2, been confirmed.

Figure 2 Český Krumlov Tourism Page's post reaction ratio



Source: Own processing

Figure 2 also clearly shows the targeting of the posts, when the Page's posts for tourists clearly dominate in the amount of likes and other emotional reactions.

3.2 The communication of the Town of Český Krumlov

The information on the Page is targeting mostly the residents of Český Krumlov and its surroundings. The Page concentrates on sharing information regarding the town's, town organisations' and municipal office's activities. The Page also posts about social, cultural and sports events in the town. There are, as to the 5th of November 2019, 6312 followers, which amounts to roughly one half of the town's inhabitants. In comparison the Český Krumlov Tourism, the followership is stronger. The research shows that the town truly focuses on communication with the locals and inviting them to local events. Through the analysis of last ten posts, their ratio and targeting have been appointed. The results can be seen in Table 2.

Table 2 Post targeting, reaction and interest ratios for the Town of Český Krumlov Page

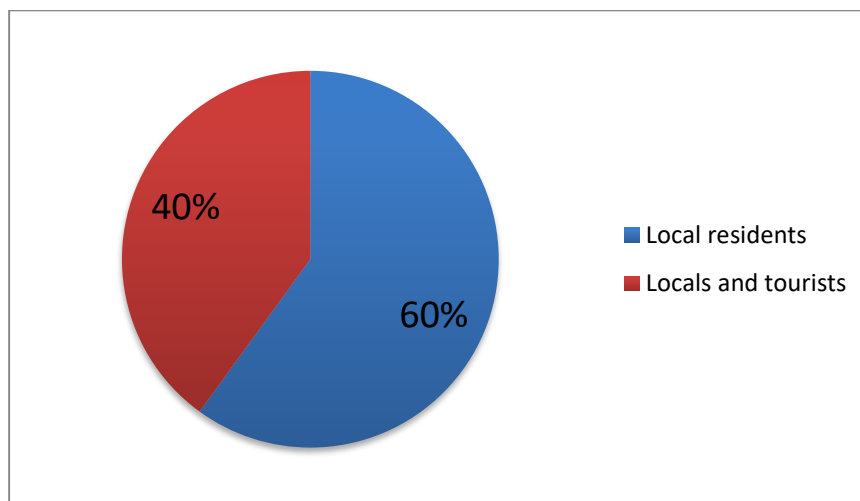
Město Český Krumlov	followers	share of posts	average interest ratio	all reactions	like	%	super	%	wow	%	haha	%	angry	%	sharing	% to the fan base
Local residents	6312	60,00%	8,8%	134	124	92,54	7	5,22	1	0,75	2	1,49	0		19	0,30
Tourists		0,00%	0,0%	0	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00
Locals and tourists		40,00%	6,3%	117	97	82,91	16	13,68	0	0,00	1	0,85	3	2,56	17	0,27

Source: Own processing

The majority of the studied posts were targeting local residents, which is accordance with the Page's owner and dedication. The biggest interest as well as the amount of reactions was spotted with the posts intended for residents. The posts targeting both of the segments also show a big amount of interest, although the posts are more sparse. The highest sharing value has been seen in the posts targeting the local residents but the mixed posts' value is only insignificantly lower. The percentage of sharing when compared to the Český Krumlov Tourism's Page is lower, which does not support our second unofficial hypothesis about community sharing and points towards a lower interest in local politics or events in the town.

The share of individual posts in the monitored timeframe is shown in Figure 3. There was 60% of posts targeting the residents and 40% of posts targeted both of the segments: the locals and the tourists. There were no posts targeting only tourists.

Figure 3 Town of Český Krumlov Page's post share



Source: Own processing

Figure 4 shows the visualisation of post reaction and interest ratio according to Table 2. The table also comprises a '0' row as the Page rarely, but still sometimes also posts information primarily targeting tourists. This has not occurred in the monitored timeframe. The reactions regarding the remaining segments do not vary drastically. There is a higher amount of emotional reactions in the case of posts for locals, which may point towards higher emotional interest in local news. Again, no negative reaction was spotted, which indicates the right targeting and content for the segment.

In both cases, the posts more 'liked' on a Page were targeting the general target audience of the Page. In both cases, pretty images of architecture and nature in the town generated more likes than simple information about events or municipal changes.

Based on conducted monitoring and analysis, any type of post targeting the type of audience corresponding with the target audience of the Page may in this scenario become more 'likeable' and 'shareable' by including an alluring local photograph or video to generate more emotions. In order to be able to devise further recommendations for Page planning, tools and management, more in-depth and long-term research must be conducted.

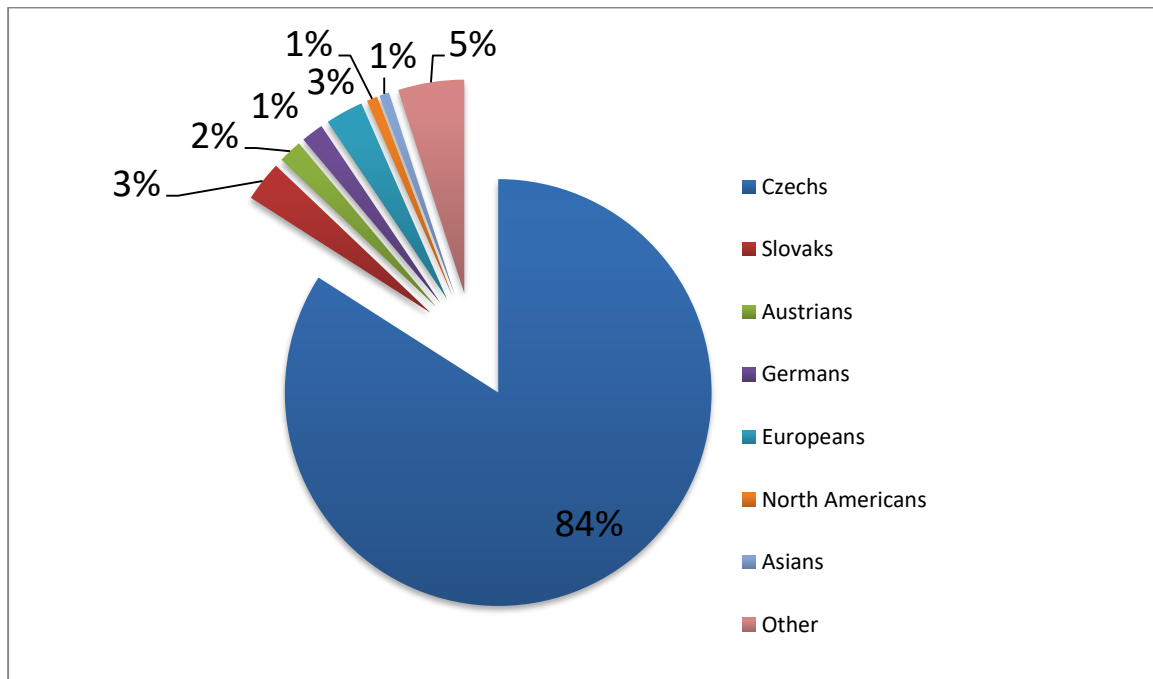
Figure 4 Town of Český Krumlov Page's post reaction ratio



Source: Own processing

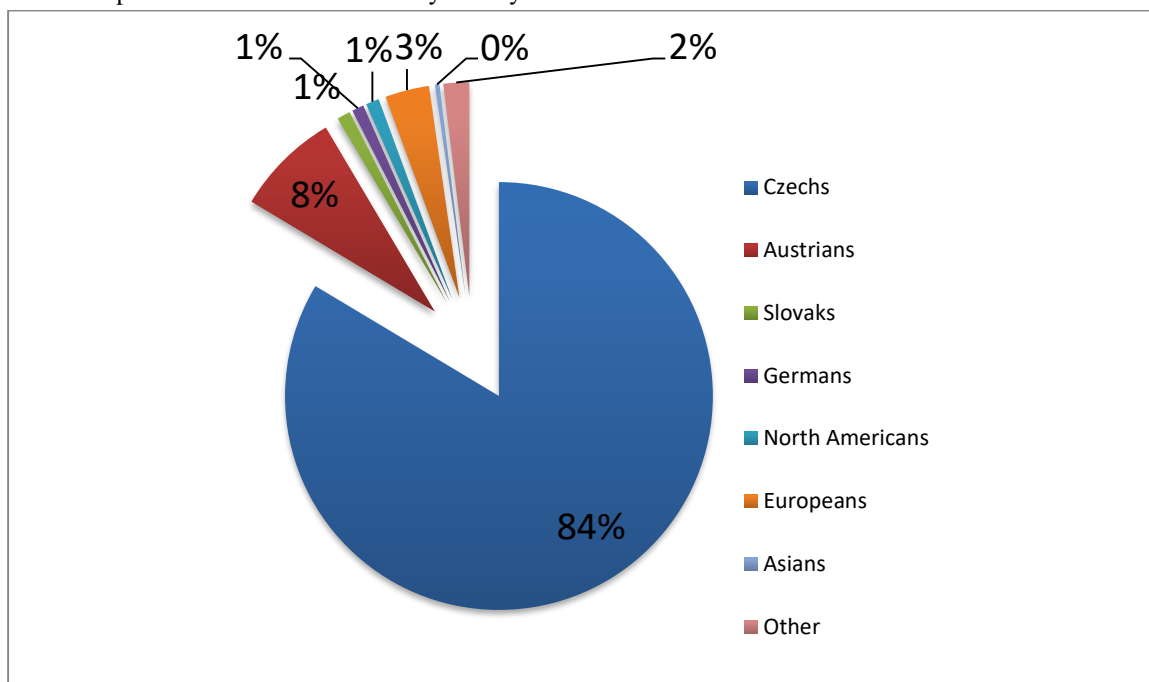
A Czech client can be determined as the main segment of both of the Pages' followers, as seen in Figure 5 and 6. With the Page of Town of Český Krumlov, Czechs are followed by Slovaks and then followers from other European states. In the case of Český Krumlov Tourism, the second largest follower base is the Austrians. This can be explained by the absence of language barrier in one case and mainly image and video content suitable for sharing in the second case.

Figure 5 The comparison of fan-base nationality: The Town of Český Krumlov



Source: own processing

Figure 6 The comparison of fan-base nationality: Český Krumlov Tourism



Source: own processing

4 Limitations and implications for further research

More insight is needed into the phenomena of community sharing based on perceived usefulness to the community (sharing important news among your friends) and the heightened reactivity to posted materials perceived as more personally familiar. Such research may present proposal of changes to be implemented in order to communicate with chosen segments more successfully.

As the data gleaned from the Facebook Pages continuously used for several years close on to the Big Data, their statistical analysis for the purposes of this study has been greatly limited and there is still a potential for further in depth-research. Due to a relatively small bulk of this data analysed to date there is also a significant margin for statistical errors. The authors acknowledge this and see it as an opportunity for continuous research as both of the Pages grow further following their rebranding.

5 Conclusion

This study has been looking to answer the following research questions:

1. Does the dedication of the Facebook Page to a certain segment have an impact on the demographic composition of the fan base?
2. What is the impact of such segmentation on the reactions of both selected target groups online?
3. How is the phenomenon of community sharing reflected in the two selected segments?

1. The answer is affirmative. According to the results, the differences between two Facebook Pages for two target segments are obvious. Each of the sites has different content, approach to its followers and follower demographic.
2. The interest and reaction ratio for the Town of Český Krumlov is 8,8% with the messages intended for residents. These messages receive more likes but fewer emotional reactions. The interest and reaction ratio for Český Krumlov Tourism with the messages for tourists is 6% have the most likes and emotional reactions.
3. While followers often share both the content for residents and for tourists, the highest sharing ratio can be found in Český Krumlov Tourism among the posts intended for tourists, usually beautiful images or videos that inspire emotion. Through this research, two base segments of the destination Český Krumlov were identified. These two segments must be approached differently, as stated in Table 3.

Table 3 The comparison of approaches towards social network marketing segmentation

Segment ->	Local Residents	Tourists
Size	< 100 000	> 100 000
Differentiation	Long-term communication, continuity is necessary	Short-term communication, visual and emotional interest is necessary
Availability	No language barrier, inter-community ties, sharing, need of an incentive	Language barrier but easily grasped interest
Advantages of communication	Positive attitude towards the town, heightened attractiveness of the destination based on valuation and preservation of local culture and including local residents in town's activities	The multiplication effect: economic development, positive influence of foreign cultures, languages, development of local infrastructures and availability of services unless the destination's carrying capacity is exceeded, then the trend turns

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Approaches to marketing activities of small and medium-sized enterprises with closer focus on marketing communication

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Abstract: Our research provides a broad overview of marketing activities used by entrepreneurs which fulfil the criteria set by small and medium-sized business (SMB) categorization. This paper provides a basic introduction to these activities, focusing on approaches towards sustainability and its principles applied in marketing communication. The target file contained businesses with more than ten employees with headquarters in the South Bohemia region. The research sample was based on stratified sampling, where strata comprised the number of employees and the form of business. The results show that marketing activities are predominantly profit-oriented, not primarily designed according to sustainable marketing principles. However, there are differences between those two categories as middle-sized enterprises incline to choose sustainable techniques more often. Also, the selection of used communication tools is different. For their limited budget small businesses often pay for sales promotion and online marketing. Middle-sized enterprises behave differently in using more expensive tools and techniques, such as advertising, event marketing, sponsoring and direct marketing.

Keywords: marketing communication, sustainable development, small and medium-sized business, stratified sampling, promotion

1 Introduction

Small and medium-sized enterprises generally represent the majority of the total number of companies operating in the economic markets. SME's also significantly contribute to the GDP and provide a large part of total employment. Nevertheless, they face many challenges in the global economy (Lukács, 2005; OECD, 2008). Since they operate mostly at the local or regional level, all their marketing activities are thoroughly monitored by all stakeholders. Their actions not only stimulate economic activity but also affect the overall standard of living at the place of business. The region often stands and falls with the development of small and medium-sized enterprises (Veber, 2017; Wong, 2005).

Moreover, small and medium-sized enterprises are characterized by a tendency towards sustainability. Sustainability, as a concept, recently moves the world. The increasing shortage of resources, the effects of extreme industrial production and economic activity affect planet Earth at many levels. The original take – make – industrial waste model is no longer valid and can be replaced by new approaches such as the circular economy (Lacy & Rutqvist, 2015). However, all the approaches usually agree on essential variables determining the system of sustainability. Sustainability should be in that way based on affecting several fundamental problems – business and its impact on non-renewable resources, over-burdening the natural environment and equity between societies and nations (Jenkins & Schröder, 2013).

The concept of sustainability is about building foundations for future success (Hedstrom, 2018) with an emphasis of more ethical, resilient and profitable business practices (Stangis & Smith, 2017). Sustainability is often characterized as equilibrium development, based on respect for available resources, the natural environment and human societies (Cohen, 2002), known as pillars of sustainability (Beheiry, Chong, & Haas, 2006; Duić, Urbaniec, & Huisingh, 2015; Hansmann, Mieg, & Frischknecht, 2012; Rogers, 2001).

Small and medium-sized companies usually tend to respect all these pillars, because of their economic and social effect of the place of business. Unlike large companies, they are closer to the LEAN concept (Trent, 2008). Their operational activities are characterized as less energy and fewer raw material, less extensive or just necessarily outsourced. As a result, they can achieve competitive prices without taking an advantage of returns to scale, respond more sensitively to consumers' needs and wishes, or equalize market changes more effectively (Mason et al., 2015; Zhou, 2016).

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On the other hand, they very often solve the problems associated with lower economic strength, a weaker position in the area of obtaining large government contracts or the inability to fully exploit existing available knowledge (Jasra et al., 2012; Man et al., 2002). Although SME's are characterized as innovation bearers, it is usually simpler innovations, without the possibility of investing heavily in the future development (Madrid-Guijarro et al., 2009; Terziovski, 2010).

Thanks to this, small and medium-sized businesses often have to work specifically in marketing, while facing a lack of finance. It is crucial for their success to communicate effectively with their customers, consumers or communities (Gabrielli & Balboni, 2010; O'Dwyer et al., 2009). Marketing communication is now regarded as a unique competitive advantage and must be seen as a fully-fledged critical point of success. Good communication should include activities such as building, cultivating and differentiating a brand, product or company name, providing information, creating and stimulating demand, highlighting the value, enhancing the corporate image, influencing stakeholders and partners or responding to adverse events (Carson & Gilmore, 2000; Kotler & Keller, 2009). At the same time, they are threatened by an aggressive policy of bigger economic players who can afford to operate for example with dumping prices.

This is quite difficult to manage and within the limited competences of SME's it is necessary to choose very carefully the goals of communication as well as its tools. Some of the tools, such as mass advertising is quite difficult to include into the communication mix, while other tools such as personal selling, sales promotion, PR or event marketing could be seen as the right way to address and reach important stakeholders. The initial situation of SME's is also quite advantageous due to the knowledge of their economic or social environment. Small and medium-sized enterprises are usually closer to their stakeholders (Atanassova & Clark, 2015; Gilmore et al., 2007). Therefore, this article deals with the selection and implementation of communication tools in small and medium-sized companies.

2 Methods

To evaluate marketing approaches of small and middle-sized enterprises, we conducted a survey based on face-to-face and telephone questioning companies selected on the stratified sampling method. The strata were formed a number of employees and company type. The population of interest was defined as companies fulfilling criteria of SMBs, managing their marketing and communication activities, excluding entrepreneurs based on trade licences and microbusinesses. Geographically, the interest was aimed at South Bohemian region in the Czech Republic. The selected sample comprises 220 units, 121 (55 %) of small businesses and 99 (45 %) of middle-sized enterprises. This proportion replicates the layout of the population of interest. Moreover, according to identification numbers, we identified turnover to validate the SMB's categorization and section in national Classification of economic activities. Majority of studied companies are active in manufacturing industry (79; 25.91 %), wholesale and retail trade (38; 17.27 %), agriculture (19; 7.73 %), building industry (17; 7.43 %), transport (16; 7.27 %) and professional, scientific and technical activities (15; 6.82 %). Other activities (36; 16.36%) include, for example, accommodation, administration, education, health care or culture.

Data were collected from April to June 2019. The main objectives were: marketing managing and organization, with a particular focus on marketing communications; marketing and marketing communication strategies and activities, financial issues and evaluation. Moreover, we studied the application of sustainable principles within the process.

3 Research results

Concerning the objectives, our research separately analysed the process of organising the marketing activities, the content of marketing activities, communication objectives and message, the attitude towards selected promotional techniques and tools, budget settings and evaluation.

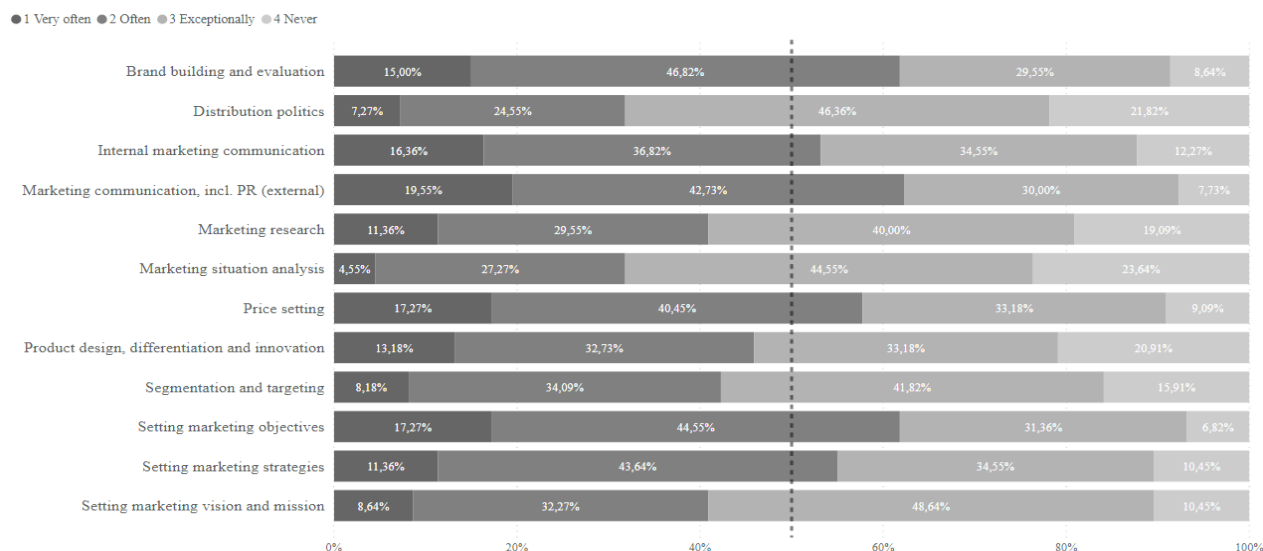
Firstly, regarding the organisational system, the leading of marketing activities significantly differ by company size. Whereas middle-size companies mainly separate marketing department within the company to manage these activities, small businesses predominantly (90; 74.38 %) lead the activities by owners or managers (including hired managers). The working team contain, on average, from 2 to 3 people in small businesses and from 4 to 5 people in middle-size businesses. Both categories of businesses also hire external services to provide determined marketing activities. Small businesses use agencies more often than middle-sized entrepreneurs. This can be explained by the lack of human resources, time limits or exceptional needs of larger campaigns within the small companies.

Moreover, we further focused on companies having their marketing department. More than half of them did not establish it in the beginning or within the first three years of their existence. The respondents stated that, in most cases, the department is called a marketing department directly. Other labels are PR department, marketing office, marketing section, marketing service or purely marketing. The results do not significantly differ by the company size.

Secondly, we analysed the main marketing activities. As Figure 1 shows, there is a wide selection of objectives determined by SMBs. There are six main objectives which SMBs set very often or often in more than 50 % cases: marketing communication in its external (137; 62.28 %) or internal (117; 53.18 %) form, brand building and evaluation (136;

61.82 %) and setting of objectives (136; 61.82 %), strategies (121; 55.00 %) and price (127; 57.72 %). Questioned middle-size businesses also exceed the 50 % border with setting marketing vision and mission (51; 51,51 % of middle-size businesses), compared to that, questioned small businesses themselves do not reach the set border in strategies setting and internal communication. That might bring a hypothesis that small businesses do not, in most cases, often focus on strategic planning and rather actively support more tactical activities. However, this statement needs to be further tested.

Figure 2 Frequencies of marketing activities managed by SMBs



Source: Own processing

Further analyses aim at marketing communication activities. First of all, we concentrated on the objective determination. Our results support the theoretical assumption about frequent quantitative objective orientation. The most frequent goals refer to attracting new clients (183; 83.18 %), increasing the sales volume (181; 82.27 %) and increasing market share (149; 67.73 %). Surprisingly, the respondents very often or often also state brand orientated objectives, such as brand building, sustaining a brand image (168; 76.37 %) and increasing of the brand awareness (167; 75.91 %). On the other hand, the sustainable orientated objective was the least frequent with 74 (33.63 %) respondents who set this objective often or very often. There is a slight difference between small and middle-sized entrepreneurs, as the questioned small businesses inclined to set sustainable objectives less often (74; 33.63 %) than the questioned middle-size businesses (41; 41.4 %).

Table 1 introduces our findings concerning the communication message. There are three main contents of the message: product/service emphasis, company emphasis, social/sustainable emphasis. The questioned companies predominantly underline the performance of their product or service, its specific advantage, utility and technical or professional performance. Less often, companies emphasize their success and other performance. Socially or sustainably orientated messages (highlighted grey) are the least frequently used.

Table 11 Content of communication message

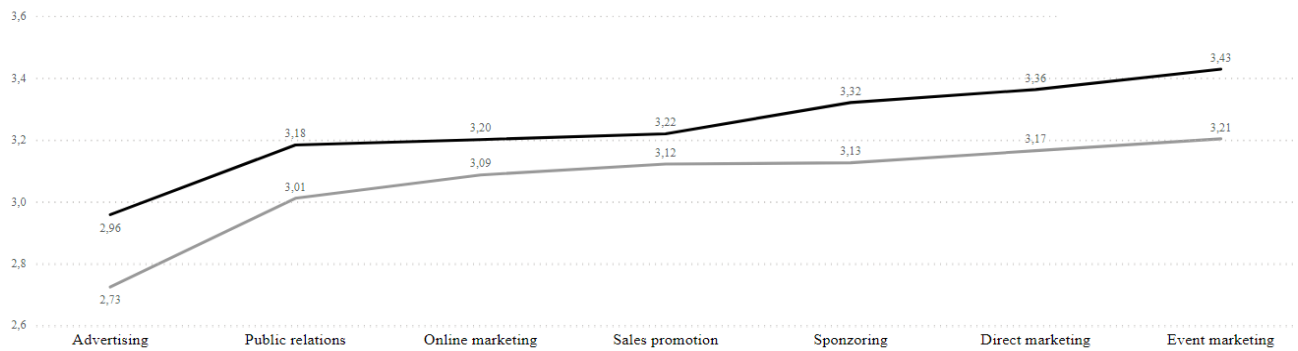
Content of communication message	Absolute frequency	Relative frequency
Product/service performance	156	70.91
Specific advantage of product/service	151	68.63
Product/service utility	148	67.28
Technical/professional product performance	134	60.91
Company's general success	112	50.91
Company's rules, trends and innovation acceptance	102	46.36
Attributes that define brand's identity	96	43.64
Environmental concerns	84	38.18
Cooperation with other companies	79	35.91
Company's performance as a successful employer	73	33.18
Company's financial success	63	28.63
Company's involvement in the community life	62	28.18
Company's contribution to social progress	40	18.18

Source: Own processing

Furthermore, our research focused on analysing the attitude towards selected promotional techniques and tools. Respondents were asked to state the frequency of selected marketing activities. We allocated weights to each frequency,

reflecting its importance and multiplied all the components in each group of communication technique or tool. Figure 2 shows a comparison of small and middle-sized business findings — the lower weighted mean, the more frequently used technique or tool. The behaviour of both categories of businesses is very similar when concerning sales promotion and online marketing. On the other side, the wider differences are in advertising, event and direct marketing. We assume that it might be caused by budget limitations for the reason that both similar activities are not so financially demanding as the activities, which differ.

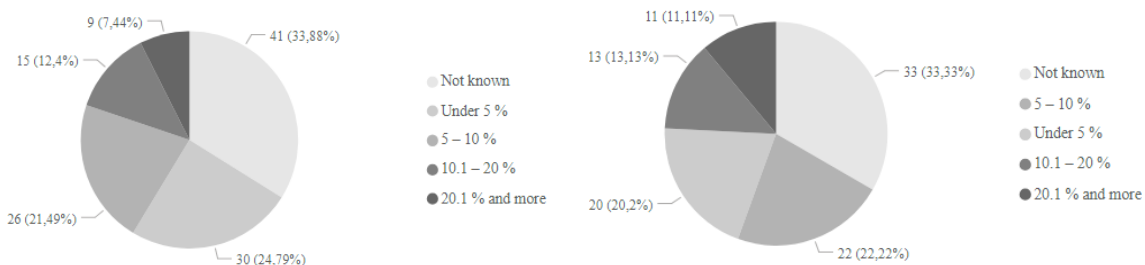
Figure 3 A comparison of attitudes towards selected promotional techniques and tools



Source: Own processing

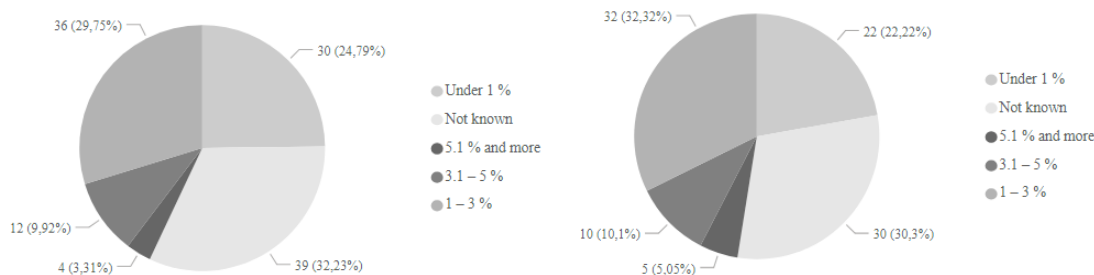
The following analysis confirms the budget limitation of small businesses. We questioned the businesses in our sample about the budget size. Firstly, we aimed at comparing size building an estimated ratio of the marketing budget. Excluding the same number of respondents who were not able to estimate the budget ratio, the layout of relative frequencies does not significantly differ, as introduced in Figure 3. We also assessed the budget size as an annual revenue ratio, which should demonstrate the budget in the context of the real financial sources, as the size of the revenue differs in each category. Figure 4 shows our findings. The layout is comparable again. Therefore, we can assume that the budget of small businesses is more limited than the budget of middle-sized entrepreneurs.

Figure 4 A comparison of small (left) and middle-sized (right) businesses concerning communication budget based on the ratio of marketing budget



Source: Own processing

Figure 5 A comparison of small (left) and middle-sized (right) businesses concerning communication budget based on the ratio of annual revenue



Source: Own processing

Finally, we assessed the evaluation of marketing activities. The respondents of both categories similarly stated that they most commonly use sales analyses (122; 55.45 %), analyses of customer number (97; 44.09 %), customer research

(51; 23.18 %) or other (6; 2.73 %) more sophisticated methods including analytical software GAS (Good Analytical System). Interestingly, 35 (15.91 %) respondents do not evaluate their marketing and communication activities. This number contents mainly small businesses which might be connected with missing strategic planning mentioned above.

Inter alia, questioned enterprises assessed acceptance of sustainable principles by their main product/service. The mean of stated degree is 2.99 for small businesses and 2.79 for middle-sized entrepreneurs on the scale from 1 (product has all attributes of sustainability) to 5 (product has no attributes of sustainability). Even though the larger companies rate their product/service as sustainable more than the small businesses, the difference is not statistically significant.

4 Conclusions

The findings show that marketing management differs by the size of the company. While marketing activities in small businesses are led mainly by the owner or manager and the team often counts from 2 to 3 members, the majority of middle-sized enterprises have separate marketing departments, and, on average, 4 or 5 people cover their teams.

Within the researched sample, the small and medium entrepreneurs predominantly aim their marketing activities at marketing planning, brand building and also at using marketing techniques, such as price setting and marketing communication. The results also differ by the size of the company. Frequently, small businesses apply tactical activities; contrary, middle-sized enterprises more often focus on strategic activities. Moreover, SMBs aim generally at reputation and results, rather than evaluation through research and marketing analyses.

Concerning marketing message, it contents predominantly quantitative objectives focusing on product, its characteristics, specifics and utility. Sustainable and social goals occupy bottom positions in the list of the most frequent message contents. The findings do not significantly differ by the size category; however, they follow trends concluded by Popescu, Vrănceanu & Roșca (2012).

The comparison of the frequency rate of promotional tools and techniques shows that small businesses similarly incline to attitude towards sales promotion and online marketing. Middle-sized enterprises behave differently in using more expensive tools and techniques, such as advertising, event marketing, sponsoring and direct marketing. The explanation is based on budget limitations, which are proved by comparable proportions of turnover ratio. As the SMB's categorisation limits the revenue, small businesses have clearly lower financial sources for marketing activities.

When concerning the evaluation of marketing activities, both categories use similar analyses; however, there are companies performing no assessment techniques at all.

Our findings are based on a survey conducted among small and middle-sized businesses in the South Bohemian region in the Czech Republic. The sample is based on a stratified sampling method and with its proportions adequately represents the population (dataset) of interest. Limits and error rate connected with a lower number of respondents can be eliminated by exceeding the sample. As the data collection was not anonymous, we are able to guarantee unique sample units even in the future. Also, further statistical analyses, specifically causality testing, are planned in connection with different variables.

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Role of Stakeholders within the Strategic Planning in Tourism from the Perspective of Regional Authorities

Jitka Mattyašovská¹

Abstract: This paper is focused on the strategic planning of tourist destinations at the regional level; more specifically, on strategic planning within the tourism in individual regions of the Czech Republic by implementing the stakeholder management into this process. Specifically, it deals with identification and intensity of stakeholders' involvement into the creation of strategic documents of the higher territorial units and application of selected procedures performed by stakeholder management. It is just the stakeholders' involvement that contributes not only to the correct identification of strategic goals and implementation methods but also to their successful accomplishment.

Strategic planning is an essential factor of competitiveness and sustainable development. Likewise, the approach to this issue reflects ever-growing pressure on public responsibility of companies and institutions. Application of this concept on the basis of voluntary commitment, that is to say perception of the broader context covering the social area, environment and stakeholders' involvement, provides the scope for establishment of communication, relationships and co-operation with an impact on the competitive advantage of entities and fulfilment of the sustainable development principles.

Keywords: tourism, strategic planning, stakeholders, regional development

JEL Classification: Z32, Z380, Z39, O89, L83

1 Introduction

Tourism is of great interest at the global level as well as at the level of the European Union, individual states or regions, cities and municipalities. The reason for this is that tourism provably contributes to the economy in all the mentioned territorial units. A positive consequence may be seen its long-term growth, which is continually predicted by UNWTO (2011).

Tourism is regarded to be a significant factor of regional development, as also demonstrated by the fact that it has been a part of regional development policy at the European Commission level where the tourism is defined as a key element for the development of some less developed European regions. The situation in the Czech Republic is similar. Tourism constitutes a part of the Strategy for Regional Development valid for the current (until the end of 2020) as well as future period (2021+). The existing Strategy for Regional Development (2013) specifies that the tourism sector is a specific part of the competitiveness in regions, and it is a very differentiated phenomenon which can be applied in given areas having favourable conditions perfectly suitable for the development of tourism. Furthermore, the Strategy for Regional Development (2013) states that *“as a result, tourism is able to contribute to the reduction of the occurrence of socio-economics disparities in a region (the regions located in peripheral areas, mountain areas, etc.). Many regions perceive tourism as a long-term and the only potential of their development in the area of infrastructure, entrepreneurship and employment policy.”* Ultimately, tourism affects the growth of the standard of living and the wellbeing of residents (Strategie regionální rozvoje, 2006).

Tourism constitutes a part of a key strategic document for regional development in the Czech Republic; and besides, its framework is governed by independent state policy. The Concept of State Policy in Tourism 2014 – 2020 (Mattyašovská, Tučková, 2019) is its tool. This document is followed by strategic documents of the Czech Republic regions, and according to Act No. 129/2000 Sb., on Regions, the tourism sector gained its autonomy (ČR, 2000). All regions in the Czech Republic (excluding Prague Capital City) have a strategic document elaborated for the tourism sector. They are all listed in Table 1.

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Table 1 Overview of strategic documents on tourism sector valid for the regions in the Czech Republic

Region	Strategic material for tourism	Validity period
Prague Capital City	X	X
Central Bohemian	Programme of Tourism Development in Central Bohemian Region	2018–2023
South Bohemian	Concept of Tourism Development in South Bohemian Region	2015–2020
Plzeň	Concept of Tourism Development in Plzeň Region	2014–2020
Karlovy Vary	Concept of Tourism Development in Karlovy Vary Region	2018–2023
Ústí nad Labem	Strategy of Tourism Development in Ústí nad Labem Region	2015–2020
Liberec	Programme of Tourism Development in Liberec Region	X
Hradec Králové	Programme of Tourism Development in Hradec Králové Region	2014–2020
Pardubice	Strategy of Tourism Development in Pardubice Region	2016–2020
Vysočina	Strategy of Tourism Development in Vysočina Region	2017–2025
South Moravian	Programme of Tourism Development in South Moravian Region	2014–2020
Olomouc	Programme of Tourism Development in Olomouc Region	2014–2020
Zlín	Updated Programme of Tourism Development in Zlín Region	2015–2020
Moravian Silesia	Strategy of Tourism Management in Moravian Silesia Region	X

Source: MMR RIS 2018

If we deal with the urgent needs of the strategies of individual regions in more detail, we may conclude that in general, they are identical and directly linked to priority axes included in the Concept of State Policy on Tourism 2014 – 2020. The priority areas in regions include, e.g. destination management, development and exploitation of tourism potential, improvement in the quality of services, communication and co-operation within the territory, marketing, etc. (Kolektiv autorů, 2019).

The development of regions is one of the strategic objectives of the state administration as well as local administration in the Czech Republic. And one of the ways of such development is the tourism, as mentioned earlier. For that reason, it is necessary to pay close attention to the process of strategic planning and administration, and involve the stakeholders who can influence this process, or vice versa; who can get affected by such process and its realisation. Particularly, when such influence is expected to have not only positive impacts.

Thus, what comes first is the mapping and identification of interest groups who are defined as “stakeholders” (an English term) in the professional literature. This process alone is very complex, and there are further difficulties connected with tourism aspects. One of the aspects, a significant one, is a high number and variety of stakeholders affected by tourism, their interests and goals. With no effort, it is possible to find many definitions of the specific term of “stakeholders” in the professional literature (e.g. Freeman, Reed, 1983; Mitchell, Agle, Wood, 1997; etc.). According to Freeman (2001), a stakeholder is “any group or an individual who can affect or is affected by the achievement of the organization’s objectives”. Thesaurus on tourism (Pásková, Zelenka, 2012) does not use the term of “stakeholder”, instead the term of “actor within tourism” [*aktér cestovního ruchu* in Czech] is used, which is defined as “each individual or organization who is involved in tourism and influenced by it, or who has other relation to tourism in a particular destination”. By identification of stakeholders, strategy makers may benefit from e.g. suitable involvement of stakeholders in the process of strategy creation, and consideration of their interests.

In this context, this paper scrutinises the application of stakeholder approach and its extent within the elaboration of strategic documents for the tourism sector at the level of higher territorial units. Šimberová (2010) identifies the stakeholder approach as follows: “Stakeholder approach explains the fact that the goal of an entity is not only to satisfy the needs of their customers and employees but also to represent interests of other groups existing outside market relations and affecting political and public matters”. According to Freeman and McVea (2001), the main goal of the stakeholder approach is to administrate and integrate stakeholders’ relations and interests, which results in a long-term success of the company. “Stakeholder approach emphasizes active management of the business environment, relationships and promotion of shared interests” (Freeman, McVea, 2001).

According to Goeldner, Ritchie and McIntosh (2000), the policy of tourism is regulated by a framework which is formed by rules, regulations, strategies, etc. Consequently, new decisions are adopted within such framework which have impact on the tourism development. Palatková (2006) adds that “the objective of the tourism policy in a destination is to provide the maximum amount of benefits for “shareholders” with a minimum amount of negative impacts”. Palatková (2006) explains the term “shareholders” as e.g. city, region, state, entrepreneur, etc. When paraphrasing the above stated facts, it can be concluded that the goal of the tourism policy in the destination (in this case it is a particular region) is to provide stakeholders with the maximum amount of benefits and a minimum amount of negative impacts.

The stakeholder approach within the process of formulation of strategic documents requires an analysis of stakeholders. First, it is necessary to identify individual stakeholders. The number as well as the size of stakeholders groups depends on a type of an entity and determined goals. Částek (2010) states a possibility of goals determination which narrows down the stakeholders groups, as appropriate. The professional literature frequently describes the stakeholders as e.g. proprietors, investors, creditors, suppliers, employees, local communities, the state, interested

organizations, media, competitors, etc. (Částek 2010). The stakeholders groups cover a larger area of tourism. They also include, e.g. residents, visitors, local administrations at all levels, environment-focused organizations, destination management organizations (DMO), entities arising from culture area and culture heritage, and from social and healthcare area (Goeldner, Richie, 2012).

2 Methods

This paper aims to bring new findings in terms of the approach of selected regions towards the creation of strategic documents in the context of stakeholders management. Based on the literature search in combination with practical findings, a basic table containing 40 stakeholders groups was elaborated. The table is to be used for determination of significance (ranking) of individual groups from the perspective of a respondent. Respondents had a possibility to extend the table according to their practice.

A primary research method is a structured interview held with the officials responsible for tourism agenda at selected regional authorities. This method was used to collect the primary data which were further analysed and compared.

3 Research results

The primarily planned goal of the research is an analysis of the extent of stakeholders' involvement in the process of formulation of strategic documents within the area of tourism at the level of regions in the Czech Republic (CR). Out of the total number of 14 regions (including Prague Capital City), three higher self-governing regional units were selected for the pilot verification. The combination of a structured interview and questionnaire was applied. The interview participants were officials responsible for the tourism sector in the studied regions.

3.1 Identification of stakeholders

The research focuses on the integration of stakeholders in the process of strategic planning within the selected regions. For research, stakeholders are perceived as entities arising from public, private and non-profit areas; and individuals, or their interest groups, are also taken into consideration. Such stakeholders are indicated as bearers in the strategic documents, and targets and individual priorities will be accomplished through them. Entities or individuals or their groups, which are affected by the strategy goals should also be included (Mattyášovská, Tučková, 2019).

The existence of a valid strategic document on tourism was repeatedly verified in all three studied regions. Furthermore, all respondents declared that they include the groups of stakeholders, of which there is quite a large number, in the strategy formulation. Two regions apply the narrowing criteria: territorial importance (local/regional/supra-regional), coordination importance in the territory and the existing cooperation. All representatives of participating regions regard the stakeholders as very important, ranked on the 0 – 5 scale (0 no importance, 5 significant importance) with grade 4 or 5. Stakeholders are defined as follows:

- Identification within a working group created for the purpose of a strategy creation (the group consists of officials from a regional authority who are responsible for tourism, DMO representatives at the regional level, politicians, representative of self-governing unit, experienced professionals, academia representatives, etc.)
- Identification of regional authority officials responsible for tourism.

Based on the experience from the existing co-operation, the officials from one regional authority find the evaluation of the importance of individual stakeholders as fundamental. Representatives of the second authority do not see this aspect as essential; they do not evaluate the importance. According to the officials from the third authority, the importance is essential but only in some cases.

Representatives of all three authorities agreed that they evaluate more facts in stakeholders groups. The overview of the corresponding facts is presented in Table 2.

Table 2 Overview of evaluated facts concerning the stakeholders

	<i>Region 1</i>	<i>Region 2</i>	<i>Region 3</i>
Is there any relationship between the entity and the stakeholder?			
Size of the stakeholder			
Stakeholder's interests			
Urgency during the settlement of requirement or reaction to the stakeholder's attitude			
Stakeholder's attitude towards the entity			
Identification of relationship:			
The entity is in a dominant position towards the stakeholders			
The entity has power over the stakeholder			
The stakeholder is dependent on the entity			
The stakeholder is in a dominant position towards the entity			
The entity is dependent on the stakeholder			
Stakeholder has power over the entity			
Interdependence:			
There is interdependence between the entity and the stakeholder			
The relationship is legal (contractual relationship)			
Stakeholders have legal entitlement towards the entity			
stakeholder takes a risk			
stakeholder has a moral entitlement			
Stakeholder is interested in the entity's activities (no legal entitlement)			
What is the stakeholder's power (his ability to influence the entity)?			
What is the stakeholder's interest/claim?			
What is the stakeholder's attitude (neutral, passive, active)?			
Impact on the stakeholder (weak – strong)			
The anticipated reaction of the stakeholder (neutral, negative, positive)			
Development of the above-mentioned facts			

Source: Own processing

With the aim to determine the ranking of the importance of the stakeholders groups, the individual stakeholders groups were pre-defined on the basis of the professional literature and a long-term experience of the author, in such a manner that they encompass the most higher number of stakeholders with whom the respondents meet in their practice. The total number of groups of stakeholders is 40 and they contain the groups from the public administration area as well as business or non-profit entities. Residents and visitors who are significantly influenced by tourism have also been included. The

respondents were also given a possibility to add other stakeholders to the list. However, none of the respondents made use of this possibility. Table 3 illustrates the preferences of respondents from individual regions. It is evident that all respondents have agreed that the DMO at the regional and local levels is important. Another concordance regarding the ranking and, thus the importance of stakeholders is very low here. There are several factors that might have caused this situation. For example, the strategies completed in different manners, diverse potential, strong stakeholders, level of co-operation, political background, etc. The situation in region 1 is very interesting as the respondents marked all stakeholders with number 1, which means that all stakeholders have the same importance. They claimed that none of the groups is preferred since the partnership principle is observed in the region.

Table 3 Overview of pre-defined groups of stakeholders for the purpose of research

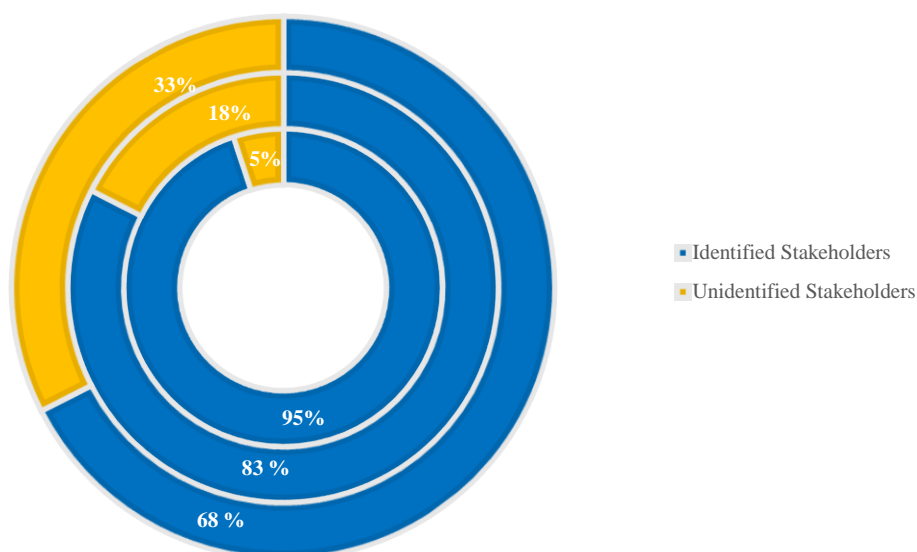
Stakeholders	Ranking		
	Region 1	Region 3	Region 2
Political representation	1	24	1
State administration (ministries, etc.)	1	16	24
CzechTourism	1	10	25
Departments of Regional Authorities (Regional Development, Culture, Agriculture, Environment, Transport, Economy)	1	4	13
Local administration	1	3	4
Union of municipalities and cities	1	11	36
Regional development agencies	1	2	37
Regional Economic Chamber	1	39	39
District Economic Chambers	1	40	38
Local action groups	1	19	33
Microregions	1	17	5
Establishers/founders of DMO at all levels	1	8	34
Regional DMO	1	1	2
Territorial DMO	1	9	3
Local DMO	x	12	14
Non-profit organizations	1	34	26
Profession-oriented organizations	1	18	23
Interest organizations (e.g. Czech Tourist Club)	1	5	6
Civic centres	1	20	32
Tourist information centre	1	6	8
Nature conservation, geological parks	1	13	27
National Trust, owners of historic sites, museum, galleries	1	21	12
UNESCO World Heritage Site	1	38	15

Business entities – collective accommodation, catering, conference facilities	1	14	16
Business entities – individual accommodation facility	1	35	35
Business entities – tourist destinations, amusement	1	15	11
Business entities – events	1	25	17
Business entities – sport, outdoor activities	1	26	18
Business entities – rural tourism, agriculture tourism	1	30	20
Business entities – transport	1	31	21
Business entities – tour operators, travel agencies	1	36	22
Business entities – wellness, fitness	1	32	19
Business entities – possible partners (e.g. strong companies operating in the region)	1	22	31
Spa resorts	x	27	7
Universities	1	23	29
Institutions/organizations within the area of science, education, healthcare, social care	1	33	30
Consulting firms, design companies	1	37	40
Suppliers (a strategy elaboration)	1	7	28
Visitors	1	28	10
Residents	1	29	9

Source: Own processing

Furthermore, the involved respondents identified stakeholders with whom they meet in their practice, communicate or directly co-operate. The overview of the proportion of identified and unidentified stakeholders is presented in Figure 1.

Figure 1 Proportion of identified and unidentified stakeholders



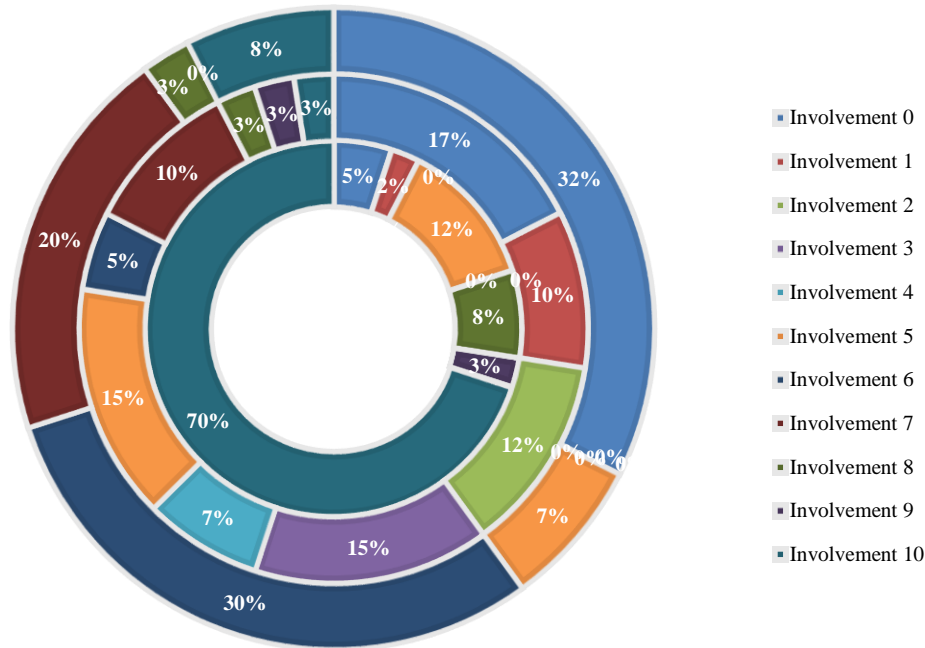
Source: Own processing

Note: the inner circle depicts the results for Region 1, the middle circle for Region 2 and the outer circle for Region 3.

3.2 Extent of stakeholders' involvement

In the next phase, the extent of the stakeholders involvement in co-operation during a strategic document formulation for tourism at the regional level was evaluated. This evaluation is illustrated in Figure 2. The evaluation was carried out on a scale 0 – 10, where 0 represents no involvement and 10 a high degree of involvement. It was possible to realise such involvement of stakeholders for example, through comments to the plan in individual stages of its preparation, participation in a survey based on a questionnaire, etc. The rate of involvement above 5 is shown in Region 1, as much as 93%. Region 2 rated 5 and above for 39% of stakeholders groups. Region 3 declares such rating in 68% of stakeholders groups.

Figure 2 Evaluation of the extent of the involvement of stakeholders into the preparation of region strategic document

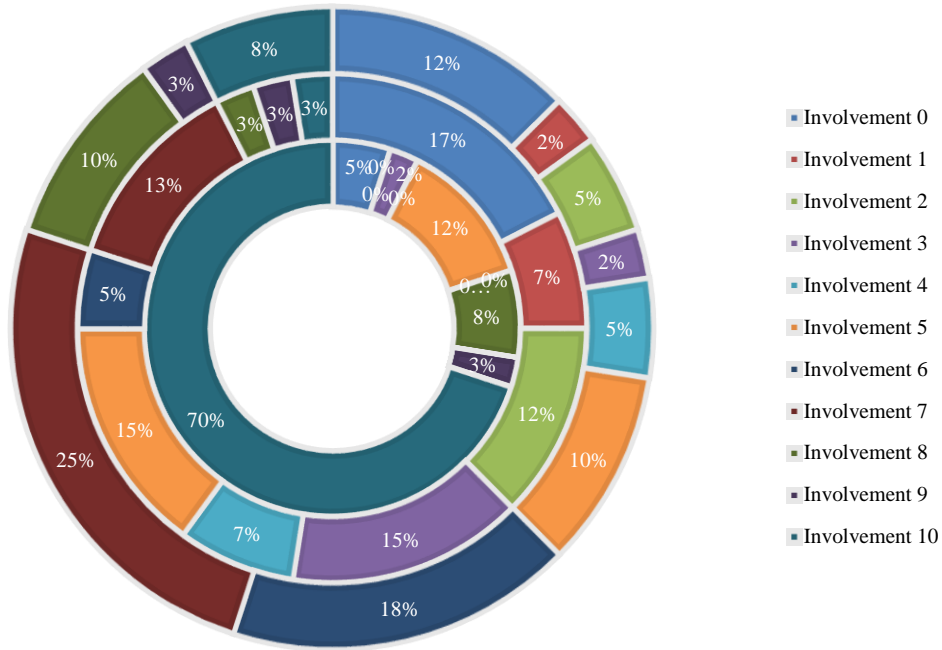


Source: Own processing

Note: the inner circle depicts results for Region 1, the middle circle for Region 2 and the outer circle for Region 3.

Figure 3 presents the evaluation of stakeholders and their importance for the successful realisation of strategic tourism goals from the perspective of responsible workers of the region. Region 1 indicates that the overwhelming majority, i.e. again 93%, is essential for the successful implementation of the strategy. Out of this, 70% of the stakeholders groups are rated on 0 – 10 scale with the highest rating, i.e. 10. Region 2 indicates the same evaluation as in the previous issue, i.e. 39%. The highest rating was 10 in 3% of stakeholders groups. Region 3 rated 5 and above in 74% of stakeholders groups. The highest rating of 10 was attributed to 8% of stakeholders.

Figure 3 Evaluation of the importance of stakeholders groups for successful implementation of the strategy from the regional perspective

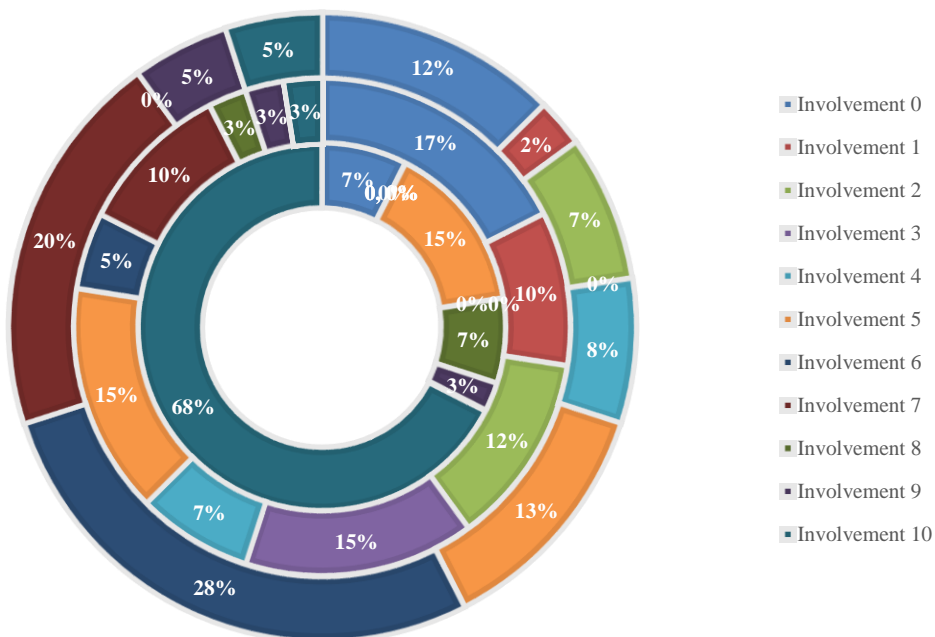


Source: Own processing

Note: the inner circle depicts the results for Region 1, the middle circle for Region 2 and the outer circle for Region 3.

The last Figure 4 indicates evaluation of respondents of the real involvement of individual stakeholders in actual fulfilment of priorities of the valid strategic material of the region. And again, Region 1 rating is repeated, as 93% of stakeholders were rated 5 and above. The respondents of Region 1 attributed the maximum, i.e. 10 points to 68% of stakeholders. Region 2 is again repeatedly considered in ranking and applied the rating of 5 and above to 39% of stakeholders, out of which only 3% of stakeholders rated the highest level of evaluation. Region 3 indicates a rating of 5 and above for 71% of stakeholders. The value of 10 was awarded to 5% of stakeholders.

Graf 4 Evaluation of actual involvement of individual groups of stakeholders into realisation of strategy from the perspective of the region



Source: Own processing

Note: the inner circle depicts the results for Region 1, the middle circle for Region 2 and the outer circle for Region 3.

The question “whether the particular regional authority has a strategy for communicating with stakeholders through Tourism Department” was answered as follows: Region 3 does not have any strategy, and Regions 1 and 2 have the strategy; however, without any official anchoring. This implies that the communication strategy is not processed as an official document. Responsible officials as well as politicians have discussions on regular basis with representatives of individual groups of stakeholders through e.g. e-mails, social media, Council for Tourism Strategy, working groups at the Regional Permanent Conference, and other working and advisory groups within the tourism area (Mattyášovská, Tučková, 2019).

4 Conclusions

The research findings are clear, and they give evidence that the responsible officials from regional authorities are aware of the need to involve stakeholders in formulation of region strategic documents, in this case, documents focused on tourism area. This involvement is of crucial importance in terms of the fact that the stakeholders are very important for the successful accomplishment of the goals determined by the strategies.

Stakeholders are identified in respect of their practical experience and acquaintance with relevant officials from regional authorities, or alternatively, in co-operation with professional public. Two out of three regions are able to determine the order of importance of stakeholders groups for the formulation as well as implementation of strategic goals. In stakeholders groups, respondents evaluate some of the facts stated in Table 2. However, according to Agle, Mitchell and Sonnenfeld (1999) they do not analyse the level of power, urgency or legitimacy which may cause complications in some regions (destinations) in the future for example where visitors concentration is too high or not identified strong partners who can contribute to achieve strategic aims in the destination because cooperation is not developed.

The research shows that stakeholders in the regions involved in the research are given attention, their significance is perceived in the process of formulation as well as in the process of implementation of strategic documents in the tourism area. Discussions organised on regular basis are held with stakeholders or at least with their representatives through online communication channels or within the working groups. Establishment of the communication is perceived as a very important shift in establishing relationships leading to co-operation and partnership. Hence, the co-operation and partnership provide the destination with a very fundamental benefit in the form of a competitive advantage (Mattyášovská, Tučková, 2019). The above findings show further research opportunities, such as stakeholders in their mapping, in-depth analysis not addressed by regions, their networking through network analysis, etc.

Acknowledgement

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Acronyms

CR	Czech Republic
DMO	Destination Management Organizations
MMR	Ministry of Regional Development
UNWTO	World Tourism Organization

Why a marketing realization is financially demanding for some Czech companies?

Marie Švarcová¹

Abstract: The article deals with problems of a marketing realization in some Czech companies. At present time the term “Marketing” is very spread in the Czech Republic. A whole range of firms perceive marketing differently and a realization is represented as financially demanding or nearly very expensive. In many cases the marketing is confused with promotion or advertisement, other firms see in the marketing a “new” form of sale which ought to deceive a customer and consumer into a product. Some firms refuse to realize a marketing fully. Why some firms think in this way, this was a subject of the investigation. The conclusions are aimed at uncovering this fact at selected firms.

Key words: marketing, advertisement, consumer, customer

JEL Classifications: M31, M37

1 Introduction

As the origin of this entrepreneurial activity has been dated since the end of the 19th century and in countries with the developed economy this question was already successfully solved in the last century, so the perception and realization of marketing in the Czech Republic is very problematic at present.

To comprehend the marketing as financially demanding is very deceptive. For this consideration it is necessary to proceed from marketing definitions and characteristics and to find an answer to the question: What is the marketing in fact? An answer can be found at a whole range of prominent authors (Kotler, Armstrong, Perreault, McCarthy, American Marketing Association – AMA, Solomon, Marshal, Stuart, Boučková etc.), for example according to Kotler (1998), the marketing is a social and management process by which individuals and groups acquire what they need and require through a production, offer and exchange of valuable products with others. AMA (2020) defines the marketing as: The new definition reads, “Marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large.” Boučková and coll. (2003) states that the marketing principle is an endeavour to find a balance between interests of a customer and interests of an entrepreneurial subject. The key point of each marketing consideration and subsequently also a marketing decision should be a customer. In another characteristic (Bunešová, 2004) there is stated that the marketing is an activity of satisfaction of needs, wishes and requirements of consumers and customers which we compare with possibilities of our firm with utilization of science, technology and with regard to a space and time, this all for the purpose of a long-term profit realization.

In most cases the main idea is: a satisfied customer. If we are to satisfy customers’ needs, we must identify them firstly. We can identify them only then when we will communicate with customers and consumers. The most simply form of communication is listening, as stated by RC. Whiteley (1991). To know its customer is the basic precondition of a firm success in the market environment. Unrespect this basic idea of the marketing contradicts a successful operation of a firm on the market.

If most people, including some business managers, are to define marketing, then most of them usually say that the marketing is “sale” or “advertisement”, as stated by Perreau and McCarthy (1995). But goods were already sold in the antiquity and advertisement was a part of this sale. Whereas the origin of the marketing activity is connected with modern times – the end of the 19th century. The sale, as stated by Kotler (1998), is a plum on the gateau and the advertisement is only a part of marketing tools (Products, Price, Placement and Promotion). Every producer produced a product already in the antiquity, they bargained over the price, offered their products at some place and it was necessary to inform about that sale in some way and also to draw attention to themselves, what they did, for example they called out, cried, lighted fires etc.

To utilize marketing in the entrepreneurial activity seems to be a platitude at present time and most companies ought to have no problems to accept it quickly but also to work in compliance with the development and research which will be

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reflected in the marketing activity. But it is not the reality for the time being. Many firms, as stated by Perreault and McCarthy (1995), are orientated to a production or they regularly slip to that trend and they must knowingly force themselves to concentrate to interests of customers and to their planning again. A similar piece of knowledge is also presented by Kotler (2004) who states that marketing problems, to which most establishments face, are very aimed at tools of the marketing mix instead of to be aimed at needs, wishes and demands of customers. Solomon, Marshal and Stuart (2006) state, that the marketing relates to real people of meat and bones who must accept difficult decisions; they occupy with the best ways how to create a new product or how to make a product to that extent attractive that it disappears from sale shelves directly before eyes. Is it possible that some managers explain this characteristic just as sale and advertisement? Levitt (1983) named the reality, when a businessman wants to sell products and services without acquainting with customers' requirements, as a marketing short-sightedness and in the year 1983 he proposed the definition for enterprise purposes: Rather than to earn money only, the better is to create and to keep a customer. His image was that a firm survival depends on a customer. He says that *"sale is fundamental for the existence of firms and he argues that the marketing is a much broader concept than sale"*. He states that it is easy to produce goods but much difficult is to sell them in a competitive environment (this fact was pointed out by T. Baťa already in the twentieth of the last century). He furthermore states that the marketing is neglected because a firm feels to be safe. Whiteley (1991) cites Levitt and he states another meaningful idea: ***"People buy solutions of problems, not products, and successful producers are solvers of problems"***. A detection of problems is connected with the activity, inquiry of information about concrete problems which satisfy their needs, wishes and requirements. This activity is realized by the form of communication with a customer – i.e. by a marketing communication.

If a customer's satisfaction or solution of problems is at the first stage in the marketing activity, what costs are spent for finding needs, wishes and requirements? As Whiteley (1995) states in one of seven principles of the book *Enterprise managed by a customer*, to wit: Listen to the customer. We ought to know a customer, to know answers to the questions:

- What are customer's needs and expectations and on which of them he/she cares about most?
- How well are we able to fulfil these wishes and expectations?
- How well are our competitors able to fulfil them?
- How can we cross that border behind which a satisfied customer stands and when this customer will be enthusiastic?

Kotler (2006, page 26) reveals the question of costs of marketing and he states that company managers complain to the fact that their marketing is not effective. They spend still greater and greater costs to marketing and still with smaller results and he substantiates this state as follows:

- They identify marketing with sale.
- They put emphasis on recruitment of customers instead of care for them.
- Pursuit of a profit of each transaction instead of an effort for a purposeful provision of a value to a customer.
- Sale of a product instead of an endeavour to understand and satisfy real needs of a customer.

Intelligent firms orientated to marketing improve their knowledge of customers in consequence of utilized new technologies which provide a whole range of information through the information and communication system. In spite of the fact that these systems were not so perfect, at the beginning of its origin the marketing was realized with a greater respect and weight. Firms knew to listen and they collected information with a greater consistency than now. At our territory, at the beginning of the last century, the marketing was very successfully realized for example by T. Baťa.

2 Methods

This article is based not only on general knowledge of marketing, advertisement and promotion, but also on a studied special literature, experience from practice and also from a performed research. There was processed secondary information acquired from the research of the company Nielsen Admosphere and from primary information. The research at some Czech firms was aimed at the utilization of marketing at firms and at the way in which the marketing is realized at firms. For obtaining information about the present state of firms in relation to marketing and its realization there was used the information from the explorative research of attitudes of chiefs of entrepreneurial subjects (TOP managers and head workers of marketing departments) which was processed with the use of the program "R" and excel. The investigation via questionnaire run at the beginning of the year 2018 by a random method at the probabilistic selective sample of 111 firms.

The investigated Czech firms are classified according to a size of representation: 56.7 % (i.e. 63) of limited liability companies; 22.5 % (i.e. 25) of tradesmen; 15.3 % (i.e. 17) of joint stock companies; 5 % (i.e. 13) of limited partnerships;

1 % (i.e. 2) of public trade companies; furthermore 2.7 % (i.e. 3) of registered associations; 1.8 (i.e. 2) of state enterprises and 0.9 % (i.e. 1) of public-law trade institutions. With a number of employees, from the very small number of employees to organizations employing more than 250 employees, in the list: 49.55 % (i.e. 55) of firms with the number of employees from 1 to 10; 18.92 % (i.e. 21) of firms with the number of employees from 11 to 50; 18 % (i.e. 20) of firms with the number employees above 250 employees; 9.9 % (i.e.11) of firms with the number of employees from 101 to 250 and 3.6 % (i.e. 4) of firms with the number of employees from 51 to 100. The territorial distribution is represented by the following regions: Central Bohemia, Southern Moravia, Southern Bohemia, Karlovy Vary, Ústí nad Labem, Plzeň, Highlands, Hradec Králové and Prague. The list of towns and cities reflects only the representation with a greater number of respondents: České Budějovice, Prague, Písek, Strakonice, Jihlava, Pelhřimov, Český Krumlov, Tábor, Prachatice, Jindřichův Hradec, Benešov, Příbram, Karlovy Vary and other towns with a small number of representation of respondents. Subjects of entrepreneurial activity at investigated Czech entrepreneurs are very diverse and are arranged according to a number of representations. 25.2 % (i.e. 28) in the sphere production: 6.3 % (i.e. 7) building industry, 5.4 % (i.e. 6) mechanical engineering, 5.4 % (i.e. 6) textile production, 3.6 % (i.e. 4) foodstuffs production, 0.9-1.8 % (i.e. 1-3) products of wooden products, timber processing and other productions in a small representation. For the sphere of services 74.8 % (i.e. 83) – 21.6 % (i.e. 24) business units, 10 % (i.e. 11) sphere of tourism, 6.6 % (i.e. 7) financial services, 3.4 % (i.e. 4) sphere of transport and distribution of propellants. Other entrepreneurs providing services are represented in less than 3 % (i.e. 1-3) electric power distribution, IT technologies, consultancy, advertising services, market research, marketing, real estate agency, optics, car sale, personal agencies and others.

Of the total number of 20 questions which related to the marketing characteristic and ways of its realization, furthermore to the marketing activity, compilation of marketing plans, i.e. also to problems of finding needs, wishes and requirements of customers, consumers. A very significant part there were questions relating to the form of the marketing realization in a firm by a form of open questions and at closed ones with a possibility of more answers. That is why a sum of the percentage share need not to be equal 100 in the total sum. Example: Marketing is realized by the form of advertisement but also with the use of social networks or by advertisement and promotion etc.

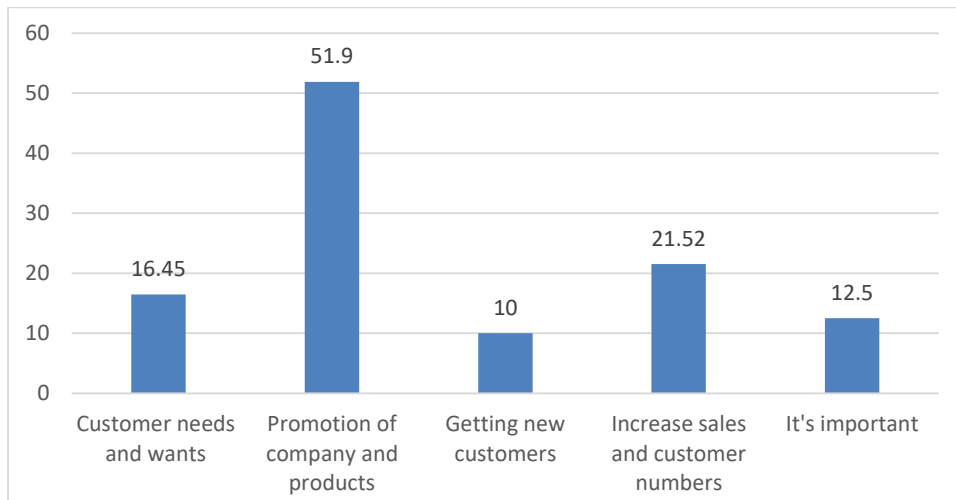
3 Research results

The result of the research realized at selected Czech entrepreneurs was surprising in relation to a great number of entrepreneurs who did business as tradesmen or as s.r.o. (limited liability companies) with prevailing number of employees by 10 and contemplating the marketing as an advertisement. Opinions of entrepreneurs (respondents) on the marketing importance in the firm are mostly coincidental and they see the essential necessity in its realization. They see a variety in the utilization but they are again mostly coincidental in the marketing realization by the form of advertisement. A creation of marketing in the firm is positively evaluated by 71 % (i.e. 79 answers) and they state that they utilize the marketing. But the full 72 % (i.e. 57 answers) of this number of answers of surveyed firms stated that a marketing activity in their firms is realized by making an advertisement. 17.5 % of answers realizing the marketing by promotion and sale support. Only in 3.75 % respondents represent the marketing activity by questioning and communication with customers. Social networks are utilized in 7.5 %, to wit both for communication and for advertisement purposes. Only in one answer social networks were utilized for questioning (i.e. 1.26 %). (See Tab. p. 5)

Approach of entrepreneurs to marketing utilization in firms

The entrepreneurs state that they use marketing for various reasons (see figure 1). In 16.45 % (13 answers) the entrepreneurs state that finding customers' requirements is the reason for marketing utilization. In a greater representation the entrepreneurs state a promotion of the firm and products 51.9 % (i.e. 41 answers). 10 % (i.e. 8 answers) of entrepreneurs stated as a reason of the marketing utilization the recruitment of new customers. Other answers in the percentage of 21.52 % (i.e. 17 answers) state as a reason of the marketing use the increase of a sale and a number of customers and in 12.5 % (i.e. 10 answers) state as a reason the essential necessity of the marketing use.

Figure 1 Reasons of the marketing utilization by some entrepreneurs in the Czech Republic (in %)

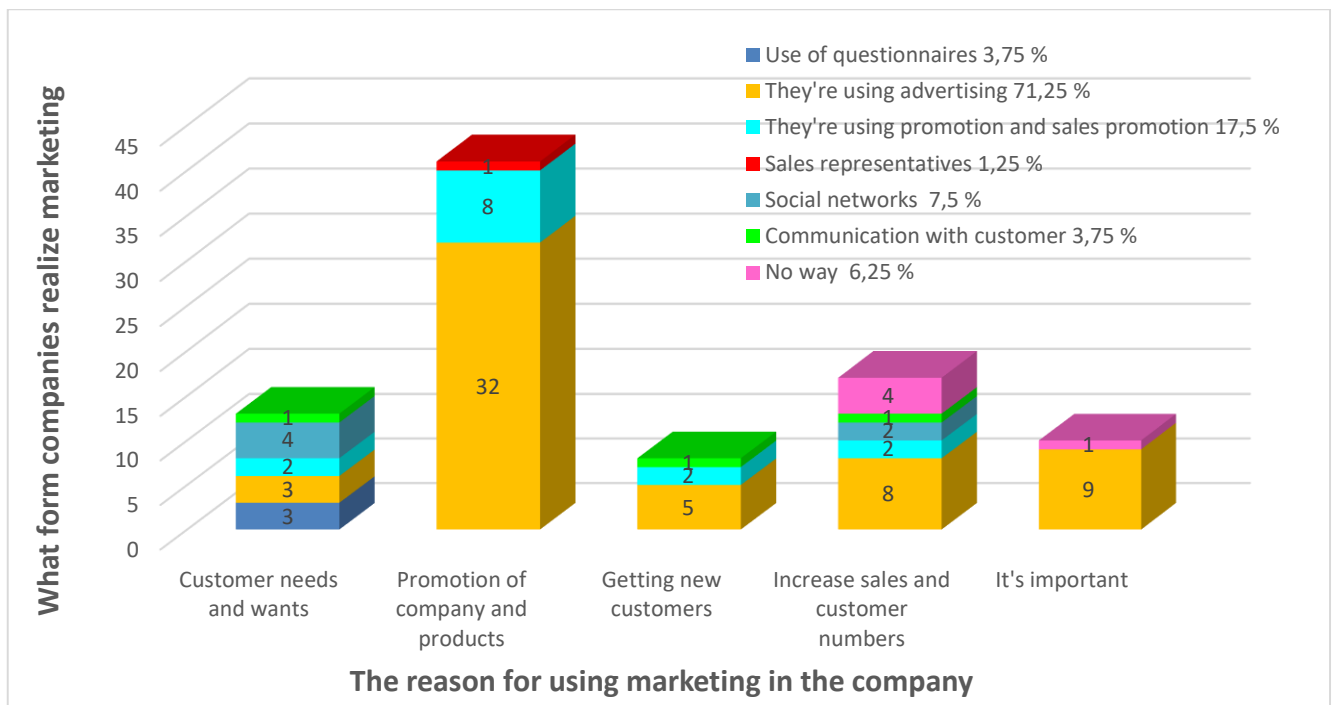


Source: Authors

Approach of entrepreneurs to forms of the marketing realization in firms

As follows from the figure 2, there is evident not only the reason of the marketing utilization but above all the way (form) in which single entrepreneurs realize the marketing in the firm. In spite of the fact that the entrepreneurs answered that they realized the marketing for that reason that they needed to find requirements of customers (13 answers = 100 %), so of this number they state that they find requirements: in 30.77 % (4 answers) by means of social networks, in 23 % (3 answers) by the form of advertisement and the same percentage representation was stated by the entrepreneurs for questioning and inquiries, in 15 % (2 answers) they state a realization in the form of promotion and sale support, and in 7.7 % (1 answer) they state a communication with a customer. Entrepreneurs who use the marketing in the firm for reason of realization of the firm and products promotion, in 41 answers of this number there are 78 % of answers that they realize by advertisement, in 19.5 % by promotion and sale support and in a minor quantity (1 answer) by a communication with a customer. The remaining answers are in a small representation, as follow from the graph 2 and from the table 1.

Figure 2 Approach of entrepreneurs to the marketing utilization in firms (number of answers = 100)



Source: Authors

Table 1 Approach of entrepreneurs to utilization and realization of marketing in represented answers (in %)

Marketing is used in business for the following reasons: What form companies realize marketing:	Ways (forms) of marketing realization in firms							
	The reason for using marketing in the company							
	Use of questionnaire, inquiry	Advertisement	Promotion, sale support	Business representatives	Social networks	Communication with customer	No form	
Customers' needs	16,45	3,75	3,75	2,5		5	1,26	
Promotion of firm and products	51,9		40,5	10	1,25			
Getting new customers	10		6,25	2,5			1,25	
Increase of sale and customers' number	21,52		10	2,5		2,53	1,25	5
It is necessary	12,2		11,05					1,25
Total	112,37•	3,75	71,25	17,5	1,25	7,53	3,75	6,25

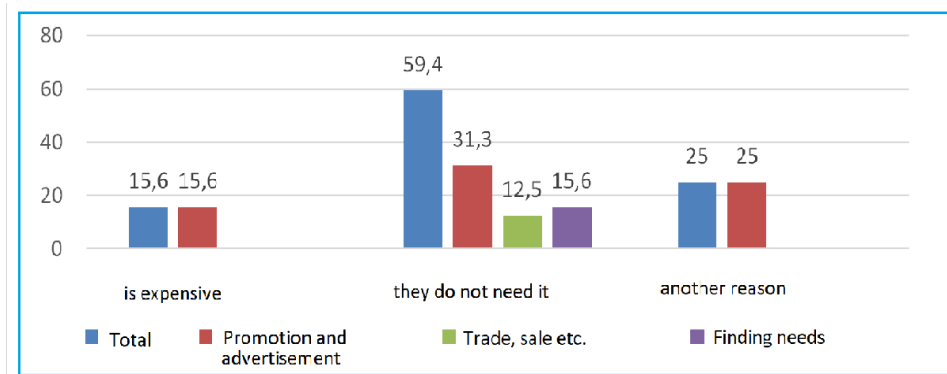
• Some questions could be answered by more possibilities, that is why $\sum \neq 100\%$

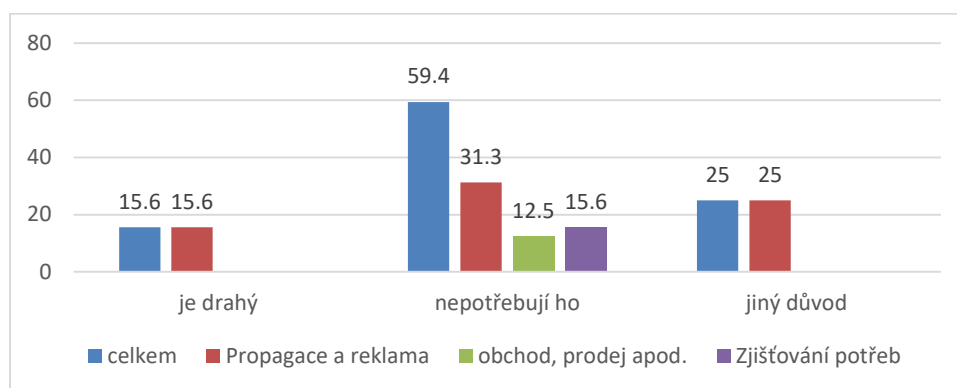
Source: Authors

Entrepreneurs who do not realize marketing in firms

In 28.83 % (i.e. 32 answers) (See figu 3) the entrepreneurs state that they do not realize marketing. As a reason they in 15.6 % (5 respondents) state that it is too expensive. They see a financial demandingness in promotion and advertisement (specifically in 6.24 % in sale support and in 9.36 % in advertisement realization). 59.4 % (i.e. 19) entrepreneurs state that it is not important for the firm, they do not need it. Of this number 31.3 % (i.e. 10) of entrepreneurs state a promotion and advertisement as a reason, 12.5 % (i.e. 4) entrepreneurs do not state a reason why they do not realize a marketing but 15.6 % (i.e. 5) entrepreneurs state that they do not need a marketing because they know that the marketing is used for finding needs, wishes and requirements of customers. Another reason why the entrepreneurs state that they do not utilize the marketing was the option – another reason. This another reason was mentioned in 25 % (i.e. 8) cases, coincidentally with an advertisement and promotion.

Figure 3 Survey of answers of entrepreneurs who do not use marketing (in %, 32 answers = 100 %)





Source: Authors

With regard to the fact that there is a great representation of answers relating to an advertisement or promotion, there is in some media given information about expenses on advertisement and on some advertisement means. According to inquiries and advertisement expenses monitoring the company Nielsen Admosphere (www.nielsen-admosphere.cz) states a growing trend for the next period. In the last year the expenses exceeded the 100 milliard limit and they are still continue to rise. The given datum, as mentioned by the source, does not record expenses on a sale support nor on other tools of promotion (Public relations, personal sale etc.). That is why it is possible to state that products promotion is financially demanding at present. Provided a question relating to advertisement expense is put, as supposed, so it would not be answered. On the basis of several telephone calls this fact was confirmed. The entrepreneurs did not want to answer and they stated that there was the question of internal information.

All entrepreneurs use some other form of a sale support for making their firm more visible on the market and drawing attention to their products and firm, but the advertisement has the greatest representation of this support because it arose with the trade and it will cease to exist also with the trade.

4 Conclusion

In conclusion it is possible to state that acquired results point out a very important fact to which it is necessary to pay a great attention. To look at marketing as at advertisement is very dangerous for reason of competitiveness and existence of firms in the market environment. To identify needs and requirements of customers and consumers is the basic precondition of a successful development of an entrepreneurial activity. A marginalization of recognisability of needs, whether for reason of exchange for advertisement or for reason of getting new customers or for reason of stating that a marketing is not necessary or that it is too expensive, can lead to problems in the firm or to its cessation. Of the total number of respondents there are only 3 answers connected correctly with the marketing activity and full 65 answers with the advertisement and provided we connect also promotion and product support, there is the question of 79 respondents. With adding those who do not use marketing for reason of financial demandingness is that number 84 and for another reason (they do not need marketing, it is unnecessary for them) in the number of 92 answers of entrepreneurs i.e. 82.88 % of the total number of respondents (111 respondents). This number is very high because it is considered in relation to marketing utilization, but in the form of advertisement or promotion.

By confusion of advertisement for marketing there is explained a statement of financial demandingness because costs of advertisement, as already mentioned, continue to rise. It is not possible at present not to use advertisement media and advertisement means. A direction of the present trend is based on sizeable expenses of advertisement. Consequently it is possible to say that advertisement is financially demanding but there are also other forms of a product support which are not financially demanding, example. How much does a smile cost? And it has a non-substitutable place in a product promotion.

Also marketing has its non-substitutable place in an entrepreneurial activity and it is based on a recognisability of needs, wishes and requirements. One of the marketing activities which is not financially demanding is a customer's recognisability. To get to know a customer, we must be able to listen. There are many ways in which a customer communicates with us and what he/she tells us, what he/she asks and what he/she needs (example: to analyse complaints, claims, to investigate customers' reactions). How many entrepreneurs do record questions to products which are missing in the firm? What conclusions they do from such information? From what sources they can get information? We can get answers also by putting ourselves into customers' shoes place, that we will know their feelings, expectations, opinions, proposals for improvements etc. From needs of customers we ought to do a measure of success.

On the basis of found facts there has not been proved a causal connection among a size of firms, form of business or a subject of entrepreneurial activity to a marketing realization predominantly in the form of advertisement. It cannot be said: that small firms realize marketing in the form of advertisement, but it can be said nor about large companies.

There can be more reasons why the terms marketing, advertisement and promotion are mutually interchanged. It can be the question of the fact that marketing was not used in centrally planned economics and that is why a foreign literature is more used. On the basis of some studied translated foreign literatures into the Czech language it can be said that translations are often inaccurate. I see another problem in the translation of the term marketing itself which can be translated into the Czech language variously (according to a content), but this term is not translated even if a content is different and that is why mistaken interpretations occur contrary to other languages, for example the German language. Provided a problem is in the translation, afterwards I recommend using the experience from the age of the First Republic when the marketing was at our territory used by various outstanding entrepreneurs who had and have a success in the whole world, for example Tomáš Baťa who already in 1892 understood the importance of a customer for an entrepreneurial success and he expressed his relation to a customer in the slogan "Our customer our Lord". This entrepreneurial clan is a symbol of the First Republic and it was renowned by its moderate economic policy and respect to employees (Janda, 2019); Daniel Swarovski, a Czech native, glass cutter, who left to Austria later and who has been up to now known by his ground glass of crystal glass in the whole world; Carl Hardtmuth, the founder of the firm KOH-I-NOOR in České Budějovice etc. Furthermore it would be suitable for Czech entrepreneurs to pay a great attention to listening to customers, not only to those present but especially to those future ones.

The question for discussion:

Why is it consequently necessary to spend constantly greater and greater costs of advertisement provided we produce products according to customer's wishes?

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B2B Relationship to Fair Trade

Jan Šalamoun¹, Hana Volfová²

Abstract: A fair trade reason is to meet the needs of today's society provided the quality of future generations life. As well as fair trade and sustainable consumption is one of the main goals of companies that lead up sustainability at all levels of human being. Business companies are gradually setting specific patterns of their behavior in relation to activities related to fair trade issues. These steps should lead to sustainable management including but not limited to recycling at all levels of the production and distribution chain, the development and communication of environmentally friendly products and services, and the use of renewable energy sources. The general fair trade concept is based on vertical cooperation between traders of developed countries and small producers from developing countries.

Keywords: business, fair trade, sustainable consumption

JEL Classification: Q01, M31

1 Introduction

The reason for fair trade is the effort to meet the needs of contemporary society provided that the quality of life of future generations is not undermined. As well as fair trade sustainable consumption represents the main goals of companies in relation to sustainability at all levels of human being. Companies gradually set specific patterns of their business in relation to activities related to fair trade issues. The actions by companies should lead to sustainable management including but not limited to recycling at all levels of the production and distribution chain the development and communication of environmentally friendly products and services and the use of renewable energy sources. The general concept of fair trade is based on vertical cooperation between traders of developed countries with small-scale producers from third world countries. Fairtrade International aims to ensure ethical treatment of the citizens of developing countries. If the necessary conditions are synchronized traders around the world can sell trademarked products (Fairtrade®, Rainforest Alliance, World Fairtrade Organization, UTZ) knowing that they contribute to improving the quality of life for people in developing countries.

We have been dealing with fair trade products for several years in the Czech Republic. More and more new brands are entering the market and questions are increasingly being asked about what each brand and logo represents and which products are or are not “fair”.

The aim of the article is to identify the needs of existing business entities in the Fairtrade system and the problems of new entrants to this system.

Fairtrade is the most widely known all over the world and widespread concept of social certification and is often translated as “fair trade” (Hesková et al., 2014). Business relationships based on mutual communication, respect and transparency that underpin the Fairtrade philosophy make it possible for disadvantaged producers and workers to improve their living and working standards (FLO-CERT, 2011).

Fair trade is, by definition of FLO (FLO-CERT GmbH), understood to be a business partnership based on bilateral dialogue between producers from so-called developing countries and their partners from developed countries. A prerequisite is long-term cooperation that ensures the relevance of the whole relationship (FLO-CERT, 2011). DeCarlo (2011: 2) defines fair trade in a similar way that is to say a trade partnership based on dialogue transparency and respect striving for greater equality in international trade. By offering better trade conditions safeguarding the rights of producers and workers in developing countries it contributes to sustainable development. Fair traditions actively support producers by raising awareness of the concept and campaigning to change the rules and practices of conventional international trade. According to Hunt (2012) the main essence of this system is the association of individual farmers from developing countries under unified producer organizations, which significantly strengthens the bargaining position towards large traders which usually require the purchase of large quantities of a production.

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Chambolle and Poret (2013) explain the fair trade system as a vertical communication between producers (peasants) and spot market distributors selling finished products. On the spot market there is often a so-called “snowball” effect on the one hand, fair trade organizations provide manufacturers with various types of contracts, including, for example guaranteed minimum purchase prices of their commodities or direct relationship with distributors. On the other hand, some manufacturers decide to make contact with distributors of fair trade products on their own. In practice however this poses serious problems with the sustainability of fair trade production. However, producer organizations do not act on their own, it is certification that meets the requirement of process transparency.

Fairtrade plays an important role in the relationship with manufacturers, distributors and customers.

Fair trade is according to Manning et al. (2012) An innovative value chain aimed at providing greater economic value and social benefits to primary producers in less developed countries through international trade in food, beverages and domestic products. Its aim is to improve the trade status of small farmers, in particular with a guaranteed minimum price and focus on development and poverty alleviation. Cooperatives of small fair traditional producers must meet labor standards, sustainable agriculture and democratic participation. For fair traditional products a minimum price is guaranteed, which is not affected by fluctuations in world prices. In general, the price accepted by fair traditional manufacturers is significantly higher than the price received by non-Fairtrade manufacturers. In addition to the price to be used in community, social, health and infrastructure investments, social premiums are also paid (Dammert and Mohan, 2015).

Distribution chains have played a strategic role in spreading knowledge about fair traditional products. For example Co-op UK launched its own product line in 2000 Tesco introduced its own line of products in 2004 since 2006 Marks & Spencer has only supplied fairtrade coffee and tea (Wright and McCrea, 2007) and the Italian Coop Italia received the 2005 Ethical Award for its Solidal brand from GDO Week magazine (Cremonini, 2007). Among the coffee distribution chains Starbucks was at the forefront of purchasing certified coffee from its suppliers to sell only Fairtrade certified coffee (Manning et al., 2012).

Distribution chain strategies generally contribute to increasing global sales of fair traditional products but do not represent a transformational message through their involvement (Bezençon and Blili, 2009) because distribution chain workers are unable to provide fair trade explanations and materials or information on related initiatives because this information is part of the world fair trade agreements. As a result consumers purchasing fair traditional products in mainstream supermarkets may be considered a segment of the mass market that is more heterogeneous in terms of purchasing incentives than the market represented by consumers who identify themselves as ethical consumers (De Devitiis et al., 2012).

So far research into fair traditional products has according to Andorfer and Liebe (2012) focused mainly on consumer attitudes following a theoretical approach based on social psychology and sociology (Chatzidakis et al., 2007; Doran, 2010; Hwang and Kim 2018). Fewer studies followed an economic theoretical approach to ascertaining consumer preferences for fair traditional goods and thus their research objectives were estimating the implicit price of consumers or willingness to pay for products labeled as a trade mark (Loureiro and Lotade, 2005; Maietta, 2005).

Some sources have also highlighted the role that gender plays in shaping consumer preferences for fair traditional goods since women who are predominantly family shopping are more likely to be more interested as a result of their consumption decisions (Micheletti, 2003). Women have historically been important in promoting ethical consumerism and generally show stronger preferences for these kinds of public goods (Zelezny et al., 2000; Aidt et al., 2006; Carlsson et al., 2010). Thus the profile of an ethically oriented or socially responsible customer is the profile of a relatively young woman living in a middle to high income urban area, a high level of education and a high level of individual social capital subsidies (De Devitiis et al., 2012, Koos, 2012, Yang et al. 2012).

However, research questions as to whether and how the socio-economic context affects consumers' values and habits of fair traditional products are relatively neglected in the literature. This also applies to the role played by aspects of the social structure that defines social capital (eg universal trust, widespread civil standards and association networks) in shaping consumer preferences for fair traditional goods (Putnam, 1993). Social capital which is related to the assets and resources available through network interactions, helps to share information. This may include socially responsible issues and could raise awareness of these issues thereby increasing the willingness to pay for them. Moreover the set of shared values for fair traditional organizations is tangible and clearly identifiable as it is linked to the pursuit of a better standard of living in the developing world.

Former UK Prime Minister Tony Blair summed up this phenomenon very aptly: “Globalization is a fact. Not only financial but also communication, technological and cultural or travel. In the world of internet information technology and television globalization will be. The challenge is not to stop it, but to harness the power of society and link it to justice.”(2001, in Dicken, 2007:3).

Fairtrade is a concept inherently connected with increasing dependence of national economies export burden and above all the phenomenon of today - globalization (Hesková et al., 2013). If we want to look for the cause of globalization we must go back more than fifty years before the Second World War when in the context of the extreme depletion of all production resources the dependence of national and regional economies on the stronger it did not weigh so much (Hoogvelt, 1997). There was interconnection not only at the economic but also social cultural or technological level and this collectivization suddenly enabled the world (especially the Western) to consume cheaper and more affordable food clothing appliances and other products (Raynolds, Murray, Wilkinson, 2007). But at the cost of global competition from huge companies the dictate of the lowest prices and the underestimation of human power and the environmental factor.

Justice is the essence of the concept of fair trade which developed in four basic waves. The first took place just after the Second World War when Western Europe tried to recover economically with the support of handicrafts from Eastern Europe (Nicholls, Opal, 2005).

In the second wave so-called alternative trade organizations (ATOs) were created with the aim of offering manufacturers the opportunity to trade with developed countries without disadvantageous reduction of feed-in prices. (Bornstein, 2007). The first pioneers were well-known companies like Traidcraft UK founded in 1979 in the UK or the German Gepa a subsidiary of the originally Dutch Stiftung S.O.S. (Gepa, 2013).

Third we can understand the efforts of these alternative business organizations to offer products to a broad consumer base. This stage was also characterized by the introduction of brand policy with the first fair trade brand in 1988 named "Max Havelaar" according to a character from an amendment to the exploitation of coffee collectors in Dutch colonies. (Hunt, 2012) and has been adopted in many European and North American countries. With some modifications it is generally used to the present day and shields many other products besides coffee. The Fairtrade philosophy itself is now communicated through the Fairtrade® trademark which guarantees that products labeled in this way have been certified to Fairtrade international standards. By purchasing these products consumers contribute not only to improving the living and working conditions of many producers but also to protecting the environment.

Karjalainen and Moxham (2013) are steadily increasing the number of fair trade products available as demand for socially responsible products increases. In practice however this poses an increasing threat of fierce competition with other branded products. Although consumers are starting to push organizations towards ethical behavior they are not yet willing to pay higher prices. In order to get the price of fair trade products down the distribution network policy needs to change. At present the simple rule applies - the more distributors the higher prices for end consumers. For this reason is one of the main efforts of fair trade organizations is to minimize intermediaries.

It is the strengthening of the growth of fair trade products in the mainstream consumer policy that is the fourth and so far the latest wave of Fairtrade development when large global companies such as Sainsbury's or Starbucks have adopted this concept. (Nicholls, Opal 2005). In 2004 in addition to coffee, tea and chocolate Tesco UK offered consumers for example fruit and fair trade flowers in retail chains. (Moore, 2004).

2 Methods

The main aim of the article is define Fairtrade in terms of sustainable consumption and further to introduce the Fairtrade certification process from the perspective of certification authorities such as FLO-CERT GmbH. In addition to a specific application will be presented the theoretical framework of fair trade.

The main research method of this work is the synthesis of already known knowledge of leading authors who have been dealing with this issue in the long term. The conclusion of the work is reflected from the author's own opinion after the above synthesis.

3 Results

In order to establish a partnership in relation to fair trade, it is necessary to establish the principle of joint cooperation. For this purpose there is a method of certification that lays down rules for mutual economic benefit.

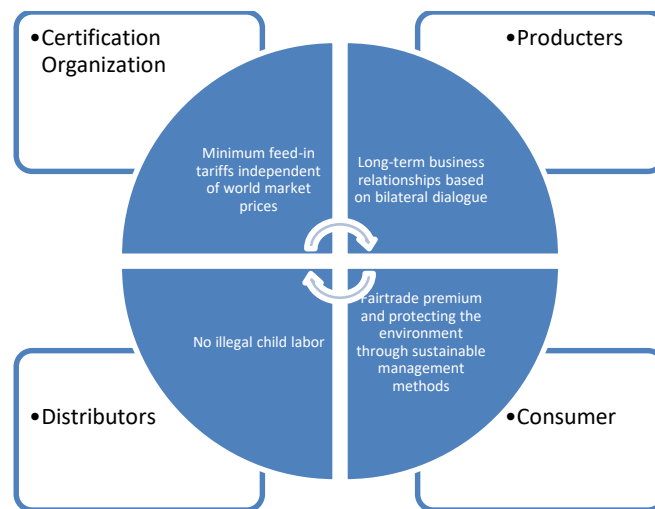
The term "certification" generally means the contracting authority's assessment of the beneficiary's fulfillment of the criteria. The certification system is undoubtedly associated with various problems both financial and organizational in nature. Not every organization even if it meets the most stringent certification criteria can afford to be certified due to limited resources or to offer a certified product. Within a Fairtrade® certification system it is possible to certify a specific product not a manufacturer dealer or distributor. The Fairtrade® certificate on the product means that those involved in its production or the production of the raw materials needed to produce it have received a fair reward for their work, enabling them to live in dignity and develop their community. In 2003 the certification company FLO CERT GmbH was

established distributors and supervision of compliance with the criteria resulting from this certification. There are dozens of auditors of this company who carry out certification activities around the world.

The basic certification criteria that describes a picture 1 include according to FIO-CERT, 2011 the following:

- Minimum feed-in tariffs independent of world market prices.
- Long-term business relationships based on bilateral dialogue.
- No illegal child labor.
- Fairtrade premium.
- Protecting the environment through sustainable management methods.

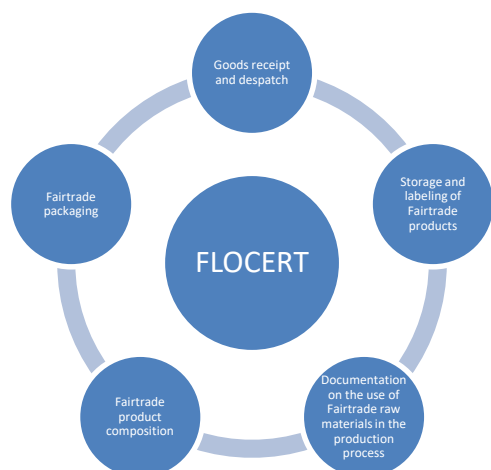
Picture 1 Certification criteria during relationship to Fair Trade



Source: own processing according to Hesková (2013)

However, producer organizations do not act on their own; the requirement of transparency is met by certification. This is overseen by the independent FLO-CERT (under the umbrella of the FLO - Fair Trade Labeling Organization) which according to international Fairtrade standards as stated (Nicholls, 2005) assists producers with certification services especially in relation to establishing long-term relationships and good practices fair trade products but also performs audits and continuous checks of all certified entities. (Oosterveer, Sonnenfeld, 2011). In the late 1990s trademark communication initiatives merged to create an international certification body for Fairtrade an international labeling organization called Fairtrade Labeling International (FLO). FLO-certified coffee has also started selling in supermarkets; in this case however the marketing chain was longer and less direct as the roaster mostly bought green cherries from various distributors which in turn buy them from export companies and cooperatives. The main difference from the conventional value chain was that individual producers operating on large plots or large farms were excluded from contracts (Valkila et al., 2010). The FLOCERT's check is based on the steps which has shown the picture 2.

Picture 2 The FLOCERT's check



Source: own processing according to FLO-CERT (2011)

4 Conclusions

Due to the transparency and credibility of the Fairtrade system the entire partner chain needs to be constantly monitored. It is already apparent from the above that Fairtrade certification is required for the production or processing of fairtrade products as well as for trade in fairtrade raw materials which is provided by an independent FLO-CERT company based in Germany under the auspices of Fairtrade International.

The Fairtrade certification itself takes effect only after the entity has received a trading permit from FLO-CERT. Subsequently the fairtrade raw material can be purchased processed and traded. Most often FLO-CERT carries out regular audits that involve both physical inspection and accounting audits of all areas that are important for the production and processing of Fairtrade products.

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Economics of Agriculture

Viability of small and large farms in redefined areas with natural constraints in the Czech Republic

Tomáš Hlavsa¹, Marie Štolbová², Zuzana Hloušková³

Abstract: The agricultural system in the Czech Republic has a distinctly dual structure of farms. Average farm size is the highest in the EU, and enterprises with several thousand hectares of land are not at all unusual. This is also true in areas with natural constraints (ANC). The impact of the changes in the definition of ANC in the Czech Republic since 2018 and the introduction of new rates of ANC payments into the ANC farm economy were modelled. Farms were classified according to the size of utilized agricultural area (UAA). The goal is to show the need for changes in the future ANC scheme. Several differences were found, such as in the profit per hectare UAA, the employment differences measured by the annual working unit (AWU) per 100 hectare of farmland and in the farm viability indicators. A change in the thresholds used of the degresivity of ANC payments for the next programming period in order to help smaller farms in the Czech Republic is then recommended.

Keywords: ANC, ANC payment, economy of scale, viability

JEL Classification: B41, C10, Q14, Q18

1 Introduction

Support for farms in areas with natural constraints is related to the "European model" of agriculture where agriculture plays a role not only in food production but also in the maintenance of the cultural landscape, environment and biodiversity as defined in the Cork Declaration (1996).

Another important shift was noted in Agenda 2000 (EC, 1997), namely, that rural development became the second pillar of the Common Agricultural Policy (CAP). The measures funded by the EAGGF Guarantee Section in the previous period were supplemented with support for less-favoured areas (LFAs). The reform should ensure multifunctional, sustainable and competitive agriculture in Europe, including in problematic regions. The concept of European agriculture is linked to the objectives of the current CAP, which are themselves connected to the EU's development goals as defined in the Commission's Communication Europe 2020 Strategy (EC, 2010), namely: (1) smart growth – knowledge and innovation; (2) sustainable growth – competitive / ecological / economy more resource efficient; and (3) promoting inclusion – employment, social and territorial cohesion. A strong emphasis is placed on the role of small – and medium-sized enterprises in meeting these objectives. Within the overall CAP framework, support for rural development in the 2014-2020 programming period contributes to the achievement of these objectives by focusing on promoting the competitiveness of agriculture, ensuring sustainable management of natural resources and climate action, and achieving a balanced territorial development of rural economies and communities, including job creation and sustainability. (Regulation (EU) No 1305/2013).

One of the important measures supporting the European model of agriculture is support for farmers operating in less favourable conditions. Studies of the agriculture and public goods production stress the role of less-favoured areas (LFA) (EC, 2009) „Well-managed agricultural landscapes have not only high eco-system values, but with their scenic and recreation feature they are also a key asset for other businesses, such as the tourism industry“. Following the objectives of the current CAP payments to farmers in mountain areas or in other areas facing natural or other specific constraints should, by encouraging continued use of agricultural land, contribute to maintaining the countryside as well as to maintaining and promoting sustainable farming systems. Less-favoured areas have already been divided into three sub-areas: mountain areas, other LFAs and areas with specific constraints.

The definition of Other areas has long been criticized. The Court of Auditors (2003) has criticized inconsistencies as well as differing approaches to farmers in EU countries; criticism has also emerged in research results (Shucksmith, Thomson and Roberts 2005, Dax 2005, Cooper, et al. 2006). Experts of the Joint Research Center (JRC), Eliasson, Terres and Bamps (2007), have drafted a report proposing a set of biophysical criteria that should define areas with limited agricultural production due to less favorable soil, topography and climatic conditions in Europe.

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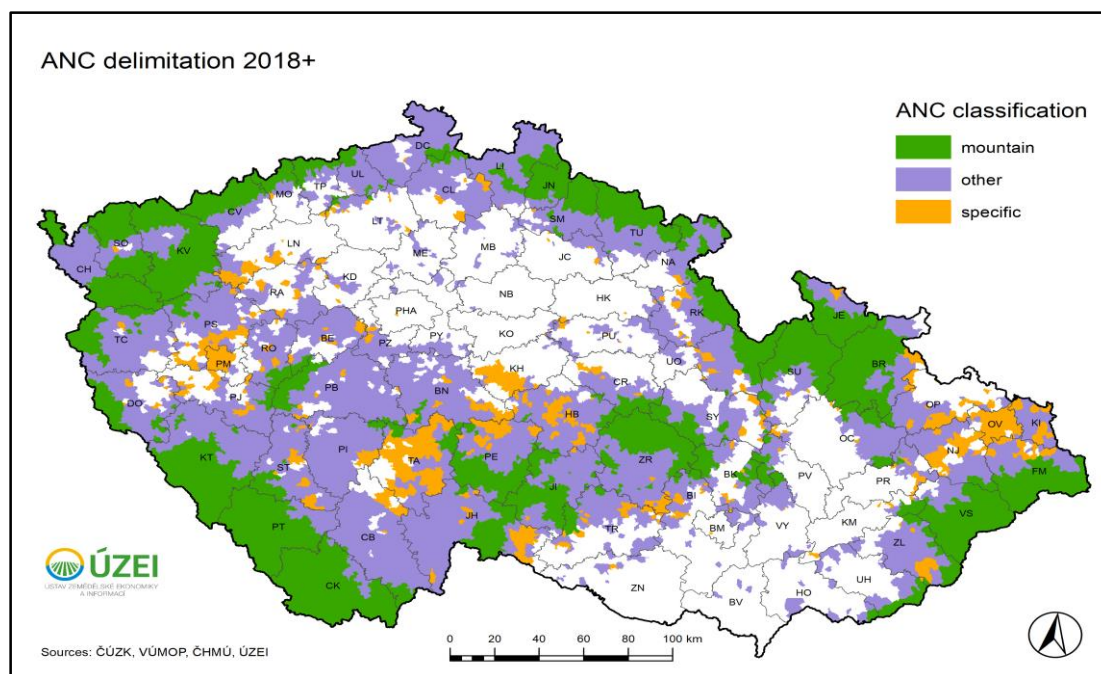
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In 2009, detailed guidance on the application of the criteria was developed (Böttcher et al., 2009), including the proposal of a threshold level for individual criteria. Approved proposals for common criteria have become part of the Annex to Regulation EC and EP No 1305/2013. By 2018, Member States had to apply these criteria to their territories and redefine the areas for support. These territories are now called areas with natural constraints (ANC).

Since 2018 the schema of ANC in the Czech Republic has changed. The defined area increased from 50.1% to 56.5% of the UAA.

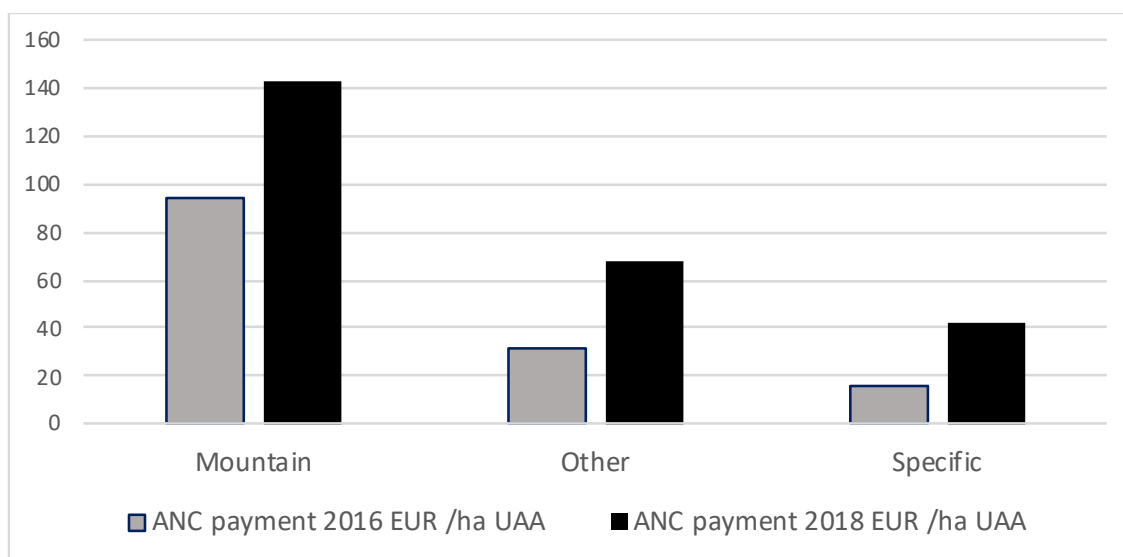
Figure 1 Areas with Natural Constrains (ANC) in the CZ since 2018



Source: VUMOP, CUZK, CHMU, UZEI created by Kucera UZEI

At the same time, ANC payments in the Czech Republic have increased compared to the previous period. Basic payments were differentiated according to the farming system of single farms (predominantly animal production – increase of payment rate by 35%, predominantly crop production decrease by 42%). Average ANC payment per ha of UAA after redefinition in comparison with previous average payment is shown in the Figure 2.

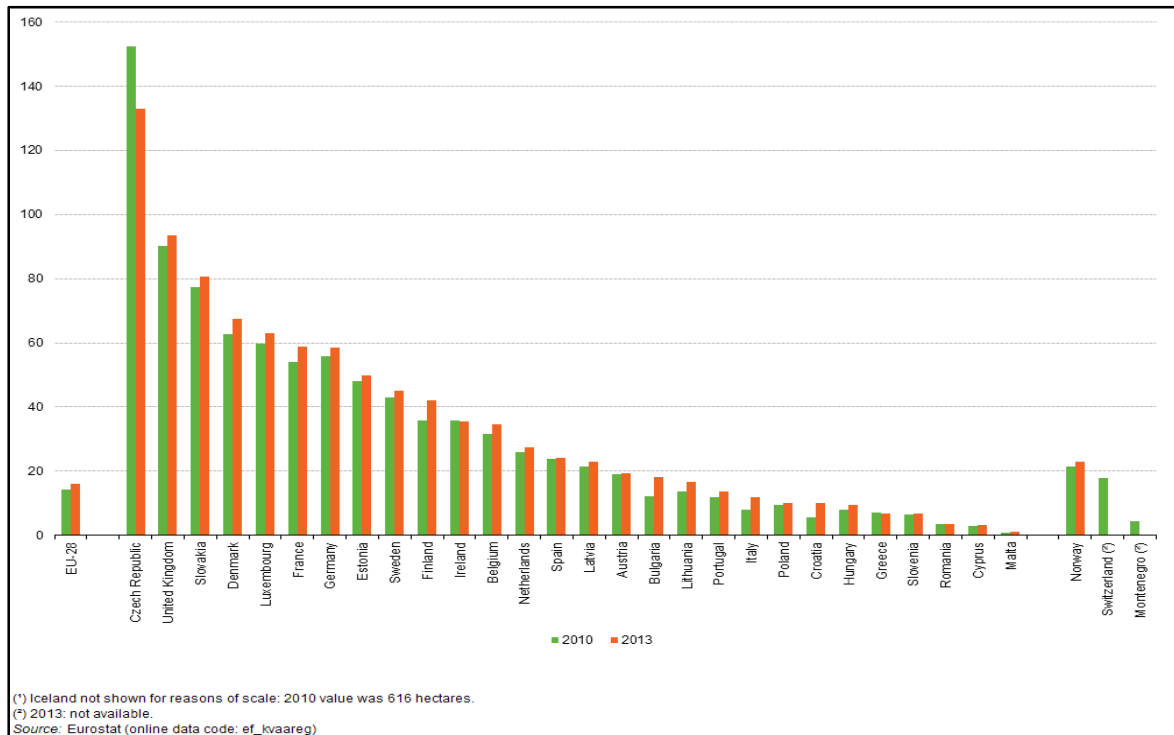
Figure 2 Comparison of average payments by ANC category



Source: the authors, based on FADN 2016, LPIS and model

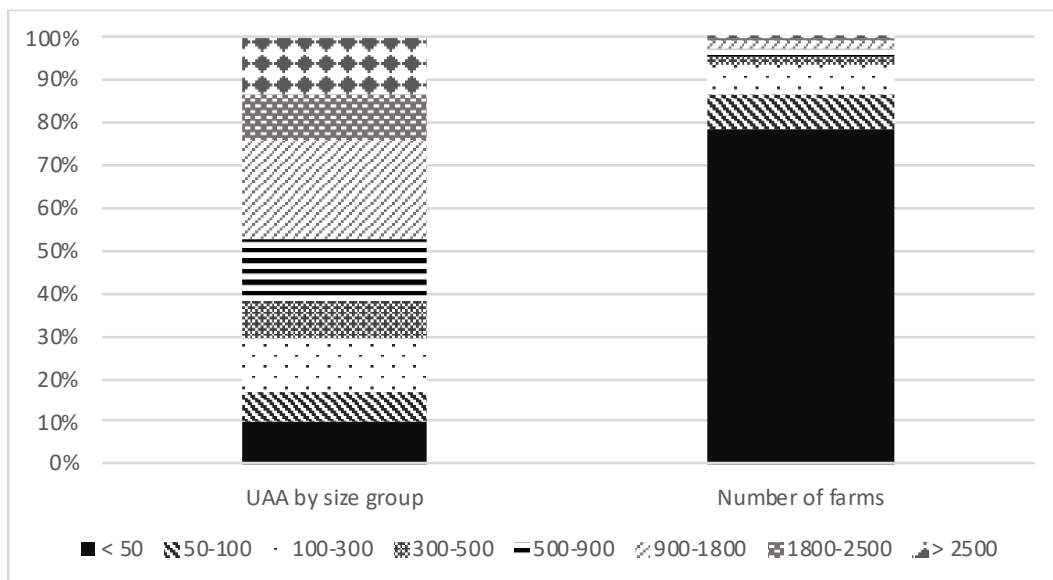
The Czech Republic has the highest average farm size compared to other EU countries (Figure 3). It has a distinctly dual structure of farms, enterprises with several thousand hectares of land being not at all unusual. Similarly, these large farms also operate in ANC. In these areas 80% of all ANC farms use only 10% ANC land (Figure 4).

Figure 3 Comparison of average farm size in EU countries



Source: Eurostat

Figure 4 Dual structure of ANC farms in the CR



Source: the authors, based on LPIS

Regulation EC and EP No 1305/2013 mandates that EU countries apply gradual reductions in ANC payments depending on the hectare size of the farm (degressivity of payment). It is based on the idea that large farms can benefit from their size. In the programming period 2007-2013, the LFA payment degressivity system was not implemented in the CR. The degressivity of the ANC payment rate was determined as follows:

Table 1 Degresivity of ANC payments rates

Category ha UAA	Degresivity rate %
up to 300 ha	0
300 ha - 500 ha	-10
500 ha - 900 ha	-18
900 ha - 1 800 ha	-22
1 800 ha - 2 500 ha	-27
more than 2 500 ha	-30

Source: MZe 2018 Rural Development Program 2014-2020

The objective of this paper is:

- to assess selected economic indicators of farms in ANC by size groups, taking into consideration new conditions since 2018.
- to assess the viability of small and large farms in the new ANC conditions

2 Methods

Agricultural farm data in the ANC were analysed in accordance with size classes. For the classification of individual farms by ANC 2018, the LPIS and the share of the UAA belonging to the ANC were used.

Farms representing the ANC were categorized into size groups according to their UAA. Size groups have been set with respect to the limits used in the Czech Republic for the degressivity of ANC payments. The group of farms up to 300 ha of UAA was divided into 3 subgroups. A more detailed breakdown of the size group up to 300 hectares was used with respect to the practice of most EU countries that use a significantly lower threshold for full-rate payments for the determination of degressivity rate (Cooper, T. et al., 2006).

The FADN CZ database for the year 2016 was used for analyses. The FADN database provides for internationally comparable data for assessing the income of agricultural holdings and the impacts of the Common Agricultural Policy. (Vrolik et al. 2010, Diazabakana, et al. 2014, Andersen et al. 2007, Brennan et al. 2016) The FADN database is a powerful tool for the evaluation of the economic viability of farms. Farms of the FADN 2016 were classified according to the ANC in effect since 2018. Data on agricultural land of individual farms registered in the Land Parcel Identification System (LPIS) and allocation of land blocks according to the redefined ANC 2018 were used. In the 2018 economy model, the actual ANC payments based on FADN 2016 were replaced by payments modelled under the new conditions in 2018. The farms were then grouped into size groups.

First, the exploratory data analysis was employed on the economic results of farms analysed in the FADN database. The goal was to clean the data and reduce the impact of outlying observations. Farms with outlying results were excluded. The identification of outliers was based on the Tukey Fences. An outlier is value below $Q_1 - 1.5(Q_3 - Q_1)$ or above $Q_3 + 1.5(Q_3 - Q_1)$, where Q_1 is first quartile and Q_3 is third quartile.

The economic results based on farm group averages were compared. Economic prosperity by ANC farms by size classes was measured by the following indicators:

Indicators

- Farm net value added (FNVA)
- Farm net value added (FNVA) per annual working unit (AWU)
- Current subsidies and ANC payments
- Modified profit

FNVA should cover not only the paid wages of employees but also the expected income for an unpaid labour force including owners (opportunity cost of equity). Modified FNVA (MFVA) was used in the calculation of profit.

$$MFNVA = \text{Farm net value added} - \text{Wages} - \text{Interest paid} - \text{Rent paid} \quad (1)$$

Subsequently, the reference average income per unpaid worker (Family Labour Unit - FWA) was established. This income was used as the opportunity cost to farmer's unpaid labour and the modified profit was calculated.

The average annual wage of an agricultural worker recorded in the CZSO's survey "Average Gross Monthly Wage Survey by Activity of CZ-NACE" was also used to estimate the opportunity cost for FWU and the level of modified profit was calculated according to the following formula:

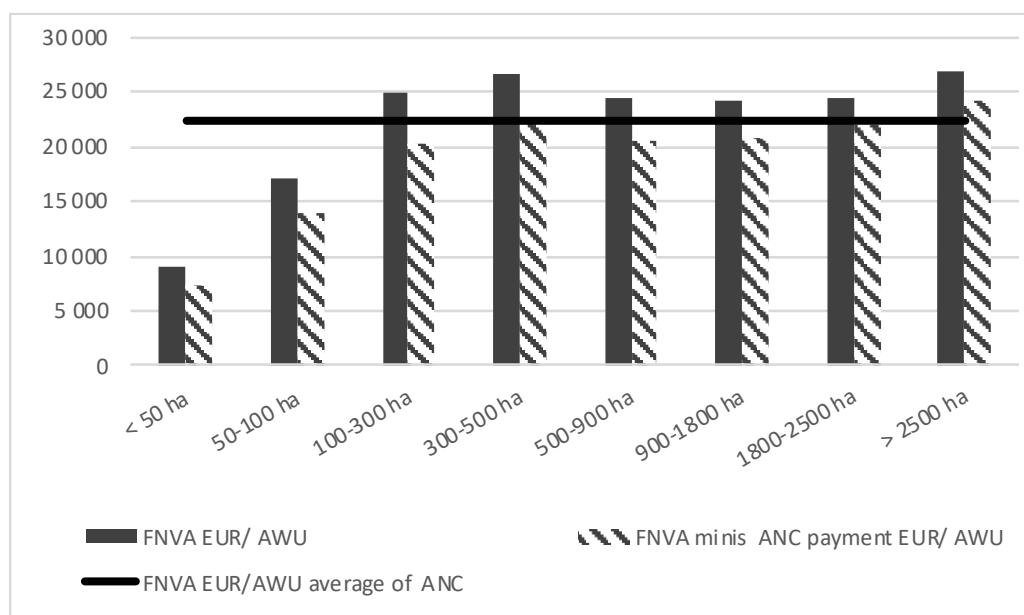
$$\text{Modified profit} = \text{Modified FNVA} - \text{FWU} * \text{average wage} \quad (2)$$

3 Research results

The basic indicator used to compare the economic situation of agricultural holdings according to types of farming, regions and states is FNVA per AWU, both available in FADN outputs and in scientific work such as Copus AK, Leat PM K (1992), Berkeley H. (2012, 2015), Bašek V., Kraus J. (2011), Reiff M., Ivanicova Z., Surmanova K. (2018).

The level of FNVA per AWU, modeled for 2018 for each size group, was compared to the average FNVA per AWU for all farms per ANC total. At the same time, the FNVA per AWU was modeled after subtracting of ANC payments (Figure 5).

Figure 5 Comparison of the economic situation of ANC farms with and without ANC 2018 payments



Source: the authors, based on FADN 2016, LPIS and model

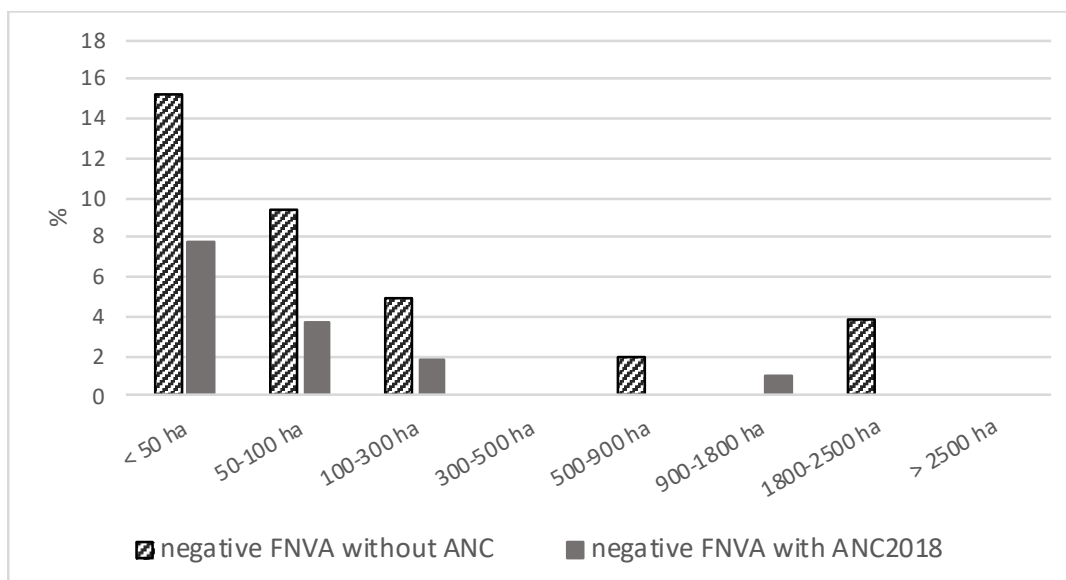
The results show that farms in size groups over 100 ha of UAA achieve better than average economic results in ANC. Moreover, ANC farms over 1800 hectares of UAA would achieve comparable and better results than the average of ANC farms even without ANC payments.

The viability of farms is threatened if they do not cover rent, interest and wages of paid employees. These items are covered by the FNVA.

A proportion of farms that have negative FNVA without ANC 2018 payments was analysed. It was also shown that among the groups of smaller farms are those that do not reach the positive FNVA even with ANC 2018 payments.

Without ANC payments, 15% of farms up to 50 ha of UAA would have a negative FNVA, ANC farming support is important for 2% ANC farms with an area of 500-900 ha and 4% ANC farms of 1800-2500 ha of UAA. ANC payments provide a positive FNVA for all farms over 300 ha of UAA. A certain proportion of the smallest farms is still threatened because new ANC payment rates do not help farms to overcome a negative FNVA. (Figure 6).

Figure 6 Share of ANC farms with a negative FNVA with and without ANC 2018 payments by farm size



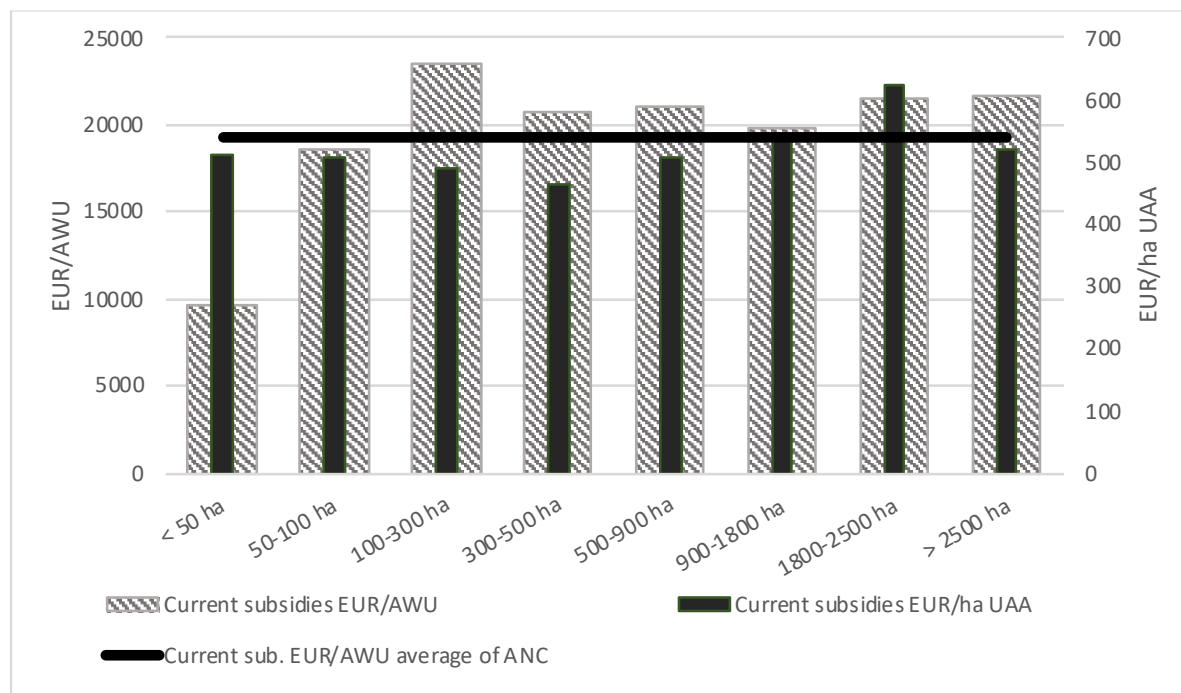
Source: the authors, based on FADN 2016, LPIS and model

Farm subsidy support in ANC 2018 by current subsidies was evaluated both by the average aid amount per hectare of the UAA and also per the AWU and compared to the ANC average (Figure 7).

Although there are no significant differences in the current subsidies per ha of UAA, the farm worker's support for farms up to 50 ha is only half the ANC average.

In a group of up to 50 hectares the family farms prevail. On average, 5.3 AWU is employed per 100 ha of UAA. Farms in the ANC 100-300 ha employ only 2 AWU per 100 ha. In all size classes above 50 ha, the average density does not exceed 3 AWU per 100 ha of UAA.

Figure 7 Current subsidies of ANC 2018 farms by farm size



Source: the authors, based on FADN 2016, LPIS and model

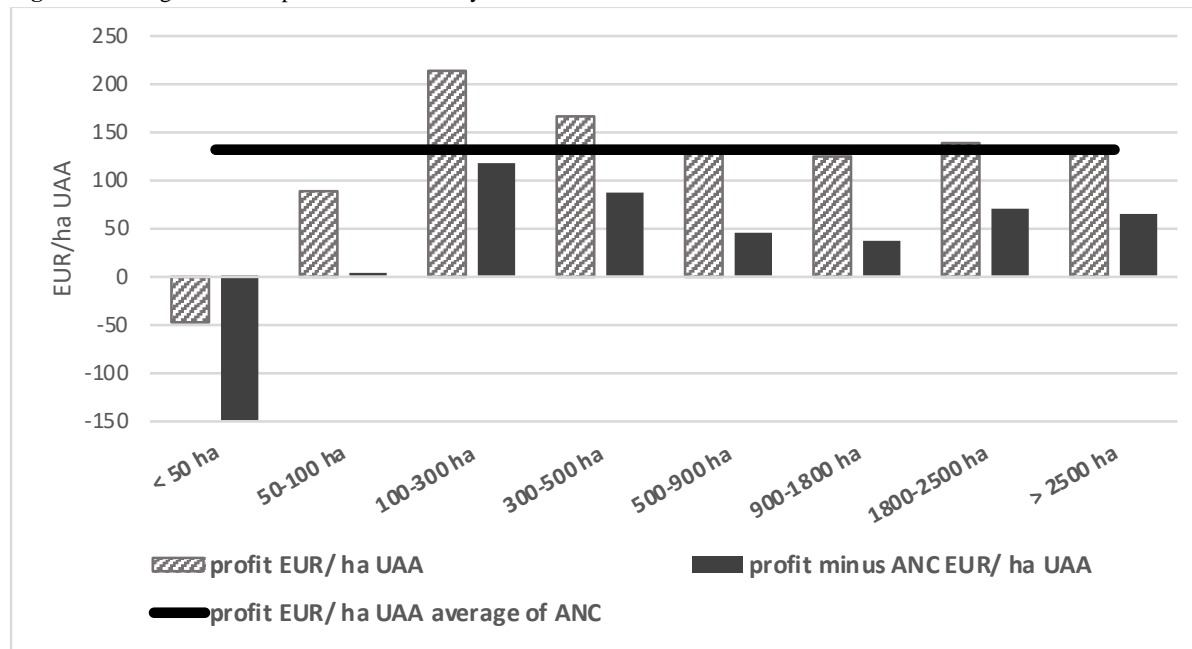
Methods of measuring viability in agriculture are treated in Špička et al. (2019), which states that FNVA per AWU is a key indicator for assessing the economic level of farms in time and between farm categories. The economically viable

farm can cover labour costs, land and capital costs with the FNVA. However, the indicator does not reflect the real economic viability of farm workers.

Therefore, Modified average profit per ha UAA (1) per farm size groups ANC was calculated.

According to this method, farms in the size group of up to 50 hectares of UAA demonstrate a loss, which means that FWU income is below the average income of paid labour in agriculture (Figure 8).

Figure 8 Average modified profit ANC farms by farm size



Source: the authors, based on FADN 2016, LPIS and model

Meier (2004) dealt with the issue of income indicators for the OECD publication. His analysis of a time series carried out by the Swiss Farm Accountancy Data Network (FADN) shows that over a long period of time, family farm income is considerably lower than private consumption. The gap even increases if calculated costs for unpaid labour and for net worth invested in the farm are taken as a reference point (average salaries of employees; average interest on long-term governmental bonds)

According to Meier (2004), several theoretically and empirically sound explanations exist, which might be summarised as follows:

- Economic explanation: alternatives for off-farm occupation are missing (*i.e.* the true opportunity costs are lower than assumed in Figure 8 “calculated costs”).
- Behavioural explanation: There are non-economic factors that allow farmers to become or stay farmers (tradition, influence of the profession, independency)
- Indicator explanation: the “income gap” is based on inappropriate indicators. There are two major problems: cash flow generated by the farm can be very different from income, and the limited farm-focus ignores a part of the reality (for example off farm work of farm family members).

This may be an explanation of why there are still farms in the Czech Republic up to 50 hectares of UAA. The differences in the economic situation between farms in the ANC up to 50 ha and over 100 ha, however, are so large that the viability of a number of small farms in the ANC can be considered threatened. The European Parliament (2018) expresses support for small farms in the EU: “Although small farms produce only a portion of the total EU agricultural output, their contribution in creating rural employment, supporting rural societies and landscapes, and ensuring that traditional and local production continues, makes them a cornerstone of European agriculture”.

4 Conclusions

Comparison of the economic indicators monitored in ANC farm size groups resulted in substantial differences between farms up to 100 ha and over 100 ha of UAA. The viability of predominantly family farms with area under 50 ha of UAA appears to be especially threatened.

There were no significant differences between the ANC farms with more than 300 ha, which is the first threshold for degressivity of ANC payments. On the other hand, there are large differences in the economic situation of the ANC farms with less than 300 ha. For these farms, however, the same conditions are set in ANC 2018 payments.

The Common Agricultural Policy in the Czech Republic should be more focused on the viability of family farms. ANC payments should be more targeted to farms up to 50 hectares of UAA. A degressivity rate should be set for acreages exceeding 100 hectares of UAA. It may be noted that for farms with 300-500 hectares of UAA, the benefit of their size is clear. Considering even larger farms, the economic results of the size groups are similar. But the scheme of degressivity of ANC rates in the Czech Republic does not reflect this fact.

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Basic Characteristics of the Overall Development and Structure of Agriculture in the Countries of Central Europe after 2004

Denisa Dvořáková¹, Věra Bečvářová²

Abstract: This article focuses on the development of the size and structure of agricultural production in the countries of the Visegrad Group, as well as Austria and Germany, in the period from 2004 to 2016. It therefore specifies the basic trends in the development of this sector in the given region in the period after the V4 countries joined the EU. To do this, it compares the dynamics of the development and structure of agriculture in the V4 countries (the Czech Republic, Poland, Hungary and Slovakia), Austria and Germany between 2004 and 2016. It analyses the dynamics of development and the scope and final structure of agricultural production in the countries in question on the basis of the development of the following indicators: total net value of agricultural production, net value of crop production and net value of animal production at the constant prices applicable between 2004 and 2006 in I\$. Analyses show that little generally declared effort has been made to unify or converge the economies in this sector. The total net value of agricultural production and net value of animal production indicators has been increasing in Germany, Poland and Austria. In contrast, we can see an increase in the net value of crop production during the period in the case of Poland, the Czech Republic and Slovakia. Development trends are still assessed using the statistical methods of beta and sigma convergence, which show a tendency to divergence in 2004 – 2016 in the case of the total net value of agricultural production and net value of animal production indicators amongst the selected countries, whereas, in the case of the net value of crop production indicator, this is a manifestation of convergence. The results of the beta and sigma convergence analysis are shown in the form of a graph and are presented in the article using correlation diagrams.

Keywords: Visegrad Group, total net value of agricultural production, net value of crop production, net value of animal production, beta convergence, sigma convergence, correlation diagram.

JEL Classification: Q1, O13, P32

1 Introduction

The agrarian sector is increasingly becoming the subject of discussion, both in terms of addressing food security and in terms of its irreplaceable role in maintaining a viable landscape, addressing the consequences of climate change, as well as the preconditions for developing specific regions (Swinnen, J., Vandeplas, A., 2015). These criteria are more or less reflected in the concept of the European model of multifunctional agriculture in the current framework of the European Union's Common Agricultural Policy. Greater decentralization and a strengthening of the role of individual EU Member States in specific policy solutions in relation to agriculture and the region are expected in the preparations for the post-2020 model. As a result, apart from increasing authority, it will mean further growth in responsibility for the chosen strategy, concept and solution of objectives and priorities associated with meeting the role of the agrarian sector in the given territory's development. The preparation of the new concept takes place under the conditions of a fundamental change in the business environment related to the processes of the globalization of agrarian markets, the formation of agribusiness and its food verticals, which have been reflected in the agrarian sector since the 1990s with a significant production, regional and social impact. They are a manifestation and consequence of technological

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development and related processes in the development of the division of labour and cooperation in economic activities from the use of scarce natural resources for producing agricultural products, their evaluation and finalization up to the form demanded by the final consumer (Bečvářová et al, 2005).

The concept of agribusiness, which can generally be characterized as an approach that examines the issues of the entire food management system so that it functions effectively in the development of a business environment, which, from the standpoint of its criteria, means applying a dynamic concept of competitive advantage. Thus, the question of business entities' efficiency and competitiveness is not solely determined by the efficiency of using production factors in the original, narrow definition of agriculture as the primary production sector, but also by the ability to be successfully involved in the entire system of producing and selling the final products of agricultural origin. In this concept, it is possible to find the causal context of the phenomenon of increasingly successful networks of cooperating entities at the horizontal and vertical levels within the relevant commodity food chain.

This gives rise to the question: How will development in the regions evolve in the wake of the "relaxed" CAP? The European Union itself has long been talking about the need for convergence of its regions. This approach was generally reflected in the 2007-2013 programming period, when convergence, related to competitiveness, employment and European Union cooperation, became the main objective of Union policy (MRD, 2015). It is therefore appropriate to assess this approach from an agricultural point of view, and whether convergence between regions was actually achieved over recent decades.

An objective evaluation offers scope for implementing theories based on the convergence and divergence of regions, which are some of the most important in regional development. In the case of convergence theories, Blažek and Uhlíř (2002) state that they are based on the assumption of a gradual balancing of the differences between regions. In contrast, divergence theories are based on the tendency for interregional differences to increase due to differentiation processes. The authors also state that, in terms of time, it takes much longer to reduce the differences between regions than it does to increase them. E.g. Hampl (2005) states that over time there is a constant alternation of the above-mentioned trends, but certainly not all authors dealing with the issue of regional development agree with his statement.

In connection with objectivization, i.e. measuring convergence between regions, it is possible to use beta and sigma convergence methods Minařík et al. (2013). This method of measuring convergence between regions was first used by Barro (1991) and laid the groundwork for research in this area (Obstfeld, Rogoff, 1996).

A region's ability to move away from the others and be better is reflected in its competitiveness in agriculture, which the European Commission (2009) defines as the ability to grow, innovate, produce more and better, but also to maintain or gain market share, both domestic and international. This being under the assumption that it is becoming increasingly important in the light of the above-mentioned processes of globalization and the increasing liberalization of international trade, Komorowska (2014). The success or failure of Member States' individual approaches to the CAP will have a decisive impact on the regions' development.

The aim of the research is to evaluate the development in the size and structure of agricultural production in the agrarian sector of the V4 countries (Czech Republic, Poland, Hungary and Slovakia), Austria and Germany between 2004 - 2016. It is therefore an evaluation and comparison of the position of agriculture and its development in these countries after the accession of the V4 countries to the EU under the Eastern Enlargement.

2 Methods

The paper analyses the dynamics of development and the extent and final structure of agricultural production in the study countries based on the development of the following indicators: total net value of agricultural production, net value of crop production and net value of livestock production at constant prices 2004-2006 in I\$, which allows an international comparison.

The data obtained on the variables' values have been logarithmized, thus eliminating any distribution asymmetry.

The variables' average growth coefficients were then calculated using the following formula:

$$\bar{k} = \sqrt[n-1]{\frac{y_n}{y_1}}$$

Subsequently, point diagrams were constructed in which the horizontal axis (x) plots the logarithms of the initial values and the vertical axis (y) the logarithms of the average growth coefficients. Then, the regression line equations, containing α and β parameters, were determined using the least squares method. The direction of β determines whether the prevailing tendency is convergence or divergence. In the case where $\beta < 0$, the line is decreasing, and a convergence tendency prevails. If $\beta > 0$, then the line is increasing, and a divergence tendency prevails.

At the end of beta convergence, the coefficients of determination, in percent, are determined based on the equation below:

$$100 r^2 = 100 \frac{\text{var log } \bar{k}}{\text{var log } k}$$

If the given coefficient reaches the value 100, the tendency is considered significant, if, in contrast, it approaches 0, the tendency is not significant.

The sigma convergence is measured using an explication of the work of the above-mentioned authors as follows: the data obtained from all sub-periods are logarithmized and then the individual standard deviations are calculated. Subsequently, line graphs are constructed in which the calculated log standard deviations are plotted on the vertical axis and the individual years are shown on the horizontal time axis (2004 - 2016).

If the beta convergence shows the analysis tool has low conclusiveness, due to a low determination coefficient value, a correlation diagram is constructed using the following procedure for its depiction:

In the correlation diagram, the logarithms of the initial values are plotted on the horizontal axis and the average growth coefficients are plotted on the vertical axis. Using averages, the diagram is then divided into 4 quadrants. Units with above-average initial values combined with above-average growth rates lie in the 1st quadrant. This means there is a tendency to move away from other units. Units with below-average initial values combined with above-average growth rates lie in the 2nd quadrant. In the longer term, it can be assumed they will transfer to the 1st quadrant. Units with below-average initial values combined with below-average growth rates lie in the 3rd quadrant. There is a tendency for them to lag behind other units. Units with above-average initial values combined with below-average growth rates lie in the 4th quadrant. In the longer term it can be assumed they will transfer to the 3rd quadrant.

Highly conclusive convergence is then demonstrated when the units of interest are in the second and fourth quadrants. On the other hand, for highly conclusive divergence, the units are in the first and third quadrant.

Adequate data for the paper were obtained from the FAOSTAT database. The statistical data were analysed using MS Excel software and Statistica statistical software.

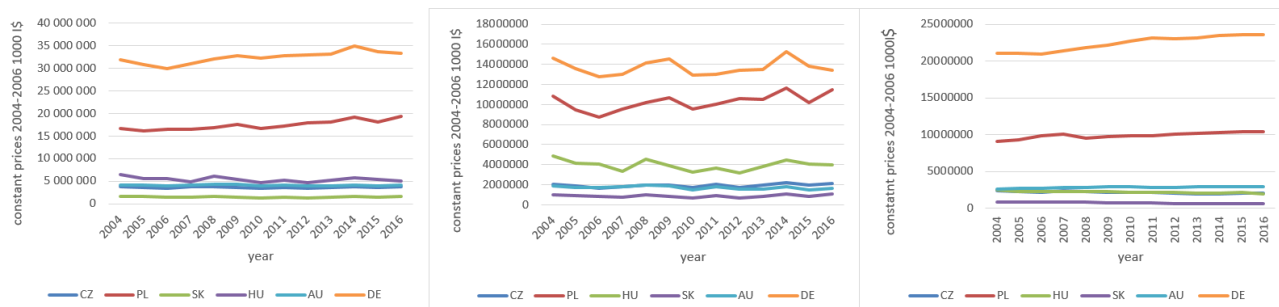
3 Research results

Analyses of the total net value of agricultural production and the net value of livestock production indicators show that they exhibited growth between 2004 and 2016 in the case of Germany, Poland and Austria. For the Czech Republic, Hungary and Slovakia, they showed a decline in this period (Figure 1).

The most significant increase was recorded in the case of the indicator of total net value of agricultural production in the case of Poland (16%), the same can be said about the net value of livestock production. Here, Poland achieved an increase of 13.5%. The highest decline in the total net value of agricultural production was in Hungary (-22%), whilst for the net value of livestock production it was in Slovakia (-23.8%), followed very slightly by Hungary (-23.5%).

For an increase in the net value of crop production indicator was recorded over the monitored period in Slovakia, Poland and the Czech Republic. The highest growth for this indicator among these countries was in Slovakia (11%). In the other countries, the value of this indicator decreased, most notably in Hungary (-19%).

Figure 1 Development of indicators: total net value of agricultural production, net crop production values and net livestock production values



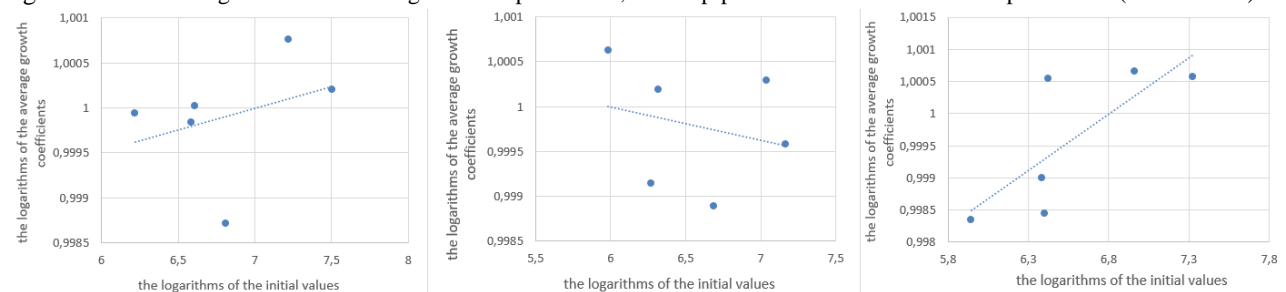
Source: FAOSTAT, own processing

Statistical analyses were carried out on the data obtained, these showed they had left-side asymmetry, which required turning them into log values, thus eliminating the asymmetric distribution.

In the case of the total net value of agricultural production beta convergence takes the form of a regression line: $y = 0.0005x + 0.9966$, implying that $\beta > 0$. The line is growing. However, the trend is not significant since the determination coefficient reaches $100 r^2 = 11.32\%$. For the net value of crop production, beta convergence has the form of a regression line: $y = -0.0004x + 1.0022$, $\beta < 0$, the line has a decreasing shape, the determination coefficient is $100 r^2 = 6.01\%$. The net value of livestock production is described by a regression line in the form: $y = 0.0018x + 0.9881$, $\beta > 0$, where the line is increasing, the coefficient of determination has a relatively high value $100 r^2 = 59.2\%$.

It can be stated that, on the basis of beta convergence, the V4 countries, Germany and Austria show divergence tendencies in the case of the indicators: total net values of agricultural production and net livestock production, they are moving away from each other. In the case of the net crop production indicator, the situation is reversed, and countries tend to converge towards each other. We observe this in the Figure 3.

Figure 2 Beta convergence of net total agricultural production, net crop production and net livestock production (2004 - 2016)



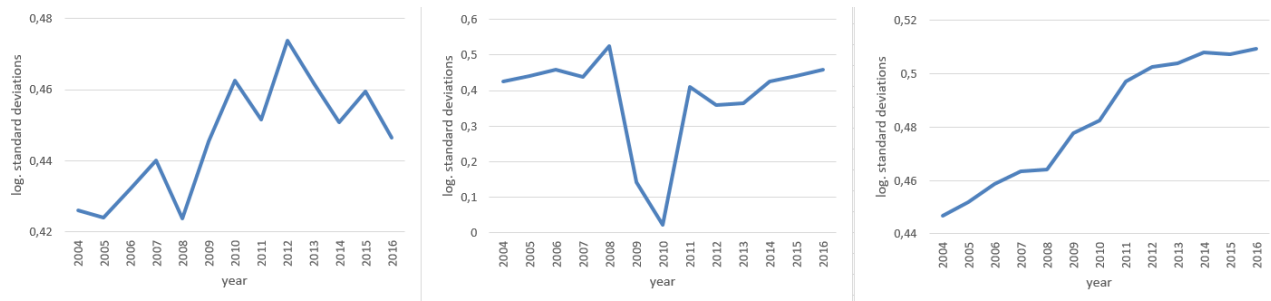
Source: FAOSTAT, own processing

For sigma convergence, in the case of the indicator for total net value of agricultural production, a significant oscillation of values can be observed. Between 2005 and 2012 there is a divergence trend between the countries, except for 2008 and 2011, when there is convergence between the countries. A tendency towards convergence is also apparent between 2012 and 2016, apart 2015.

The net value of crop production shows a tendency towards divergence between 2004 - 2008. Thereafter, a sharp fluctuation (decline) can be observed, which is partially offset by a significant increase in the next year of observation, since 2013 a trend towards divergence can be seen again.

During the entire observation period (2004 - 2016) the net value of livestock production only displayed a tendency towards divergence. This is due to the fact that the standard deviation of the log values increases, as does the variability between countries that are moving away from each other.

Figure 3 Sigma convergence: net total agricultural production, net crop production and net livestock production (2004 - 2016)



Source: FAOSTAT, own processing

In the case of beta convergence, only low determination coefficients were achieved in the above analyses except for the analysis of the net livestock production indicator. In this case, Minařík et al. (2004), recommend creating a correlation diagram with the logarithm of the average growth coefficient on the x-axis, and the logarithm of the initial value on the y-axis.

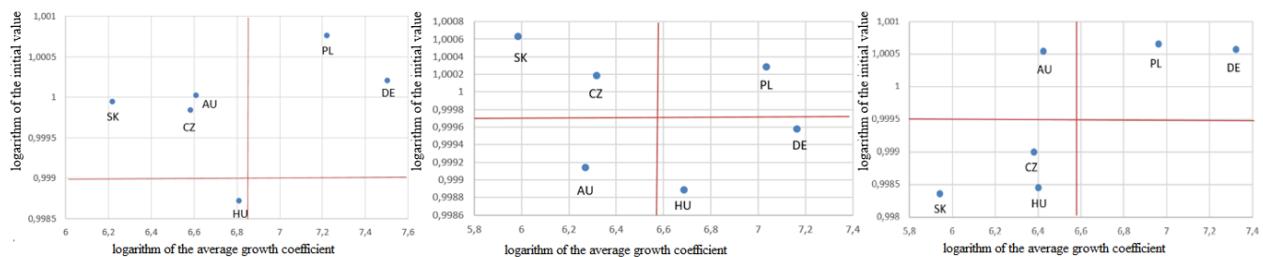
The analysis of correlation diagrams shows in the Figure 5 that in the case of the indicators for total net agricultural production and net crop production, Poland and Germany are in the first quadrant. For the livestock net value indicator, it is only Poland. These countries initially showed a higher value of the indicator and showed a high rate of growth in the period under review. It can be expected that in the future these countries will move away from the other countries in these indicators.

Austria, Slovakia and the Czech Republic are in the second quadrant for the indicator of total net value of agricultural production. Slovakia and the Czech Republic are also presented in this quadrant with regards to the net crop value. Austria, on the other hand, is here due to its net livestock production. Being in this quadrant is typical for countries that initially had a low level for the indicator but showed a high rate of growth. It can be assumed that, as concerns the given indicator, they will move to the first quadrant of the correlation diagram.

Only Hungary appears in the third quadrant for the indicator of the total net value of agricultural production. Hungary is also in this quadrant in the case of the net livestock value indicator, followed by the Czech Republic and Slovakia. Austria is in the third quadrant for the net crop value indicator. Countries that are characterized by a low initial value and subsequent low growth rate are located in the third quadrant of each correlation diagram (indicator). It can be assumed that, over the long run, these countries will lag behind the other countries as concerns the individual indicators.

For the net value of crop production indicator, only Germany and Hungary can be found in the fourth quadrant. An above-average value for the indicator was initially observed in both countries; however, this was followed by a low growth rate. In the future it can be assumed they will move to the third quadrant.

Figure 4 Correlation diagrams of net total agricultural production, net crop production and net livestock production (2004 - 2016)



Source: FAOSTAT, own processing

Demonstrable convergence is specified in the case of the indicator for the net value of crop production, whilst demonstrable divergence can be seen in the indicator for net livestock production.

4 Conclusions

This paper, which analyses the development of the size and structure of agricultural production in the Visegrad Group of countries (in the Czech Republic, Poland, Hungary and Slovakia), as well as in Austria and Germany in the period 2004 - 2016, confirms that both efficiency and changes in the business environment associated (not only) with the formation of the common agrarian market have had a significant effect on the development of agriculture in each country. The period following the 2004 enlargement of the EU, in which the Central European V4 countries became EU Member States, was another significant developmental milestone for these countries, following the transformation of their economies in the 1990s. However, at the time of the Eastern Enlargement, the original EU-15 countries also struggled with the problem of overproduction of certain commodities, which not only affected the options for incorporating the new members into the market, but also required a number of reforms to the CAP. There was also significant pressure on the EU by the WTO, which highlighted the need of greater market liberalization. Within the policy framework, it was reflected primarily in lowering the support for commodity prices and the choice of other forms of intervention. During their application, the individual states' concept of and approach to generally established rules was, to a certain extent, already being reflected, which has since been manifested in the specific further development of agriculture in the monitored Member States.

The analyses show that the generally proclaimed unification or convergence of the economies in this sector has not come about so far yet about to any large extent.

In the case of the indicators for total net value of agricultural production and net value of livestock production, they increased for Germany, Poland and Austria. On the other hand, the indicator for the net value of crop production recorded an increase in the monitored period in Poland, the Czech Republic and Slovakia.

Based on the evaluation of the beta and sigma convergence indicators between 2004 and 2016, the indicators of total net value of agricultural production and net value of livestock production between selected countries show a tendency towards divergence (countries are moving away), in contrast, the tendency was more to convergence for the indicator of net value of crop production. Conclusive convergence is specified in the case of the indicator for net value of crop production, whereas there is conclusive divergence for the indicator of the net value of livestock production. Overall, all indicators showed the very good position of Poland, which is only in the first quadrants of the correlation diagrams with its persistent, significant growth. The same situation can be also observed in Germany, which failed to rank in the first quadrant solely in the case of the net value of crop production indicator.

The concept of a balanced European model of multifunctional agriculture, which is being promoted under the CAP, is increasingly confronted with new challenges stemming from the acceleration of globalization processes, which are reflected in the development of contemporary agriculture and the entire agrarian sector in its horizontal and vertical contexts and thus affect its production and non-production aspects. This model highlights the need to increase the role of agricultural production in order to fulfil its role in rural and social development. Moreover, it foresees a significant strengthening of the role of the Member State in specific solutions to the established general principles within the CAP. The success or failure of solutions in the area of production is increasingly reflected in all dimensions (economic, environmental, technological as well as the human and social) of regional development.

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Specifics of price transmission in transition economies: case of potatoes markets in Czech Republic and Russian Federation

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Abstract: Price transition mechanisms in transition economies remain to be one of the frequently mentioned topics in academic and public discussions. Economies in transition give significant material to study price transmission, as oftentimes these economies have specific parameters of these processes. This study attempts to compare price transmission mechanisms on potatoes markets in Czech Republic and Russian Federation. Dataset contains consumer and producer prices of potatoes in Czech Republic and Russian Federation and covers period of 1999-2018. Analysis is divided into two parts: before import ban (August 2014) and after. Using ADL model of prices, paper analyzes specifics of price transmission on potatoes market in Czech Republic and Russian Federation before and after 2014, identifies similarities and differences in price transmission mechanisms.

Keywords: price transmission, Czech Republic, Russian Federation, transition economies, agricultural markets.

JEL Classification: C10, F10, Q17.

1 Introduction

Czech Republic and Russian Federation are economics with similar past, but completely different present. Both economies went through transition in 1990s, and there is a mixed evidence whether this transition is already over or not.

Comparative studies of both economies in question have been undertaken in different aspects, including energy relations (Binhack and Tichy, 2012), purchasing power parity (Chang and Tzeng, 2011, Lu et al., 2012, Bahmani-Oskooee et al., 2017) and trade specializations (Chiappini, 2011). Relatively small number of studies compare economies of Czech Republic and Russian Federation, especially in terms of agricultural sector. It can be argued that these economies differ in size and many other parameters, although both economies have been undergoing significant changes since the end of 1980s. At the same time, in the light of Russian import ban introduced in August 2014, it becomes interesting to analyze changes in price transmission for basic commodities in Russian Federation. In case of potatoes market, Czech Republic and Russian Federation have almost no trade connection to each other, therefore price transmission for potatoes in Czech Republic might be considered as a control, while price transmission in Russian Federation is a treatment group.

Russian import ban has received significant attention in scientific literature after its introduction in 2014 (Gurvich & Prilepskiy, 2015, Dong & Li, 2018, Kraatz, 2014, Dreve, Calin & Bazga, 2015, Kutlina-Dimitrova, 2017, Oja, 2015, Smutka et al., 2016, Wengle, 2016, Wegren & Elvestad, 2018, Wegren et al., 2017, Wegren et al., 2016, and Berendeva & Ratnikova, 2018, Krivko et al., 2019). At the same time, the topic of price transmission during the period after the Russian import ban has not received wide coverage in scientific literature. This paper represents the first attempt to detect specifics of this process, in particular in relation to similar processes in other countries.

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2 Methods

Data for the research comes from Russian Federal State Statistical Service (Rosstat) and Czech Statistical Office. Data covers the period of 1999-2018 and includes monthly producer and consumer prices of potatoes in Russian Federation and Czech Republic. Prices are converted from local currencies to USD by applying exchange rates set by Central banks of both countries respectively.

Data is analyzed by methods of time series analysis, including Autoregressive Distributed Lag (ADL) model (Hassler and Wolters, 2005). Stationarity of time series is tested by Augmented Dickey-Fuller (ADF) test and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test. Both tests had confirmed the time series as non-stationary, therefore suggesting the presence of unit roots. The problem of unit roots in time series is addressed by differencing data, resulting in stationary time series. The same ADL(n,k) model is estimated for each country, and for two time periods: January 1999 - July 2014 (Period 1) and August 2014 - December 2018 (Period 2).

$$y_{1t} = \beta_0 + \sum_{i=1}^n \beta_{i+1} y_{1(t-i)} + \sum_{j=0}^k \gamma_{j+1} x_{1(t-j)} + u_{1t} \quad (1)$$

where y_{1t} - consumer price; x_{1t} - producer price; n, k - number of lags, β_0 - constant, β, γ - regression coefficients, u_{1t} - error term.

Lag is determined based on Akaike Information Criterion or AIC (Akaike, 1974) and Bayesian Information Criterion or BIC (Schwarz, 1978), which suggests using first lags of consumer price and producer price variables for Czech Republic for both periods. Testing for Russian Federation suggests using ADL(3,3) for the Period 1 and ADL(2,1) for the Period 2. At the same time, it seems better to estimate the same models for both countries in order to obtain comparable results, so ADL(1,1) model is deemed to be the most balanced option. Results of testing for AIC and BIC are shown in the Table 1.

Table 1 AIC and BIC values of models for Czech Republic and Russian Federation suggest using ADL(1,1).

Model	Czech Republic				Russian Federation			
	Period 1		Period 2		Period 1		Period 2	
n,k	AIC	BIC	AIC	BIC	AIC	BIC	AIC	BIC
1,1	-1.561	-1.492	-2.688	-2.538	-3.167	-3.098	-3.689	-3.539
1,2	-1.549	-1.462	-2.660	-2.471	-3.185	-3.098	-3.676	-3.487
1,3	-1.534	-1.429	-2.617	-2.388	-3.171	-3.066	-3.628	-3.399
2,1	-1.560	-1.473	-2.659	-2.469	-3.223	-3.136	-3.806	-3.617
2,2	-1.555	-1.450	-2.659	-2.432	-3.212	-3.107	-3.792	-3.565
2,3	-1.540	-1.417	-2.616	-2.348	-3.197	-3.075	-3.749	-3.481
3,1	-1.554	-1.449	-2.637	-2.407	-3.293	-3.188	-3.770	-3.540
3,2	-1.556	-1.434	-2.608	-2.340	-3.285	-3.162	-3.749	-3.481
3,3	-1.548	-1.409	-2.580	-2.274	-3.362	-3.223	-3.714	-3.408

Source: Own processing

Effect of Russian import ban is assessed by applying differences-in-differences approach to the estimated coefficients of the ADL models.

Research question is formulated as follows: What are the differences and similarities in price transmission between Czech Republic and Russian Federation for the market of potatoes for the periods before and after introduction of Russian import ban in 2014?

3 Research results

Differences between price transmission on the market of potatoes in Czech Republic and Russian Federation can be tracked starting with determination of the lag for the models. Testing based on AIC and BIC shows the highest fit of models with first lag for Czech Republic. In economic terms, it means that changes in consumer and producer prices in previous month have the highest potential to describe the changes in consumer price in current month. In case of Russian Federation, relatively higher descriptive power resides with the changes of consumer prices 3 months ago (for the period of 01.1999-07.2014) and 2 months ago (for the period of 08.2014-12.2018). These facts coincide with high volatility of consumer prices in Russian Federation in both periods, while prices in Czech Republic were significantly more stable. Results of ADL models' estimation are shown in the Table 2.

Table 2 ADL models estimation results for Czech Republic and Russian Federation. Standard errors in parenthesis, p-values: *-0.1, **-0.05, ***-0.01.

	CR, 01.1999- 07.2014	CR, 08.2014- 12.2018	RF, 01.1999- 07.2014	RF, 08.2014- 12.2018	RF, 01.1999- 07.2014	RF, 08.2014- 12.2018
β_0	0.042** (0.02)	0.064 (0.041)	0.002 (0.009)	0.019 (0.021)	-0.007 (0.008)	-0.006 (0.021)
β_1	0.662*** (0.06)	0.571*** (0.127)	1.158*** (0.084)	0.544*** (0.137)	0.785*** (0.05)	0.365*** (0.131)
β_2	-	-	-0.772*** (0.124)	-0.286*** (0.097)	-	-
β_3	-	-	0.495*** (0.085)	-	-	-
γ_1	1.571*** (0.337)	1.661*** (0.594)	1.056*** (0.105)	1.451*** (0.243)	1.397*** (0.099)	1.917*** (0.198)
γ_2	-0.873*** (0.324)	-0.741 (0.615)	-0.527*** (0.149)	0.01 (0.381)	0.934*** (0.124)	0.563 (0.346)
γ_3	-	-	0,242 (0,157)	-	-	-
γ_4	-	-	-0,539*** (0,134)	-	-	-

R²	0.794	0.694	0.974	0.927	0.967	0.914
F value	234.439***	36.254***	924.679***	146.26***	1751.997***	169.246***

Source: Own processing. ADL(3,3) and ADL(2,1) models are shown only for reference.

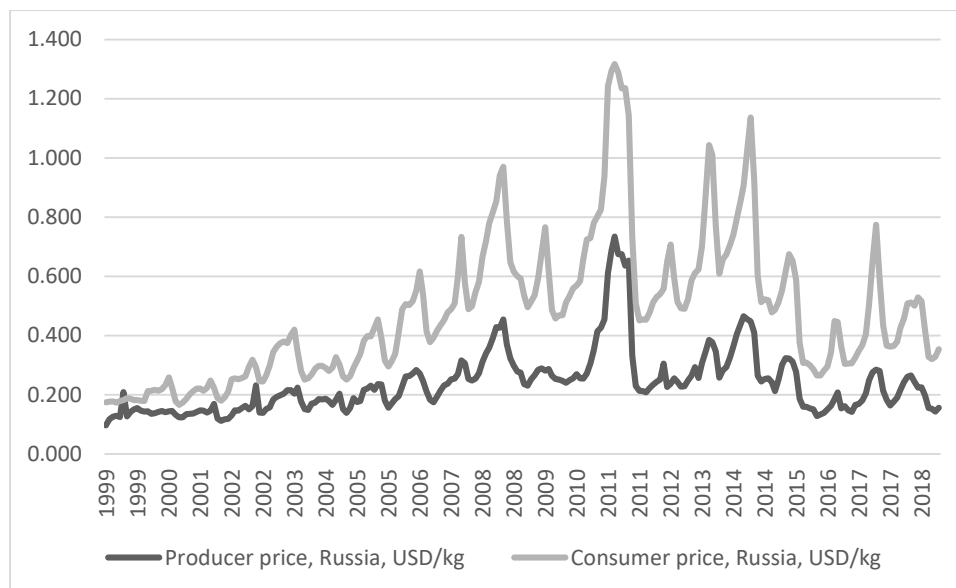
Constant seems to be non-relevant to price transmission in three out of four estimated models, as this parameter is not significant for Russian Federation in both periods, and for Czech Republic in 08.2014-12.2018. Estimated values of the constant term are also relatively low. Nevertheless, it is possible to note the presence of statistically significant constant component in consumer prices in Czech Republic in Period 1, which is unique among models in the scope of current research.

Estimated models reveal several important observations. Market of potatoes in Czech Republic can be characterized by relatively stable transmission of price changes from producers to consumers. As it can be seen from the results, parameter estimations did not dramatically change in Period 2. Coefficient γ_1 is estimated in the range of 1.571-1.661, which means that magnitude of change in consumer prices due to change in producer price was on the same level in each month during the observed period. It is important to notice negative value of estimated coefficient γ_2 , which characterizes the impact of producer prices change in previous period on consumer prices in current period. This fact holds true only for Czech Republic, while estimated values of coefficients for Russian Federation are positive for both periods. Intuitively, negative values show quite fast speed of price adjustment: change of consumer price in current period is positively associated with change of producer prices in current month and negatively associated with change in producer price previous month. Positive values of this parameter show, that not all influence of change of producer price in current period is realized in change in consumer price in current period. This fact might suggest relatively slower speed of price adjustment in Russian Federation in Period 1, whilst the parameter has decreased in Period 2, suggesting increase in price transmission speed after Russian import ban.

Coefficient β_1 for Russian Federation has decreased from 0.785 in Period 1 to 0.365 in Period 2, suggesting lower dependence of consumer prices in current period on consumer prices in previous period, while coefficient γ_1 has increased from 1.397 to 1.917, showing increased role of producer prices on consumer prices in the same period of observation. Summarizing these findings, it is possible to conclude about higher influence of producer prices on consumer prices in the Period 2 (after 2014) then in Period 1. Models ADL(3,3) and ADL(2,1) are showing the same picture of changes in coefficients between two periods, suggesting the robustness of such conclusions.

Figure 1 shows development of consumer and producer prices of potatoes in Russian Federation in the period of 1999-2018 converted to US dollars. Prices have shown significant volatility and recurrence during the observed period, and not every peak in consumer prices was preceded by peak in producer prices; one of the examples of it can be noticed in the period between 2008 and 2010. Noticeable peak in the beginning of 2011 coincides with currency appreciation, when Russian ruble was at the strongest position in relation to US dollar during the observed period. This peak is observed in both producer and consumer prices. On the other hand, conspicuous increase in consumer and producer prices in 2008 can be attributable to rise in Consumer Price Index as a result of Global Financial Crisis of 2007-2009. Russian Federation experienced significant effects of crisis, that was mirrored in increased inflation and food prices. There is also a notable linear upward trend in both consumer and producer prices between 1999 and 2008, while in 2014-2017 this trend became rather downward.

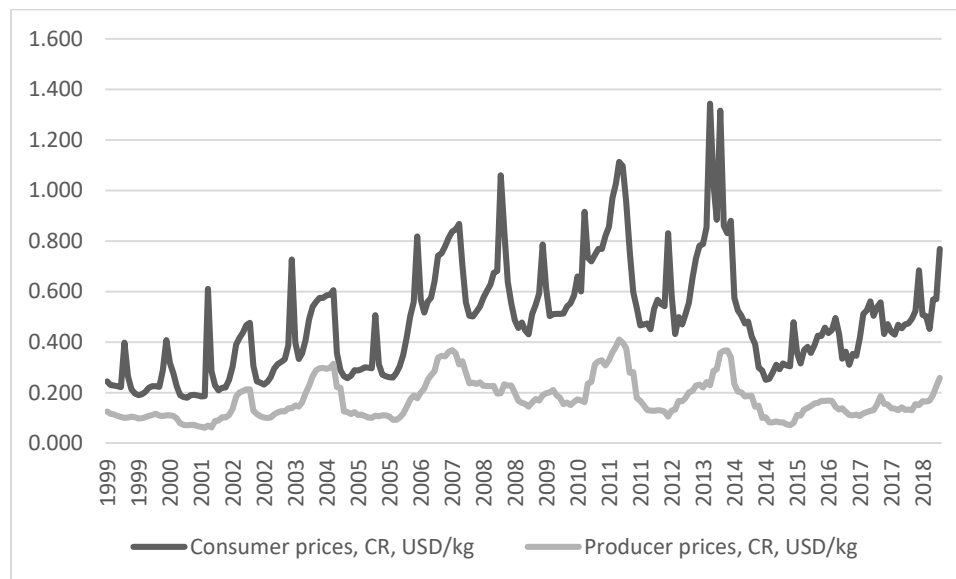
Figure 1 Producer and consumer prices of potatoes in Russian Federation in 1999-2018



Source: Own processing, Russian Federal State Statistical Service.

Comparison to producer and consumer prices of potatoes in Czech Republic (Figure 2) shows differences in the development of producer prices, which have been moving in the range of 0.1-0.4 US dollar per kg during whole observed period. Consumer prices showed significantly different dynamics, with peaks that are difficult to attribute to changes in producer prices. At the same time, there is no observable linear trend in both variables, but it is possible to notice a few levels of support for price, such as 0.4 US dollar per kg for consumer prices in 2008-2012 and 0.2 US dollars per kg in 1999-2005, as well 0.07 US dollars per kg for producer prices. Producer prices have never dropped lower than the last-mentioned level, which may suggest the minimally acceptable prices for producers. Interestingly, similar level is observed for Russian Federation too, but the level is higher – not less then 0.15 US dollars per kg – which is twice as much, as in Czech Republic.

Figure 2 Producer and consumer prices of potatoes in Czech Republic in 1999-2018



Source: Own processing, Czech Statistical Office.

Upward linear trend in consumer prices after 2014 in Czech Republic was not accompanied by similar increase in producer prices for the same period. This was reflected in the results of estimated ADL(1,1) model for Czech Republic, as coefficient γ_1 , which shows the dependence of consumer prices on producer prices from the same period, increased from 1.571 (period before 2014) to 1.661 (period after 2014).

The effect of the import ban on price transmission in Russian Federation can be assessed by using differences-in-differences approach, as it is shown in the Table 3.

Table 3 Assessment of Russian import ban effect on Russian Federation.

Coefficient	Czech Republic			Russian Federation			Difference-in-difference
	Period 1	Period 2	Difference	Period 1	Period 2	Difference	
γ_1	1.571	1.661	0.090	1.397	1.917	0.520	0.430
γ_2	-0.873	-0.741	0.132	0.934	0.563	-0.371	-0.503

Source: Own processing

As it can be concluded from the results shown in Table 3, parameter γ_1 for Russian Federation has changed by 0.43 in excess to changes in Czech Republic, meaning that ceteris paribus every 0.1 US dollar change in producer price in Russian Federation after 2014 would result in 0.043 US dollar change in consumer prices, and this change might be attributed to the effect of Russian import ban. Interestingly, as coefficient γ_2 has excessively decreased by 0.503, there is an evidence of even less likely increase in consumer price in current period, if there was an increase of producer price in previous period. In terms of coefficient γ_2 both countries have shown the opposite dynamics: there is an increase for Czech Republic and decrease for Russian Federation.

4 Conclusions

Czech Republic and Russian Federation have several similarities in price transition mechanisms in two periods in scope of current research. Firstly, there is an evidence of increased dependence between consumer prices and producer prices, which is reflected in increased coefficient γ_1 after 2014 for both countries. The pace of the increase was stronger in case of Russian Federation then Czech Republic.

Secondly, in case of Czech Republic before 2014, there is an evidence of statistically significant constant component of 0.042 US dollars per kg, at the same time this component increased to 0.064 US dollars per kg after 2014 but became statistically insignificant. The presence of constant component can be understood as an evidence of higher rigidity of the market. For Russian Federation, constant is not statistically significant for both periods, suggesting no standard tendency in consumer prices, and higher flexibility of the market too.

Thirdly, coefficient γ_2 is negative for both periods for Czech Republic, while it is positive for both periods for Russian Federation. In economic terms, this fact suggests the presence of consumer prices correction mechanism, where higher change of producer price in previous period suggest lower change of consumer price in current period. There is no such evidence for Russian Federation, as all estimated coefficients are positive.

Finally, the effect of Russian import ban in 2014 was estimated to be on the level of 0.43 US dollar of excessive consumer price change attributed to change in producer prices.

Generally speaking, similarities in price transition mechanisms between Czech Republic and Russian Federation are proved to be in place, however changes after 2014 in both countries are different. Changes of parameters in case of Russian Federation is at higher pace then in case of Czech Republic. As was shown by the research results, there are also differences in price transmission mechanisms between Czech Republic and Russian Federation. On the basis of the research results, it is possible to state that potatoes market in Czech Republic is more rigid in terms of consumer and producer prices, while this market is much more flexible in Russian Federation. Therefore, reaction on structural

breaks (as import ban might be considered) is higher for Russian potatoes market rather than for Czech. This might be observed in both periods (before and after 2014) for both countries.

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Economic Effectiveness of Crop Production

Filip Valentíni¹, Dominika Čeryová², Natália Turčeková³, Lukáš Both⁴

Abstract: The aim of presented article is to evaluate the economic efficiency of crop production in the selected agricultural company using the basic indicators of profitability over the period 2013- 2017. The article analyzes the development of soil fund, yield per hectare, development of realization prices, development of profitability of selected crops and profitability of crop production. Results suggested that production of sugar beet, rapeseed, spring barley and winter wheat is steadily profitable even without considering the subsidies. Overall, the crop production was profitable in the period under review without subsidies but they increased the profitability rate.

Keywords: efficiency, profitability, crop production, profit

JEL Classification: D24, Q10, Q11, Q12, Q13

1 Introduction

Agriculture is an integral part of human life. Even though it is not the sector that influence economic growth significantly, its role in the national economy of any state is irreplaceable from the viewpoint of ensuring the state's food security, optimizing the use of available land resources and increasing its importance in the development of landscaping, ecological, social and tourist activities. In Slovakia, agriculture is a specific and important sector of the national economy. As the climatic and geographic conditions in the Central European region enabled its intensive development, Slovakia has grown into a typical agricultural state throughout its history. One of the main strategic goals of each business is to maximize profit and achieve high profitability.

The growth of the company's profitability rate is typically a positive sign of its economic viability. Various forms of support system are crucial for agricultural profitability, by improving the economic results. The economic profit or loss is the most important economic indicator, which is monitored and planned in each enterprise, but it does not have the sufficient ability to report the effectiveness of the business (Bielik and Turčeková, 2013). Therefore, the various ratio indicators are calculated by comparing various items from income statement against the profit. Such ratios are referred as profitability ratios. Papula et al. (2017) argue that if we want to assess the achieved results more objectively, it is necessary to transform expression of profit into a proportional indicator.

Efficiency is expressed by the degree to which inputs are transformed into outputs. Profitability in agriculture has several characteristics. We have to primarily consider the impact of natural conditions, production structure, technology changes, changes in the organization of production, degree of use of resources and labor, production quality and other factors (Záborský, 2006). Indicators of profitability represent return on business effort (Zalai, 2013). They are used to express and analyze the effectiveness of the company's operational activities. The Common Agricultural Policy has a considerable impact on economic efficiency of farms as well. It currently provides about 30% of gross farm incomes through subsidies and it is a significant factor influencing economic performance (Chrastinová, 2013).

2 Methods

The aim of the article was to evaluate the economic efficiency of crop production - case study of agricultural company in Slovakia, using the basic indicators of profitability, over the period 2013-2017.

For the case study we implemented calculations in conditions of an agricultural cooperative based in Kukučínov, in the south of western part of Slovakia. It is situated in the hot, dry region with mild winters and longer sunshine. Company

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is located in maize production area with a soil type of chernozem, at an altitude of 135 m. m. In 2017 the cooperative managed 1,130.97 ha of agricultural land, of which 1,112.83 ha was arable land and remaining land was classified as permanent grassland and vineyards.

As for the crop production the dominated crops are cereals. Additional smaller part of production structure consists of oilseeds, root crops and feed crops. In terms of cultivated area, the most important crops include winter wheat (36.05% of arable land), rapeseed (14.92%), spring barley (10.58%), grain maize (8.30%), alfa (7.22%), silage maize (6.54%), sunflower and sugar beet (up to 5%).

Crop hectare yields in individual years were fluctuating due to the large dependence of crop production on climatic conditions. However the hectare yields of crops tended to grow. The realization prices of almost all commodity crops declined.

For the processing of the results, the following accounting documents were used: profit and loss statements, annual reports on economic results of individual crops, calculation of own costs for individual crops, statements of internal organization of accounts.

Following indicators were quantified:

$$\text{Return on cost} = \frac{\text{net profit}}{\text{own cost}} \times 100, \quad (\%) \quad (1)$$

$$\text{Return on cost with subsidies} = \frac{\text{net profit} + \text{subsidies}}{\text{own cost}} \times 100, \quad (\%) \quad (2)$$

$$\text{Return on sales} = \frac{\text{net profit}}{\text{sales revenues}} \times 100, \quad (\%) \quad (3)$$

Since we only knew sales without subsidies when assessing the profitability of individual crops, we did not count the rate of return on sales with subsidies.

$$\text{Return on revenues} = \frac{\text{net profit}}{\text{revenues}} \times 100, \quad (\%) \quad (4)$$

$$\text{Return on revenues with subsidies} = \frac{\text{net profit} + \text{subsidies}}{\text{revenues} + \text{subsidies}} \times 100, \quad (\%) \quad (5)$$

3 Research results

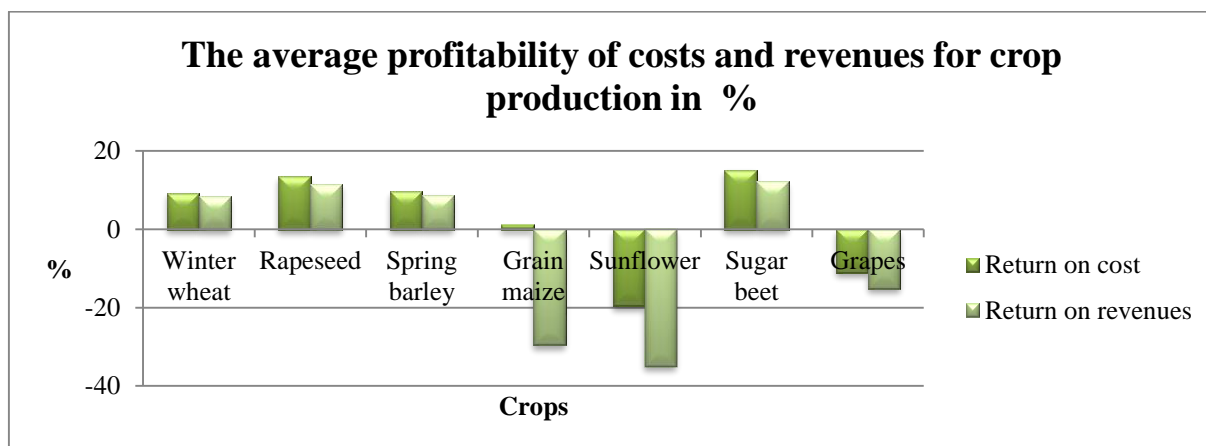
Cultivation of winter wheat was profitable over the whole period under review, but the profitability was volatile, in our research. The highest returns were reported in 2013, when one euro of costs engaged in production generated profit of € 0.1279, and one euro reflected in sales generated profit of € 0.1114. A similar research was also undertaken by Cai et al. (2019). The authors' research was focused on the evaluation of the economic efficiency of crop production by rotating crops with cover crops. Unlike our research their findings show that economic profitability of the crop is negatively affected by the cover crop during the first two years but were positive in the fourth year.

Production of spring barley was also profitable. The highest profitability was achieved in 2014 amounted 15.74% and in terms of sales it was 13.60%. From the viewpoint of the profitability development for grain maize, there were considerable differences. The production of grain maize was most profitable in 2014, when one euro of costs earned 0.4619 € in terms of profit and one euro of sales generated € 0.3160 of profit. However, in 2013, the production of grain maize was not profitable. Rapeseed reported a positive profitability over reported period as well. In 2013 and 2014, it even showed higher returns than winter wheat. The most profitable year for production of rapeseed was 2013, when a cost consumed in production gained € 0.2744 of profit and one euro of sales earned € 0.2153 in terms of profit. With the exception of year 2015, sunflower cultivation was not profitable. For the selected agricultural company, the worst year was 2014, when one euro engaged in cost produced a loss € 0.5029 and on euro of sales there was a loss € 1.0117. Sugar beet cultivation was profitable over the whole period under review but with great differences. The most profitable was

its production in 2017 when the return on cost ratio reached 36.18%, which is the highest profitability among all considered crops in company over the observed period. A comparison of the average profitability of costs and revenues of selected crops is shown in Fig. 1.

In terms of return on cost, the most profitable crop was sugar beet, followed by rapeseed, spring barley and winter wheat. At the profitability boundary there is grain maize. Production of grapes and sunflower was not profitable over the observed period. From the viewpoint of evaluating return on revenues, we can see very similar results, with the exception of grain maize, where the rate of return on sales was negative.

Figure 1 The average profitability of costs and revenues for crop production in %



Source: PD Kukučínov, own processing.

The development of profitability of crop production is shown in Tab. 1 and Fig. 2. The development of profit, revenues, costs and yield per hectare is fairly balanced. Costs per hectare ranged from € 1,427.86 to € 1,682.13, revenues per hectare without subsidies ranged from € 1,629.70 to € 1,934.67, and profit/loss per hectare excluding subsidies was in the range from € 106.70 to 330.16 €.

Table 1 Development of crop production profitability

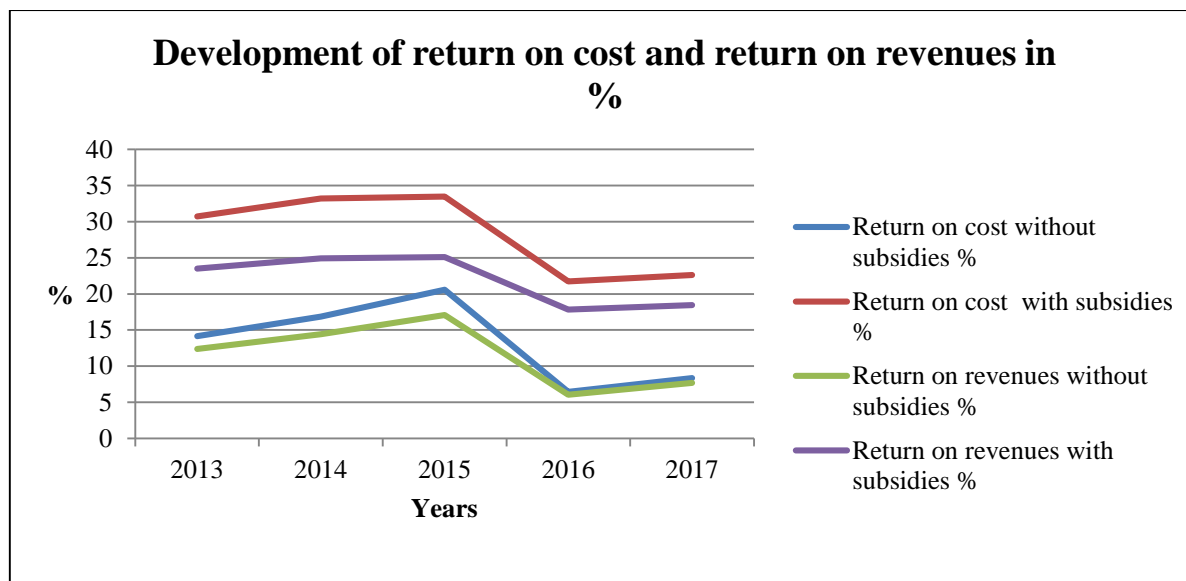
Indicator	Year				
	2013	2014	2015	2016	2017
Revenues without subsidies €/ha	1 629.70	1 883.85	1 934.67	1 762.80	1 822.18
Revenues with subsidies €/ha	1 866.60	2 147.36	2 141.74	2 015.96	2 062.65
Cost €/ha	1 427.86	1 611.91	1 604.50	1 656.10	1 682.13
Profit/loss without subsidies €	201.84	271.94	330.16	106.70	140.05
Subsidies €	236.90	263.51	207.07	253.16	240.47
Profit/loss with subsidies €	438.74	535.45	537.23	359.87	380.52
Return on cost without subsidies %	14.14	16.87	20.58	6.44	8.33
Return on cost with subsidies %	30.73	33.22	33.48	21.73	22.62
Return on revenues without subsidies %	12.39	14.44	17.07	6.05	7.69
Return on revenues with subsidies %	23.50	24.94	25.08	17.85	18.45

Source: PD Kukučínov, own processing.

Selected agricultural company achieved profit in crop production each year over the reported period, thus crop production was profitable even without taking subsidies into account. On the other hand, Jahnátek and Miklovičová (2011) state that the subsidies provided have a positive effect on increasing economic efficiency, which they also statistically proved in their research using the Kruskal - Wallis test. The amount of subsidies received for crop production ranged from € 207.07

to € 263.51 per hectare. Received subsidies increased revenue per hectare by € 240 on average. The return on cost increased, on average, by 113% and return on revenues by 91% taking the subsidies into account.

Figure 2 Development of return on cost and return on revenues of crop production in %



Source: PD Kukučínov, own processing.

4 Conclusions

The main objective of each business is to make the production process as efficient as possible. Overall aim of the article was to evaluate the economic efficiency of crop production in the selected agricultural company over the period 2013 and 2017, using the profitability indicators.

Crop production of selected company in each year under review was profitable for winter wheat, spring barley, rapeseed and sugar beet even without taking into account the subsidies. However, the development of profitability indicators was considerably uneven. Regarding the average return on cost, the most profitable crop in the period under review was sugar beet, where the profitability rate was 15%, followed by rapeseed, spring barley and winter wheat. The grain maize was still at the profitability boundary as well. Production of grapes and sunflower was not profitable over the observed period.

The selected company achieved profit in each year for crop production, so it is possible to conclude that crop production is profitable even without taking subsidies into account. However, the subsidies increased the overall profitability quite significantly, which was on average 28% in terms of cost and 22% in terms of revenues.

Generally, the profitability of crop production in Slovak agricultural companies was negative when we consider production without subsidies. On the other hand, when we take subsidies in the account, the profitability of crop production was 13% in terms of cost and 12% in terms of revenues.

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Development of indicators of medicinal, aromatic and spice plants in Slovak republic and Czech Republic

David Červený¹, Jana Ladvenicová², Zuzana Bajusová³, Ľubomír Gurčík⁴

Abstract: Medicinal plants have their irreplaceable position within agricultural crops grown in Slovakia, but also in the Czech Republic. They are classified as natural herbal remedies. Their meaning and use varies. More than 1 100 species are considered as medicinal plants in Europe. About 150 species are processed in Slovakia. The paper deals with the analysis of basic indicators related to the cultivation of medicinal and spice plants, medicinal plants themselves in Slovakia and the Czech Republic as the development of harvested areas, yield development and fertility in the period 2010 - 2018. Both countries have suitable conditions for growing medicinal plants. The development of the harvesting areas of medicinal and spice plants as well as the medicinal plants themselves in the Czech Republic exceeds their harvesting areas in Slovakia. The average harvested area of medicinal plants in the Czech Republic was 3 468 ha and in Slovakia 1 933 ha. The average harvested area of medicinal, aromatic and spice plants (MASP) was 6 821 ha in the Czech Republic and 2 268 ha in the SR. On the contrary, the yield of medicinal plants is higher in Slovakia than in the Czech Republic, the average production in the monitored period reached 3251 t in the SR and 2 895 t in the Czech Republic. The average share of medicinal plants in agricultural land and arable land was the same in both countries.

Key words: MASP, medicinal plants, harvested area, production, yield, Slovakia, Czech Republic

JEL Classification: Q10, Q13

1 Introduction

The plant world consists of more than 300 thousand plant species. Plants, as primary producers, ensure life on our planet, and since ancient times have been an interest in human exploration and use. One of the important properties of plants is the content of active substances which are important in therapeutic therapy. In Europe, more than 800 species are used for treatment (Mochnacký, Benčať, Kočík & Benčaťová, 2016). Medicinal plants have a history all over the world. We did not initially differentiate them into the category of medicinal and useful plants. They belonged to one category - utility plants. Certainly, even now, this classification is appropriate if we are talking about utility plants that were later included in the group of medicinal or medicinal, aromatic and spice plants. Interest in medicinal plants in Slovakia is from ancient times (pagan periods). Later their tradition shifted to the Christian era. The development of medicinal plants in Slovakia was caused by many personalities such as František Ignác Jachske, Kristián Augustin de Hortis, Gašpar Donati, Ján Barvírek Tonsoris, Juraj Fándly, Jozef Ľudovít Holuby, Jozef Beránek-Agnelli, Ľudmila Thurzová (Jakábová, 2016). Medicinal and aromatic plants are a very heterogeneous group with very different pedigree status of species. Some of them are known, used and cultivated for a very long time but others are wild and still just collected by hand from natural fields (Dušková, Dušek, Smékálová & Orságová, 2016). Medicinal plants are obtained from natural sources for further use, processing and use and are referred to as natural medicaments of plant origin. The importance of medicinal plants varies. It consists of the use of treated and processed plants and their parts, or the use of isolated substances in the following areas: pharmaceutical industry, human medicine, veterinary medicine, cosmetics - using medicinal plants as raw material, food industry, tobacco industry, cosmetics - using aromatic plants as raw material, food industry, distillery, canning, home use - use spice plants as raw materials (Habán, Otepka, Vaverková, Habánová & Kobidová, 2013). In

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Slovakia, 150 kinds of medicinal plants (together with foreign plants) are processed industrially. Their share in the production of pharmaceuticals is 30 - 45%. Harvesting of medicinal plants from natural sites is not enough to cover the constant growth of their consumption. From the point of view of the protection of the natural gene pool of plants, the attention of experts focuses on limiting the harvesting of medicinal plants from natural habitats only to those species that are not successful in cultural conditions and yet their cultivation is unprofitable. The best way to ensure sufficient raw material for the pharmaceutical industry is to grow medicinal plants under large scale production conditions (Porhajaš, 2001). Vegetation in Slovakia is extremely varied and unparalleled in Europe. Favorable vegetation conditions also influence the production of substances in plants. Medicinal plants from Slovakia are also highly valued in foreign markets. The domestic market for medicinal plants is growing and also brings economic gains (Šalamon, 2012). Medicinal, aromatic and spicy plants have an important position also in the system of agricultural crops in the Czech Republic (Kocourková, 2015). As in the Czech Republic and Slovakia, the most cultivated medicinal plant is *Silybum marianum*, followed by the Spear-Thyme, Chamomile (Habán, Macák & Vaverková, 2015). The future of cultivation of medicinal plants depends on many factors such as varietal composition, purchase organization, subsidies, demand for domestic raw materials, requirements of the processing industry (Čičová, 2019).

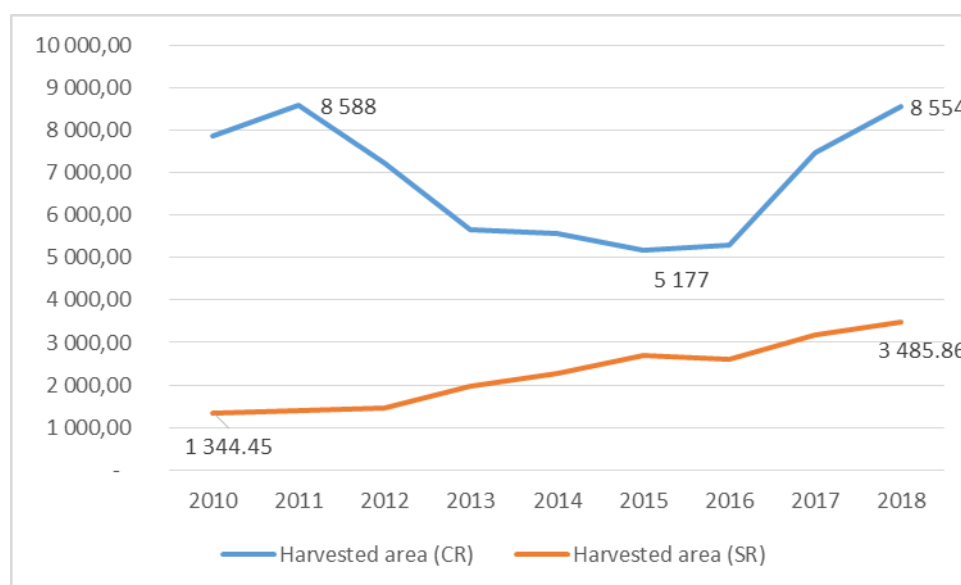
2 Methods

The necessary data for the contribution were drawn from the Statistical Office of the Slovak Republic and from the Situation and Prospective Report issued by the Ministry of Agriculture of the Czech Republic. In this paper we focus on the analysis of the development of basic indicators related to the cultivation of medicinal, aromatic and spice plants (MASP), as well as the medicinal plants themselves in Slovakia and the Czech Republic - namely area, production and fertility. We quantify the index as a proportion of 2018 and 2010 to determine the overall increase (decrease) in percentage over the whole analysis period. Then we calculate the change, as the difference between 2018 and 2010, and the average value for the whole period for each indicator. We also compare the share of harvested areas of medicinal plants and MASP in the area of agricultural and arable land in Slovakia and the Czech Republic.

3 Research results

In the Slovakia, similarly in the Czech Republic, the abbreviation MASP is used for the term medicinal, aromatic and spice plants. In Europe, the term Medicinal and Aromatic Plants is used. in the USA Herbs, Spices & Medicinal Plants (Haban, Macak & Vaverkova, 2015). Currently, in the Czech Republic, the harvest area of medicinal, aromatic and spice plants is 8 554 ha, while in Slovakia this area is more than 2 times smaller and reaches 3 485.86 ha. The highest harvested area of MASP in the Czech Republic was 8 588 ha in 2011 and in Slovakia in 2018. In the Slovak Republic we observe a continuous increase of MASP harvested areas from year to year. In the Czech Republic there was a decrease in area between 2011 and 2015, but since 2015 we have been seeing an increasing trend. In the monitored period (2010 - 2018) the average harvested area of MASP in the Czech Republic was 6 821 ha, while in Slovakia it was more than 3 times less (2 268 ha), for the whole analyzed period the harvested area of MASP increased by 9% in CR and in Slovakia it was an increase by 159%.

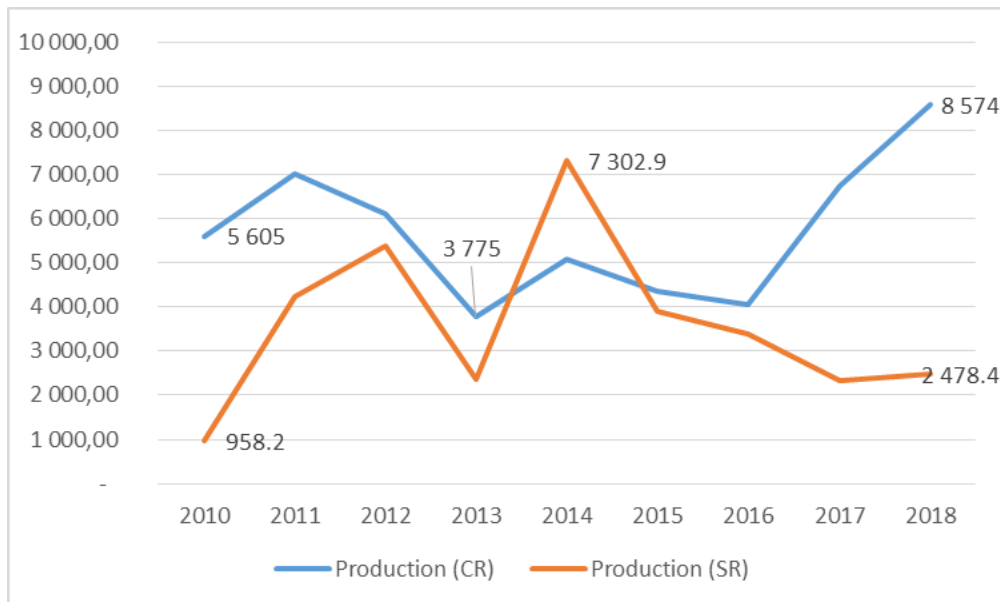
Figure 1 Development of MASP harvested areas in Slovakia and the Czech Republic in 2010 – 2018 (in ha)



Source: Statistical Office of the Slovak Republic and from the Situation and Prospective Report issued by the Ministry of Agriculture of the Czech Republic, authors own processing

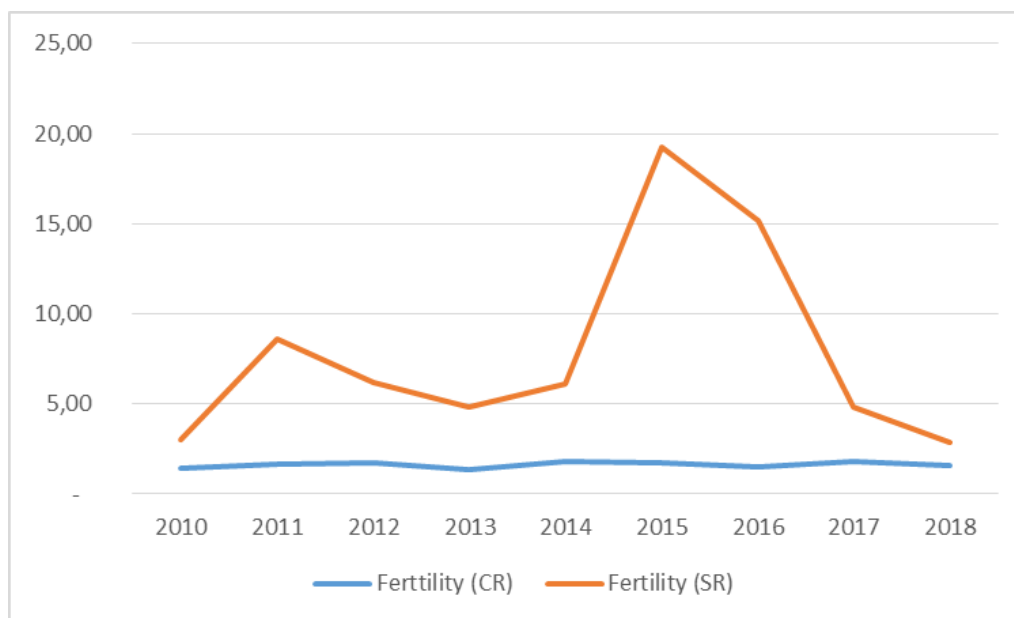
FIG. 2 shows the development of MASP yield in Slovakia and the Czech Republic. The development of the production was fluctuating in both countries. Throughout the period under review, MASP was higher in the Czech Republic, with the exception of 2014, when MASP production was 7 302.9 t in Slovakia and 5 066 t in the Czech Republic. At the beginning of the period under review, the MASP production in Slovakia was 5.85 times smaller. During the period under review, the average MASP production in the Czech Republic reached 5 696 t, while in Slovakia only 3 592 t. Over the entire period under review, the average MASP production increased by 53% in CR and in Slovakia by 159%.

Figure 2 Development of MASP production in Slovakia and the Czech Republic in 2010 – 2018 (in tonnes)



Source: Statistical Office of the Slovak Republic and from the Situation and Prospective Report issued by the Ministry of Agriculture of the Czech Republic, authors own processing

Figure 3 Development of MASP fertility in Slovakia and Czech Republic in 2010 – 2018 (in t/ha)

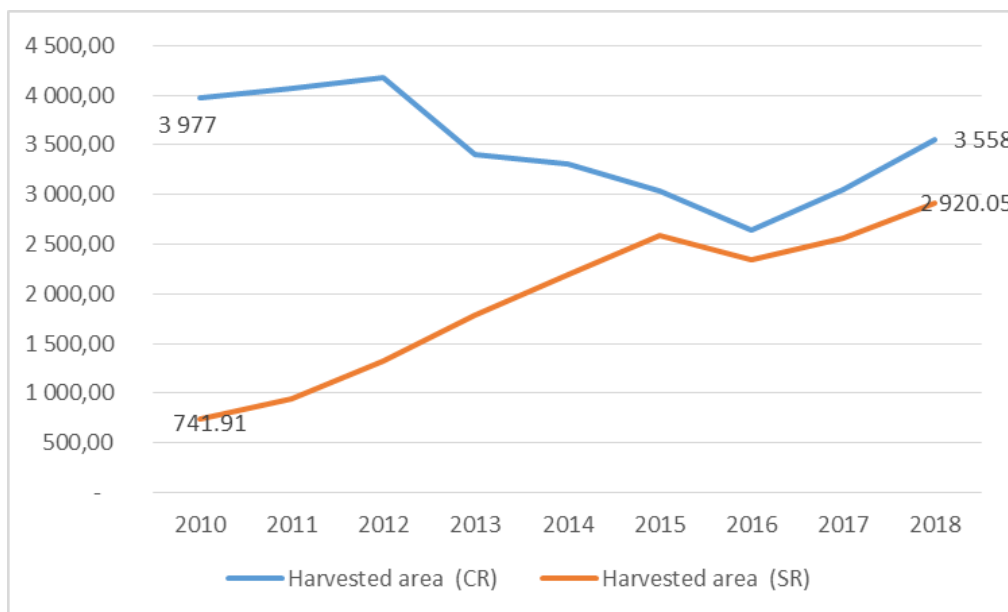


Source: Statistical Office of the Slovak Republic and from the Situation and Prospective Report issued by the Ministry of Agriculture of the Czech Republic, authors own processing

FIG. 3 shows a comparison of MASP fertility in both countries. In the Czech Republic the fertility rate of MASP did not exceed 2 t/ha during the whole monitored period, while fertility in Slovakia was several times higher, with the exception of the last two years. This disproportionate difference is attributed to the extremely high fertility of other spice and aromatic plants in Slovakia, as well as the structure of sowing and the use of part of the plant (stem, root, flower) for processing. The average fertility rate of MASP in Slovakia was 7.87 t/ha, while in the Czech Republic 1.62 t/ha. Over

the entire analyzed period, MASP fertility increased by an average of 10% in the Czech Republic and a decrease in fertility by 5% in Slovakia.

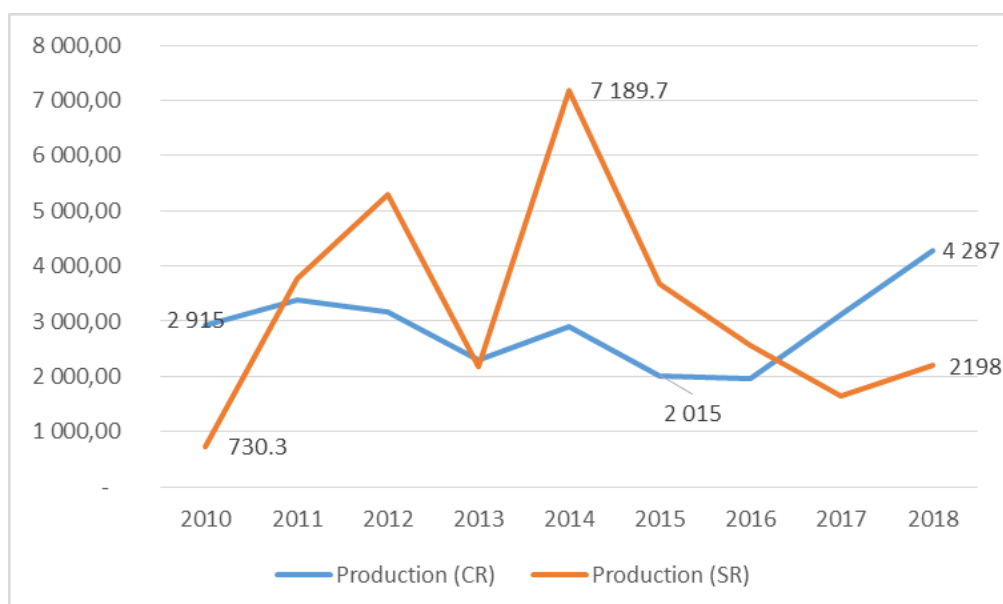
Figure 4 Development of medicinal plants harvested areas in Slovakia and the Czech Republic in 2010 – 2018 (in ha)



Source: Statistical Office of the Slovak Republic and from the Situation and Prospective Report issued by the Ministry of Agriculture of the Czech Republic, authors own processing.

Referring to FIG. 4, it is evident that the evolution of harvested areas of medicinal plants in the countries compared has a different trend. In Slovakia, this trend is positive due to the fact that the area of medicinal plants is continuously increasing during the whole monitored period. Between 2010 and 2015, the harvesting areas of medicinal plants increased almost 3.5 times. When comparing the last and the first year of the monitored period, we recorded an increase 4 times in the harvesting areas of medicinal plants in Slovakia; the average harvested area of medicinal plants is 1 933 ha. The largest harvesting areas in the SR are in the Košice, Prešov and Žilina regions due to suitable soil and climatic conditions for growing medicinal plants in comparison with other regions of the SR. In addition to the above mentioned factors, the increase in the harvesting areas of medicinal plants is also influenced by sales and subsidies allocated. In the Czech Republic we have a negative trend. While at the beginning of the period under review, the area of medicinal plants was 3 977 ha, it decreased to 2 643 ha in 2016. In the whole monitored period, the harvest area of medicinal plants in the Czech Republic decreased by 11%, and their average harvest area was 3 468 ha.

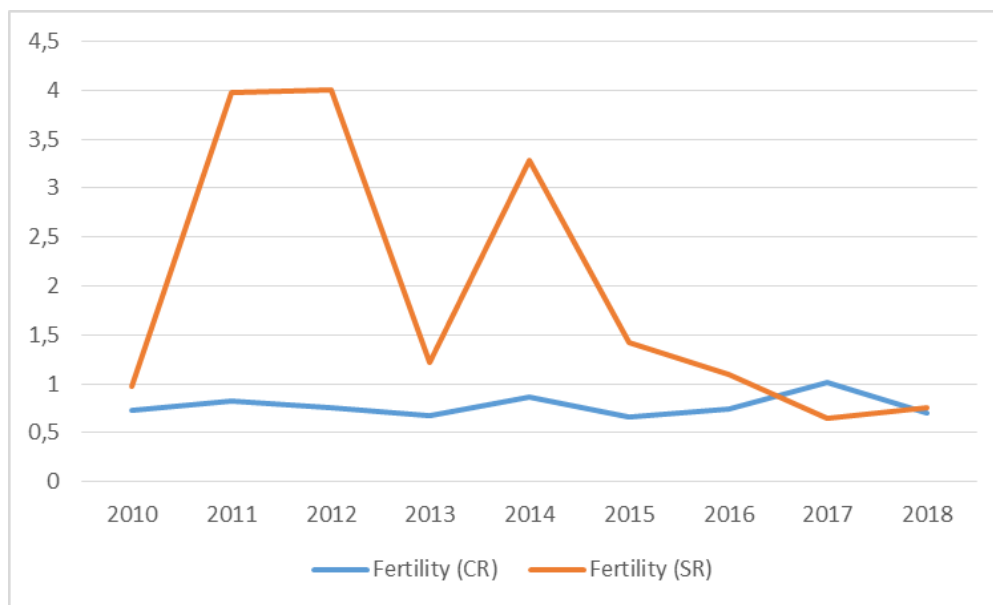
Figure 5 Development of medicinal plant yield in Slovakia and Czech Republic in 2010 – 2018 (in t)



Source: Statistical Office of the Slovak Republic and from the Situation and Prospective Report issued by the Ministry of Agriculture of the Czech Republic, authors own processing

The development medicinal plants yields (Fig. 5) in Slovakia has a growing and stepped nature. Between 2010 -2014, the yield of medicinal plants increased almost 10 times when it reached its maximum in the monitored period (7 189.7 ha). From that moment, the yield decreased until it reached 2 198 t at the end of the reference period. When comparing the last and the first year of the monitored period, we can see that the yield of medicinal plants increased 3-times. The average harvest was 3 251 ha. In the Czech Republic, we have seen an increase in the yield of medicinal plants throughout almost the entire period, with the exception of 2015 and 2016, when the crop oscillated at 2 000 ha. When comparing the last and the first year of the monitored period, we see an increase in medicinal plants harvest by 47%, the average medicinal plants yield was 2 895 t.

Figure 6 Development of medicinal plants fertility in Slovakia and Czech Republic in 2010 – 2018 (in t/ha)



Source: Statistical Office of the Slovak Republic and from the Situation and Prospective Report issued by the Ministry of Agriculture of the Czech Republic, authors own processing

FIG. 6 shows the development of fertility of medicinal plants in both countries. The average fertility rate of medicinal plants in the Czech Republic is 0.78 t / ha, while it exceeded 1 t / ha only in 2017. When comparing the last and the first year of the monitored period, we can see that the fertility decreased by 4%. On the other hand, when looking at fertility in Slovakia, it is evident that it shows higher values for almost the entire period except at the end of the period. In 2011 and 2012, fertility in Slovakia was more than 4 times higher than in the Czech Republic. Average fertility in Slovakia reached 1.93 t / ha. When comparing the last and the first year of the reference period, we see a decrease by 23%.

Table 1 Share of medicinal plants and MASP in agricultural and arable land (%)

Indicator/year	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average
Area of MP /agricl.land SR	0.04	0.05	0.07	0.09	0.11	0.13	0.12	0.13	0.15	0.10
Area of MP /arable land SR	0.05	0.07	0.10	0.13	0.16	0.19	0.17	0.19	0.22	0.14
Area of MP / agricl.land CR	0.11	0.12	0.12	0.10	0.09	0.09	0.08	0.09	0.10	0.10
Area of MP /arable land CR	0.16	0.16	0.17	0.14	0.13	0.21	0.11	0.12	0.14	0.15
Area of MASP/ agricl.land SR	0.07	0.07	0.08	0.10	0.12	0.14	0.14	0.17	0.18	0.12
Area of MASP /arable land SR	0.10	0.10	0.11	0.14	0.17	0.20	0.19	0.24	0.26	0.17
Area of MASP /agricl.land CR	0.22	0.25	0.20	0.16	0.16	0.15	0.15	0.21	0.24	0.19

Area of MAS /arable land CR	0.31	0.34	0.29	0.23	0.22	0.21	0.21	0.30	0.34	0.27
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Source: Statistical Office of the Slovak Republic and from the Situation and Prospective Report issued by the Ministry of Agriculture of the Czech Republic, authors own processing

Table 1 shows the development of the share of medicinal plants and MASP in arable and agricultural land in Slovakia and the Czech Republic. In Slovakia there is an increasing share of medicinal plants on agricultural land. While at the beginning of the period under review this share was at 0.04%, at the end of the period under review it was 0.15%. We can also observe a growing share of medicinal plants in arable land. During the period under review, it increased by 0.17%. In the Czech Republic, the share of medicinal plants in agricultural land in the period under review was fluctuating. At the beginning of the monitored period (in the 2nd and 3rd years) the share of medicinal plants in agricultural land was 0.12%, later (in 2016) it decreased to 0.08% and at the end of the monitored period it increased to 0.10%. In the Czech Republic, the share of medicinal plants was fluctuating. While at the beginning of the reporting period the share of medicinal plants on arable land was 0.16%, in 2016 it fell to 0.11% to reach 0.14% at the end of the period. The share of medicinal, spice and aromatic plants together has a growing tendency in the Slovak Republic on both agricultural and arable land. The MASP share in arable land shows a higher average value (0.17%). In the Czech Republic, we also see an increasing share of MASP in both agricultural and arable land. We can state that, when comparing both countries, MASP has a larger share of selected land in the Czech Republic. On the other hand, in Slovakia we see a higher continuous increase in the share of MASP in both agricultural and arable land.

4 Conclusions

Medicinal plants have an irreplaceable role on agricultural land in both countries. Although cultivated to a lesser extent than many other agricultural crops, their cultivation is important in various respects. According to Kocourková (2015) in the Czech Republic, subsidies are involved in the development of some types of MASP: direct payments, European Agricultural Fund for Rural Development, national support, support and guarantee fund, national food support program KLASA, system protected geographical indications and EU designations of origin. Based on the research we can conclude that the harvested areas of either medicinal plants or medicinal, aromatic and spice plants together are higher in the Czech Republic. On the other hand, there is a continuous increase in harvesting areas in Slovakia. While at the beginning of the reporting period the difference between the two countries was almost 6-times, at the end of the reporting period the difference was less than 3-times (MASP total). For medicinal plants we follow a similar trend. At the beginning of the reporting period, the harvest area of the medicinal plants was more than 5-times higher. In 2018 this area was only 1.2 times larger. The MASP yield was fluctuating in both countries. During the whole period under review, MASP production was higher in the Czech Republic with the exception of 2014. Medicinal plants production in Slovakia was increasing with step-like nature. In 2014, the yield of medicinal plants in Slovakia was almost 2.5 times higher. During almost the entire period we recorded higher fertility of both MASP and also medicinal plants in Slovakia. In Slovakia, we see an increasing share of both medicinal plants and MASP in both agricultural and arable land.

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Factors of milk consumption and production in Slovakia

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Abstract:

The article deals with monitoring of the development of the milk market and especially the identification of factors that determine milk production and consumption in the Slovak Republic. When examining questions of milk production and consumption, as with other agricultural commodities, it is important to correctly evaluate statistical data obtained by mathematical methods and especially to interpret them in the context of very diverse relationships and determinants. The period under review will be from 2001 to 2018. Based on the regression analysis, the significance of the link between the explanatory factors and the explained milk production or consumption will be determined.

Keywords: Beef cattle, determinants, indicators, milk production, milk consumption,

JEL Classification: G32, G33, C35

1 Introduction

Cow's milk is one of the basic foods of human nutrition and is the subject of daily consumption. The situation on the dairy market is very variable and is constantly monitored. Thanks to that, we have detailed statistics on economic aspects as well as on the quality of milk in Slovakia, Europe and the world.

According to Paška (2009), cattle breeding is considered to be an essential sector of livestock production, but also of the entire agricultural system. The main task of management in the production of milk is equable and continual production. He says that the economic aspect at milk production should be the following relation: milk sales in € + grants for milk production in € \geq milk production costs in € + own consumption in €.

According to Kapsdorferová, et al (2010), the dairy industry is one of the long-term competitive sectors of the Slovak food industry. The circumstances of the milk market and the market of dairy products are as follows:

- the milk production has stabilized,
- the current purchase is about 1 billion liters of milk per year,
- the number of dairy plants has decreased and the number of dairy cows has decreased;
- the purchase prices of raw cow's milk decreased also,
- milk and dairy product consumption decreased from 253 kg per person per year to the current 172 kg per person per year,
- however, the milk yield of cows, the quality of dairy products increased and dairies were modernized.

Kopáček (2016) states that agricultural production and milk production in the post-war period until the economic changes after 1999 had an ever-increasing quality. Slovakia produced almost 2 billion milk per year. It was fully self-sufficient in dairy production and 30% of dairy products were still exported. After 1990, with the fall of socialism, total milk production and the associated dairy product production declined. Milk production stabilized for the current purchase of approximately 850 mil. liters per year.

Strapák, (2013) writes that beef cattle breeding will continue to perform two basic functions in Slovakia in the future: the production function and the non-production function. In Slovakia, from 1990 to 2016, the number of bovine animals decreased from 1563070 to 457.1 thous. pieces. A similar situation was observed also in cow breeding, where the number decreased from the original 548666 pieces in 1999 to 135.9 thous. pieces in 2016.

According to Kuzma (2006), ensuring a healthy diet for the world's population remains a global problem. There is a broad consensus that global food demand will increase in the long term. Increased food consumption in the medium term is technically solvable. However, rising costs of intensifying agriculture may encounter economic options, especially in poor countries.

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According to Zentkova (2005), milk production in the next period will be determined by the internal (dairy cows, yield) and external (input and production prices, state interventions) production environment. There are significant factors for primary producers whose level they can only slightly influence.

2 Methods

The aim of the paper is to present the results of a research study aimed at mapping the situation on the milk market and to identify factors that influence the development of milk production and consumption in Slovakia. A regression analysis was used to achieve the stated main goal. Under regression we understand study of the relationship between two or more variables using statistical model, which is characterizing the dependency between the selected variables. Using regression model expresses the regression analyses the quantitative influence of separate explanatory (independent) variables on the explained (dependent) variable. The linear regression model explains the relationship between dependent variable Y and k number of independent variables X_j ($j = 1, 2, \dots, k$). It has a general form:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \dots + \beta_k x_{ik} + e_i,$$

The absolute member – coefficient β_0 is called *intercept*. It is interpreted as a conditional mean value variable Y assuming that all explanatory variables take the value zero.

Coefficients X_j ($j = 1, 2, \dots, k$) are called *regression coefficients*. Regression coefficient β_j shows how the mean value of the dependent variable Y changes, if the independent variable X_j changes by one unit and the other variables stays unchanged (Šoltéz, E. 2008).

All regression analyses are conducted using regression analysis and data are logarithm. Multicollinearity wasn't proved in any model. Heteroscedasticity and autocorrelation problems were removed using heteroscedasticity autocorrelated consistent (HAC). Due to the use of logarithmical data in regression models, the regression coefficients are representing elasticities.

The data used in this article come from the Milk Situational and Outlook Reports published by the Research Institute of Agricultural and Food Economics of the Ministry of Agriculture of the Slovak Republic. The period under review is 2001 to 2018. Using regression analysis, we investigated the relationship between milk production as a dependent variable (s) and the number of dairy cows and the yield of dairy cows as independent variables (x_1 and x_2). We also used the linear regression model to investigate the dependence between milk consumption as a dependent variable (s) and the consumer's milk price and the net cash income of Slovak households as independent variables (x_1 and x_2).

Table 1 Production and factors of production

	Production (thous. ton)	Number of dairy cows (pcs)	Milk yield (kg/cow)
2001	1113.8	239.3	4793.105
2002	1162.9	237.4	5045.146
2003	1108.9	220.5	5179.355
2004	1078.6	206	5235.72
2005	1099.8	198.5	5541.67
2006	1091.7	192.5	5670.13
2007	1074.7	180.6	5951.38
2008	1057.2	175.5	6024.94
2009	957.3	165.9	5769.82
2010	917.98	161.3	5692.09
2011	928.32	156.1	5945.95
2012	959.42	152.4	6295.53
2013	933.89	147.4	6334.18
2014	948.71	145.9	6504.68
2015	957.42	142.2	6732.6
2016	933.3	135.9	6867.51
2017	938	131.3	7145.13

2018	932.59	128.3	726.87
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Source: own processing

Table 1 shows the amount of production in Slovakia in millions of kilograms, the average number of dairy cows per year in thousands, and the average annual milk yield per cow in kilograms. Then we can build a regression model for regression analysis.

Table 2 Consumption and factors of consumption

	Consumption (thous. ton)	Consumer price (€)	Net cash income (€)
2001	870.51	0.52	212.07
2002	893.947	0.56	222.86
2003	851.394	0.60	235.45
2004	825.271	0.65	241.62
2005	832.866	0.66	251.17
2006	821.63	0.64	285.97
2007	828.123	0.66	320.43
2008	827.258	0.73	351.76
2009	833,397	0,60	350,61
2010	883.902	0.62	348.95
2011	846.841	0.71	361.77
2012	857.735	0.74	366.34
2013	857.952	0.76	369.88
2014	903.873	0.79	390.13
2015	917.558	0.77	422.83
2016	956.891	0.64	440.91
2017	949.415	0.70	455.83
2018	937.101	0.74	473.36

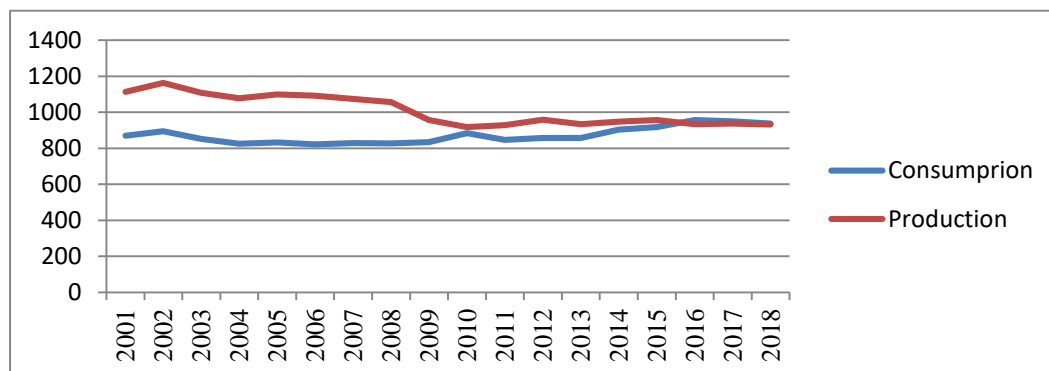
Source: own processing

Table 2 shows the amount of total consumption in millions of kilograms, the consumer price of milk in euros and the average monthly cash income per capita in euros.

3 Research results

The development of the dairy market situation can be monitored through many indicators. The basic ones are the total amount of milk produced and the total milk consumption in Slovakia. Data obtained from public sources are clearly arranged in the following chart.

Figure 1 The development of production and consumption of milk in thous. tons



Source: Own processing

Figure 1 shows that production from the beginning of the period under review exceeded consumption until 2016, when milk consumption exceeded production, and this situation lasted until the end of the period under review. We consider this to be a very unfavorable situation, as production has been declining throughout the period and has fallen so much that it does not even cover domestic consumption. Of course, foreign milk trade should be pointed out. Account should also be taken of the fact that part of the domestic milk production is exported and therefore the rest of the consumption is milk from foreign production. Milk consumption has been relatively stable over the long term.

3.1 Milk production analysis

In milk production, we identified the number of dairy cows and the average annual milk yield as the main factors.

Table 3 Regression analysis of milk production

<i>Regression analysis</i>						
Multiple R	0.9632					
R square	0.9278					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	2	110997.5	55498.77	96.44583	2.73E-09	
	<i>Coefficients</i>	<i>Standard error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Limits	-237.7880	219.1716	-1.0849	0.2951	-704.9412	229.3653
Number of dairy cows	3.9648	0.4738	8.3677	4.93E-07	2.9548	4.9747
Milk yield	0.0937	0.0234	4.0064	0.0011	0.0438	0.1435

Source: own processing

The correlation coefficient (Multiple R) is almost equal to 1, which means that there is a strong statistical dependence between the production and the number of dairy cows and the yield of dairy cows. The coefficient of determination (R square), in turn, explains the variability of production and suggests that the chosen linear model and the chosen independent variables explain 92,78% of the changes in the dependent variable. Since the Significance F is less than 0,05, the model chosen is appropriate and the independent variables are able to explain changes in the dependent variable. The calculated P value of both analyzed independent variables was compared to the alpha (0,05). Since the P value was less than 0,05, we can say that the parameters selected are significant, meaning that both the number of dairy cows and the yield of dairy cows affect milk production. If the number of dairy cows increases by 1000 heads, milk production will increase by 3.96 million kg. If the average milk yield increases by 1 kg per dairy cow, milk production will increase by 0.09 million kg. It can be assumed from the input data that milk yield increases but the number of dairy cows decreases significantly. The most important factor of decreasing milk production in Slovakia can be considered decreasing number of dairy cows and liquidation of cattle breeding.

3.2 Milk consumption analysis

In milk consumption, we identified the consumer price of milk and net cash income per person as the main factors.

Table 4 Regression analysis of milk consumption

<i>Regression analysis</i>						
Multiple R	0.7374					
R square	0.5438					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	2	18642.6821	9321.3410	8.9400	0.0028	
	<i>Coefficients</i>	<i>Standard error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Limits	881.3615	73.0666	12.0624	4.03E-09	725.6238	1037.0992
Consumer price	-284.3939	142.7081	-1.9928	0.0648	-588.5690	19.7812
Net cash income	0.5358	0.1315	4.0749	0.0010	0.2555	0.8161

Source: Own processing

Now we can build a regression model for regression analysis. The correlation coefficient (Multiple R) is close to 1, which means that there is a statistical dependence between consumption and net cash income and the consumer price of milk. The value of R square 0.5438 tells us that the dependence between the chosen coefficients is moderate. The value of Significance F is less than alpha (0.05), so the model is suitable. We compared the value of the two independent variable variables examined with alpha (0,05). Our analysis shows that the P value of the milk consumer price indicator is higher than the alpha value compared (0,05), which means that this indicator is not statistically significant. This means that the

consumer price does not affect milk consumption. Na druhej strane P hodnota druhého analyzovaného ukazovateľ, čistý pražný príjem, nedosahuje hodnotu alfa (0,05), na základe čoho môžeme analyzovať, že tento ukazovateľ je štatisticky významný a jeho zmena pôsobí na zmenu spotreby mlieka. If households' net cash income increases by EUR 10 per person, milk consumption will increase by 5.35 kg. Thus, the results of the regression analysis suggest that in long term perspective the milk price has no effect on the total milk consumption. What affects consumption, however, is the net cash income, on the basis of which the consumer determines his consum basket. However, the dependence of the factors is only moderately strong, so it can be concluded that other factors also affect consumption.

4 Conclusions

Milk is one of the basic products of livestock production in agriculture and is one of the basic components of the population's nutrition. Milk is an important commodity in the food market, as it is subject to daily production and consumption. By examining the development of the situation on the milk market, we found that since 2001 milk production in Slovakia exceeded its consumption, until 2016, when milk consumption exceeded its production, and this situation persisted till the end of the period under review. An unfavorable fact is the constant decrease in milk production due to the decrease in the number of dairy cows in Slovakia, despite the increasing milk yield per dairy cow. Simo, Mura a Buleca (2016) also point to a significant long-term reduction of the number of cattle and especially the number of cows. Milk consumption in Slovakia has been relatively stable over the past eighteen years. The regression analysis showed that the consumption is not influenced by the milk price but by the per capita cash income, on the basis of which the consumer determines his consumption basket. Overall, however, the deterioration of the dairy market is assessed negatively, given that domestic production does not cover domestic milk consumption, which supports the import of milk from abroad. Given the long-term negative development in primary production, there is reason to assume that this development will continue also in the following period. Gurčík et al (2016) defines that based on the long-term development and its predictions the self-sufficiency of the Slovak Republic in milk production threatened. One of the options to avoid this production risk is government assistance, which would provide targeted support to milk producers on the basis of changes in the exercise price and the milk yield of dairy cows in farms. Examination of the impact of subsidy policy on the dairy market could be the subject of further investigation.

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Structural Changes in the Czech Dairy Industry

Jana Lekešová¹, Ivana Blažková², Barbora Daňková³

Abstract: Significant structural changes have been taking place in the Czech agri-food sector in recent decades, which is especially valid in the dairy industry. The paper responds to this development by analysing the market structure on the Czech dairy market. The aim of the paper is to evaluate the development of market concentration on the dairy market with regard to the dynamics of foreign trade with dairy products in the period 2003-2017. The main dairy processors on the Czech market are identified and market concentration ratio CR4 is calculated with and within the foreign trade adjustment to find out, how import competition affects the overall market share of large dominant firms in the dairy industry. The results show that market concentration in the Czech dairy industry increased in the period 2003-2017 (CR4 was 26.7% in 2003 compared to 41.6% in 2017). Also the import penetration ratio increased significantly (from 11.7% in 2003 to 35.5% in 2017), which means that the demand for dairy products in the Czech Republic is increasingly being met by foreign producers. However, the position of the largest major dairies is not threatened by import competition, as the CR4 indicator adjusted to the foreign trade does not change much (40.8% with the foreign trade adjustment compared to 41.6% without the foreign trade adjustment in 2017). These findings point to a strong position of the main players on the Czech dairy market. As a result, the balance of market power in the commodity chain may be disrupted and cause significant socio-economic implications for all stakeholders, i.e. consumers, agricultural producers, processors, and retail.

Keywords: dairy industry, market concentration, foreign trade, Czech Republic.

JEL Classification: G32, G33, C35

1 Introduction

Milk is considered to be one of the main agrarian products of the European Union – approximately 75% of milk production is produced in the EU (European Commission, 2019). Milk is further processed in specialized dairy processing enterprises. Processed milk products play an important role in human nutrition due to a number of important and essential substances for the human body, such as whey protein (3.3%) and casein (Kopřiva, 2011). In the Czech Republic, the production of milk food products belongs to the traditional sector with strategic importance, which results not only from the nutrition value of milk, but also from the role of the milk sector in the practical implementation of the philosophy of multifunctional agriculture, i.e. in terms of its contribution to environmental and social field, as emphasized by Zdráhal and Bečvářová (2018).

In recent decades, the markets with milk and dairy products have undergone significant changes within all vertical stages of the milk commodity chain. There are many factors that influence current developments, of which globalization can be considered the most important factor, which significantly affects the links within agro-food sector, rural areas and national economy. The manifestations of globalization are evident at all levels of the commodity chain, e.g. changing market structures, growth of import competition, increasing concentration and consolidation, expansion of large multinational corporations. If the distribution of market power within the commodity chain is unbalanced, there is a greater likelihood of abuse of market power or anti-competitive behaviour (Blažková, 2010). Concentration and consolidation processes take place also in food processing industry (Swinnen and Vandeplass, 2010), since food processors are looking to strengthen their market position in relation to the multinational retail corporations as the strongest players on the food market (Daniels, 2008; Blažková and Dvouletý, 2017). Moreover, there is an increased competitive pressure of import competition on the food processing markets (Zdráhal a Bečvářová, 2018).

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This paper responds to the above mentioned developments, since the disrupted balance of market power in the commodity chain may cause significant socio-economic implications for all stakeholders, i.e. consumers, agricultural producers, processors, and retail. The aim of the paper is to evaluate the development of market concentration on the Czech dairy market with regard to the dynamics of foreign trade with dairy products in the period 2003-2017.

2 Methods

The data for the analysis were obtained from the commercial database Albertina published by Bisnode (2019), which includes financial statements of enterprises in the Czech Republic. Additional data sources were publications by Ministry of Agriculture of the Czech Republic (2009, 2018). The period of analysis was from 2003 to 2017. Market is defined based on the 3-digit level of the Classification of Economic Activities (CZ-NACE).

The aim of the paper is to evaluate the market concentration in the Czech dairy industry (CZ-NACE 10.5) and to assess the impact of import competition on the concentration level. The extent to which the demand for goods and services is being met by foreign producers rather than domestic production is evaluated with the use of the import penetration ratio (IMP), as previously used by Blažková and Chmelíková (2015). Market concentration is expressed by concentration ratio (CR4), which is calculated without and within the foreign trade adjustment.

The concentration ratio of four largest firms (CR4) is calculated as follows (Viscusi et al., 2005):

$$CR_4 = \sum_{i=1}^4 S_i$$

where S_i denotes the percentage of the i -th firm calculated as the production of the company divided by the sum of production of all firms in the market (in this case, the production is calculated in terms of revenue, i.e. sales of own products and services).

The import penetration ratio shows the extent to which the demand for goods and services is being met by foreign producers rather than from domestic production. The import penetration ratio is built as (Lindner et al., 2001):

$$IMP_t = \frac{M_t}{Y_t + M_t - X_t}$$

where t indexes the year, M_t and X_t are, respectively, the imports and exports of the sector in the year t , and Y_t is the total sector output expressed through the total sales of own products and services.

To be able to assess the impact of import competition on the market concentration and the market power of the largest companies, the CR4 indicator is further adjusted to the foreign trade, i.e. the value of dairy products' imports in the given year is added to the total sales of the whole dairy industry in the given year, and the value of dairy products' exports in the given year is deducted from the total sales of the dairy industry (Blažková and Chmelíková, 2015).

3 Research results

The Czech domestic market is characterized by a relatively low number of enterprises, which, moreover, has a decreasing tendency - while in 2003 there were 361 enterprises in the Czech dairy industry, in 2017 only 172 enterprises were operating in this sector (Ministry of Agriculture of the Czech Republic, 2009, 2018). There are several large companies in the Czech dairy industry and many small dairies operating at regional level. The processing companies are very closely technologically profiled and usually work closely with suppliers of packaging materials and distributors.

Figure 1 shows ten largest dairy processors in the Czech Republic in 2017 producing a total of 68.8% of milk deliveries, which means an increase of 0.5% compared to 2016 (Kopáček, 2018). Pragolaktos and Madeta are among the largest milk processors in the Czech Republic in 2017. In addition, Pragolaktos further processed 6.4% of the milk purchased in Germany. Furthermore, more than 8% of milk was processed in companies Olma and Tatra. A total of 6.3% of the volume of milk on the Czech market was processed by Brazzale Moravia, below 5% by Mlékárna Kunín, Moravia Lacto, Savenia FD, Dairy Klatovy, and Polabské mlékárny.

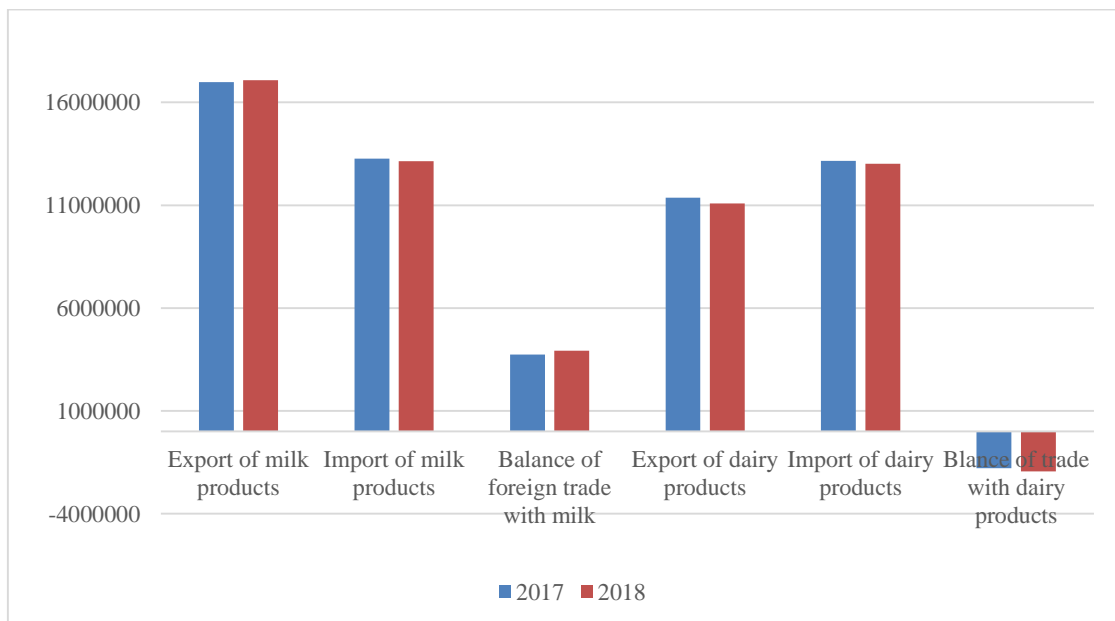
Figure 1 Top dairy processors in the Czech Republic in 2017 sorted by volume of processed milk (in million litres)



Source: Kopáček, J. (2018).

Due to the globalization the market becomes more open, large, and the demand for milk and dairy products increases not only within the European Union, but also worldwide. On the one hand, the foreign trade means for the Czech processors the possibility of selling their products on a wider market, but on the other hand, intensifying competition. As seen in Figure 2, the Czech processors have not sufficiently exploited the benefits of foreign trade, as the balance of foreign trade in processed dairy products (products with higher added value) is negative.

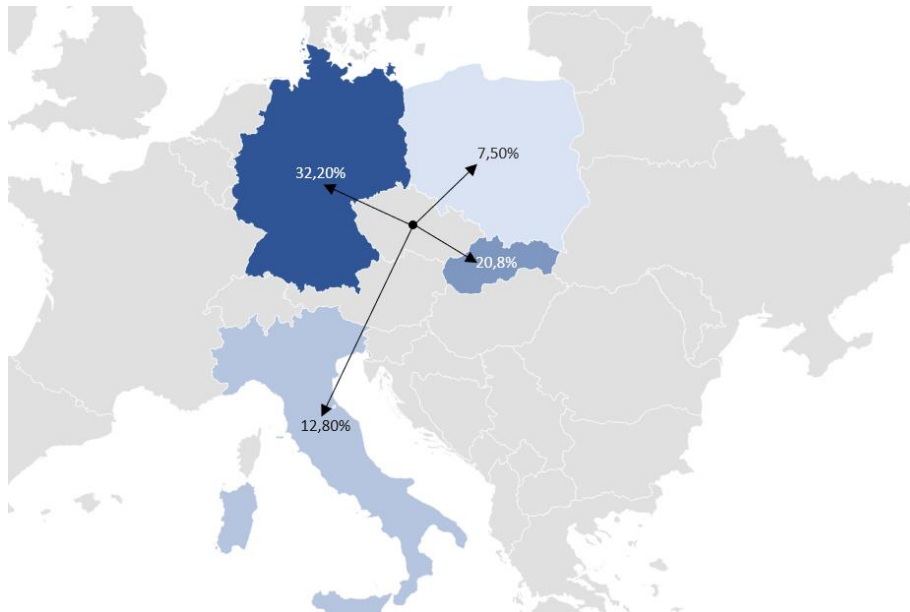
Figure 2 Foreign trade with milk and dairy products in 2017 and 2018 (in ths. CZK)



Source: Agrární komora ČR (2018); authors' elaboration.

Milk and milk products are most exported to Germany, accounting for 32.20% of the total financial volume of exports. Besides Germany, the most important export destinations are Poland, Slovakia and Italy. These four countries accounted for more than 73% of the financial volume of exports in 2017, as seen in Figure 3.

Figure 3 The main export destinations of the Czech milk and dairy products



Source: Ministry of Agriculture of the Czech Republic (2018); authors' elaboration.

In terms of imports, Germany is the dominant importer, accounting for almost 40% of the total financial volume of imports. As seen in Figure 4, milk and dairy products are imported especially from Germany, Poland and Slovakia, which in financial terms represent 78.3% of all imports.

Figure 4 Main importers of milk and dairy products into the Czech Republic

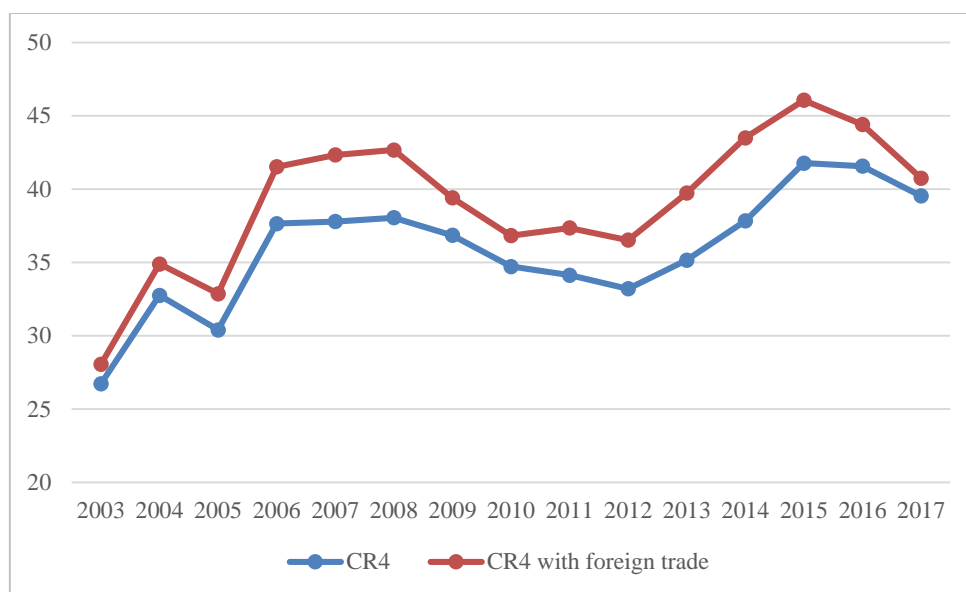


Source: Ministry of Agriculture of the Czech Republic (2018); authors' elaboration.

As can be seen from the Figure 5, the market concentration in the Czech dairy industry expressed by share of the four largest firms on the total food production (CR4) in the period 2003-2017 grew – CR4 in the Czech dairy industry has been around 40% in recent years. The process of market concentration in the Czech dairy industry is under way due to the multinational retail chains which often prefer foreign suppliers – these retail chains seek production of low price levels and are usually little interested in production quality issues. The concentration trends can be expected to continue as large

companies are better able to compete on the market than small processors, which have to focus especially on local or regional markets.

Figure 5 Market concentration in the Czech dairy industry (in %)



Source: Authors' elaboration on the basis of the data published by the Ministry of Agriculture of the Czech Republic (2009, 2018) and by Bisnode (2019).

Moreover, the increased competitive pressure of the import competition in the Czech dairy industry supports these processes. The level of import penetration measured by IMP in the Czech dairy industry increase significantly in the period of years 200-2017 – while in 2003 import penetration was 11.65% of domestic demand, in 2017 it reached over 35% (see Table 1). It shows that the demand for dairy products in the Czech Republic is increasingly being met by foreign producers. However, the position of the largest major dairies is not threatened by import competition, as the CR4 indicator adjusted to the foreign trade does not change much (40.8% with the foreign trade adjustment compared to 41.6% without the foreign trade adjustment in 2017). These finding point to a strong position of the main players on the Czech dairy market. While import competition is growing (see Table 1) and increasingly larger part of domestic demand is met by foreign processors, the market share of the four largest processors in the Czech Republic is not very affected (see Figure 5). Therefore, in particular, smaller processors are threatened by foreign competition, they are forced to leave the market, and the market power of the biggest processors on the Czech dairy market is increasing.

Table 1 Import penetration ratio in the Czech dairy industry in 2003-2017

Year	IMP (in %)
2003	11.65
2004	14.23
2005	18.44
2006	22.84
2007	26.40
2008	26.52
2009	28.84
2010	31.29
2011	34.00
2012	36.75
2013	37.78
2014	42.88
2015	39.73
2016	40.60
2017	35.47

Source: Authors' elaboration on the basis of the data published by the Ministry of Agriculture of the Czech Republic (2009, 2018) and by Bisnode (2019).

4 Conclusions

Nowadays, globalization processes, which penetrate the entire structure of society, have the greatest impact on the world economy. They cause significant structural changes in the agri-food sector as well, which it has to cope with. The manifestations of globalization are evident at all levels of the commodity chain and influence the performance, efficiency and productivity of all subjects on the markets (Novotná et al., 2014). This paper responded to these developments and its aim was to evaluate the development of market concentration on the Czech dairy market with regard to the dynamics of foreign trade with dairy products in the period 2003-2017. For this purpose, the market concentration ratio CR4 is calculated with and within the foreign trade adjustment, which enabled to find out the development of market concentration and how import competition affects the overall market share of large dominant firms in the dairy industry.

Market concentration in the Czech dairy industry increased in the period 2003-2017 (CR4 was 26.7% in 2003 compared to 41.6% in 2017). Increasing imports of dairy products are reflected in the significant increase of the import penetration ratio, which was 11.7% in 2003 compared to 35.5% in 2017. However, the position of the largest major dairies is not threatened by import competition, as the CR4 indicator adjusted to the foreign trade does not change much (40.8% with the foreign trade adjustment compared to 41.6% without the foreign trade adjustment in 2017). These findings point to a strong position of the main players on the Czech dairy market.

The Czech dairy sector has not yet exhausted the opportunities for further development and the possibility of increasing the efficiency of dairy processing and sales on the domestic and European markets. The major problem facing the dairy sector is the strong market position of the retail sector (Blažková, 201; Blažková and Dvouletý, 2017) and the volatility of milk prices (Daňková et al., 2017). From the perspective of competitiveness, it is necessary to focus on the particular stages of the commodity vertical, where it is necessary to emphasize sustainable management and corporate governance. It should be essential for the country to maintain a certain level of self-sufficiency in food production, which also applies to milk and dairy products. However, the market may be threatened by an imbalance in the distribution of market power, underlining the need to implement a functional competition policy. Moreover, the dairy sector has a long tradition on the Czech market, so it is important to strive for profitability and prospects in this sector.

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Influence of Farm Size on Economic Results

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Abstract: The paper aims to evaluate the economic situation of Czech farms and their development in the period 2014 – 2017. The analysis is based on the database Albertina. Farms were sorted by size. The profitability of agricultural holdings is low with frequent fluctuations caused by the dependence of the profit/loss on external conditions. The effect of the size of the farms on profitability is not apparent. The impact of farm size on the volume of subsidies per hectare is not obvious. However, given the higher production intensity of larger farms, there is an indirect proportion that, with increasing size, the share of subsidies in total revenues declines.

Key words: agriculture, profit/loss, capital, return on assets, subsidies.

JEL Classification: Q10, Q14, Q18

5 Introduction

Agriculture is of strategic importance for the provision of goods linked, in particular, to ensure a strategic level of food security, landscape management and environmental protection. The risks associated with doing business in agriculture result from the specific conditions of agriculture, in particular the impact of climate and price changes. Some risks are specific to Czech farms. The problem is the long-term undercapitalization, the credit burden of farms and the outflow of finance from the agricultural sector during the transition. It is therefore important to monitor the development of agriculture, analyse risks and identify vulnerable areas of agricultural business. Adamišín & Kotulič (2013) argue that a slow structural change in agriculture and high subsidies require studies on whether such conditions could explain the poor performance of the agricultural sector and, if so, what is the impact of the introduction of high CAP subsidies on farm behaviour and survival. As summarized by Gorton & Davidova (2004), the issue of farm productivity and efficiency in post-socialist countries is crucial to understanding their competitiveness in the enlarged EU and the evolution of farm structure changes in these countries. Farm survival is important as it is crucial to land use and sustainable rural development, as prosperous farms provide employment and civic amenities in rural areas.

Land abandonment in post-socialist countries after the transformation was relatively high due to political and economic changes. Kuemmerle et al. (2009) cited as declining revenues from agriculture, uncertainty connected with rented land and demographic trends as the main causes of this phenomenon. Many authors discuss the impact of the CAP on farm performance (Ciaian et al. 2015; Kroupová & Malý 2010; Bakucs et al. 2010; Bojnec & Latruffe 2013; Mary 2013; Rizov et al. 2013) or compare subsidies by different classification of farms (e.g. Roman et al. 2010; Gocht et al. 2013; Sinabell et al. 2013; Latruffe & Mann 2015). Reiff et al. (2016) say that one of the objectives of the CAP is to reduce the differences in agricultural performance, so they analysed the differences in agricultural and food industry performance across the EU in the period 2010-2013. They used taxonomic development measures proposed by the Hellwig and Ward method. Their results are consistent for both methods and confirmed the existence of significant differences in agricultural sector performance between the old and new member states. Of the new member states, only Estonia and Latvia are among the top 10, with the remaining new member states listed in last positions.

The productivity of agricultural entities organized in producer groups is analysed in their work by Szelağ-Sikora et al. (2015) and found that the productivity of unorganized farmers is significantly lower. Varga and Sipiczki (2015) evaluated the foreign commitments of agricultural producers, analysed the technological and commercial concepts associated with various financing products in Hungary. The study of Ciutacu et al. (2015) aimed to define the differences and similarities between the European model of agriculture and rural development and the current situation in the Romanian agricultural sector. According to the authors, farmers in Romania are still severely disadvantaged compared to their competitors in the old EU Member States.

Novotná and Volek (2016) analysed the difference in labour productivity of farms classified by size. They have shown that farm size has a significant impact on labour productivity and the effect of the subsidy policy is the convergence of

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labour productivity in farm size groups. According to Kroupová & Trnková (2014), agricultural holdings focused on field production are characterized by a high differentiation of economic performance. The acreage of the farm was identified as the most important determinant of the inequality that arose. Operational subsidies eliminate differences, but the effect of subsidies is not fully shifted to the inequality of profit/loss.

This paper aims to evaluate the economic situation of Czech farms and its development between 2014 and 2017 and to identify differences in economic indicators depending on the size of the farm.

2 Data and Methods

As a source of data for analysis, the Albertina database, which is based on data obtained from the standard financial statements for 2014-2017. Data from enterprises whose prevailing subject of activity is agriculture were selected from the database. The SZIF data on the beneficiaries of the subsidies were assigned to the farms, on the basis of which the approximate acreage of the utilized agricultural land was calculated.

The classification is by size as defined by the European Union regulation (Annex I to Commission Regulation (EC) No 800/2008⁴) as follows: micro-enterprises are defined as enterprises employing less than 10 persons and whose annual turnover or balance sheet total does not exceed EUR 2 million; a small enterprise is an enterprise which employs fewer than 50 persons and whose annual turnover or annual balance sheet total does not exceed EUR 10 million; medium-sized enterprises employ fewer than 250 people and whose annual turnover does not exceed EUR 50 million, or whose balance sheet total does not exceed EUR 43 million; if a company is neither a micro nor a small or medium-sized enterprise according to the above parameters, it is a large enterprise.

In the analysis of the main indicators of farm management, the paper is focused on the development of profitability and cost ratios, efficiency of production factors and financial stability. The basic indicators of financial analysis (Giroux, 2003; Peterson & Fabozzi, 2006) were used to analyse profitability, turnover, capital structure and liquidity, as well as to evaluate the interaction between these indicators in the 2014-2017 period. The efficiency of production factors is evaluated using indicators of production intensity, labour productivity and turnover. The relation of revenues to the area of agricultural land is characterized by the intensity of production, the relation to labour costs is characterized by labour productivity and the relation between revenues and assets is characterized by turnover. The subsidy dependency index is used to assess the development of subsidies, and it represents the cost ratio (without subsidies), where a value above 100% expresses what proportion of farm costs have to be covered by subsidies (CZSO, 2010).

3 Research results

3.1 Characteristics of the sample

In the years under review, the Albertina databases contained 1877 farms in 2014, 1779 in 2015, 1505 in 2016 and 1052 farms in 2017. According to the size classification databases contained 22% of micro-enterprises, about 47% of small enterprises, about 30% of medium-sized enterprises and 0.5% of large enterprises. Assets calculated per hectare of agricultural land are CZK 110 thousand / ha and their trend is increasing in all size groups. Average sales of own products and services per hectare of agricultural land show a decline in 2016. In individual groups, there is a significant increase in larger enterprises.

Table 1 Basic characteristics of the average farm

Year		2014	2015	2016	2017
Number of farms	micro	804	704	507	315
	small	927	885	761	512
	middle	398	396	379	314
	large	9	8	7	7
	average	2138	1993	1654	1148
Agricultural land (ha)	micro	287	282	292	286
	small	987	995	979	1 011
	middle	2 232	2 295	2 248	2 240
	large	4 123	3 833	5 593	5 593

⁴ <https://op.europa.eu/en/publication-detail/-/publication/b1e24aa4-d04e-4593-b587-09df9e505275/>

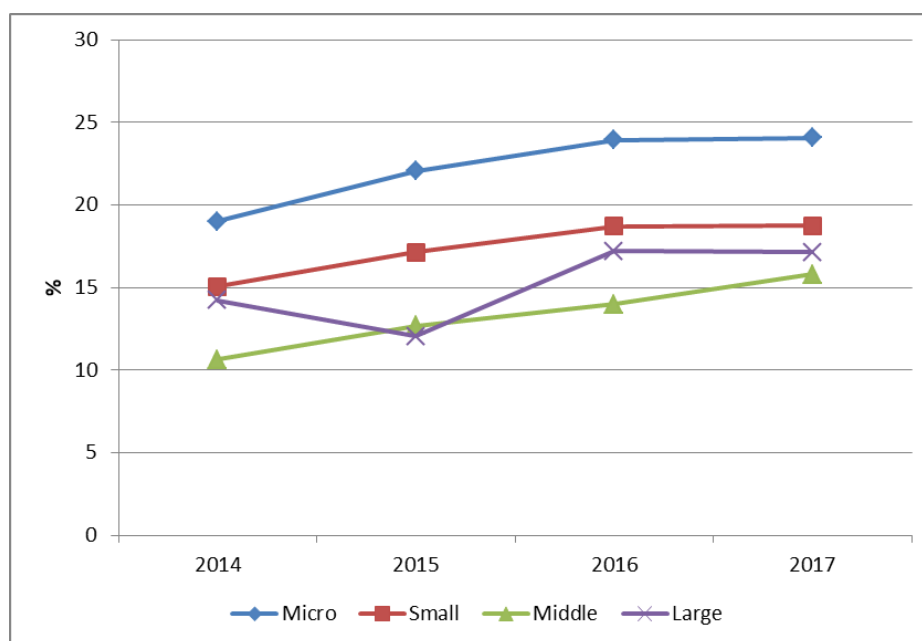
	average	968	1 013	1 078	1 176
Assets (thous. CZK)	micro	15 391	15 672	16 084	15 733
	small	81 147	82 966	87 832	91 676
	middle	254 407	266 404	277 776	285 993
	large	715 513	670 647	982 401	1 091 460
	average	91 343	98 003	113 149	130 084
Revenues from sales of own products and services (thous. CZK)	micro	7 573	6 746	6 326	5 954
	small	35 600	34 969	33 037	35 974
	middle	115 468	113 663	109 714	112 938
	large	317 337	299 675	324 039	414 075
	average	46 874	47 165	43 873	51 303

Source: Own processing

3.2 Development of the structure of assets and capital

The structure of assets of the average company in terms of long-term and short-term items shows no trend, the share of long-term assets in each year is around 60%. By looking more closely into individual groups, significant trends can already be noticed. While at the start of the survey the share of land in total assets was 15%, in 2017 it was already 19% (figure 1). The share of land is growing fastest for medium-sized enterprises. The share of buildings in total assets decreases in all groups except micro-enterprises. The decline is partly due to a decrease in the nett asset value and, in particular, to an increase in the share of land. In the case of machinery and equipment, there was a slight decrease in their share of assets in all groups, which in 2017 was 14%.

Figure 1 Development of the share of land in total assets

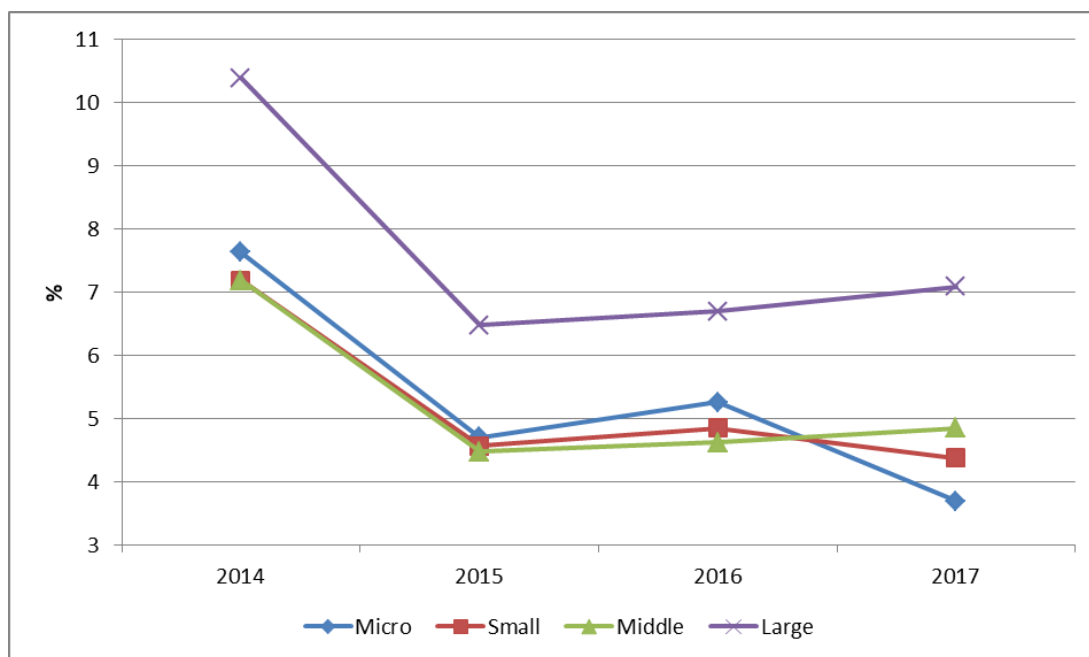


Source: Own processing

3.3 Development of financial ratios

The profitability of the average farm is low, the average of 7% was exceeded only in 2014 and the trend of development is the same in all groups. At the same time, there is high year-on-year volatility. Given that profitability has the same trend across all farm groups, it is clear that external influences are the cause of this high volatility (Lososová & Zdeněk, 2014). The effect of the size of the company on the level of profitability is not apparent, the only exception being large enterprises, which achieve significantly above-average profitability (figure 2).

Figure 2 Development of return on assets



Source: Own processing

Generally speaking, the development of profitability is affected mainly by the development of cost ratio of production, with the strong, unpredictable effect of realization prices and unfavourable influence of some cost items (especially land rents and wages in the last year). The increase in labour productivity has a positive effect, while the positive impact of the efficiency of fixed assets has been exhausted (Kopta, Lososová, & Zdeněk, 2016) and activity indicators have been deteriorating in recent years.

Establishing a universal economic strategy for a successful farm is ambiguous. Factors characterizing farms with higher profitability include: higher costs per hectare of agricultural land resulting in higher yields and production intensity, higher amount of assets per hectare and their less depreciation rate, higher use of debt, higher share of crop production in total revenues and less diversification of crop production. On the other hand, these are factors that sharply increase both the volatility of the profit/loss and the potential threat from the resulting loss (Kopta, 2013).

In terms of cost ratio, the most significant item is the cost ratio of consumption from production. Its values are relatively stable over time and the average for the period under review is 60% in micro-enterprises, 53% in small enterprises, 52% in medium enterprises and 39% in large enterprises. Personnel costs are a significant cost item; their costs in 2017 were 15% in micro, 19.6% in small, 20% in medium and 15% in large enterprises. The reciprocal indicator is labour cost productivity, which is significantly higher for micro and large enterprises.

The current ratio for the average micro-enterprise was 1.96 in 2017; in a small enterprise 3.43; in a medium-sized enterprise 3.6 and in a large enterprise 4.5. Current ratio values oscillate over time and exceed the recommended range in all years, except for micro-enterprises. The development of the debt ratio of the average farm in all groups shows a downward trend. The differences in the level of debt ratios between SMEs are insignificant and debt ratio decreases with the size of the enterprise. In 2017, the overall debt ratio was 51% in the micro-enterprise, 36% in the small enterprise, 35% in the medium-sized enterprise and 24% in the large enterprise.

3.4 Development of subsidies

In 2017, subsidies received by the average farm amounted to around 9000 CZK per hectare of agricultural land. The effect of company size on the volume of subsidies paid per hectare is not very obvious. However, given the higher production intensity of larger enterprises, there is the indirect proportion that the share of subsidies in total revenues decreases with increasing size of farm. The share of operating subsidies in total revenues is the highest in micro-enterprises (27%), in small enterprises 17%, in medium-sized enterprises 12% and in large enterprises 6%. These proportions are stable and slightly oscillate from these values during the reporting period.

By subtracting subsidies from profit before tax, the average farm is exposed to a loss, the trend of which is significantly increased over time (Lososová et al. 2017). The most significant drop in profit after deduction of subsidies would occur

in medium-sized enterprises (more than 50 employees). Without subsidies, only large companies, i.e. over 250 employees, would be profitable. The increasing dependence of the economic situation of farms on subsidies is evidenced by the subsidy dependency index (a value above 100% indicates the need for subsidies to cover costs). In 2017, this value was 110% in the average company (the highest in micro-enterprises).

As the size of the enterprise grows, the balance of subsidies and taxes decreases. In the case of small and micro-enterprises, the share of net beneficiaries (enterprises with a predominance of subsidies over taxes) is 90% and a positive surplus of subsidies over taxes for micro-enterprises reaches 6154 CZK / ha (for small 3464 CZK / ha). In the case of medium-sized enterprises, the share of net beneficiaries is 75% and the positive surplus over taxes is 1517 CZK / ha. Large enterprises are the only category where net payers predominate. In 72% of enterprises in this category, taxes prevail over received subsidies and the difference between subsidies and taxes reaches -2956 CZK / ha (in 2017).

4 Conclusion

The average profitability of a typical farm is low. This allows the reproduction of fixed assets, but the yield to the owner is minimal. Only the category of large companies (over 250 employees and turnover of EUR 50 million), which show above-average profitability, is excluded from such low profitability. Given the unavailability of operational data, the question is whether this higher profitability is related to the quality of management, bargaining position within the retail chain, or a higher proportion of non-agricultural production in these companies. Values of production intensity suggest rather the last option.

In addition to low profitability, the farm is threatened by its high volatility and frequent sinks into a significant loss. Given that profitability shows the same trend in all the areas under review, it is clear that external factors (especially prices) are the cause of this high volatility. The volume of subsidies paid per hectare is growing and at the same time the dependence of the company on this support increases. Subsidies no longer serve to maintain a reasonable profit but cover part of the operating costs. This leads to (from the agricultural point of view negative) long-term stagnation of realization prices. The volume of subsidies also negatively affects the amount of some cost items (in several areas, for example, the amount of subsidies received per hectare equals the amount of land rent required). The positive influence of subsidies can be seen in balancing less favourable economic conditions. A further advantage of subsidies as a certain income is that they are not subject to volatility and thus partially offset the price and climate risks.

The real risk for Czech farms is the possible introduction of a limitation of subsidies. As mentioned above, the most significant drop in profit after deduction of subsidies would occur in medium-sized enterprises (more than 50 employees), and the impact on small enterprises would also be significant. Micro-enterprises are not directly affected by the ceilings and large enterprises can maintain positive profitability even without subsidies. There are considerations that some disadvantage for larger enterprises would make it easier for small and micro-enterprises to gain access to the market. We believe that it would be cheaper and easier for traders to replace domestic production with imports and the consequent restriction of the internal market would also have negative consequences for companies that would not be directly affected by the limitation.

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Evaluation of Economic Performance of Companies in Chosen Food Industry in South Moravian Region

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Abstract: The paper focuses on the evaluation of the performance of the meat processing companies (NACE CZ 10.1) in the South Moravian Region in the period of 2008-2017. The data from the database Albertina were used for the evaluation of the performance of food industry companies, in particular on the profit, assets and capital base of companies. The paper presents the indicators for the small and medium-sized enterprises, which have an important role in the economic performance of the region. The performance of companies is influenced by many factors. For the evaluation of the performance of companies selected indicators of financial analysis are used. The results show a positive development of the performance of the NACE CZ 10.1 section of the food industry, reflected mainly in the increasing volume of sales, which is reflected in an increase in the profitability of businesses.

Keywords: Economic productivity, small and medium-sized enterprises, finance analysis, food industry, South Moravia regions

JEL Classification: O14, O18, Q18

1 Introduction

The food industry, as a part of the manufacturing industry, has an important role in the industry of each state, because of its securing of food security. According to the information of the Ministry of food and industry (Panorama zpracovatelského průmyslu 2017) the manufacturing industry in the Czech Republic has a longtime tradition and it is important part of the state's economy. The importance of the food industry in the Czech Republic can be shown on the share of the revenues of this sector on the total revenues of the manufacturing industry. This share was in 2008 approximately 8,5%. In 2017 there was a decrease of the share by 2 p.p. on the value 6,5%. In the classification of economic activities is the food industry signed as NACE CZ 10. The development of the food industry is influenced by the situation (development) of the leading groups of this sector. The economic level of the individual companies of the individual sectors of the food industry testifies about the competitiveness of the total sector in the global trade and about its share on the development of the region where the companies are running their business.

For the evaluation of the economic level of the companies the indicators of the financial analysis could be used. In general, financial analysis brings different economic perspectives which allow to make a draft image of the financial situation of the company. (Chmelíková, 2010) The analysis of the competitiveness of the food industry in the Czech Republic can be found in the papers by Šeligová a Košťuríková (2019), Blažková, Dvoutělý (2018), Náglová and Horáková (2016), Mejstříková et al. (2011), Plášil, Mezera et al. (2010) and others. According to Holečková (2009) the main aim of the financial management is to ensure profitability, return of the invested capital. She also states that foreign capital can be the profitable as well if the company can use it effectively to ensure financial stability as one of the most important factors affecting the value of the company. Companies with increasing value will have a greater ability to compete with the other companies and participate on the development of region.

Small and mid-sized enterprises (SMEs) have the main share of the structure of the firms (in the Czech Republic it is approximately 99,8% from all companies). The SMEs has an undeniable role in economic development of the region and on the creation of competitive environment there. The indisputable advantage of SMEs is that they give people the possibility of self-realization, stabilize society, are usually not owned by foreign entities, are more closely connected to the region and can easily react to changing conditions. (Verber, Srpová et al. 2012)

The aim of this paper is to evaluate the economic situation of the selected group of SMEs focused on processing and preserving meat and meat products in the South Moravian region in the period 2008-2017. For the evaluation of the economic situation are used the ration indicators. The results of the meat processing companies are compared with results

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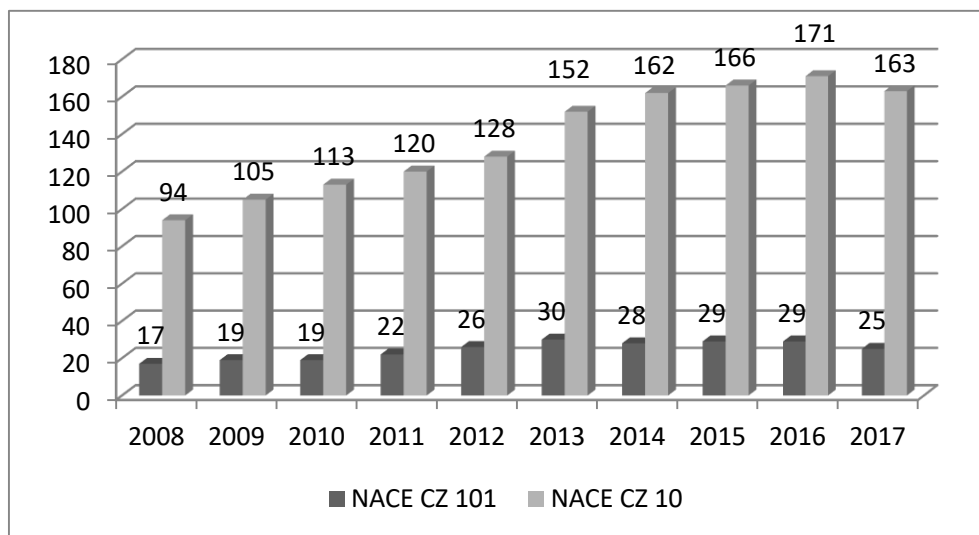
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of the food industry companies in the same region. Taking into consideration the fact that in this paper is the profitability regarded to be the basic indicator of business performance, the research will also focus on the identification of the key factors affecting profitability of selected companies. The question which factor can be used to increase the performance of the meat processing companies will be also answered.

2 Data and Methods

The data from the Albertina database are used for the analysis. In this database are available data about the assets and capital structure of the companies and the information about the factors of the profit generation. The paper is focused on the SMEs of the food industry (NACE CZ 10) of the South Moravia region. The information about the development of the number food industry companies and the meat processing companies is in the figure 1.

Figure 1 Number of the analyzed companies in the period 2008-2017



Source: Own processing, data: Albertina

In the monitored group of enterprises, the SMEs with the main activity in the NACE CZ 10.1 (Meat processing industry) belong to the companies with one of the highest shares on sales of the food industry sector. In the 2017 the share was approximately 16%, which corresponds to the national average. Based on the information of the Ministry of industry and trade was in the Czech republic the share of NACE CZ 10.1 on the total sales of food processing industry 22,8% in year 2017 . This sector represented 24,8% of the total number of units operating in the food industry. (Panorama potravinářského průmyslu, 2017).

The indicators of the financial analysis commonly used in this type of analysis are used for the financial analysis, in particular the indicators for evaluating of the profitability, indebtedness, solvency and efficiency of business assets.

Taking the above mentioned information into consideration, **Return on Assets (ROA)** was chosen as the representative of profitability indicators; the profit before tax and interest (EBIT) was used for the calculation. Other chosen indicators were: **Return on Sales**, as a share of profit before tax and interest (EBIT) in total sales; **Total Indebtedness**, as a share of total liabilities in total capital; **Current Liquidity**, as the ratio of current assets and current liabilities and **Total Assets Turnover** measured by the relationship between sales of own products, services and goods and total assets of the enterprise.

To identify the key factors affecting the Return on Assets (ROA) the pyramid decomposition the so-called Du Pont diagram, was used, which represents a component approach to performance analysis through the decomposition of factors affecting the business performance. (Wagner, 2009)

The logarithmic method based on indexes of changes of individual sub-indicators was used to express the degree of influence of individual indicators.

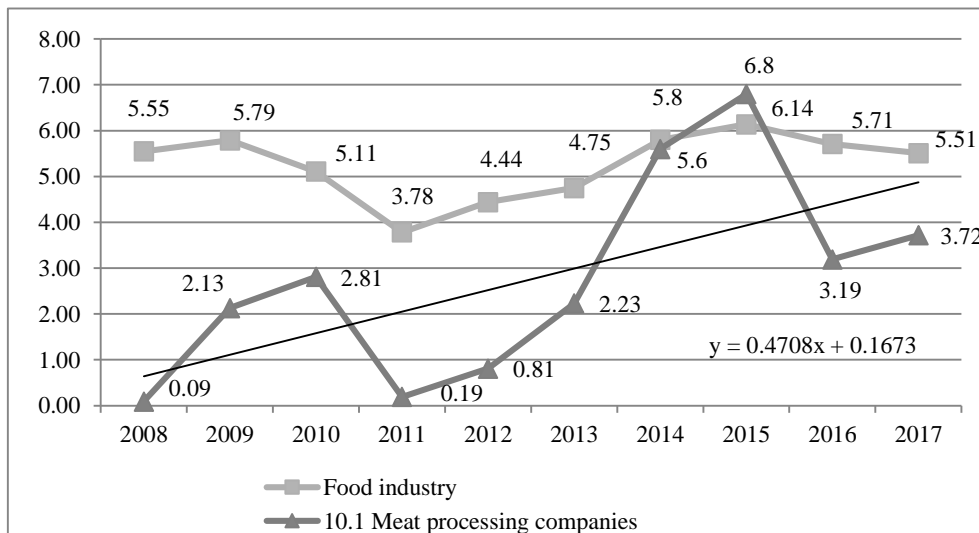
3 Research results

The level of industry in a country is influenced by the development of the key components of the sector. The key parts of the food industry are companies engaged in the meat processing, taking the share on sales, value added and personnel costs on the whole sector into consideration. . The aim of this paper is the assessment of the economic performance of SMEs of the meat processing industry. To meet the above mentioned aim, the chosen indicators of financial analysis have been calculated. In the following section their development and factors influencing their development are described.

3.1 Return on Assets and the factors influencing its development

As the key indicator of economic performance of companies is used the Return on Assets (ROA), also called as an indicator of the production power. This indicator evaluates the overall efficiency of business management. From Figure 2 can be seen that the total profitability of the food industry and the meat processing industry is in positive numbers, which indicates profitable production and profitability of the sector. The Return on Assets of the food industry companies in the South Moravian region oscillates around 5%, with the exception of 2011, when the profitability decreased to 3,78%. Since 2011, the profitability of the food industry has been growing, until 2016, when a decline was observed. With the exception of 2015, the monitored group NACE CZ 10.1 meat processing companies has a lower profitability. In comparison with the development of profitability of the food industry there is a very variable development. According to the results of the research of Blažková and Dvouletý (2018) the group of meat processing companies belongs longtime to the least profitable in the food industry of the Czech Republic. As factors influencing the development of the profitability it is possible to include the factors influencing revenues, where the quality of offered products plays the decisive role, as well as the market position and its ability to counter the pressure of retail chains to maintain the level of consumer prices. The production part the profitability is influenced by the level of efficient cost management and by an increase in the labor productivity. The character of the production of this sector and its high technological demands are the reasons why the value of the long term assets is increasing by the introduction of digitization and robotization. Because of the negative value of the profit and the increasing value of assets in the beginning of the period the value of the ROA indicator in NACE CZ 10.1 is very low. For more detailed analysis of factors the decomposition of the Return on Assets on the indicator Return on Sales and Total Assets Turnover were done.

Figure 2 The value of ROA in the chosen group of companies in the period 2008-2017



Source: Own processing, data: Albertina

The logarithmic decomposition shows that the indicator Return on Sales contributes the most to the ROA development. . The investment in long and also in current assets were increasing value of total assets, what decreases the value of the Total Assets Turnover. This also shows the decreasing efficiency of total production by the meat processing companies. In the food industry e is the situation a little bit different. The value of the total assets is increasing, because of the investment, but the total productivity keeps on the same level. The indexes of particular sub-indicators for each of the analyzed groups are stated in Table 1 and 2.

Table 1 Indexes of the selected indicators of the ROA – companies NACE CZ 10

Indexs	2009/2008	2010/2009	2011/2010	2012/2011	2013/2012	2014/2013	2015/2014	2016/2015	2017/2016
I ROA	1,0428	0,8821	0,7408	1,1739	1,0683	1,2225	1,0585	0,9294	0,9662
I ROS	1,0775	0,9068	0,6279	1,1042	1,0825	1,4219	0,9672	0,9432	1,0508
I Total Assets Turnover	0,9678	0,9727	1,1798	1,0632	0,9869	0,8598	1,0944	0,9854	0,9196

Source: Own processing, data: Albertina

Table 2 Indexes of the selected indicators of the ROA – companies NACE CZ 10.1

Indexy	2009/2008	2010/2009	2011/2010	2012/2011	2013/2012	2014/2013	2015/2014	2016/2015	2017/2016
I ROA	22,7755	1,3175	0,0676	4,2419	2,7721	2,5092	1,2141	0,4690	1,1662
I ROS	21,5668	1,4347	0,0646	4,1043	2,7824	2,5599	1,3293	0,5429	1,2540
I Total Assets Turnover	1,0560	0,9183	1,0471	1,0335	0,9963	0,9802	0,9133	0,8637	0,9300

Source: Own processing, data: Albertina

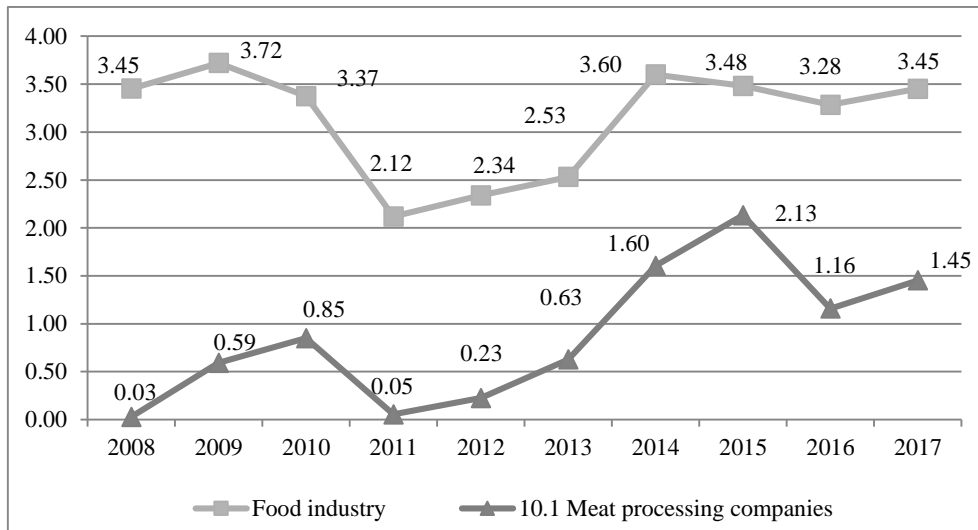
3.2 Return on Sales

The value of Return on Sales, sometimes called as profit margin, is influenced by the changes of the sale's quantity and also by the changes in the prices of own products, services or goods. A more detailed analysis of sales of NACE CZ 10.1 shows that during the period 2008-2017 the total sales increased by 40%, sales of goods increased significantly (53%), revenues from sales of own products and services increased approximately by 38%. In terms of structure, revenues from sale of own products and services contribute more than 85% to the total sales; the sales of goods only to 15%. The amount of sales shows the ability of the company to realize its products on the market under the condition of nowadays competition and consumers' preferences.

The dependence of the meat processing industry on the animal production of the farms leads to transmission of the financial situation of the farms to the processing entities in higher levels of processing. According to the information from the Ministry of Agriculture (Panorama potravinářského průmyslu 2017) the production of the meat has decrease, in particular the main type of meat – pork meat (year to year decrease is 4,2%). The production of the agricultural companies has slightly increased, the export has decrease and the price of the meat has significantly decreased. The price of the meat processing companies has increase slightly. According to the information of the Ministry of Agriculture poultry meat is going to be more popular (Zemědělství 2018, MZe ČR, 2019). The production of poultry meat increase slightly, the export decrease and the increase of domestic consumption is accompanied by slight increase of the consumer price. Consumption of the beef is increasing continuously and the same is true for the beef's consumer price.

Other components affecting Return on Sales can be the cost items and the level of the inputs productivity. The trend in the output consumption in the sector under review is the same as the development of the sales. The increase by 70% has been in the other important cost item – personal costs. The personal costs are obviously affected by the month value of the personal costs per worker. According to the data from Czech statistical office, the average month wage per person in the food industry in 2017 was 24 475,-CZK. It increased by 6,8% year-on-year. Average personal costs per worker in the NACE CZ 10.1 was 21 261,-CZK (Panorama zpracovatelského průmyslu 2017).

Figure 3 The value of Return on Sales in the chosen group of companies in the period 2008-2017

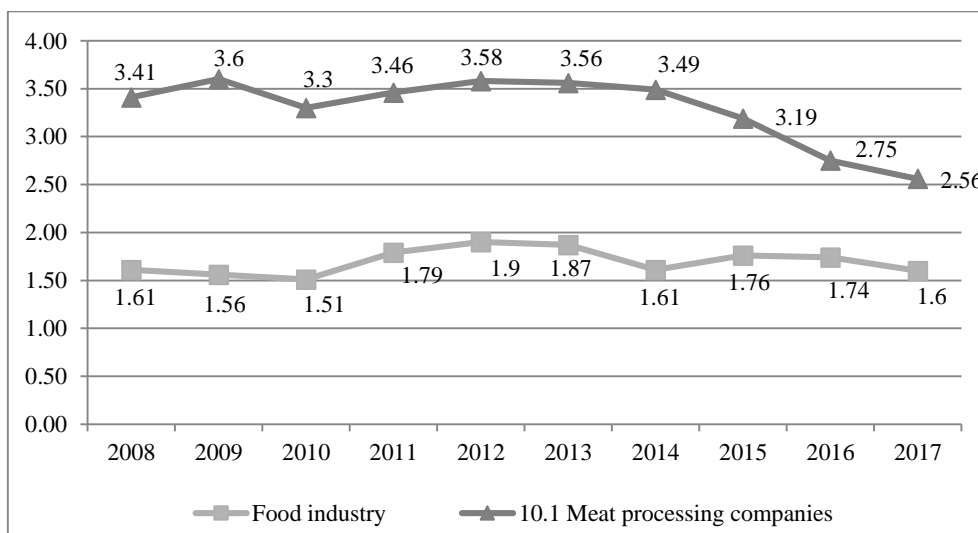


Source: Own processing, data: Albertina

3.3 Total Assets Turnover

The indicators of activity calculate the ratio between sales (revenues) on the value of the assets. They give information about effectivity of the production factors, which influence the profitability of the capital. By the comparison of the development of the Total Assets Turnover and Return on Assets of the meat processing companies there was found out that the developments of the indicators are different. Since 2015, the Total Assets Turnover of the group NACE CZ 10.1 has been decreasing; the reason was higher investments activity and slower grew of the sales. The value of assets of the food companies grew by 93% between 2008 and 2017. The value of fixed assets has been doubled and also the value of current assets has been higher by around 85%, because of higher production capacity. While the production efficiency of assets for the food industry has stayed at the same value (level), the Total Assets Turnover for the meat processing industry has decreased. The value of the assets of the meat processing companies has increased by 85% during the followed period, the value of the fixed assets more than 100% and the value of current assets raised around 60%.

Figure 4 Value of Total Assets Turnover for chosen group of companies in the period 2008-2017



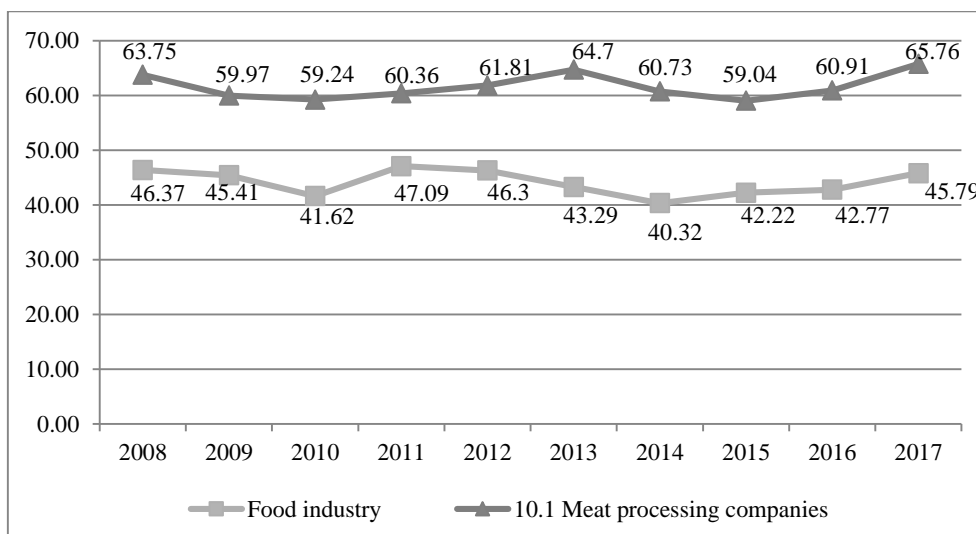
Source: Own processing, data: Albertina

3.4 Total Indebtedness

The indicator of total indebtedness measures the share of the foreign capital on the total company's capital. According to Růčková (2011) the decision between choosing own or external sources and the effort to optimize the capital structure of companies are the important decisions in the financial area, as they influence the development of the company and its overall prosperity. According to Jindřichovská (2013), a certain level of indebtedness is acceptable, because of the tax shield that makes the foreign capital cheaper compared to own one. As is shown in figure 5, the Total Indebtedness of the

meat processing companies is higher by 20 % than of the food industry companies, due to the higher share of long-term assets. The capital structure of the NACE CZ 10.1 companies is as follows: the share of the short term liabilities is 75% of the foreign capital, long term liabilities 10%, and bank credits 15%. By comparing the development of profitability and debt ratio we can derive a negative relationship between these indicators. The increase in profit (internal financial source) leads to a decrease in utilization rate of external sources.

Figure 5 Value of Total Indebtedness for chosen group of companies in the period 2008-2017



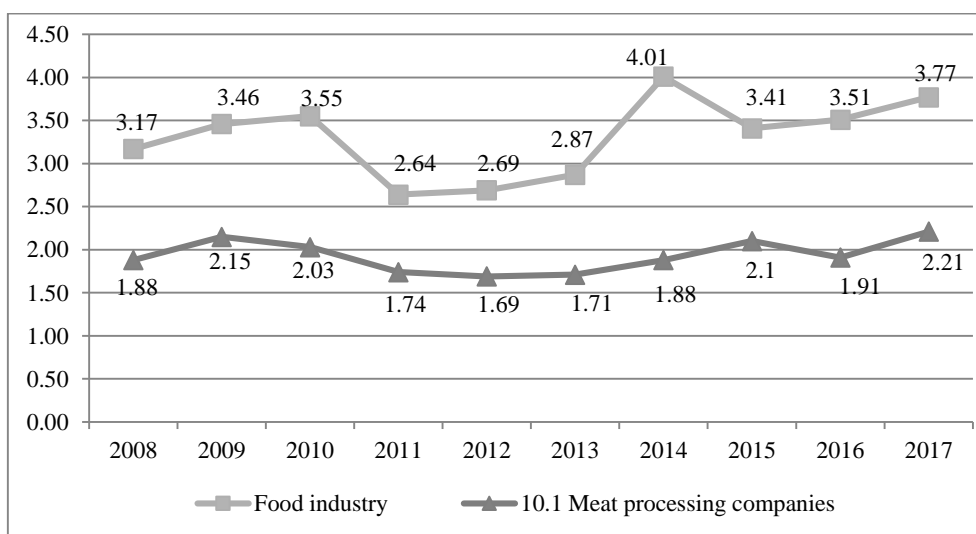
Source: Own processing, data: Albertina

3.5 Current Liquidity

According to Růčková (2011), the main aim of the company's financial management is to reach the financial stability. Reaching of the solvency is mentioned as one of the financial stability criteria. Both the analyzed groups of companies are able to pay the short term liabilities for the whole period, as you can see in the figure 6. The current liquidity of the meat processing companies in the South Moravian region is otherwise lower than by the food industry companies, but for proper paying of the liabilities it is enough.

The share of the inventories on the current assets is between 20 – 25%. According to the value of the inventories it is possible to say, that the companies have adequate value of inventories and are also able to manage the their value based on the changes in the demand of this products. The main part of the current assets are current receivables (60 - 70%). The conducted financial analysis has shown the shortening of the payback period. The payback period was 35 days in 2008 and 27 days at the end of the period. The liabilities turnover period was longer than the payback period only in 2008 and 2009.

Figure 6 Value of Current Liquidity for chosen group of companies in the period 2008-2017



Source: Own processing, data: Albertina

4 Conclusion

Based on the conducted analysis it is possible to declare, that the development of the economic situation of the SMEs of the NACE CZ 10.1 – meat processing companies in the South Moravian region in the period 2008-2017 is variable and does not correspond with the development of the food industry in the region, in particular by the profitability. Positive conclusion is, that there is positive trend in profitability development.

More detailed analysis of the return on assets, by using the logarithmic decomposition, has found out that the main factor influencing the profitability is Return on Sales. The total value of sales has risen by 40% during the period for the group of NACE CZ 10.1. The increase of the sales was caused by the increase of sales from the own products and services (by 38%) and also sales of goods (by 53%). The trend of the consumption costs is the same as for the sales. The personal costs of the meat processing companies have been increased as well because of rise of the average wage. In this case it is also necessary to say that the average wages of the group NACE CZ 10.1 are lower than of the food industry. The higher level of investment activity compared to the growth rate of sales is reflected in the decreasing efficiency of the companies' assets. The value of total indebtedness of the food industry is around 40 % and is lower by approximately 20 % than total indebtedness of the meat processing industry. The analysis of the external capital based on the payback period has found out that short term liabilities prevail in both the groups. Its share for the food industry is 65 % and for the meat processing industry 75 % of the total external sources. The indicator of liquidity has shown, that the companies are able to pay the short term liabilities.

The aim of the paper was to evaluate the economic performance of SMEs of chosen food industry by using the financial analysis' indicators. The subject of the further research will be the analysis of partial factors of the revenues and cost parts of pyramidal decomposition. It is also necessary to have in mind, that by the evaluation of the contribution of enterprises to the region development it is also necessary to use other methodological procedures. These procedures should be able to use evaluate the contribution of the enterprises in the chosen sector to the development of the region in the context of the whole complex of socio-economic impacts. This will be the subject of further research.

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The impact of the application of the common agricultural policy on the production and processing capacity of sugar beet in the Czech Republic

Martin Vaněk¹, Věra Bečvářová²

Abstract: Sugar beet cultivation as a traditional crop of Czech agriculture with its subsequent processing has a long tradition in the history of Czech agriculture. The contribution deals with the development of production of this commodity in the context of changes in the business environment in the period before and after the Czech Republic's accession to the European Union. The research analyzes the influence and consequences of the application of common agricultural policy instruments on sugar beet production and processing capacity in the Czech Republic, also in comparison with developments in other EU Member States. Critical indicators of basic production criteria in this sector are used to assess the impacts of the common agricultural policy. Based on the data obtained, the impact of the common agricultural policy on the development of the dimension of this sector is presented. The results of the analyzes confirm that the end of sugar quotas in 2017 has become a key aspect for the future of the sector.

Keywords: sugar beet, sugar refinery, efficiency, European Union, quotation, common agricultural policy,

JEL Classification: Q10, Q18

1 Introduction

Sugar beet is cultivated as industrial crop primarily for production of sugar, its waste products for production of alcohol and feed for farm animals. We date the beginnings of its cultivation in our territories since year 1831. It's spread was facilitated by suitable climatic and agroecological conditions. After the first world war, in the period between 1926 – 1930, sugar beet was cultivated on 202 130 hectares. With the arrival of economic crisis, in correlation with following structural changes, the total area for cultivation of sugar beet was reduced to 127 890 hectares by year 1989. The shift to market economy after 1990 and input of foreign capital into the processing industries was also a significant aspect contributing to further decrease (Dufek, 2011).

Sugar beet is a suitable crop for disruption of current narrow planting methods, which are based mainly on alternating cereals, oil plants (mainly oilseed rape) and maize (for corn seed or silage). Since sugar beet is classified as a root crop, it is suited to be fertilized with organic fertilizers, which we incorporate into the soil by plowing that disturbs soil tightening. The deep root system of sugar beet also contributes to the disturbance. Large leaf apparatus enables greater sequestration of carbon dioxide and the following production of oxygen (Pavlík & Opršal, 2016). Large quantity of after-harvest leftovers, together with organic fertilizers, contributes to greater soil fertility. Based on the aforementioned aspects, sugar beet is classified as crop with high pre-crop value.

Sugar beet appears as a suitable agricultural crop for its pre-crop value, as well as an industrial crop for production of sugar. Czech agricultural industry and the following manufacturing industry has to deal with very competitive environment, as sugar across the works is produced from more preferable crop, the sugarcane. Sugarcane is a crop typical for tropical or subtropical climate. In comparison with sugar beet, sugarcane has higher sugar yield per area unit by 20 – 25 % (Pulkrábek, 2007).

According to the Krouský (2008); Maitah, Řezbová, Smutka & Tomšík (2016); Trnková & Froněk (2017) the entry to the European Union had a key influence on the cultivation of sugar beet and its processing. Before the entry to the EU, sugar beet growers were not limited in cultivated area size and manufacturers in the amount of sugar produced. Entry to the EU meant application and assertion of measures within the common agricultural policy, including the following

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reforms. Characteristic sign of these reforms was introduction of sugar quotas for sugar manufacturing and introduction of minimal purchase prices of sugar beet for growers.

2 Methods

The paper presents results of analysis and development comparison of basic production characteristics for the reporting period 2000 – 2017 from the following sources: Situational and prospective reports sugar and sugar beet, EUROSTAT database, Cefs sugar statistics (CEFS), Sugar and sugar beet production reports. Considering the developments in the business environment of the agrarian sector in Czech Republic, some data is tracked since year 1995.

3 Research results

3.1 Sowing areas, yield, sugar content of beet

Sowing areas: Before entry to the EU, Czech growers were not limited in their productions. Typical sign of this period was fluctuation of sugar beet purchase prices, which also brought fluctuations in the size of sowing areas.

Table 1 Development of sowing areas, yields and sugar content of sugar beet in Czech republic

Period	Sowing area (ha)	Root yield (t/ha)	Sugar content (%)
1995	93 870	40,72	15,96
1996	103 690	42,06	16,99
1997	95 770	39,76	16,56
1998	79 200	44,88	15,83
1999	57 900	46,94	17,28
2000	60 300	47,44	17,66
2001	78 900	49,79	15,66
2002	76 900	50,49	16,13
2003	74 000	45,46**	18,21**
2004	69 000	50,57**	18,53**
2005	63 200	54,31**	18,70**
2006/2007	55 801	53,64	18,41
2007/2008	45 146	54,71	16,47
2008/2009	45 146	53,81	18,04
2009/2010	44 131	60,94	16,85
2010/2011	43 914	59,34	16,65
2011/2012	46 886	71,26	17,32
2012/2013	49 235	67,16	17
2013/2014	49 702	62,79	17,59
2014/2015	48 056	78,11	15,91
2015/2016	43 252	60,94	18,2
2016/2017	51 353	71,23	18,2
2017/2018**	58 300	73,85	17,5

(note.: ** source Listy cukrovarnické a řepářské)

Source: Situační a výhledové zprávy Ministerstva zemědělství, Listy cukrovarnické a řepářské, 2019, own processing

Changes in the development of sowing areas characterize the period 1995 – 1999, where sowing areas during overall reduction of acreage fluctuated in range from 57 900 hectares to 103 690 hectares (table 1). Average yield was in range from 39,78 to 46,94 tons of sugar beet per hectare. Since year 2000, within pre-entry period, agriculture shifted to similar application of sugar market regulations as within EU countries. Goal of the SZP regulation measures in this period with this commodity was to lower overproduction of sugar, which was apparent on both European and world market. Based on the overproduction problems the EU primarily set goal to increase competitiveness of this industry with reforms of common sugar market organization (SOT). These measures contributed in our agriculture to stabilize sowing areas roughly around 75 000 hectares and provided protection from imports of sugar from third-party countries.

Entry to EU however meant limitations of sugar beet sowing areas, primarily as a result of introduction of production quotas for sugar production. This reform significantly impacted our growers. Application of this reform in 2006 caused further reduction of sowing areas in this period to size between 43 000 – 49 000 hectares. Increase in sowing areas to 58 300 hectares came in the marketing year 2016/2017 as a result of planned sugar quota termination by year 2017.

Yield: Before year 2000, when there was basically no enforced state interference on markets within this commodity vertical, hectare yield of sugar beet was ranging from 39 – 47 tons per hectare. Only the application of legislative measures in pre-entry period began to focus more on efficiency as a result of decrease in sowing areas. Since year 2000, hectare yields began to rise up to 54 tons of sugar beet per hectare. Our growers had to adapt to conditions of SOT reform applied since year 2006, which enforced criteria of competitiveness. Emphasis on higher cultivation intensity was the main starting point, how to hold up in harsh competitive environment between European and world growers. Since year 2006 there is indeed an increase in yields. At the end of reporting period, the average yield of sugar beet was already 73,85 tons per hectare. In comparison to year 1995, it was increase in hectare yields by 45 %.

Sugar content: Sugar content also increased within the reporting period. Sugar content rose from 15,96 % in year 1995 to 17,5% by year 2017. An important factor in the increase of sugar yield was mainly shift from yield-type seeds to sugar content type seeds. Credit for the increase in sugar content is also due for agrotechnics itself as well, as sugar beet is classified from the grower's perspective among high-demanding crops and requires certain level of experience in growers. Very important factor, which we however are unable to affect, is weather, where sugar beet prefers balanced rainfall. Ideal proof is year 2014/2015, when due to large scale droughts caused wilting of leaf apparatus and with the arrival of rainfall in the second half of vegetation period sugar beet used sugar contents to renew growth. In final conclusion that meant record yield of sugar beet bulbs, but the sugar contents were same as in year 2001.

3.2 Processing capacities

Development in cultivation of sugar beet would besides suitable agroecological conditions not go by without following processing industry, which was confined also in our territories. First 15 manufactures processing sugar beet were established within our territories in the period 1810 – 1812. First sugar refinery, Dobruška, functioning to this very day, was established in year 1831. In the period 1920 – 1925, there were 149 functional sugar refineries in our territories. First significant decrease in their numbers happened after the second world war (down to 91 functional sugar refineries) and this decrease continued in the following years. Before year 1995, there were 37 functional sugar refineries. After year 1993, foreign capital was invested into sugar factory property structure. Conditions of the shift to market economy have significantly reflected upon the following development, enabling the input of foreign capital. Further transformational processes happened in association with the closure of unviable sugar refineries. In the beginning of reporting period, there were 19 functioning sugar refineries. Pre-entry period brought stabilization of the industry. In marketing year 2001/2002 we had 14 functioning sugar refineries. Entry to EU in year 2004 brought new legislative measures to the sugar market. Entry to EU meant for us decrease in the original sugar quota. This measure reflected upon decrease of sowing area (table 1), as well as decrease in the number of sugar refineries from 13 to 11 (table 2). Shortly after entry to EU, our sugar industry had to contend with another reform within SOT, which focused on the increase in competitiveness of the sugar industry and as a result decrease in overproduction of sugar. Member states were offered compensation in marketing years 2006/2007 – 2009/2010, if they gave up their sugar quota. Regarding the fact that in Czech Republic, the sugar quota was re-distributed among sugar refineries in form of produced sugar amount, it was a key decision for the sugar refineries (sugar refinery companies) whether they decide to take advantage of the offered compensation or not. Only one company (foreign) owning 3 sugar refineries decided to take the financial compensation. Since the marketing year 2007/2008, there were only 7 sugar refineries. Termination of sugar quota was planned within SOT reform to date 30. 9. 2015, however due to disunited stances of member states, the definitive termination of sugar quota was on 1. 10. 2017. Since this date, sugar refineries are no longer limited in their production, which proves increase in amount of processed sugar beet (table 2). A similar situation in the cultivation of sugar beet and subsequent sugar production as in the Czech Republic was in Poland, as confirmed, for example Kotyza, Smutka, Pawlak & Hornowski (2018), when comparing the Czech Republic and Poland in similar research indicators used in this contribution. In their results, they also show that after accession

to the EU and subsequent implementation of SOT reform, the sowing area and overall sugar beet production decreased in Poland as well as in the Czech Republic. In the following years, the decrease of sowing areas stopped in both countries, while sugar beet production started to increase due to the increasing yield of sugar beet per hectare. A more significant decline in processing capacities was observed in Poland in the period under review, as the Czech Republic experienced a significant reduction in processing capacities in the Czech Republic for the above reasons. These conclusions correspond to table 3, figures 1 and 2 of this article.

Table 2 Number of active sugar refineries in Czech Republic and amount of sugar beet processed

Year	Number of active refineries (ks)	Amount of sugar beet processed (tons)
1995-2000	19	3 501 144
2000/2001	13	2 899 612
2001/2002	14	3 900 023
2002/2003	13	4 002 644
2003/2004	13	3 400 770
2004/2005	11	3 487 773
2005/2006	11	3 430 635
2006/2007	10	2 993 344
2007/2008	7	2 414 713
2008/2009	7	2 564 883
2009/2010	7	2 831 931
2010/2011	7	2 919 292
2011/2012	7	3 576 082
2012/2013	7	3 474 009
2013/2014	7	3 308 496
2014/2015	7	4 200 019
2015/2016	7	2 740 822
2016/2017	7	3 675 611
2017/2018	7	4 292 647

Source: Situační a výhledové zprávy Ministerstva zemědělství, Listy cukrovarnické a řepařské, 2019, own processing

3.3 Comparison with selected member states

Suitable climatic and agroecological conditions allow cultivation of sugar beet practically within the bound of whole EU. Among important produces belong primarily Germany, France, Italy, Poland and Austria.

Table 3 Comparison of sowing areas of sugar beet in selected EU member states (in thousands of hectares)

	Czech republic	Germany	France	Poland	Italy	Austria
2000	61,30	452,00	409,70	333,10	249,20	42,80
2001	77,70	447,70	429,20	317,40	222,60	44,70
2002	77,50	459,40	437,70	303,00	245,70	44,70
2003	77,30	445,60	399,80	286,30	214,20	43,20
2004	71,10	440,50	384,60	297,30	185,80	44,70
2005	65,60	420,10	378,50	286,20	253,00	44,20

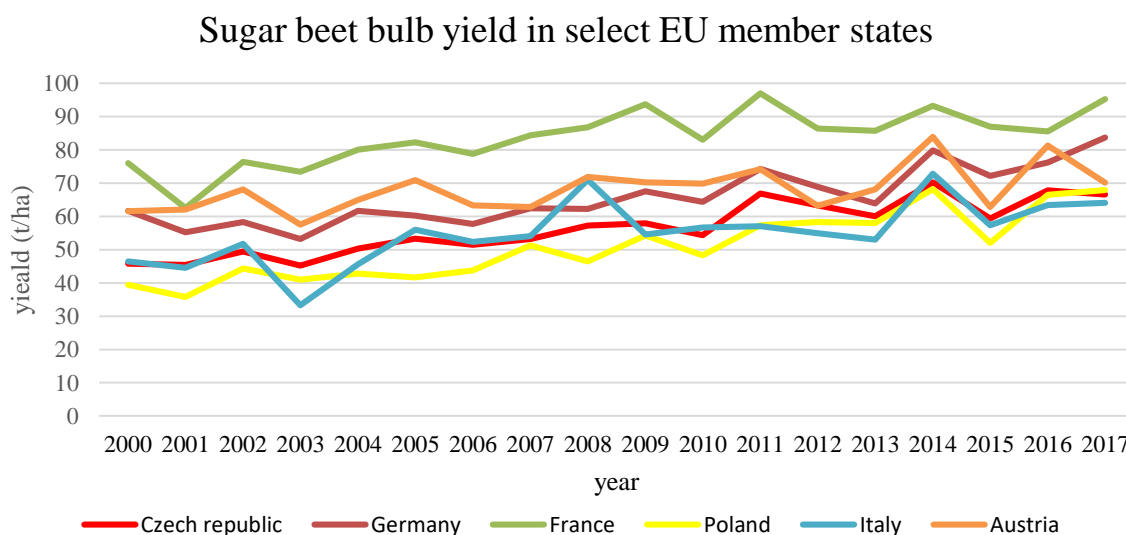
2006	61,00	357,60	379,30	262,00	91,20	39,40
2007	54,30	402,70	393,50	247,40	85,60	42,30
2008	50,40	369,30	349,30	187,50	61,80	43,00
2009	52,50	383,60	372,60	199,90	60,60	43,90
2010	56,39	364,12	383,76	206,40	62,67	44,84
2011	58,33	398,10	391,19	203,50	62,24	46,58
2012	61,16	402,10	382,68	212,00	45,55	49,26
2013	62,40	357,40	393,63	193,70	40,71	50,85
2014	62,96	372,50	406,74	197,64	51,99	50,60
2015	57,61	312,80	385,05	180,10	38,12	45,44
2016	60,74	334,50	405,23	203,40	32,30	43,50
2017	66,10	406,70	486,10	231,72	38,27	42,68

Source: database EUROSTAT, own processing

According to data in table 3, it is clear how the impact of SOT reform projected itself into the acreage of sugar beet sowing area within the observed EU member states. SOT reform from year 2006 most significantly impacted Italy, where business primarily used the compensation payments. First year after the introduction of compensation payments, year 2006, meant decrease in sowing areas from the original 253 thousand hectares to 97 thousand hectares, decrease by 63 %. In year 2017, sugar beet was sown only on 38 thousand hectares.

Termination of sugar quota by year 2017 meant increase in sowing areas in most of the member states (table 3). Sugar refinery superpowers France and Germany reacted by increase in sowing areas by 20%, Poland by 15 % and Czech Republic by 10 %. In this context, it is important to consider both the overall acreage of farmland of observed countries, intensity of production and by proxy their influence on development of the common market.

Figure 1 Sugar beet bulb yield in select EU member states

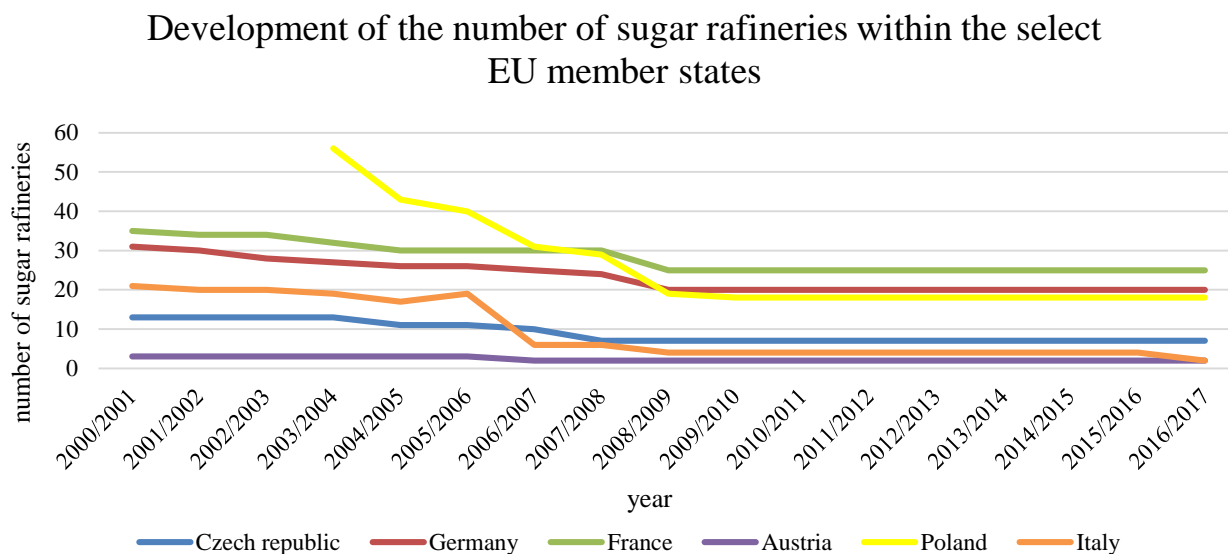


Source: database EUROSTAT, own processing

The highest yields of sugar beet bulbs reaches France, which during the reporting period increased its average yield of sugar beet from 76 t/ha to 95 t/ha. Second most important producer, Germany, has within the same period increased yield from 62 t/ha to 84 t/ha. Czech Republic and Poland also recorded significant progress, where from yields around 40 t/ha they now reach yields around 70 t/ha. Picture 1 clearly shows pressure on competitiveness and efficiency of production,

manifesting as increase in intensity. Decreasing sowing areas within the limits of quota (table 3) were compensated primarily by increasing yields. It is necessary to point out that, besides suitable agroecological conditions, one of the main prerequisites for high yields of sugar beet and intensity is these days also equal distribution of rainfall during whole year. Oceanic climate brings with it this aspect, to which mainly France and Germany are exposed. Czech Republic on the other hand is affected by continental climate, which brings significant temperature differences between winter and summer seasons, as well as unequal amount of rainfall during the whole year and in recent years even long periods of drought in summer months, causing sugar beet not to thrive. Besides from the aforementioned factors, major influence in today's business environment is involvement of businesses in the vertical of agrobusiness, meaning the ability and opportunity to process the produced commodity within the state (sugar refineries). Overview of development in numbers of active sugar refineries in the compared member states is shown in picture 2.

Figure 2 Development of the number of sugar refineries within the select EU member states



Source: database CEFS, own processing

As the picture 2 shows, changes, which reacted to the measures in the scope of SOT reforms, undoubtedly projected themselves into shifts in numbers of sugar refineries in the compared member states. From among the compared member states, the highest decline in number of sugar refineries was documented in Poland and Italy. In case of Poland, the 66% decrease was caused by entry to EU and acceptance of production quota, as well as by the following SOT reform in year 2006. Poland had to deal with high competition in this industry, where the only possible option was closure of unviable sugar refineries. In Czech Republic no simillar decline as in Poland was documented within the reporting period, as our sugar industry went through this process already before year 1990 nad 1993 with the introduction of foreign capital. In Italy, SOT reforms were reflected in both phases of commodity vertical (production and processing). Utilization of compensational payments meant decrease in sowing areas and decrease in number of sugar refineries by 68 % in 3 years. Within the remaining member states, France, Germany and Austria, no significant decrease in number of refineries was documented. One of the reasons for that fact may be, that the largest sugar producing companies which are interconnected come from Germany, France and Austria. It is logical, that within the range of SOT reforms, when it was necessary to lower sugar production, a simillar closure of unviable sugar refineries could have happened in the other EU member states as well. The above mentioned conclusion is also confirmed by Řezbová, Smutka, Pulkrábek & Benešová (2014), who in their research dealt with the owners of individual sugar refineries in the EU and the subsequent property interconnection of individual companies among themselves. In their research, they point out that 4 companies based in Germany and France own 50% of the EU market.

4 Conclusions

Sugar beet cultivation with the following processing for production of sugar is a characteristic part of our agriculture and industry. Based on the comparison of base production criteria in this industry, it is clear that Czech Republic was influenced in the reporting period primarily by 2 actualities. First was entry into EU, when Czech Republic had to apply and follow measures consequenting from SPZ, which our country committed to. Second were the following SOT reforms, where the greatest impact came with reform in 2006. After this reform the number of sowing areas significantly decreased and three sugar refineries closed down, as compensational payments were used on their production quota.

Despite this difficult period, 7 sugar refineries remained active and viable in Czech Republic, and they are successfully able to hold up against the competition, as they can rely on years of experience with sugar production. These events coupled with the shift to market economy lead to closure of unviable sugar refineries and increase in efficiency of the remaining ones. It is clear, that for increase in competitiveness and preservation of this industry within our agriculture, a necessary pre-requisite is not only intensity and efficiency of production, but also successful cooperation within horizontal and vertical conception. Within this context we can evaluate even development and impact of SOT reforms on strengthening position of our (and European) agriculture, including the production industry and also on the globalization of markets, where the entire sugar production industry of EU will have to deal with the consequences of the sugar quota termination.

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Agri-food Trade Patterns of Argentina

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Abstract: This article aims to examine the dynamic and the patterns of Argentina's agrarian trade in the last two decades. Within that it analyses the comparative advantage and competitiveness of specific agri-food products constituting Argentina's agrarian trade. The data for analysis came from UNCTAD, sorting products (46 products / sectors) by SITC classification (3-digit code). The Balassa index and the Lafay index were used to assess revealed comparative advantage/competitiveness of specific agri-food products of Argentina's agrarian trade. The results show that Argentina got market access, increased its integration in global agri-business and kept its robust position as an agrarian net-exporter in the last two decades. The product structure of Argentina's agrarian trade is becoming more concentrated. Product groups revealing strong or medium comparative advantage are SITC 081, 421, 044, 041, 043 – predominantly grain-soya agro-industrial complex. Also, the shape of territorial structure is changing and indicating diminishing position of EU as an export as well as import destination of Argentina's agrarian trade.

Keywords: competitiveness, specialization, agrarian trade.

JEL Classification: Q17, F14, F15

1 Introduction

One of the major changes in the world economy is the increase in regionalism and the growing number of preferential trade agreements between individual regional integration groups, i.e. a tendency towards inter-regionalization. The European Union (EU) has already established preferential agreements with a number of third countries (or groupings of countries) and this defines the institutional framework for mutual trade (and other interactions). Currently, the EU negotiates agreements with other countries and integration groupings.

One of the regional groupings with which the EU has been negotiating the new form of mutual economic relations is the MERCOSUR group of countries (Hrabálek & Šašínková, 2015; Hrabálek & Macháčová, 2015). MERCOSUR includes the South American states of Brazil, Argentina, Paraguay and Uruguay. After two decades of consultations and negotiations, a final document on a future trade agreement was reached in June 2019, but it was immediately criticized by a number of EU organizations and EU member states. At the moment, a decision on the European side is expected to be given and the agreement negotiated on behalf of the EU by the European Commission can be expected to be the subject of political discussions and probably disputes within the EU itself.

The main controversial topic is the liberalization of agrarian markets, where the EU is very protective and the counterparty is significantly competitive (Hrabálek, 2015). A number of objections and questions regarding the liberalization of markets with MERCOSUR countries are heard not only from stakeholders of Czech agriculture, but also from agrarian sectors in other countries. It will show the development in the next period, whether or not this draft agreement will be implemented.

There is continuous effort in research to address issues related to the (un)competitiveness of Czech agrarian and food processing companies (i.e. Dvouletý, O. & Blažková, 2018; Novotná et al, 2015; Redlichova et al, 2016; Svobodová & Živělová, 2018; Verter & Bečvářová 2017; Volek et al, 2019) as well as patterns and (un)successfulness of the Czech agrarian trade (i.e. Smutka et al, 2017; Vacek & Smutka, 2017; Smutka & Steininger, 2018). There was paid less attention to EU and MERCOSUR agrarian trade relations in the Czech literature.

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The key economy and agrarian exporter in MECOSUR is Brazil (see Zdráhal et al., 2019), yet another country, Argentina, has long been one of the most successful global agrarian exporters. To author's knowledge, surprisingly, there is limited number of studies analysing the main trend in Argentina's agrarian trade. That is why it is reasonable to retrospectively evaluate the dynamics of the agri-food trade of Argentina as part of reflections on the possible (negative) effects of this liberalization on the Czech agrarian sector, as well as to show the situation in terms of identifying new possibilities of Czech business sector involvement in MERCOSUR markets. This article aims to examine the dynamic and the patterns of Argentina's agrarian trade in the last two decades. Within that it analyses the comparative advantage and competitiveness of specific agri-food products constituting Argentina's agrarian trade.

2 Methods and data

Main data source for the statistical examination became the databases of the United Nations Conference for Trade and Development (UNCTAD). The data were collected for the period between 1995 and 2018. Standard International Trade Classification (SITC) Revision 3 was used as a base for the definition of the commodity structure of individual sectors (product groups) in agri-food trade. The analysis is done at the level of 3-digit code for 46 various agri-food products (table A1 in Annex) traded (SITC 0 + 1 + 22 + 4).

Detection of comparative advantage of a country in the trade of products is crucial when determining the shape of trade specialization and its stability. There are several methods to do so, with the most often used concept known as the "revealed" comparative advantage (RCA). The RCA is widely used to identify the strongest and weakest export industries in the country. The RCA method was developed by Liesner (1958) and further evolved by Balassa (1965; 1977), who enriched the RCA concept by Balassa index. The Balassa (BI) index compares the product's share of the country's total exports with the same share of total exports. The BI is very popular due to its simplicity and low data requirements. The BI index is calculated as:

$$BI_{ij} = \frac{\frac{x_{ij}}{x_i}}{\frac{x_{wj}}{x_w}} \quad (1)$$

Where x stands for exports, i is a nation, j represents a product and w stands for a set of countries. The BI is not symmetric; values between 0 and 1 signify that the economy reveals comparative disadvantage (CdisA); while values that exceed 1 signifies that the country is specialised in exporting the product and the country reveals comparative advantage (CA) in that given sector. In trade studies, it is customary to deploy more indexes to ensure that their information contents are realistic. Another way of controlling for trade flows is Lafay Index (LFI), which in contrast to Balassa Index, uses both import and exports. The LFI norms the trade balance of individual products with the overall balance and weights it in the trade structure (Lafay, 1992; Zaghini, 2003). The LFI allows controlling for intra-industry trade and re-exporting flows, is symmetric and seems to be more reliable than the BI when comparing the values in time series. The Lafay index is mathematically expressed by the following formula:

$$LFI_j^i = 100 \left(\frac{x_j^i - m_j^i}{x_j^i + m_j^i} - \frac{\sum_{j=1}^N (x_j^i - m_j^i)}{\sum_{j=1}^N (x_j^i + m_j^i)} \right) \frac{x_j^i + m_j^i}{\sum_{i=j}^N (x_j^i + m_j^i)} \quad (2)$$

Where x and m stand for the export and import values of particular product group. Zero signifies a comparative advantage neutral point. Presence of comparative advantage for a particular sector is confirmed by positive values of Lafay Indexes and the other way round. The higher index value is the more intensive is the comparative advantage and specialisation of the sector. The descriptive statistics of BI and LFI values is presented in the table (table A2) in appendix.

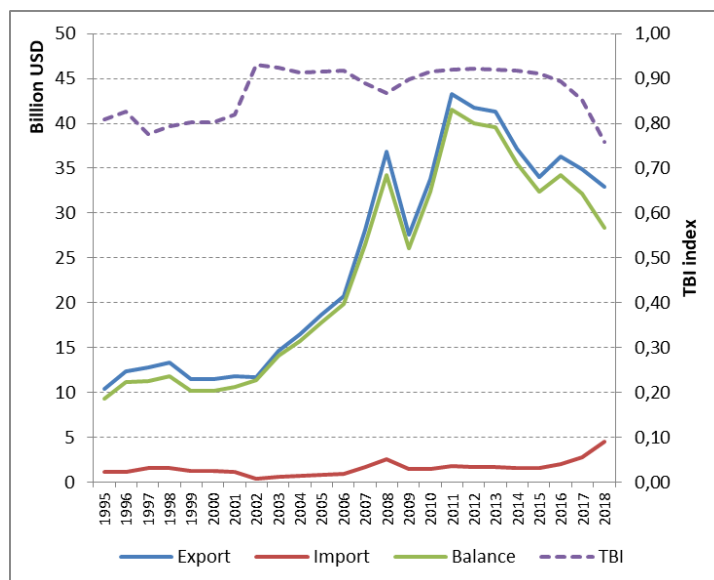
Also, scores of BI and LFI were examined regarding how weak or strong the comparative advantage of each product is. Following Hinloopen and Van Marrewijk (2001), BI scores were grouped using absolute thresholds: reveal CdisA ($BI \leq 1$), weak CA ($BI > 1$ and $BI \leq 2$), medium CA ($BI > 2$ and $BI \leq 4$) and strong CA ($BI > 4$). There is no general guide in literature for classifying the LFI values into categories, so the data was grouped based on quartiles (relative thresholds) from positive LFI values: reveal CdisA ($LFI \leq 0$), weak CA ($LFI > 0$ and $LFI \leq 0.089$; first and second quartile), medium CA ($LFI > 0.089$ and $LFI \leq 0.469$; third quartile) and strong CA ($LFI > 0.469$; fourth quartile).

3 Research results

The value of Argentina's agri-food import has slightly grown up from 1.1 to 4.5 billion USD from 1995 through 2018 (grew up 4.1 times). In the same time period, the value of Argentina's agri-food export grew up 3.2 times and reached 32.9 billion USD in 2018, reaching its peak 43.3 billion USD in 2011. The dynamics of agri-food trade varied during the reviewed period. In the early 2000s agri-food exports gain its momentum and significantly increased. The increase in Argentina's exports occurred in the new millennium, when the implementation of Uruguay Round Agreement on Agriculture was completed globally. Likewise, the general rise in commodity prices (especially in the period before the Great

Recession) contributed to an increase in the value of the Argentinian agricultural exports. The value of agri-food exports makes up more than half of the total value of Argentina's export. Actually, the share of agri-food export increased from around 50% to around 60% between 1995 and 2018. The value of agri-food import makes up 4.0% (on average) of the total value of Argentina's import. The values of trade balance index confirm the Argentina's strong position as an agrarian net-exporter. In the last 5 years, the data shows certain decrease in the value of the agri-food exports and in the overall agri-food export's proportions in the total exports and in the same time, an increase in the value of the agri-food imports and in the overall agri-food import's proportions in the total imports. The following figure (figure 1) shows the dynamic of Argentina's agri-food trade.

Figure 1 Change in the value of agri-food trade of Argentina (export, import, balance, trade balance index), 1995-2018



Source: Authors' presentation and calculations based on UNCTAD data

The export structure of Argentina's agrarian trade is highly specialized. The share of 3 most exported products in the total agri-food export increased from 40.9% to 52.5%. The share of 5 most exported products in the total agri-food export increased from 56.0% to 68.0%. The 5 most exported products are feeding stuff for animals, no unmilled cereals (SITC 081), fixed vegetable fats & oils, crude, refined, fractio. (SITC 421), oil seeds and oleaginous fruits, excluding flour (SITC 222), maize, not including sweet corn, unmilled (SITC 044) and wheat, including spelt, and meslin, unmilled (SITC 041). This show, that it is predominantly grain-soya agro-industrial complex that has given the momentum to Argentina's raise of export.

The import structure of Argentina's agrarian trade is more diversified than the agri-food export structure, but the data also suggest process of ongoing concentration from 1995 to 2018. The share of 3 most imported products in the total agri-food import increased from 27.5% to 45.9%. The share of 5 most imported products in the total agri-food import increased from 38.8% to 57.6%. The 5 most exported products are fruits and nuts, excluding oil nuts, fresh or dried (057), edible products and preparations, n.e.s. (SITC 098), coffee and coffee substitutes (071), cocoa (SITC 072) and fish, aqua. invertebrates, prepared, preserved, n.e.s. (SITC 037). There are also occasional (2007-2009 and 2017-2018) high imports of oil seeds and oleaginous fruits, excluding flour (SITC 222). This suggest existing link between the soya industrial complex in Argentina and the ones in other (neighbouring) countries.

The territorial shape of Argentina's agrarian trade is changing as well. The agri-food export is predominantly reaching non-MERCOSUR countries and the proportion of these countries in the territorial structure of export is increasing. Around 50% of Argentina's agri-food import comes from other MERCOSUR countries and the proportion is increasing. The structure of extra-MERCOSUR export is changing towards higher share of China, ASEAN countries and Africa. The share of EU member states decreased from 40% to 21%. This suggests diminishing position of EU as a export destination for Argentina's agrarian export. Similarly, the share of EU in the agri-food import structure of Argentina declined (from 33% in 1995 to 19.1%). On the other hand, the share of agri-food import coming from other Latin American countries and Caribbean (excl. MERCOSUR) is increasing. These specific changes in the territorial structure raise a number of questions related to the (un)successfulness of the EU as an agrarian exporter to Argentina.

The revealed comparative advantage of 46 sectors of agrarian trade of the Argentina was evaluated using the mentioned Balassas and Lafay indexes. Results from the Balassa index analyses suggest that on average 2000-2004 (in the

period when agri-food export of Argentina started to grow very rapidly), 8 sectors (SITC 011, 041, 044, 045, 081, 091, 222, 421) show revealed comparative advantage 38 sectors show comparative disadvantage. Results from the Lafay's index analyses suggest that, in the same time period, 18 sectors (SITC 011, 022, 034, 036, 041, 042, 043, 044, 045, 046, 059, 061, 074, 081, 091, 121, 222 and 421), show revealed comparative advantage and 28 sectors show revealed comparative disadvantage. Following part interrogates the structural change in the revealed comparative advantage in the period of Argentina's agri-food trade expansion.

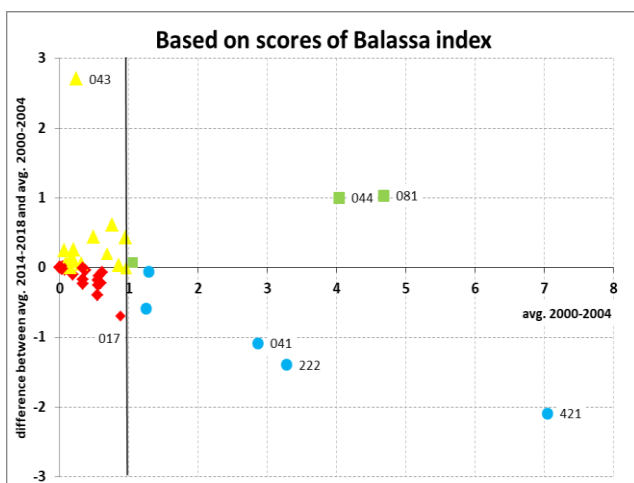
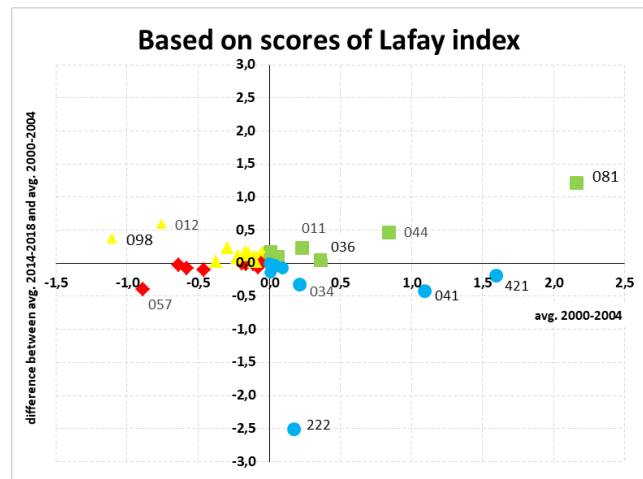
Change in Argentina's comparative advantage in specific agri-food products

Methodologically, the values of BI and LFI indexes of individual product groups in the base period (t_0) and the difference between these values and the following period (t_1) are used to evaluate the comparative advantage. The base period is defined as the average of the RCA index values between 2000 and 2004. The use of average values is to balance year-on-year fluctuations in the index values. This particular five-year period (2000 to 2004) is chosen to represent the level of comparative advantage demonstrated by individual product groups in the period prior to the liberalization of Argentina's agricultural trade (since 2002). The following period (t_1) means the average of the values of BI and LFI indexes for 2014 to 2018, i.e. their level at the end of the period under consideration. From these two values (in periods t_0 and t_1) their difference was then calculated. All 46 product groups were then divided into 4 groups:

- quadrant A: the product group exhibited CA in the baseline period (t_0) and improved ($\Delta(t_1-t_0) > 0$)
- quadrant B: the product group exhibited CA in the baseline period (t_0) and worsened ($\Delta(t_1-t_0) < 0$)
- quadrant C: the product group exhibited CdisA in the baseline period (t_0) and improved ($\Delta(t_1-t_0) > 0$)
- quadrant D: the product group exhibited CdisA in the baseline period (t_0) and worsened ($\Delta(t_1-t_0) < 0$)

In 29 cases out of 46 (63.0%), the product group was in the same quadrant according to BI and LFI. In other cases, 17 out of 46 (37.0%) changed its status. These differences are due to the fact that the identification of the comparative (dis)advantage in the t_0 period was different or the change in values between t_0 and t_1 (improvement / deterioration) varied. Both indices consistently identified a comparative (dis) advantage in the t_0 period in 36 out of 46 (78.3%) product groups. Similarly, 38 out of 46 (82.6%) product groups showed the direction of change in the revealed comparative advantage. The resulting distribution of product groups into individual quadrants is presented in the graphs (Figure 2 and Figure 3) and table (Table 1).

Figure 2 and 3 Change in revealed comparative advantage of specific agri-food product groups of Argentina’s trade (BI and LFI)



Source: Authors’ presentation and calculations based on UNCTAD data

According to values of Balassa index and its change, following product groups belong to:

- quadrant A: SITC 011, 044 and 081,
- quadrant B: SITC 041, 045, 091, 222 and 421,
- quadrant C: SITC 001, 012, 016, 023, 024, 025, 036, 043, 046, 054, 058, 059, 074, 075, 098, 112, 223 and 411,
- quadrant D: SITC 017, 022, 034, 035, 037, 042, 047, 048, 056, 057, 061, 062, 071, 072, 073, 111, 121, 122, 422 and 431.

According to values of Lafay index and its change, following product groups belong to:

- quadrant A: SITC 011, 022, 036, 042, 043, 044, 045, 046, 059, 074 and 081,
- quadrant B: SITC 034, 041, 061, 091, 121, 222 and 421,
- quadrant C: SITC 001, 012, 016, 017, 023, 024, 025, 048, 054, 056, 058, 062, 098, 112, 223, 411 and 431,
- quadrant D: SITC 035, 037, 047, 057, 071, 072, 073, 075, 111, 122 and 422.

Table 1 Number of product groups in each quadrant

	BI	LFI
	No.	No.
A	3	11
B	5	7
C	18	17
D	20	11
Σ	46	46

Source: Authors’ presentation and calculations based on UNCTAD data

Using BI values, product groups were primarily allocated to quadrants D (20 groups) and C (18 groups). A significantly smaller number of product groups were allocated to quadrants A (3 groups) and B (5 groups). Thus, the BI values

point to the already existing specialization of Argentina's agrarian exports in the t_0 period, since the number of product groups showing comparative advantage (A + B) was significantly higher than the number of product groups showing comparative disadvantage (C + D). In terms of change, however, there was a slight deterioration, since the number of product groups showing an increase in the index value between t_0 and t_1 (sum of A + C is 21) was slightly lower than the number of product groups showing a decrease in the index value (sum of B + D is 25).

Using LFI values, the product groups were mainly assigned to quadrants C (17 groups), A (11 groups) and D (11 groups). A significantly smaller number of product groups were assigned to quadrant B (7 groups). The LFI values point to a higher number of product groups that were comparative in the t_0 period than BI. However, the number of product groups showing a comparative advantage (the sum of A + B is 18) was less than the number of product groups showing a comparative disadvantage (the sum of C + D is 28). In terms of change, there was rather an improvement, since the number of product groups showing an increase in the index value between t_0 and t_1 (sum of A + C is 28) was higher than the number of product groups showing a decrease in the index value (sum of B + D is 18).

The results of the analysis show the pattern of comparative (dis)advantage of individual product groups. However, in terms of assessing the overall level and, in particular, the change in the comparative advantage revealed at the level of all product groups constituting Argentina's agrarian foreign trade, the empirical results do not give a definite conclusion.

The following part of the analysis presents level of comparative advantages revealed by individual product groups in the current period (average 2014 to 2018), i.e. identifying those product groups that may be a threat to European farmers and food processing companies; and identifying those product groups (or generally sectors) that have a comparative disadvantage and can thus be an opportunity for EU exporters. The scores of Balassa index suggest that 11 product groups of Argentina's agri-food trade are revealing comparative advantage (on average 2014-2018), specifically:

- strong CA: animal feed stuff (SITC 081), maize unmilled (044) and fixed veg. fat, oils, soft (421),
- medium CA: barley, unmilled (043),
- weak CA: oil seeds and oleaginous fruits (222), wheat (041), crustaceans, molluscs (036), meal, flour of wheat (046), other cereals, unmilled (045), bovine meat (011), tobacco, unmanufactured (121)

The scores of Lafay index suggest that 21 product groups of Argentina's agri-food trade are revealing comparative advantage (on average 2014-2018), specifically:

- strong CA: animal feed stuff (SITC 081), fixed veg. fat, oils, soft (421), maize unmilled (044) and wheat (041),
- medium CA: bovine meat (011), crustaceans, molluscs (036), barley, unmilled (043), milk and cream (022), vegetables (054),
- weak CA: meal, flour of wheat (046), fruit, vegetable juices (059), tea and mate (074), rice (042), other cereals, unmilled (045), sugars, molasses, honey (061), eggs, birds, yolks, albumin (025), cheese and curd (024), cereal preparations (048), butter, other fat of milk (023), tobacco, unmanufactured (121), oil seeds, oleaginous fruits (023).

Table 2 presents the BI and LFI values between 2014 and 2018.

Table 2 Mean (2014-2018) and ranking of specific sectors according to BI, LFI and NI values, Argentina

S	BI		LFI		S	BI		LFI	
	avg.	rank	avg.	rank		avg.	rank	avg.	rank
001	0.1	38	-0.09	30	057	0.4	19	-1.28	45
011	1.1	10	0.46	5	058	0.9	12	-0.07	28
012	0.3	25	-0.18	37	059	0.9	13	0.05	11
016	0.0	42	-0.02	26	061	0.4	21	0.02	15
017	0.2	29	-0.01	24	062	0.2	32	-0.13	32
022	0.5	16	0.15	8	071	0.0	45	-0.66	43
023	0.2	33	0.01	19	072	0.2	30	-0.66	42
024	0.3	28	0.01	17	073	0.2	31	-0.21	39
025	0.1	35	0.01	16	074	0.9	14	0.04	12
034	0.3	27	-0.11	31	075	0.0	41	-0.14	34
035	0.1	37	-0.01	23	081	5.7	1	3.38	1
036	1.4	7	0.41	6	091	0.7	15	-0.13	33
037	0.0	43	-0.57	41	098	0.2	30	-0.75	44
041	1.8	6	0.68	4	111	0.1	39	-0.06	27
042	0.3	22	0.04	13	112	0.5	17	-0.15	35

043	2.9	4	0.18	7	121	1.0	11	0.01	20
044	5.0	2	1.30	3	122	0.0	40	-0.19	38
045	1.2	9	0.03	14	222	1.9	5	-2.34	46
046	1.4	8	0.07	10	223	0.3	26	0.01	21
047	0.1	36	-0.01	22	411	0.2	34	-0.01	25
048	0.3	23	0.01	18	421	5.0	3	1.40	2
054	0.4	20	0.10	9	422	0.0	44	-0.15	36
056	0.3	24	-0.36	40	431	0.4	18	-0.07	29

Note: Green – strong CA, blue – medium CA, yellow – weak CA

Source: Authors' calculations based on UNCTAD data

4 Conclusions

Based on the above analyses, we can conclude the following:

- The results show that Argentina got market access and increased its integration in global agribusiness in the last two decades. Argentina has kept its robust position as an agrarian net-exporter in the last two decades. Also, the agri-food exports are significant contribution to the total value of Argentina's export.
- The territorial shape of Argentina's agrarian trade shows certain changes. The agri-food export is predominantly reaching non-MERCOSUR countries and the proportion of non-MERCOSUR countries in the territorial structure of export is increasing. Around 50% of Argentina's agri-food import comes from other MERCOSUR countries and the proportion is increasing. The structure of extra-MERCOSUR export is changing towards higher share of China, ASEAN countries and Africa. The share of EU member states has decreased both in agri-food exports and imports. This raise a number of questions related to the (un)successfulness of the EU as an agrarian exporter to Argentina.
- The product structure of Argentina's agrarian export is highly specialized. The 5 most exported products are feeding stuff for animals, vegetable fats & oils, oil seeds, maize, and wheat. This show, that it is predominantly grain-soya agro-industrial complex that has given the momentum to Argentina's raise of export.
- The import structure of Argentina's agrarian trade is more diversified than the agri-food export structure, but the data also suggest process of ongoing concentration. The 5 most exported products are fruits and nuts, edible products and preparations, coffee and coffee substitutes, cocoa and fish.
- Results derived from RCA indexes indicate only partial changes in the pattern of the revealed comparative advantage. The Balassa indexes suggest that 11 product groups (BI) resp. 21 product groups (LFI) of Argentina's agri-food trade are currently revealing comparative advantage. Especially, animal feed stuff (SITC 081), maize (044), fixed veg. fat, oils, soft (421), barley (043), wheat (041), bovine meat (011), crustaceans and molluscs (036), milk and cream (022) and vegetables (054) are revealing strong or medium comparative advantage. Coming back to structure of Argentina's agrarian export and import, this suggests Argentina's agri-food trade follows the pattern of its comparative advantage.

A comprehensive assessment of the impact of the liberalization of agrarian trade between MERCOSUR (and Argentina in particular) and the European Union countries goes beyond the scope of this article. The analysis shows that Argentina can become an important supply base for the industries in EU producing feeding stuff (in general). Contrary, increased exports of a number of product groups may pose a threat, especially for the agrarian sectors of those European countries that primarily export agricultural commodities and fail to export processed food products. The Czech Republic is unfortunately among those countries, which fail to export value added products.

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Appendix

Table A1 Sectors and their numeric designations

SITC code	Food product	SITC code	Food product
001	Live animals	057	Fruit, nuts excl. oil nuts
011	Bovine Meat	058	Fruit, preserved, prepared
012	Other meat, other offal	059	Fruit, vegetable juices
016	Meat, ed. offl., dry, slt, smk	061	Sugars, molasses, honey
017	Meat, offl. Prdd, nes	062	Sugar, confectionery
022	Milk and cream	071	Coffee, coffee substitutes
023	Butter, other fat of milk	072	Cocoa
024	Cheese and curd	073	Chocolate, oth. cocoa prep.
025	Eggs, birds, yolks, albumin	074	Tea and mate
034	Fish, fresh, chilled, frozn	075	Spices
035	Fish, dried, salted, smoked	081	Animal feed stuff
036	Crustaceans, Molluscs	091	Margarine and shorten
037	Fish etc. prepd, prsvd. nes	098	Edible prod. prepetns, nes
041	Wheat, Meslin, Unmilled	111	Non-alcohol. beverage
042	Rice	112	Alcoholic Beverages
043	Barley, unmilled	121	Tobacco, unmanufactured
044	Maize unmilled	122	Tobacco, manufactured
045	Other cereals, unmilled	222	Oil seeds and oleaginous fruits (excl. flour)
046	Meal, Flour of wheat, msln	223	Oil seeds, oleaginous fruits (incl. flour, n.e.s.)
047	Other cereal meal, flours	411	Animal oils and fats
048	Cereal preparations	421	Fixed veg. fat, oils, soft
054	Vegetables	422	Fixed veg. fat, oils, other
056	Vegetables, prpd, prsvd, nes	431	Animal, veg. Fats, oils, nes.

Table A2 Descriptive statistics (BI, LFI indexes; 1995-2018)

	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015	2018
BI (Argentina ↔ World)												
average	0.844	0.847	0.868	0.849	0.802	0.839	0.839	0.852	0.881	0.864	0.777	0.850
st. dev.	1.263	1.263	1.360	1.349	1.449	1.413	1.340	1.274	1.269	1.425	1.253	1.377
median	0.367	0.376	0.369	0.389	0.272	0.323	0.344	0.410	0.368	0.356	0.308	0.293
kurt.	13.459	8.538	13.597	7.421	10.184	7.483	8.614	9.510	4.057	4.854	7.888	5.688
skew.	3.241	2.804	3.349	2.698	3.093	2.757	2.833	2.965	2.186	2.426	2.838	2.471
minimum	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
maximum	7.233	6.255	7.698	6.566	7.412	6.744	6.729	6.063	5.122	5.800	5.628	5.701
LFI (Argentina ↔ World)												
average	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
st. dev.	0.822	0.957	0.841	0.820	0.374	0.376	0.638	0.576	0.406	0.423	0.528	1.931
median	-0.029	-0.059	-0.045	-0.063	-0.019	-0.012	0.001	-0.009	-0.035	-0.011	-0.006	0.004
kurt.	4.732	4.271	6.555	5.116	7.668	6.466	11.088	12.283	4.711	8.275	8.155	22.902
skew.	1.499	1.368	2.006	1.325	2.126	1.995	-0.550	2.010	1.631	1.880	1.675	-3.139
minimum	-1.833	-2.289	-1.542	-2.174	-0.739	-0.609	-2.829	-1.755	-0.657	-0.966	-1.403	-10.78
maximum	3.261	3.226	3.422	3.136	1.484	1.446	2.091	2.728	1.537	1.866	2.305	6.026

Source: Authors' calculations based on UNCTAD data

Ukraine foreign trade with agricultural products to the Visegrad countries

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Abstract: Modern conditions of development of international economic relations require the expansion of areas of economic cooperation between Ukraine and the Visegrad four, which is an example of successful regional cooperation in the economic, energy, cultural, educational and other areas. Cooperation within the integration group takes place without creating a special organizational structure, except for the Visegrad Fund. In the economic sphere, Ukraine and the Visegrad countries cooperate in the form of mutual trade in goods and services, investment and migration processes. Analysing the foreign trade of Ukraine's goods with the EU, it should be noted that significant partner in export and import is Poland, and a small share in exports and imports are Hungary, Slovakia and the Czech Republic. Since January 1, 2016, the full and comprehensive free trade zone between Ukraine and the EU countries has entered into force, so there are unique opportunities to stabilize, diversify and develop its economy for the welfare of all Ukrainians. The European Union is supporting Ukraine to help small and medium-sized enterprises take advantage of these new growth opportunities and thus create new jobs.

Key words: Visegrad four, foreign trade, export, import, agricultural products

JEL Classification: F1, Q1

1 Introduction

Foreign trade is the oldest form of international economic relations. It existed long before the advent of the world economy and was its predecessor (Dakhno, 2003). The development of foreign trade was a prerequisite for the creation of economic conditions for the development of machine production, the growth of which is possible only in the presence of imported raw materials and mass external demand.

Pochtoviuk A. (2007) define that foreign trade allows different countries to show their advantages. In these conditions, consumers have a large assortment of goods, the price and quality of which varies. In modern conditions, foreign economic relations serve as a means of accelerating the scientific and technical development of Ukraine.

The increasing interdependence of countries for economic integration is an important feature of our time. Increased competition in the international agri-food market requires the study of approaches to the organization and functioning of the system of sale of goods and services (Semiv S., 2013). Tending to maintain position in the market, manufacturers should make some effort to improve the level of technology and efficiency of business processes. There is an urgent need to find other options to further reducing costs and cost of production, improve its quality.

Free foreign trade encourages competition and reduces the dominance of monopolies. Increasing competition from foreign firms forces local enterprises to switch to new production technologies that provide lower costs for the creation of goods. Unlimited international exchange of goods gives consumers the opportunity to choose from a larger range of products (Kolomak S., 2004). In terms of value in the overall complex of economic relations, the foreign trade exchange retains its leading position in the future. At the same time, exchanges between countries in the field of science and technology have been increasing in the last few decades, and trade in traditional (transport, insurance, tourism) and new (collection, storage and transfer of information, advisory services) services, which are part of the “invisible” trade, is growing rapidly. This area requires new trade and political regulation, as customs regulation becomes less effective, giving way to a system of non-tariff barriers.

Rumiantsev A. (2007) believes that in modern conditions, due to the growth of foreign trade turnover, there are two ways of trade: direct (trade without intermediaries) and indirect (trade through intermediaries).

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In general, international trade is a tool by which countries can develop specialization, increase the productivity of their resources and thus increase overall productivity.

Visegrad group (Poland, Czech Republic, Hungary and Slovakia) was founded February 15, 1991. Visegrad group (also known as “Visegrad four” or simply V4) reflects the combined efforts of Central Europe countries to work together in a number of areas that have common interest within the framework of the all-European integrations.

The determining direction of development of Ukraine is its effective integration into the world economic space. The success of Ukraine's foreign economic activity depends on its further economic and social development (Grabovsky R., 2017). That is why the cooperation between Ukraine and Visegrad four countries is so crucial.

The purpose of this paper is to formulate proposals for improving the foreign trade in agricultural products between Ukraine and Visegrad group countries and to create recommendations for achieving the level of development of the Ukrainian agricultural economy necessary for EU accession, following the example of the V4 countries.

The objects of the paper are export and import indicators from 2012 to 2018 years, the geographical structure of trade, indicators of quota regulation.

2 Methods

The main aim of the paper is to define main ways of cooperation between Ukraine and the Visegrad four countries in area of trade with agricultural products. The basic methodical approach of processing in a theoretical as well as in a practical level is presented by standard methods of scientific work such as selection, analysis, comparison, deduction and synthesis.

For this study, we used information from the previous (2018) year in order to understand the overall picture of Ukraine's agri-food trade with the Visegrad four countries (Czech Republic, Hungary, Poland, Slovak Republic).

The main source for research is statistical information about total export/import of agricultural goods, export/import of agricultural products to V4 countries, collected from State statistical service of Ukraine.

The main dataset of the study were scientific works on foreign trade of Ukraine, newsletters and reports of the State statistics service, the Ministry of economic development and trade, the National Institute for strategic studies. In the course of the research the methods of economic and statistical analysis, methods of comparison and grouping, graphical modelling of economic processes were used.

For a complete research of this topic following resources were used:

- for the general characteristic of the history and the policy of V4 regarding Ukraine, we used the “Visegrad group” website;
- to study the changes in the structure of exports and imports, we used statistical information, based on which, after its own processing, graphs were created;
- to investigate top-8 - products (sunflower oil, corn, wheat, soybeans, barley, poultry meat, cigars and cigarettes, sugar) of agri-food exports/imports to the EU we used information from Ministry of Agrarian policy and food of Ukraine website.

Moreover, during writing the thesis, we used the following research methods:

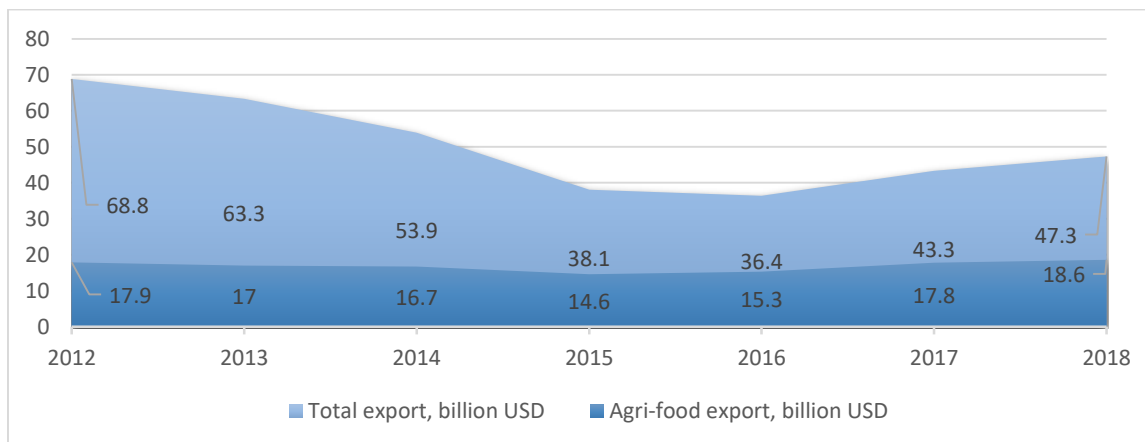
- dialectical analysis and synthesis;
- induction and deduction - to analyse and evaluate the processes of formation of the level of development of the national agrarian economy necessary for accession to the EU;
- monographic analysis - to study the specific characteristics of the development of phenomena and aspects of the formation of the level of efficiency of the agricultural sector of the economies of the group V4 and their interaction in the field of international economic relations based on the processing of relevant statistical and literary sources;
- graphic method - to illustrate the results.

3 Research results

Foreign trade plays an important role in the economy of Ukraine. The trend during 2012-2016 was a decrease in revenues from exports of goods with a simultaneous decrease in exports of agro-industrial products. Despite the overall negative dynamics, in 2018 there was an increase in exports, including agricultural products. By 2018, the total volume of export was 43.3 billion USD, which is 19% more than in 2017. The dynamics of agri-food showed a similar trend as the rest of exports, but the rate of decline in agri-food exports was less than the total and, despite the decline after the crisis of

2012/13 years, the growth of supplies was recorded in 2016. Historical volume of agri-food products export was observed in 2012, it was about 17.9 billion USD. However, in 2018 the highest volume of export was reached in amount of 18.6 billion USD. Thus, the export of agricultural products from Ukraine was doubled over the past 10 years.

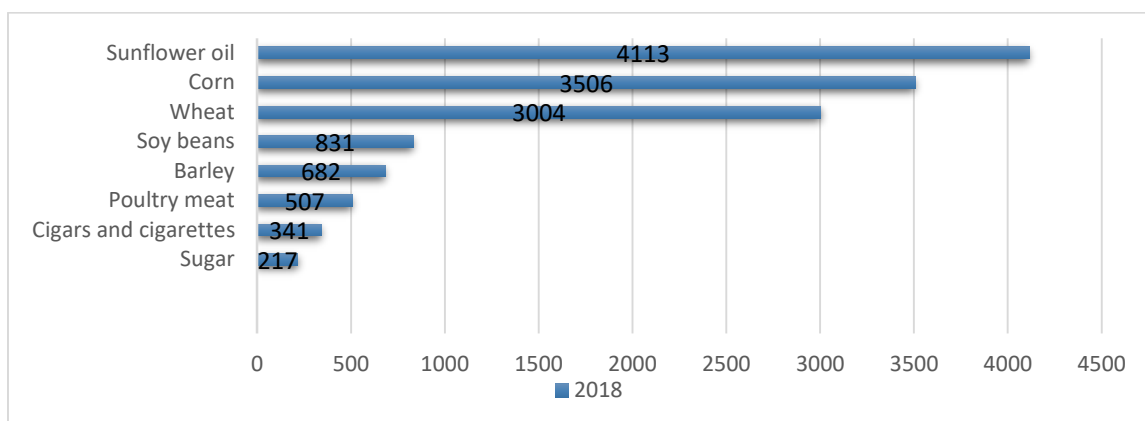
Figure 1 Dynamics of total exports and exports of agricultural products from Ukraine to the EU, billion USD



Source: Own processing

Over the past 5 years, the share of agricultural products in the structure of export revenues of Ukraine increased from 31% in 2014 to 39.3% in 2018. However, it is worth to mention that the basis of agricultural exports is still the export of raw materials, namely plant products – wheat, corn, barley and soybeans.

Figure 2 Top-8 products of agri-food exports to the EU, 2018, billions USD

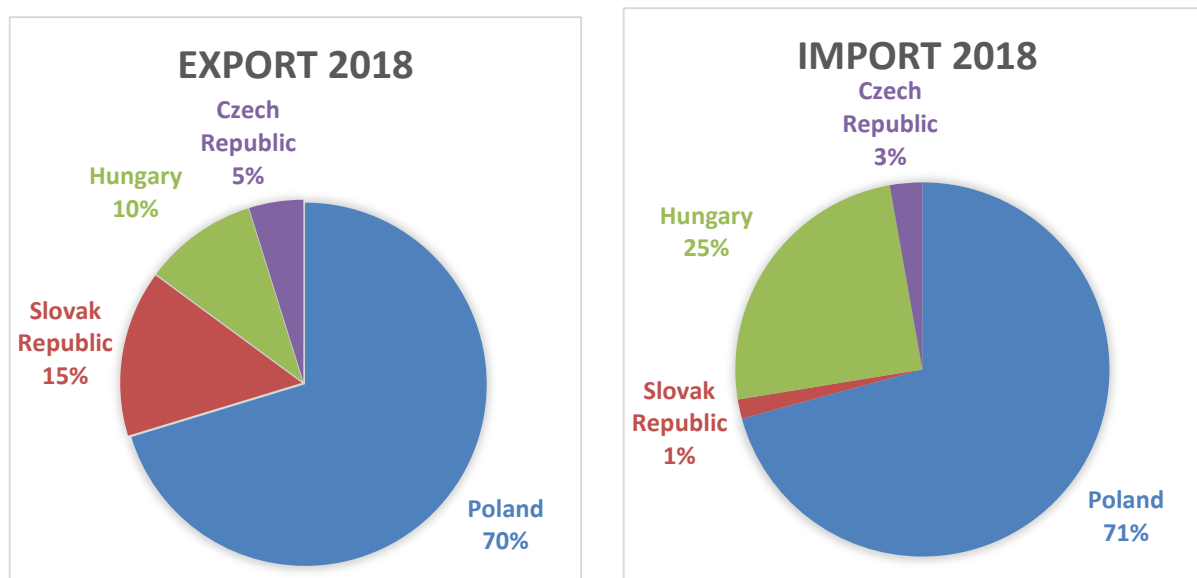


Source: Own processing

A large share in agricultural exports is sunflower oil, the volume of its export in 2018 was amounted to 4.1 billion dollars USA. Ukraine has been a world leader in the production and export of sunflower oil for several years. Other key positions are - cereals (corn, wheat, barley), oilseeds (soybeans) and oilseed products. These TOP 10 products account for 81% of all exports of agri-food products from Ukraine.

The locomotive of Ukrainian export is the agricultural sector - now every second dollar is of agricultural origin. The active growth of foreign trade turnover (the average annual rate for 2012-2015 was almost 1.5 times higher than in 2010-2011) enhances the integration of domestic agriculture into the world market. The competitiveness of Ukrainian products ensured the rapid growth of exports and, as a result, the improvement of the trade balance.

Figure 3 Export and import of agricultural products of Ukraine to the Visegrad four countries in 2018



Source: Own processing

The largest share of export is goods, but the main part of sales - raw materials. Import from the Visegrad group significantly exceed export, Ukraine does not use all the opportunities that are available under the trade agreement with the EU. It is necessary to develop a trading strategy in which to determine export priorities, to use the economic potential of Ukraine, to diversify exports, considering the specifics of the Visegrad four markets.

In table 1 we can see what kind of goods Ukraine exports to the Visegrad countries.

Table 1 Export of agricultural products of Ukraine to V4 by types of goods

Name of item	Export (millions of USD)			
	2018			
	Poland	Slovak Republic	Hungary	Czech Republic
Milk and dairy products, poultry eggs; natural honey	22816.1	859.7	1713.9	582.5
Grain crop	35583.5	9.8	6457.0	254.2
Seeds and fetuses of oil plants	39781.4	936.8	23934.7	3051.8
Animal and vegetable fats and oils	126513.7	5940.9	117.6	7957.7
Edible fetuses and nuts	19066.4	1548.4	3251.7	7042.5
Vegetables processing products	38056.6	1833.2	371.7	1963.3

Source: Own processing

From the above table it can be stated that Ukraine exports mainly raw materials, which indicates the low quality of finished products of Ukrainian producers.

In general, the share of V4 in the total foreign trade turnover of Ukraine is significant. The largest trading partner in 2018 is Poland, followed by Hungary, the Czech Republic and Slovakia.

Today, Ukraine declares itself as a state that can act as a strong player on the international market of agricultural products. Improving the integration course of Ukraine into the world space is a priority for the country.

Thanks to the European integration orientation of the state, Ukraine aims to improve the results of foreign trade and bring the state to a new stage of development. After the signing of the Association Agreement with the EU, Ukraine has

new opportunities for the gradual development of the EU market by domestic companies, improving the quality, safety, environmental characteristics of Ukrainian agricultural products, improving food security of the state. Thus, for Ukraine it is a priority to create an effective mechanism of state policy to improve the efficiency of the existing potential of the agricultural sector of the economy, its adaptation to new conditions, considering the possible risks that may arise as a result of the liberalization of foreign trade relations with European countries.

On 1 January 2016, the Deep and comprehensive free trade area (DCFTA) agreement between Ukraine and the European Union entered into force. The temporary application of the economic part of Section IV of the Association Agreement (which covers the Deep and comprehensive free trade zone) began on April 23, 2014 unilaterally, this means that Ukraine had the right to use quotas for duty-free exports to the EU, in turn, the EU countries supplied products to Ukraine on general terms. Only in January 2016 the Agreement began to operate bilaterally.

From October 2017 and January 2018, together with the main quotas, 8 additional quotas for duty-free exports to the EU for honey, cereals and flour, processed tomatoes, grape and apple juice, cereals (oats, wheat, corn and barley) began to operate.

The annexes to the Agreement fully describe the tariff regulation of trade between Ukraine and the EU. The regulation system includes:

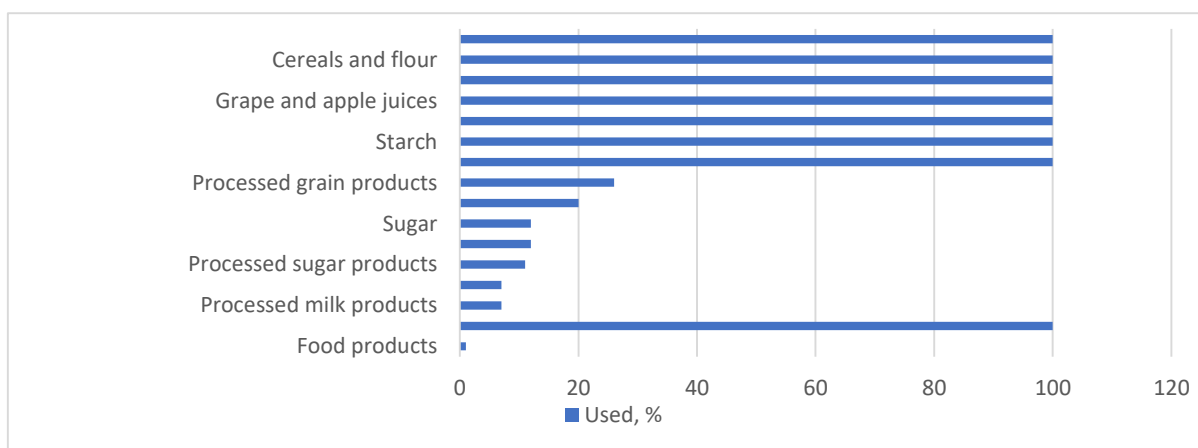
- Duties;
- Tariff quotas;
- Entry price.

The administration of EU tariff quotas is carried out exclusively by the European Union (relevant European Commission directives) based on two principles:

- “first come-first served” - registration of imported goods under the tariff quota is subject to the presence of unused balance of the corresponding quota at the time of submission of accompanying documents. Moreover, the first product is issued, which accompanying document came first;
- “import licensing” – importers of Ukrainian products apply for the right to import (license) of the Directorate General of the European Commission “Agricultural issues and rural development”. At the same time, there are periods during which it is possible to reserve the appropriate number of quotas.

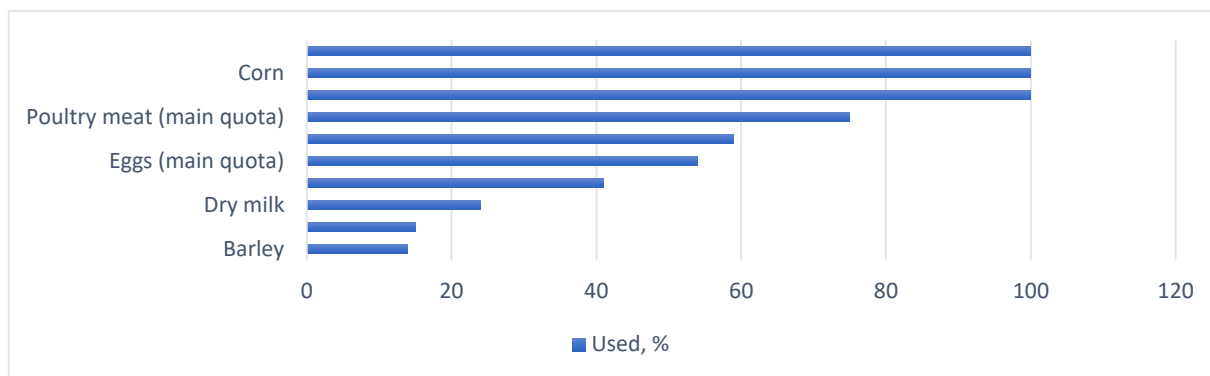
As of the end of 2018, Ukraine has closed quotas for honey, cereals and flour, malt and gluten, processed tomatoes, grape and apple juices, cereals (corn and wheat), butter, processed starch and garlic.

Figure 4 “First – come-first-served” quota closure status, December 2018



Source: Own processing

Figure 5 Status of closing quotas on the principle of “Import license”, December 2018



Source: Own processing

As of December 2018, Ukraine has also closed 5 additional quotas, namely: Natural honey; Cereals and flour; Processed tomatoes; Wheat; Corn.

Among the main trends in Ukraine's trade is an increase in the role of European countries as a trading partner, which, among other reasons, was due to the Association Agreement with the EU and the diversification of energy supply sources. In particular, food exports to European countries have increased almost five times over the past decade.

At the same time, Asian countries in the last three years have become the largest consumers of Ukrainian goods, in particular food. Oil exports to the region increased 10 times in 2006-2016. Significant changes also occurred in the export of grain crops due to the increase in maize supplies. By country, the largest volume of goods is exported to Turkey (metallurgical products and oilseeds). More than half of imports from Asia come from China, whose supply volumes have doubled over the past decade due to increased imports of products.

In the table 2 we can observe main trade partners of Ukraine in the export of goods in 2018 regarding Asian markets.

Table 2 The main trade partners of Ukraine in the export of goods in 2018 regarding Asian markets

No.	Country	Volume of exports of goods, million us dollars	Share of the country in the total volume of exports of goods from Ukraine, %
1	Turkey	2 352,4	5,0
2	China	2 200,3	4,6
3	India	2 175,9	4,6
4	Saudi Arabia	749,1	1,6

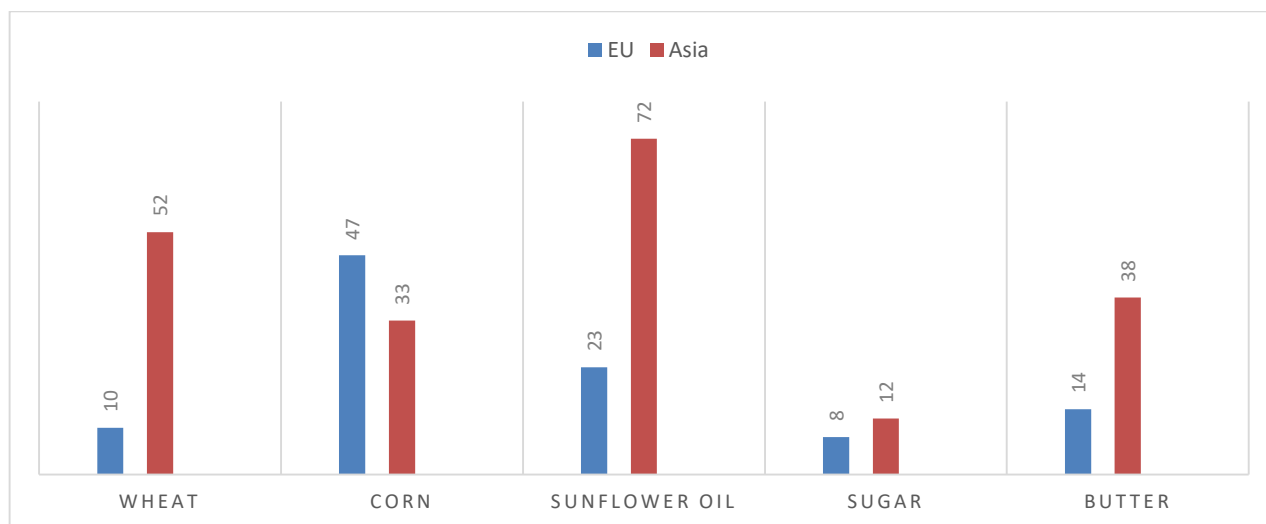
Source: Own processing

The geography of agricultural exports has significantly expanded over the past decades, and today Ukrainian food is more or less represented on all continents of the world. However, the main partners in the trade of products from Ukraine are the countries of Europe and Asia. The figure 6 is showing the comparison of the geographical structure of exports to the EU and Asian countries.

The positive aspects of Ukraine's foreign trade are: a stable positive balance of exports and imports of services, expansion of operations with European countries, first of all, with the EU and Asia. Ukraine will be able to increase the number of duty-free exports to the EU of wheat, corn, barley, oat and barley cereals and granules.

In Ukraine there are several factors that hinder the strengthening of the competitiveness of agricultural products in foreign markets, the main ones are: low level of development of the financial system, the underdevelopment of the insurance industry from production and credit risks, lack of infrastructure agro-industrial complex which increases the cost of production

Figure 6 Geographical structure of exports to the EU and Asian countries, billion US dollars



Source: Own processing

From the above data, we can conclude that due to the agreement on comprehensive foreign trade with the EU, Ukraine is increasing exports with EU countries, but through a number of factors, agricultural products do not meet the requirements of the EU market. Therefore, the majority of agricultural exports are sent to countries in Asia and the middle East. The Asian market is interesting for Ukraine because of the relatively large size of the countries, insufficient supply of agricultural goods due to overpopulation, lower requirements for product quality than in Europe, which allows Ukraine to increase exports to Asian countries.

4 Conclusions

The fact that today Ukrainian exports to the EU really still mainly consists of raw materials and semi-finished products, indicates that the legacy of the past has not yet been overcome. However, thanks to economic integration with the EU, the trend towards increasing exports of finished goods is becoming increasingly clear. And the potential is huge.

Ukrainian exports to the major European countries are still very monospecialty and industrial cooperation in the early stages.

Cooperation between V4 and Ukraine is mutually beneficial. For V4 it is an increase in markets, the number of consumers of goods and services, the expansion of business ties, cheap labour, skilled workers, cooperation in the field of tourism. For Ukraine it is investment, tourism and business development, providing preferences for citizens of Ukraine relatively small border traffic.

The volume of foreign investment in the agricultural economy today clearly does not meet its needs and does not contribute to solving the problems on the way to Ukraine's preparation for European integration. The main factors constraining the pace of foreign investment in agriculture in our country are: legal uncertainty and instability, lack of support from the authorities, corruption, excessive duration of obtaining the necessary permits, low efficiency of the industry, its significant fragmentation, low image of the industry at all levels of its functioning.

The main ways to correct the situation in the agro-industrial complex of Ukraine for the nearest period should be the developing of cooperation and agro-industrial integration, scientific substantiation of the principles of functioning and implementation of the land market, balanced development of rural regions. It is the introduction of the land market that can play a big positive role. In addition, without land as collateral, farmers have a lack of opportunities to obtain the capital needed to upgrade and re-equip their productive capacity.

Ukraine has a strong export potential, but to the extent of low state support does not use it fully. To increase its volume, it is necessary to carry out systemic reforms that would ensure technological re-equipment of the industry in order to consolidate its positions in the domestic and foreign markets. To do this, it is necessary to create conditions for attracting investment, developing a targeted and consistent state policy to support small and medium-sized producers.

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Circular Economy from the States, Regions, Companies and a Man Point of View

Microeconomic belongings of the circular and social economy in the region

Jaroslav Šetek¹, Jiří Alina², Michaela Bromová³

Abstract: The circular and social economy is usually defined as an alternative to the market and the public sector. Both economies represent an important economic and social factor in the position of market economy regulation instruments. There are many different forms in the world that link economic activities to social and environmental objectives. Within the microeconomic solidarity of the circular and social economy of the region, an innovative response to its ecological and social needs can be ensured. In the Czech Republic, a large part of the social economy is formed by enterprises employing people with specific disabilities. With the advent of Industry 4.0 technologies and the aging of the population, there is an increasing risk of unemployment for disadvantaged people. The priority interest of the interrelated circular and social economy will be to ensure employment for all disadvantaged people as a result of their inability to adapt to digital technology innovations, robotics, artificial intelligence, health and other disabilities. In implementing this program, the priority interest is to build on the principle of subsidiarity, which means allocating decision-making positions to regions.

Key words: circular economy, social economy, smart region

JEL Classification: A12, B41, E00, H11

1 Introduction

A particularly current trend in waste management is the introduction and promotion of the so-called “circular economy”, which aims to bring secondary raw materials and energy back to the production and consumption cycle and to convert waste into “resources”. In essence, it is a concept of increasing production efficiency, whose main objectives are environmental protection and the growth of the quality of human life. The introduction of circular economy principles cannot be at the expense of the quality of the end products and thus the profitability of the company (Jonášová, 2018). This procedure contributes significantly to the protection of the environment and to the creation of new jobs, especially in the aforementioned 'circular economy'. That is why the social economy is growing in importance alongside the circular economy. It is characterized by various forms of social entrepreneurship and, by its very nature, represents a modern concept in addressing some of the social and economic issues that the developed world countries face in the early 21st century. On the example of the Czech Republic, social entrepreneurship takes many forms. A large part is made up of companies that employ people with difficult access to the labor market.

The circular and social economy as an alternative to the market and the public sector, as a market economy regulation instrument, it is an important economic, social and environmental factor. Their entities are characterized by the fact that their business objectives are different from commercial companies. There are many different forms in the world that link economic activities to social and environmental objectives in the region. In essence, they respond in an innovative way to the needs of the public good and represent a source of stable economic growth. Therefore, their importance is growing worldwide and countries where the above mechanisms of functioning of economies are not yet adopted by legislation or otherwise are beginning to create conditions for their functioning within the framework of macroeconomic and microeconomic economic policy. The same is true in the Czech Republic, where social entrepreneurship (as an area of social economy) and circular economy have enjoyed unprecedented interest in the last few years.

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Also with the advent of Industry 4.0 technologies and the accompanying demographic factor of population aging, the importance of the circular and social economy can be expected to accelerate. It will be particularly difficult access to the labor market for some social groups of the population, because due to innovations (digitization, robotization, automation...) they will not be able to adapt to these technologies due to their specific handicaps (low qualification, disability...). In this context, there are challenges for both the circular and social economy. The circular economy will focus on the ecological transformation of fully physically and morally amortized technological equipment into future "resources" - production factors. This is a challenge for the social economy for entrepreneurship where disadvantaged individuals find employment. This can clearly contribute to a significant reduction in the potential adverse social and environmental impacts accompanying structural changes in the economy as a result of the introduction of Technologies 4.0. It can be assumed that, in terms of economic efficiency and the implementation of the subsidiarity principle, the role of the region is increasingly important, supported by smart technologies.

2 Methods

The functioning existence of the economic system, not only in the national but also in the regional dimension, is associated with institutions that form the logical prerequisite for ensuring stable economic growth, whose interconnected social and ecological aspects are important determinants. This is the starting point for the interlinked social and environmental policies, which are an integral part of public and regional economic policy. From its level, the quality of life of the population also develops. Institutions and communities within regions, cities and municipalities are also involved in quality of life.

For the above-mentioned reasons, analytical and comparative methods of processing prevail. These are applied to the development of the coherence of the circular and social economy with regard to the importance of the application of the principle of subsidiarity (to the policy of settlements, cities and regions). At the same time, the development of the mentioned interconnection with the theoretical concepts of human capital is compared.

3 Research results

3.1 Initial philosophy

The Dutch writer, philosopher and economist Bernard de Mandeville in the early 18th century in his essay *Fable on Bees* (entitled "Private Vice - Public Welfare"), considered the basis of economic liberalism, is of the opinion that the desire for personal benefit is a source and prerequisite economic growth and the well-being of society as a whole (Abraham & Laco; 2018). On the other hand, in reality, the human needs are very modest. We don't need too much to survive, but the needs we have can be endless. John Stuart Mill, a classic of economics and co-author of *Homo economicus*, was aware of this. His vision included to a large extent the saturation of people with their material needs, which provided fertile soil (on condition of reducing population growth) for their cultivation and shifting the value framework. He predicted high taxation of speculative profits and profits from owned natural resources, which was supposed to prevent plundering of nature (Johanisová, 2014). Growth is from biological theory an activity intrinsic to all living things, but the question remains what nature this growth should be. As stated in the theoretical concept of growth (Sedláček, 2018) on the example of a child from whom we will expect physical growth, we would probably no longer consider it healthy in an adult. We expect a sufficiently grown individual to grow culturally and educationally, and the same applies to a mature society. (Sedláček, 2018)

The above statements are fully in the context of the human capital theory, which represents the productive capabilities of man invested in production. Therefore, the "relatively young" theory of human capital (with genesis since the second half of the 20th century) is an integral part of the modern concept of economics (Abraham & Laco; 2018). Human capital understood in this way represents the knowledge, skills, abilities and characteristics of an individual that facilitate the creation of personal, social, economic and ecological well-being. This is also confirmed by the attitude of public policies (especially economic, social and regional), which, based on theoretical concepts of the relevant scientific fields, focus on the human dimension. This trend has been accelerating in recent years. The area of universal literacy (economic, social, ecological, etc.), which as one of the factors of quantitative and qualitative aspects of human capital contributes to the creation of stable economic growth, has a significant share in this. In this context, it is necessary to apply the planning of educational programs to the universal creation of population literacy on the basis of the "sliding" principle, ie to adapt to the trends of the development of post-modern society according to time intervals. This is accompanied by risks that threaten the economic, social and environmental systems. These risks can never be fully eliminated, they can only be realized by appropriate reduction with set rules. These include, in particular, the appropriate organizational structure and management culture. According to Luhman's theoretical concept, all risks of contemporary society are the result of decision-making (Abraham & Laco; 2018). The risk identification and management process also strains institutional capacities and capabilities, which can lead to conflict with other organizational structures. As a result, in addition to external, social risks, institutions have to deal with the management of their "internal" institutional risks. At the same time, institutional risk management can improve social risk management, for example by improving the decision-making

process, but it can also have potentially negative consequences if an institution manages its "risks" at the expense of social risks (Newbert; 2018). This spiral feedback between social and institutional risks requires exploring the factors that make up the balance between managing social and institutional risks and colonizing risks. As an idealized model it represents an attempt to break down and analyze the closed links between risks and their regulation (Wawrosz & Valenčík 2014).

3.2 The phenomenon of population aging and rural depopulation as an inspiration for the regional interdependence of the social and circular economy

During the 20th century, the question of aging took on a whole new dimension, as it began to extend from the individual to the whole of society, ie demographic. Demographic aging in the Czech Republic is monitored by measuring the share of age groups in the total population, further on the basis of indices, ie comparative numbers (age index, productive load indices) and average age or age median. Most frequently, the proportion of the three main age groups of the population in the population, which are defined according to the expected economic activity of most persons of the given age, is monitored (Pavelka; 2017). It is therefore a pre-productive component of the population, which is mostly stereotypically defined by ages 0-14 (respectively. 0-19 years). The productive component of the population consists of persons aged 15-64 (respectively. 20-64) and the age group of post-productive persons aged 65 and over (age group 65+). Based on the age groups thus divided, the aging process is interpreted by means of indicators in the form of average age and the index of age (number of persons aged 65 + per 100 children aged 0-14) of the index of dependence I. (number of children aged 0-14) per 100 persons aged 15-64), dependency index II. (the number of persons aged 65 and over per 100 persons aged 15-64), and the economic burden index (the number of children aged 0-19 and the number of persons aged 65+ per 100 persons aged 20-59 years). The most common characteristic used in an international comparison is the proportion of persons aged 65 and over in a given population.

The process of population aging in the Czech Republic is strongly linked to rural depopulation. The Czech countryside is not depopulated as a whole, but some areas are depopulated (municipalities under 250 inhabitants are most at risk). There are no civic amenities, infrastructure and people willing to work here. This implies a lack of jobs, transport links and the availability of services (including health and social services). The map of the Czech countryside is changing. While the satellites of large cities are growing with new family houses, the smallest villages are losing their lives, dilapidated buildings are dilapidated and the locals are mainly seniors. In both professional and lay circles, it is often talked about aging and depopulation of the countryside, which affected not only the Czech Republic but also Europe. This is confirmed by the statistics of the European Network for Rural Development, according to which the number of Europeans living in rural areas decreased by 1.6% between 2011 and 2016, although the total population of the European Union increased slightly.

3.3 Disadvantaged social groups in the labor market

The independent existence of unemployment has existed in the Czech Republic since the beginning of transformation to a market economy, ie from the beginning of the 1990s. Although the unemployment rate in the Czech Republic is currently the lowest in the European Union (2.6% in the second half of 2019), there was a period, especially in the 1990s and 2008-2010, when it started to increase gradually (Novotná & Volek; 2014). Thanks to this fact, certain groups of people have been set aside who have become disadvantaged in the labor market. The problem of some kind of "discrimination" of selected groups of people on the labor market persists to this day and can affect every individual. So far, there are a number of prejudices that can expel a person from the labor market and make it difficult for him to live. Such persons need to be given increased care in order to ensure that they are sufficiently attractive in terms of employment.

We experience disadvantages in the Czech Republic on several levels. There are disparities between large cities and rural areas, as well as regional disparities in job opportunities, quality of education, access to resources (Volek & Novotná; 2015). Social justice highlights the principles of support and solidarity regardless of ethnicity, orientation or religion. Active inclusion means enabling all people to be full members of society. In practice, it is about equal access of all people to the labor market, access to quality education, access to services that help actively participate.

A typical approach to addressing the above problem is to apply the social economy at the regional level. As an instrument of social inclusion since the 1990s, the European Union's programming documents have shifted their attention from the fight against poverty, namely from the focus on the elimination of vertical inequalities in society, to the social policy against social exclusion. This is understood as a situation where an individual or group of individuals does not fully participate in the economic, political and social life of society and / or their limited

income and limited other resources do not allow them to achieve a standard of living considered acceptable in their society. The social exclusion situation, which is caused by the displacement of these persons outside society, threatens the social cohesion of society (Mareš; 2007). The shift from the fight against poverty, ie the unequal distribution of wealth in society, to the fight against exclusion, is a change of object. In the concept of social exclusion, attention is focused on the bonds that bind the individual to the whole of society and link its individual segments. However, there is undoubtedly a strong link between poverty and the risk of social exclusion, although not all the poor must also be socially excluded. The European Union asks Member States for a strategy for social inclusion, which should be based on the common objectives formulated at the Lisbon Summit in 2000, namely sustainable economic growth, employment and social cohesion. The Union's strategic objective is a cohesive society to be achieved through social inclusion - that is, the ability of people to exercise their rights and to exercise their rights. Individual Member States therefore draw up National Social Inclusion Plans, specifying the strategies chosen to achieve these objectives and identify the specific institutions responsible for the transfer of objectives to regions and localities (Mareš, 2006). According to the National Report on Social Protection and Social Inclusion Strategies for 2008-2010, social inclusion and labor market participation are closely linked. Social economy actors create favorable conditions for the employment of persons socially excluded or at risk of social exclusion, ie those who have long-term difficulties in obtaining and maintaining a job. Therefore, the benefit of socially disadvantaged groups of the population is one of the defining characteristics of the social economy, which is manifested either by the fact that these groups are either recipients of goods and services that help them to social integration or by being employed by the social economy. This narrower view of the social economy as a tool for integrating people and groups of socially excluded and vulnerable exclusion back into the labor market (including groups of people from the disadvantaged, the long-term unemployed, women on maternity leave, immigrants, youth leaving children's homes...), eventually providing personal social services or employing disadvantaged, stresses their "equal chance" to life. This includes in particular those forms of social enterprises, such as social cooperatives, Work Integration Social Enterprise, and social enterprises that provide assisted employment to disabled people in the broader sense.

3.4 Forecast of possible social impacts of the onset of Industry 4.0

Industry 4.0 (the so-called fourth industrial revolution) should contribute to improving product quality, better working conditions or increasing productivity and flexibility of work. At present, there is no clear consensus among experts on whether or not the advent of Industry 4.0 will result in massive job loss. Brynjolfsson and McAfee were the first to warn of the upcoming trend in Technology 4.0 in the presentation of their joint work from the 2014 Second Age of Machines. Here they argue (Brynjolfsson, McAfee; 2014) that new technologies can lead to higher unemployment and increasing social inequalities. Another more radical view is held by Ford in 2017, which in his book *Robots Approach* warns of massive layoffs caused by the advent of automation and artificial intelligence (Ford; 2017). According to him, the problem of unemployment will no longer solve higher education and retraining. It is also fundamentally opposed to the idea that only the worst-paid jobs will threaten the advent of technology, as highly qualified employees are also worried about their jobs. A completely different view is that professional workers will always be needed and the risk (Mlejnský; 2016) lies in the dismissal of handling, support and non-professional personnel. According to some theoretical concepts, there is no risk of losing employment (Rüßmann; 2015); on the contrary, it can be predicted that a higher degree of automation will even increase employment. In 2016, the World Economic Forum surveyed the 371 largest employers in 15 countries around the world, showing that the largest job losses are not in blue-collar jobs, but in administrative jobs. Only the second most vulnerable group are the manufacturing professions. On the contrary, an increase in job opportunities is expected in the area of financial operations, business and management. However, much more logical and mathematical skills will be required from workers in these areas (Mařík, 2016).

At the end of 2015, the Office of the Government published a study entitled *Impacts of digitization on the labor market in the Czech Republic and the European Union*, which assesses the vulnerability of regions at the level of digitization in terms of expected changes in the labor market. The results of the study indicate that the impact of digitization on the Czech Republic does not deviate from the trend for the whole European Union, even though the Czech Republic study is slightly above average on digitization. Significantly lower risk of digitalisation is expected in Prague and Central Bohemia, while the most endangered region is the Northwest (ie the Karlovy Vary and Ústí regions). Right after Prague and the Central Bohemia Region, the least endangered region in the Czech Republic is the Southeast - ie the South Moravian Region and the Vysočina Region (Mařík, 2016).

Based on a comparison and analysis of the above-mentioned theoretical concepts of experts and empirical results on this issue regarding the possible employment impacts of Technologies 4.0, there are potentially vulnerable social groups in the population. Regardless of which professions are most affected by the issue, one can still see its solution by applying an integral unification of the circular and social economy.

3.5 Cohesion of the circular and social economy within the region as a possible solution

The interdependence of the circular and social economy is an important economic and social factor. The basis can be seen in microeconomic belongings while respecting the principles of sustainable development and social responsibility. Entities in both economies are characterized in that their business objectives are different from commercial firms. In the world one can meet their various forms, which link economic activities with social and environmental objectives in a given microeconomic entity on the example of a municipality and a region.

Within the microeconomic solidarity of the circular and social economy of the region, an innovative response to its ecological and social needs can be ensured. In the Czech Republic, the social and circular economy has enjoyed unprecedented interest and take many forms over the past few years. A large part is made up of companies that employ people with disabilities. Also with the advent of Industry 4.0 technologies and the aging of the population, acceleration by difficult access to the labor market can be expected. The interdependence of the circular and social economy in the areas of interest, cities and regions can make a significant contribution to reducing this problem. Its priority interest will be to ensure the employment of people within selected companies mainly due to their inability to adapt to digital technology innovations, robotics and artificial intelligence. It is therefore the technology applied in the circular economy that is a challenge. For this reason, the interdependence of the circular and social economies can be seen as a multifunctional meaning that simultaneously fulfills several effects, namely economic social and ecological. In implementing this program, the priority interest is to build on the principle of subsidiarity, which means allocating decision-making positions to municipalities and regions.

3.6 Application of Smart Region technologies for universal support of rural human resources

Addressing the interdependence of aging and depopulation in the regions of interest can be seen in the reduction of administrative burdens for the development of social circular business and the introduction of modern technology applications within the Smart region. It requires using methods of analysis, comparison, synthesis, observation and generalization. For this reason, it will be necessary to support the human resources of the rural population in the region. Its implementation will be necessary while respecting the principle of transparency and subsequent control of interested state and local government bodies. As a possible solution we can see the introduction of a complex specific system of planning, programming and budgeting into the conditions of the region. The main input data can be obtained from transparent indicators such as the regional competitiveness index. This is defined (Žitek, Klímová; 2015) by the region's ability to produce economic goods and to provide its inhabitants with a sustainable quality of life. While regions' competitiveness is usually measured using a composite index, which must include characteristics, they include all important aspects of competitiveness, such as productivity, exports and employment rates. If it prefers to maintain its competitiveness in the long term, it cannot find its competitive advantage in the form of low labor costs, but should encourage innovation. The competitiveness index should thus include aspects of the knowledge economy, such as the promotion of science, research and innovation, the education of the population or the share of innovative enterprises in the region. The European Union measures regional competitiveness at the level of the Regional Competitiveness Index, which consists of 11 pillars that assess both the inputs and outputs of territorial competitiveness. The aforementioned index methods will help to compare the selected region with both the Czech and European regions, providing the basis for planning, programming and budgeting.

A comprehensive system of programming and budgeting planning is a system of resource management (human, material and financial). This system enters internal interaction system linkages with other top management systems, its dominant (and integrating) position being due to the fact that any of the other top management systems (eg information system, etc.) imposes resource requirements. Resources are known to be scarce and scarce, hence the need to look for ways to use them rationally. The above-mentioned modification of the Planning - Programming and Budgeting system enables the solution of this problem, as it is such a system of resource management, which makes it possible to achieve their possible combination and allocation to the required objectives. The following methodological steps can be taken when implementing the objective allocation of resources and selecting the appropriate budgetary method:

- Analysis of the initial state. should be a detailed identification of the existing (institutional) type of financing in the given segment of Based on the the public sector.
- Based on the analysis of the state of play, make recommendations for the selection of some of the methods of objectively allocated resource allocation and the appropriate budgetary method.
- In the next step, set the transformation objectives of systemic change in resource allocation and budgeting. Define ideal (evaluable!) States in transformation goals, which the goal is to achieve in specific time horizons.
- In connection with the objectives, pay close attention to the creation of personnel (training of qualified professionals), organizational and other prerequisites for the implementation of the proposed system.

- In the final step we process the project and implementation documentation into the specific conditions of the region.

A coherent system of Planning - Programming and Budgeting could be the basic entry document for Smart Region technologies for the comprehensive support of rural human resources.

4 Conclusion

For the above reasons, it is quite certain what the manifestations will be on the quality of life of the region and subsequently the whole society. This can be seen as a "circular" movement - a cycle whose essence can be applied through the theory of behavior of social systems, through system dynamics formed since the middle of the last century by Jay Forrester or synergetics, dated 1984 (Wawrosz & Valenčík 2014). In both cases, the same conclusion can be drawn, which is the required quality of human resources as an internal force to ensure long-term stable economic growth. This is fully in line with the theoretical concepts of endogenous growth formed in the 1980s by Robert Lucas and Paul Romer. It is proved how important internal power of the economy is human resources. This can also be seen as justifying the importance of investing in the universal promotion of the quality of human life. An important component of these investments is the above-mentioned activity of helping professions in society.

The specific interdependence of the above-mentioned instruments of the circular and social economies is reflected in the fact that these narrowly focused areas are the domain of specialists for the everyday activities of the required standard of quality of life. It is logical, because in spite of all economic, reduction, reorganization and financial problems, the ultimate effect is human and the central point. He manages the whole process, realizes it and the end result is for him, because of his quality of life, economic growth as a part of national wealth also derives from the synergetic effect. This is also evidenced by the above-mentioned theories of endogenous R. R. Lucas and P. Romer (Wawrosz & Valenčík 2014). These theories are based on empirical analysis based on the correlation of investment in human resources to support economic growth. In the context of this theory, the smart technologies of the region represent the internal forces of the economy to ensure its growth.

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The Final Consumption Expenditures of Households in The V4 Countries

Elena Hošková¹, Iveta Zentková²

Abstract: The aim of the article is to find out the trend of households' final consumption expenditures in V4 countries and its determinants influence quantification. Final consumption expenditures are fragmented by COICOP classification into eleven categories: Foodstuffs and nonalcoholic beverages; Alcoholic beverages, Tobacco; Clothing and footwear; Housing, Water, Electricity, Gas and fuels; Furnishing, Household equipment, Services for households maintains; Health; Transport; Posts, Communications; Recreations and culture; Education; Hotels and restaurants. The analyzed period is 2004-2018. Used data comes from The Statistical Office of the Slovak Republic and Eurostat databases. The trend function is estimated using regression analyses. Increasing household expenditures in all observed countries and years are revealed. The noticed level of increase is in the range of 45% to 63% of the GDP. According to trend functions, the most significant increase is observed in the Slovak republic. The final consumption expenditures are yearly increasing by 327 Euro per capita on average.

Keywords: households final consumption expenditures, the structure of consumption expenditures, GDP, price level

JEL classification: H31, P46, O57

1 Introduction

Food consumption data from household surveys are possibly the single most important source of information on poverty, food security, and nutrition outcomes at national, sub-national and household levels, and contribute building blocks to global efforts to monitor progress towards the major international development goals, Zezza (2017). Sustainable consumption is one of the several Sustainable Development Goals (SDGs) defined in the 2030 Agenda for Sustainable Development. However, some EU countries that want to align the level of consumption expenditures do not pay attention to sustainability, Jankiewicz (2018). In households, there are close relationships between income and consumption, Grzywinska-Rapca, M. (2015). The expenditures, as a derivative of income level, structure and changes in time provide a relatively accurate image of the satisfaction degree from particular needs which in turn provide a complete image of standard of living, Grzegza (2018).

2 Materials and Methods

The aims of the article are to find out the trend of households' final consumption expenditures in V4 Countries and to quantify the influence of their determinants. The analytical part of the contribution is based on the Eurostat data (2004-2018), which are used to determine the development trends in V4 countries using the regression analyses. The regression analyses are also used for the quantification of significant households' expenditures determinants. Price and household income are considered as significant determinants. The influence of price change is determined by the change of price level by separate goods and services according to CIOCOP. The price level change is measured using HICP. The influence of household income is realized by net disposable income on a household member.

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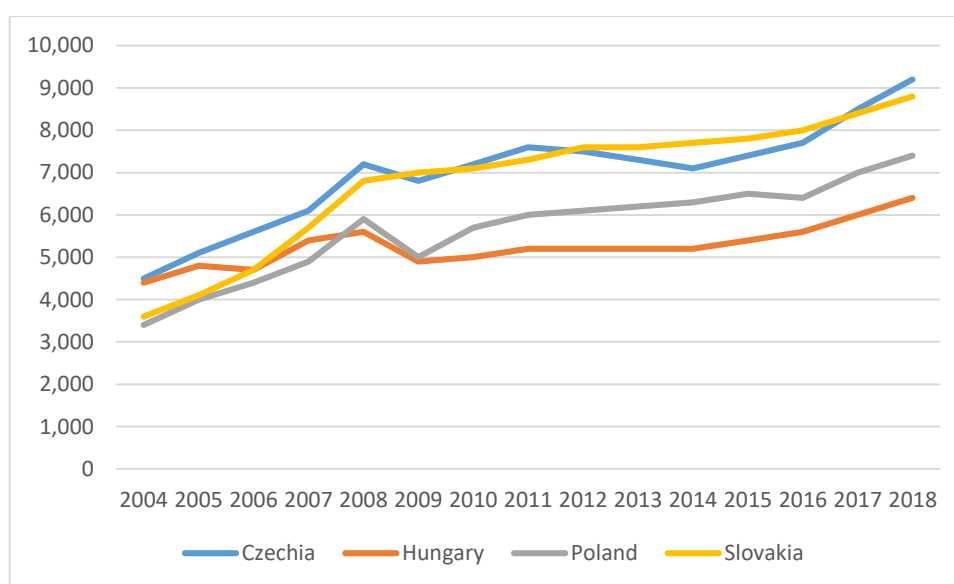
3 Research results

3.1 Households final consumption expenditure in EUR per capita and year

Household final consumption expenditures are one of the important living standard indicators. According to former research of the author is the living standard in V4 countries during 2004/2018 increasing. Final households' expenditures have a rising trend in the observed period. The most significant increase in households' final expenditures is in the Slovak Republic.

According to table 2, households' expenditures are 55.5% of the Slovak GDP. During the observed period, they increased from 3600 EUR per capita in 2004 to 8800 EUR per capita in 2018 (Graph 1). This represents an increase of 244.44 % on average. An average yearly increase in consumption expenditures is quantified by trend function and reaches 326.79 EUR (Table 1). Total households' consumption expenditures increase in the Slovak Republic is caused by increasing expenditures for all the COICOP goods and services. Price level rise and rising households' consumption, due to the increasing consumer income, are contributing. The expenditures for Housing, Water, Electricity, Gas, Fuels, Furnishing, Household equipment, Household maintain services, Health, Transport, Mail and communication, Recreation and culture, Hotels and restaurants increased the most.

Graph 1 Final consumption expenditure of households (EUR per capita and year)



Source: Eurostat

In comparison to other V4 countries the final consumption expenditures development is characterized by higher of lower variability. Households, except for Slovak, reacted to the economic crises in 2008-2009 by final consumption expenditures decrease. Until the economic crises in 2008, the Hungarian final consumption expenditures increase is driven by significant price level increase. Households' consumed quantity was not reduced and its expenditures were rising very fast. After 2009 the annual price level increase stabilized at 1-2% and expenditures are increasing slightly. The reaction to the income change in Hungary is not very significant. The annual final consumption expenditures increase from 4400 EUR to 6400 EUR (145.45%) per capita. The most increased expenditures are Housing, Water, Electricity, Gas, Fuels. The expenditures increase for this goods and services group was the highest in the V4 countries. Final consumption expenditures in Hungary represent 50.5% of the GDP on average.

Polish households' reaction to the price level change is inelastic. The most significant price level increase in Poland is observed in 2006. Similar to the price level increase reaction, the reaction to the price level decrease in Poland (2016) is inelastic. In total, the annual final consumption expenditures increased from 3400 EUR in 2004 to 7400 EUR in 2018 (217.65%) per capita. According to the estimated trend function with a determination index of 0.8864, the average annual household expenditures increased in Poland is 237.14 EUR per capita. The most significant increase is observed by Clothing and footwear, Housing, Water, Electricity, Gas, Fuels; Health. "Health expenditure in Poland increases every year together with their share in total household expenditure. The increase in drug consumption, rising supply of private health services, as well as the aging of the population, seem to decide on the increase in household health expenditure", Piekut, M. – Kludacz, M. (2015).

Table 1 Trend function of consumption expenditures

Country	Trend of final consumption expenditures of households
Czechia	$Y = 4986,67 + 250t$; adj.R ² = 0,8121 (0,01) (0,01)
Hungary	$Y = 4543,81 + 90,36t$; adj.R ² = 0,6082 (0,01) (0,01)
Poland	$Y = 3782,86 + 237,14t$; adj.R ² = 0,8864 (0,01) (0,01)
Slovakia	$Y = 4199,05 + 326,79t$; adj.R ² = 0,8533 (0,01) (0,01)

Source: author`s calculations

The Czech households reacted to the price level change more significant than other V4 countries' households. In 2008 and 2012 the price level increase is the most significant. The Czech households` reaction was an elastic decrease in the consumed quantity of goods and services. The result is the total final expenditures decrease. According to the estimated trend function, 81.21% of changes in time series are cleared and the annual final consumption expenditures increase in the Czech Republic is 250 EUR per capita. In total, the expenditures increased from 4500 EUR to 9200 EUR between 2004 and 2018 per capita which represents an increase of 204.44%. The health expenditures are the most significant. “The scheme of consumer expenditures development of Czech households shows a gradual convergence to EU15 countries“, Stejskal, L. – Stavkova, J. (2011). „The period observation spans 2005-2012, representing a period of economic growth, crisis, and stagnation and is expressed as GDP per capita“. Birciakova at col. (2014).

Table 2 Descriptive Statistics – Final consumption expenditures share on GDP

Country	N	Range	Min	Max	Mean	Std. Dev.	Variance
Czechia	15	3,20	45,52	48,72	47,3327	1,05214	1,107
Hungary	15	6,09	47,24	53,33	50,5473	2,14758	4,612
Poland	15	5,60	57,36	62,96	59,9313	1,70770	2,916
Slovakia	15	6,31	53,01	59,32	55,4680	1,67245	2,797

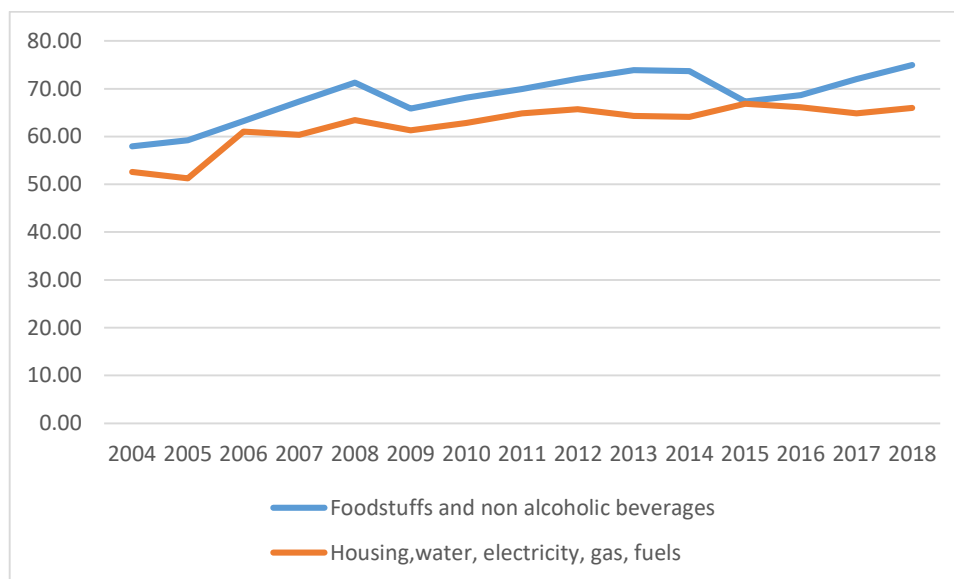
Source: author`s calculations

3.2 The influence of consumption expenditure determinants in the Slovak republic

Following the previous analyses, the most significant increase in final consumption expenditures is observed in the Slovak Republic and is driven by the household member income increase and the price level of the consumer goods and services. The second goal of these contributions is the influence power quantification in relation to the consumption expenditures by separate COICOP basket.

The estimated functions are used for the price and income influence on the consumption expenditures quantification (Table 3).

Graph 2 Main Slovak households consumption expenditures trend (EUR per capita and year)



Source: Eurostat

Table 3 The function of consumption expenditures

The group of consumption expenditures (COICOP)	The consumption expenditures function
Foodstuffs and non-alcoholic beverages	$Y = 0,06I + 0,45HICP$; adj.R ² = 0,9215 (0,01) (0,01)
Alcoholic beverages, Tobacco	$Y = 0,02I + 0,03HICP$; adj.R ² = 0,9205 (0,01) (0,01)
Clothing and footwear	$Y = 0,02I + 0,09HICP$; adj.R ² = 0,9191 (0,01) (0,01)
Housing, Water, Electricity, Gas, Fuels	$Y = 0,08I + 0,32HICP$; adj.R ² = 0,9213 (0,01) (0,01)
Furnishing, Household equipment, Services for households maintain	$Y = 0,03I + 0,02HICP$; adj.R ² = 0,9098 (0,01) x
Health	$Y = 0,02I + 0,01HICP$; adj.R ² = 0,9157 (0,01) x
Transport	$Y = 0,01I + 0,12HICP$; adj.R ² = 0,9056 (0,01) (0,05)
Posts, Communications	$Y = 0,03I + 0,03HICP$; adj.R ² = 0,9177 (0,01) (0,05)
Recreations and culture	$Y = 0,04I + 0,08HICP$; adj.R ² = 0,9170 (0,01) (0,01)
Education	$Y = 0,01I + 0,01HICP$; adj.R ² = 0,8616 (0,01) x
Hotels and restaurants	$Y = 0,04I + 0,01HICP$; adj.R ² = 0,9186 (0,01) x

Source: author's calculations

Rising households' expenditures are caused by a price level increase in all the goods and services groups by COICOP. That means the price level increase is higher than the decrease in consumed quantity as an effect of the price change. (inelastic households reaction). This's possible to identify in the goods and services groups Food, Non-alcoholic beverages, Housing, Water, Electricity, Gas, Fuels. It's given mainly by the reality of the households' less elastic reaction due to the basic needs security. The power of influence quantifying regression coefficients are indicating a positive correlation between disposal income change and Slovak households' final consumption expenditures. Table 4 presented elasticities are calculated using estimated regression coefficients. The most significant manifestation of the Slovak households' income increase is the transportation expenditures increase. An increase in income by 1% can cause an increase in transportation expenditures by 1.42% on average. The less elastic reaction to the income change is observed by basic goods like food, non-alcoholic beverages, clothing and footwear, water, electricity, gas, and fuels what confirms the previous analyses of price level influence. Consumption expenditures increase by these goods and services is so driven mainly by raise in the price level.

Table 4 The elasticity of expenditures

The group of consumption expenditures (COICOP)	E
Food and non-alcoholic beverages	0,33
Alcoholic beverages, Tobacco	0,64
Clothing and footwear	0,43
Housing, Water, Electricity, Gas, Fuels	0,48
Furnishing, Household equipment, Services for households maintain	0,86
Health	0,90
Transport	1,42
Posts, Communications	0,77
Recreations and culture	0,63
Educations	0,79
Hotels and restaurants	0,90

Source: author's calculations

Determinants' influence on household expenditures is also influenced by the social status of the household members. Lesakova, D. (2014) proved that „The main changes in pensioners consumption in the Slovak Republic are caused primarily by the income“.

4 Conclusion

The aims of the article were to find out the trends in V4 countries households` final consumption expenditures and quantification of its determinants influence. The regression analyse was used to determine the trends. In the whole observed period (2004-2018) is the V4 countries' households` consumption expenditures trend increasing. The highest increase is recorded in the Slovak Republic and in Poland. Comparing the final consumption expenditures with price level trend and households` income in separate V4 countries` mostly inelastic reaction in the relation of price and income is observed. The higher elastic households` reaction to the price level change is visible only in the Czech Republic. The regression analyse was used for the quantification of determinants influence on the households` expenditures according to the COICOP basket in the Slovak Republic. Three results confirmed the reality of increasing basic goods expenditures due to the increasing price level. Provided income elasticity analyses revealed, from 11 selected goods and services, as the most luxurious transportation expenditures.

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Material and Value Flows of Waste

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Abstract: The aim of this work is to map the processes of handling waste products in the European Union and the Czech Republic. Involved subjects (companies, individuals, societies) must currently respect the principles of social responsibility. It is necessary to create an environment leading to socially sustainable flow of waste products with regards to environmental, social and economic aspects. Involved subjects need a tool capable of making waste product usage more efficient, making transactional cost lower and minimize impacts on environment. Mentioned steps are in concordance with principles of circular economy.

Keywords: waste, circular economy, firm, social responsibility, sustainability

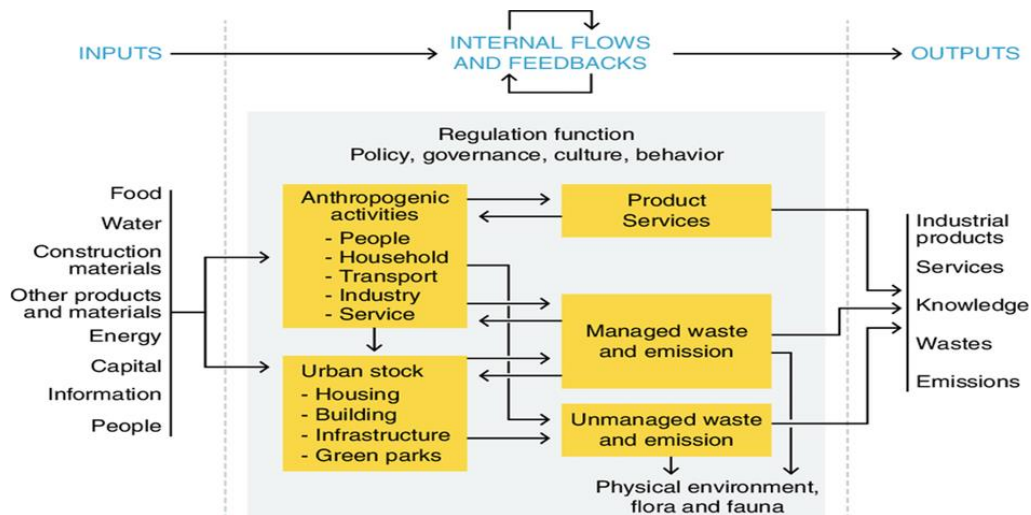
JEL Classification: D04, M21, R11

1 Introduction

The waste flow as a fundamental attribute of Circular Economy (CE) gains more and more attention on global scale. It focuses on question how to surpass current model of supply (production) and demand (consumption) based on permanent increase and growing need for production source (materials, work, energy, information, ...).

Every waste flow influences, in a particular way, economy output. There is a relationship among usage of materials, waste generation and output (Figure 1). Separation is a mean of disruption of the feedback between use of raw materials and output creation or waste generation and output creation. Even though absolute separation depends on material properties, it enables an increase of output, maintaining constant waste generation. Hierarchical waste flow seems as an appropriate attitude to an application of this approach (Van Ewijk and Stegemann, 2016).

Figure 1 Inputs, outputs, internal flows and feedbacks



Source: Chavez et al. (2018)

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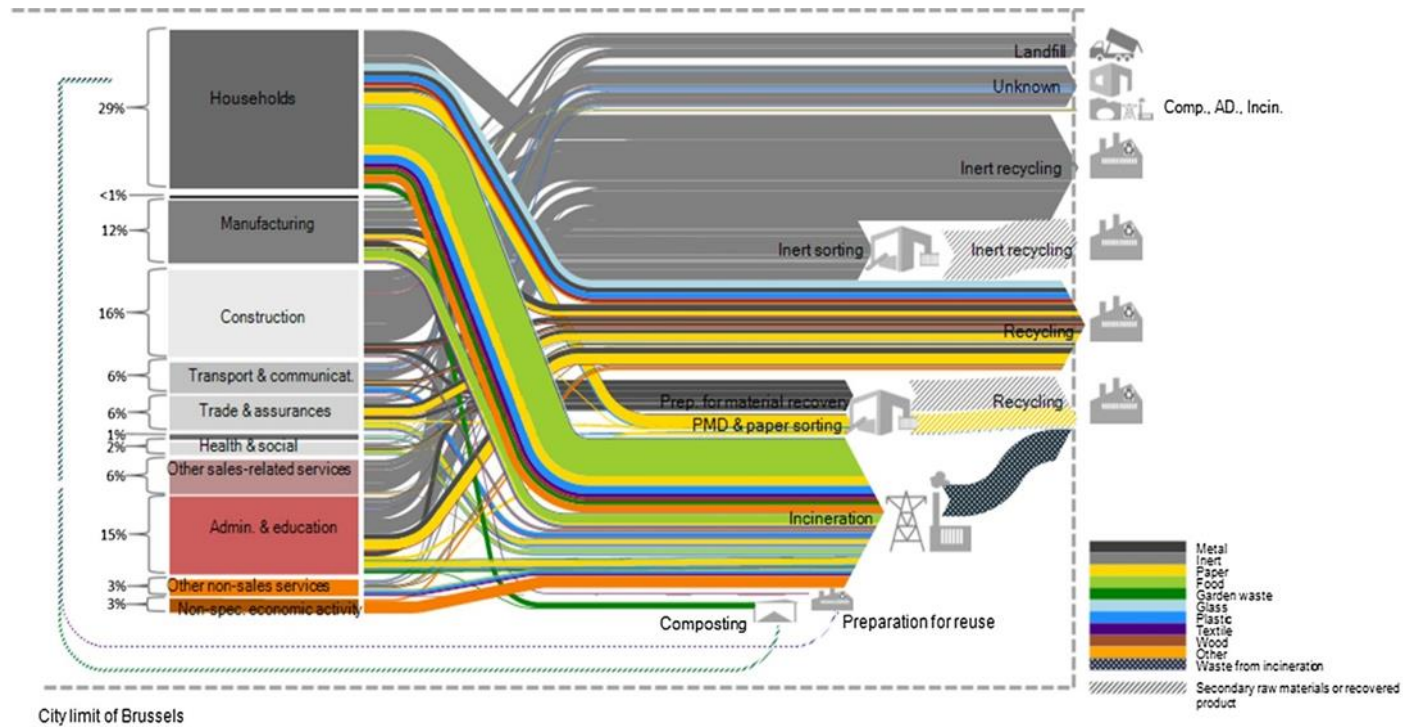
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Circularity can be perceived as a recycling and reuse of resources, as a shift from fossil to renewable sources, as well as reduction of resource consumption. The wide range for different material flow and their mutual relations must be according to Haas et al. (2015) aimed for both – closing of material cycles and applying of ecological material cycles. Iacovidou et al. (2017) also emphasize the necessity of judging the optimal degree of circulation in accordance with particular products, components and materials regarding their geographic location and diversity of used procedures and technologies, as well as regarding their political, institutional and socially-cultural context (Figure 2). After that it is possible to suggest a closed material cycle.

Circular Economy aims at: a) better efficiency of used resources b) correct and balanced accord between economy, environment and society especially targeted at sustainable waste managing of villages and industry by supporting of adapting the patterns within the framework of economic system.

Figure 2 Material flows of waste by sectors



Comp.= composting; Inc.= incineration; AD.= Anaerobic digestion

Source: Zeller et al. (2019)

Transformation to CE is at its beginning. Positive results of CE are conditioned by the construction of the policy for economical return of investment. From the pragmatic point of view it is essential to create motivational rules and specifications for companies and investors.

Nowadays national approaches are still individual. As a result there are doubts concerning their efficiency. It is true in general, that the final aim of CE support is to separate the environmental pressure from the economic growth.

In the segment of waste managing interesting results have been reached. In some developed countries a high extent of waste recycling has been reached thanks to modern technologies. The most significant need is to change technologies, change obsolete images of satisfactory manufacturing models and environmental and social standards.

National economics of EU 27 are not successful in application of models for creating product outputs with closed (circular) cycle. Non-economical usage of material, energetic and labour input still persists. Currently applied consumption models while creating values overuse comparative advantages of substitution of local inputs for seemingly economically profitable and easily obtainable globalised inputs. Chen and Ma (2015) concluded that identification of models for interchanging of particular types of waste could give some information to the government about mutual industry correlation and using overproduction of by-products of other industries as substitution for original materials (primary inputs). Besides industries can find an opportunity to extend industrial symbiosis

using supply and demand survey for by-products which are connected to processes and technologies used in different sectors.

2 Methods

The aim of this work is to map the processes of handling waste products in the European Union and the Czech Republic. Involved subjects (companies, individuals, societies) must currently respect the principles of social responsibility. It is necessary to create an environment leading to socially sustainable flow of waste products with regards to environmental, social and economic aspects. Involved subjects need a tool capable of making waste product usage more efficient, making transactional cost lower and minimize impacts on environment. Mentioned steps in (Contribution) were focused on analysis of waste generation in the EU and waste structure in the Czech Republic by sectors according to CZ-NACE.

Main source of data is from EUROSTAT and ČSÚ in 2002, resp. 2008 -2018. Firstly The circular material use rate by EU countries was found out. The circular material use rate measures the share of material recovered and fed back into the economy in overall material use. This indicator is defined as the ratio of the circular use of materials to the overall material use. The analysis of waste flow in the Czech Republic and comparison with other EU countries resided in comparison of recycling in kg per capita index in 2008, 2012 and 2017. The development in the volume of waste in tons, the structure of waste by sectors and the structure of waste by origin were examined in the Czech Republic.

3 Research results

First step was to identify the flows of waste and their recovery. Part of reused wastes (Recovery) is used for recycling, then for composting and a certain part must be used for disposal by landfilling or incineration on land.

Figure 3 shows Circular material use rate in the EU in 2004 - 2016. This figure shows the percentage of material input for domestic use.

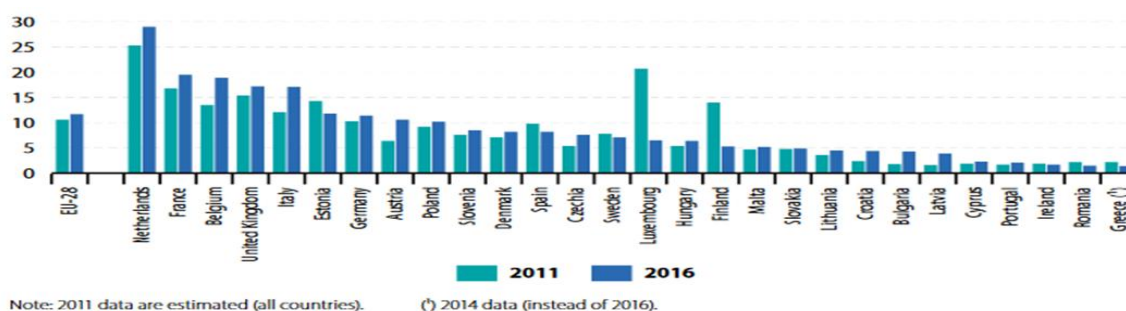
Figure 3 Circular material use rate in EU



Source: Eurostat

A higher Circular material use rate value means that more secondary materials substitute for primary raw materials, thus reduce the environmental impacts of extracting primary material. Figure 3 implies slightly increasing value on average for the EU countries. Figure 4 shows the same indicator according to each country.

Figure 4 Circular material use rate in individual EU countries

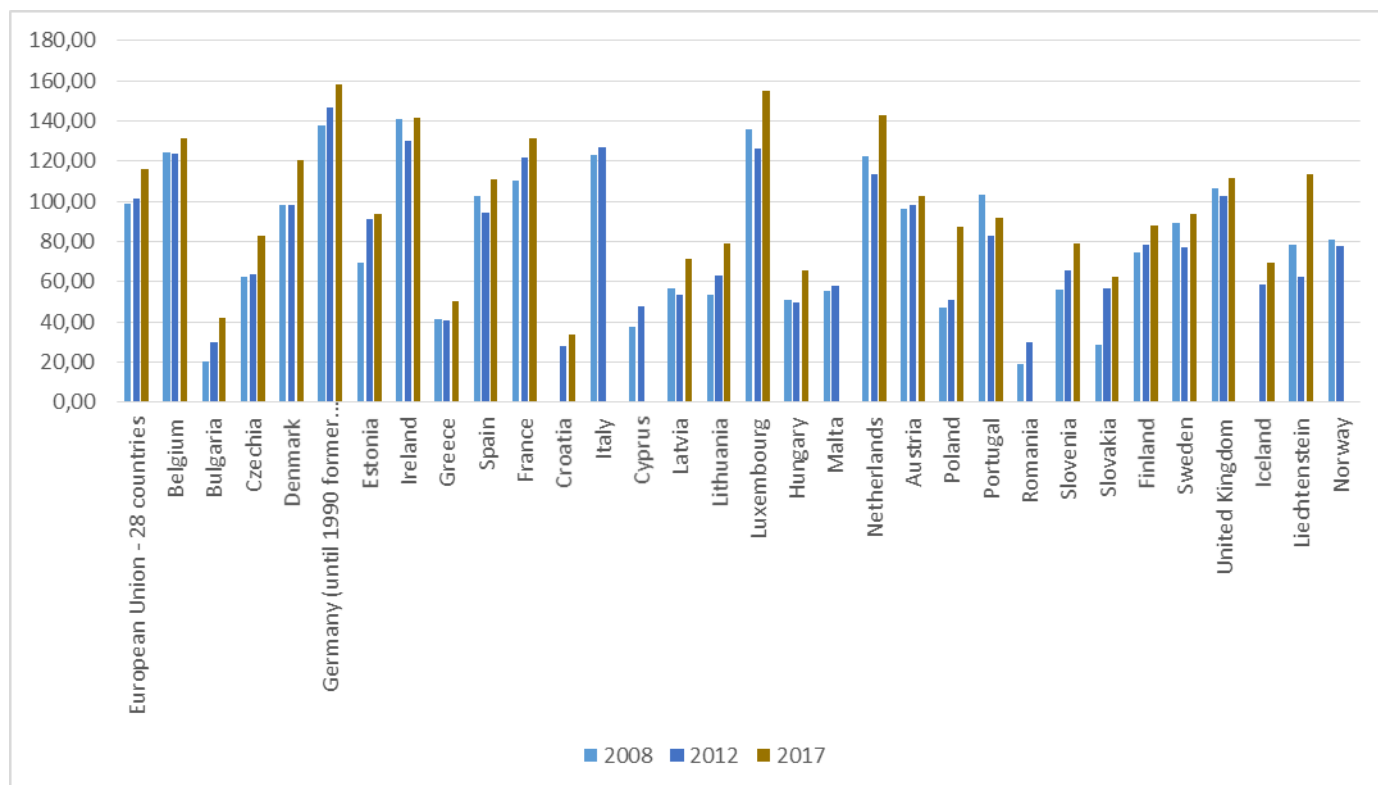


Source: Eurostat

Figure 4 implies that the highest value of this index we can find in older members of the EU like Netherlands, France, Belgium, United kingdom etc. The Czech Republic is slightly below the EU average. The lowest rate of Circular 195ateriál have Greece, Romania, even Portugal and Ireland.

Focusing on recycling (kg per capita) in particular countries (Figure 5), values are increasing in time. The highest values can be found again in Netherlands, but also in Luxembourg, Germany. The Czech Republic in 2017 is on 72% of average EU level.

Figure 5 Recycling, kg per capita



Source: Eurostat

The further focus was on analysis of wastes in the Czech republic, waste structure, its development and differentiation by structure were examined. Table 1 shows waste structure in 2002 – 2018.

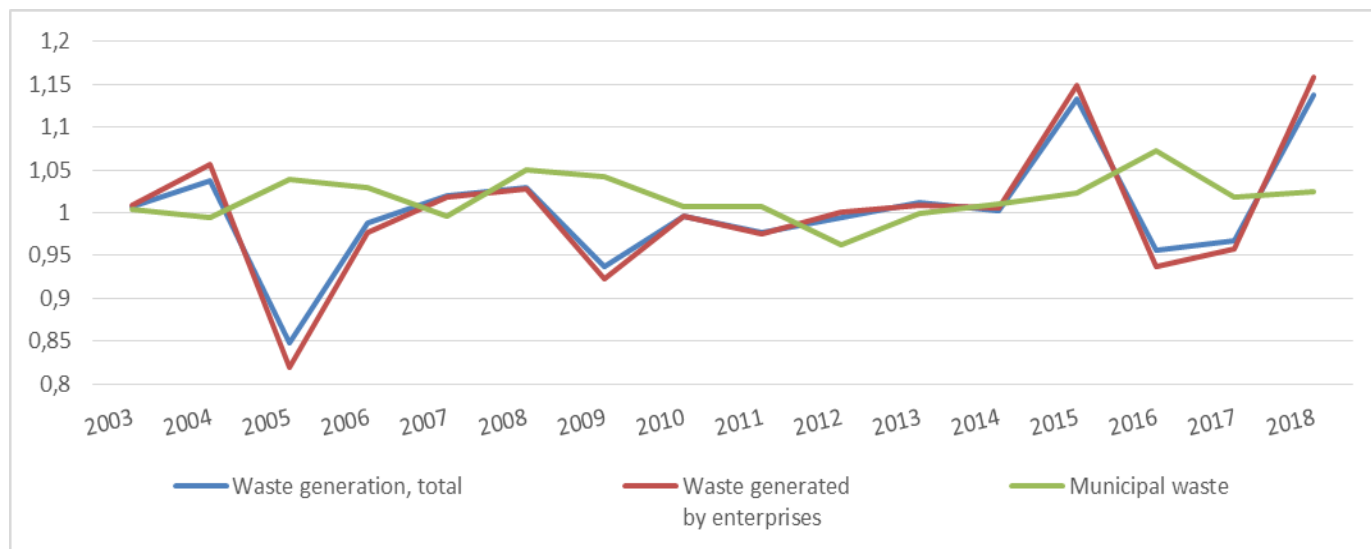
Table 1 Waste structure in Czechia

	2002	2004	2006	2008	2010	2012	2014	2016	2018
Waste generated by enterprises	88,58	90,34	86,34	85,99	84,66	85,08	85,06	84,64	85,31
Municipal waste	10,10	9,66	12,34	12,28	13,82	13,79	13,71	13,90	13,16

Source: Own calculations based on CZSO data

Table 1 implies that substantial part of waste is generated by companies (about 85%) and only about 13% belongs to the household generated waste. There are no significant changes in waste structure in time development, since 2012 it has been the same. Figure 6 shows growth rate of waste production. The largest part of the waste is generated by companies, so the development of the total amount of waste is almost identical with the development of waste generated by companies.

Figure 6 The growth rate of waste production in Czechia



Source: Own processing based on CZSO data

The biggest growth rate of waste can be seen in 2015 (about 15% annually) and 2018 (about 16%). There was an influence of the sharp growth of waste production in sewerage, waste management and remediation activities and construction (see Table 2) Municipal waste since 2014 slightly increases, which is influenced by the real economic cycle. This time period shows stable growth of economy.

Waste structure by selected economic activity was examined for more detailed analysis (Table 2).

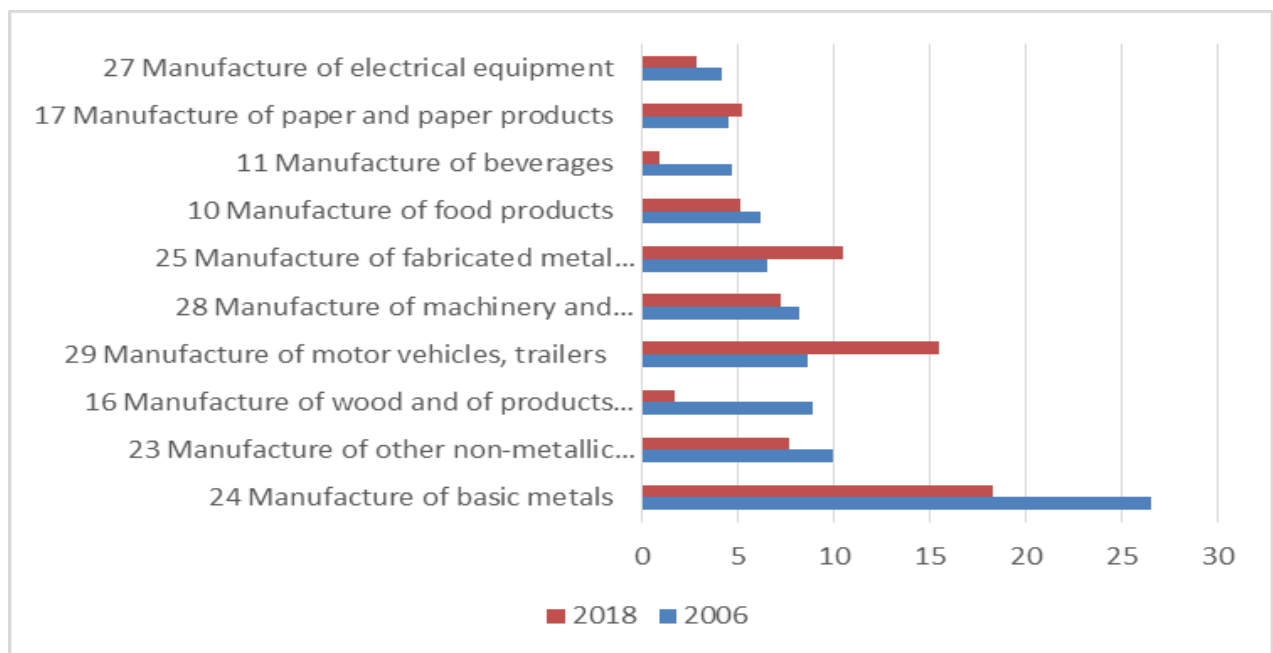
Table 2 Waste generated by enterprises: by selected economic activity

	2006	2015	2016	2017	2018
Waste generated by enterprises: by selected economic activity in thousand tonnes	21 264	23 247	21 802	20 884	24 189
of which (%):					
Agriculture, forestry and fishing	1,36	0,45	0,53	0,54	0,57
Mining and quarrying	2,22	0,82	0,66	0,46	0,34
Manufacturing	27,60	19,63	21,42	24,80	21,04
Electricity, gas, steam and air conditioning supply	9,73	5,02	4,08	3,09	2,09
Sewerage, waste management and remediation activities	7,97	15,64	16,66	17,41	17,95
Construction	42,40	48,64	46,52	43,04	47,96
Transport and storage	1,91	0,98	1,16	1,03	1,91

Source: Own processing based on CZSO data

Table 2 implies that the biggest part of waste has construction industry as expected (about 47%) and manufacturing industry (about 21%). More detailed analysis in Figure 7 implies that the biggest waste producers are manufacture of basic metal sector, manufacture of motor vehicle sector a manufacture of fabricated metal product sector. The last two mentioned increased waste production in 2018 in comparison with 2006 almost doubled.

Figure 7 Waste generated by enterprises: by selected economic activity - sector C Manufacturing (proportion)



Source: Own processing based on CZSO data

Figure 7 implies that from 2006 to 2018 there was a significant change in the share of the waste in metal processing structure, there was a decrease of ratio caused mainly by structural changes in the industry, on the other hand in automotive industry the ratio increased.

4 Conclusions

There is a focus on waste material recovery, reuse of waste, which is an important step towards the transition from waste to circular economy. Realization of mentioned approach requires mapping of the current waste flows, defining of weaknesses and threats of current state and following suggesting of proper tools, which are in accordance with the principles of sustainability and social responsibility of interested subjects, those that will eliminate restrictions and possible risks connected with current waste flow.

It means better hierarchy process of waste generation, identification and more detailed specification of strategy for particular type of waste and following characterization and evaluation of closed material cycle, possibly its degree of closeness. Smaller scale contribution could be a creation of a new tool such as an environmental stock market, structured by type of waste etc.

Creators of economy policy can gain at least some inspiration for deciding about tools and measures in the different political approaches, which will represent a real transition from the principles of circular economy to their fulfilment by practical means.

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Sharing economy and agricultural services

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Abstract: A shared economy is an economic reality and agriculture is one of many sectors that could benefit from this concept. The aim of the paper is to define the possibilities of using the shared economy in the field of agricultural services. The main area for sharing in agriculture is in the sharing of agricultural machines (agricultural services). It is an area with a high potential of unused capacities due to seasonal using of machines. Sharing services in agriculture has many advantages and some disadvantages. Overall, using of sharing economy for agricultural services is opportunity for sustainability in agriculture. The limiting factor for larger expansion will be the willingness of agricultural enterprises or farmers to use sharing economy.

Keywords: sharing economy, agriculture, services, firms.

JEL Classification: M21, Q12, Q01

1 Introduction

In the world there is a growing trend of sharing economy that is changing the traditional sectors of the economy as a concept industry 4.0. It is an economic business model based on sharing, lending or renting assets. The development and expansion of information and communication technologies has become the driving force. The sharing economy has therefore become one of the fastest growing areas of the economy. At the same time, it should be noted that the sharing economy also has its limits and drawbacks. A sharing economy is an economic reality and agriculture is one of many sectors that could benefit from this concept. The main potential in agricultural sharing lies in sharing or lending machines (agricultural services) that are not fully used by farmers. The aim of the paper is to define the possibilities of using the sharing economy in the field of agricultural services.

The world is constantly changing and with it the ways in which economic operators use their resources. The concept of sharing is not new, but an intense debate on sharing and economic cooperation has only appeared in the last few years around the concept of "sharing economy" (Cheng, 2016). This is due to the fact that although sharing has existed for a long time, digital platforms and other large-scale communication technologies do not (Sutherland & Jarrahi, 2018). Sharing economy is part of a wider complex of so-called circular economy, also known as circular economy. Sharing lies in the fact that we do not buy property, but only their services.

The sharing economy influences especially the social area in the context of neighborhood assistance (Puschmann & Alt, 2016, Dusek, 2017), the environmental area in the context of lower environmental burden (Boons & Bocken, 2018) and the economic area (Lombardi & Schwabe, 2017) in the context of utilization of free capacities, machinery and other assets with the consequent positive economic benefit in the form of higher sales and profit. The sharing economy includes unique features that allow businesses to gain a competitive advantage (Spacek & Hajek, 2017). At the same time, the sharing economy can affect the labour market which is the biggest problem in some European countries (Pavelka & Loster, 2016, Šetek & Petrách, 2016). The sharing economy is associated with the development of digital platforms (Sutherland & Jarrahi, 2018) that enable a smooth and unimpeded contact between the service provider and the customer (consumer, customer). It gives owners the opportunity to search for their product or service literally in real time. Digital platforms help reduce the cost of market transactions.

2 Methods

The aim of the paper is to define the possibilities of using the sharing economy in the area of agricultural services. The article is focused on the Czech Republic and the area of services in agriculture. In the first part, the article focuses on the sharing economy, their basic types and scope. The next part clearly defines Czech agriculture, its investment activity and efficiency of capital utilization using the indicator of capital productivity (production / gross fixed capital formation). This part is followed by an analysis of the applicability of the sharing economy in the area of agricultural

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services with a clear definition of advantages, disadvantages and potential. The source of the data was the Czech Statistical Office (National account). The observed data were from the period 2008-2018).

3 Research results

3.1 Sharing economy and enterprises

The sharing economy is a modern trend that has developed particularly in recent years and could play an important and unmistakable role in the economy over the coming years and decades. The technological boom and digitalization of the company has allowed the rise of the concept of sharing. The concept of this concept is built on the mutual sharing of goods or services between actors, and this exchange is realized through Internet platforms (Gansky, 2010). The sharing economy, as a relatively new, lively and constantly evolving concept, does not find a uniform division that could be considered as a coherent consensus. Therefore, the platforms of a sharing economy are described differently by authors, but they build on the general pillars based on the essence of sharing.

In terms of the role and involvement of the different actors approach may be ways of sharing divided into three categories (Smolka & Hienerth, 2014):

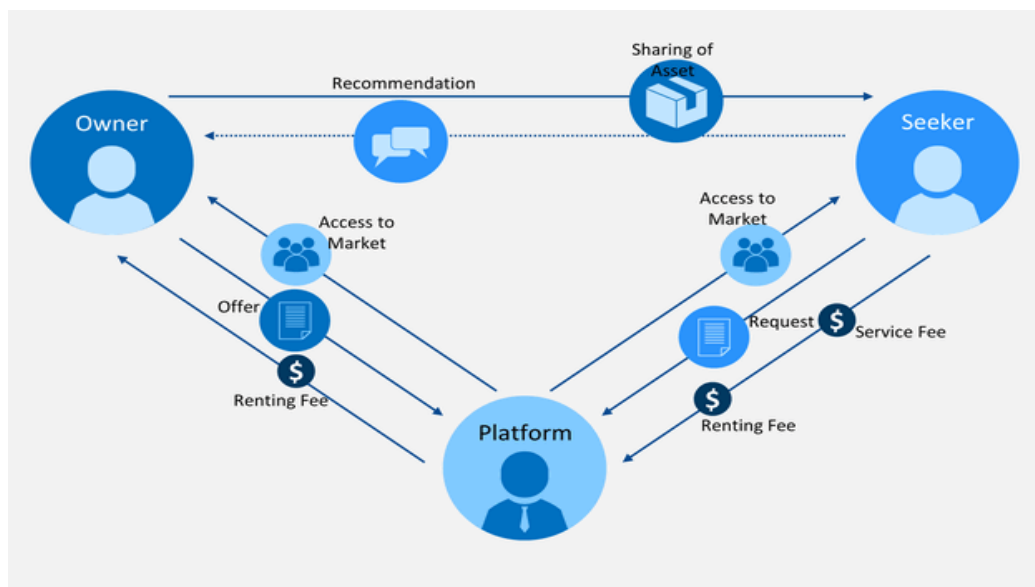
- person-to-person (P2P),
- business-to-customer (B2C),
- business-to-business (B2B).

Person-to-person (P2P) is a way of sharing when products and services are exchanged directly between individuals. This form is greatly supported by the company's technological background and digitization, which enable mutual communication and user interaction through Internet platforms or mobile applications. An example is the tourism sector (Mura & Kljucnikov, 2018), where there are already Internet platforms for sharing services (Airbnb).

Business-to-customer (B2C) characterizes the type of sharing where goods or services, or objects of exchange, are owned by a particular company. They are then leased to end-users with some added value. As with the above-mentioned model, business-to-customer relies on mobile applications and Internet interfaces through which the exchange method can be realized (Puschmann & Alt, 2016) . An example of this platform is UBER.

Business-to-business (B2B) has recently become an increasingly popular and sought-after type of sharing. B2B is the kind of sharing that takes place between two companies. This is primarily an effective way for companies to borrow unused premises, machines or equipment for consideration. Instead of purchasing goods or services, they are leased by companies to others. A very common subject of sharing in this case is the lending of unused space, areas or equipment itself (Demary, 2015) .Individual Internet platform, which acts as a kind of virtual marketplace, no work space, office equipment, etc. does not own. An example of this platform is Liquidspace.

Figure 1 Sharing economy – Business model



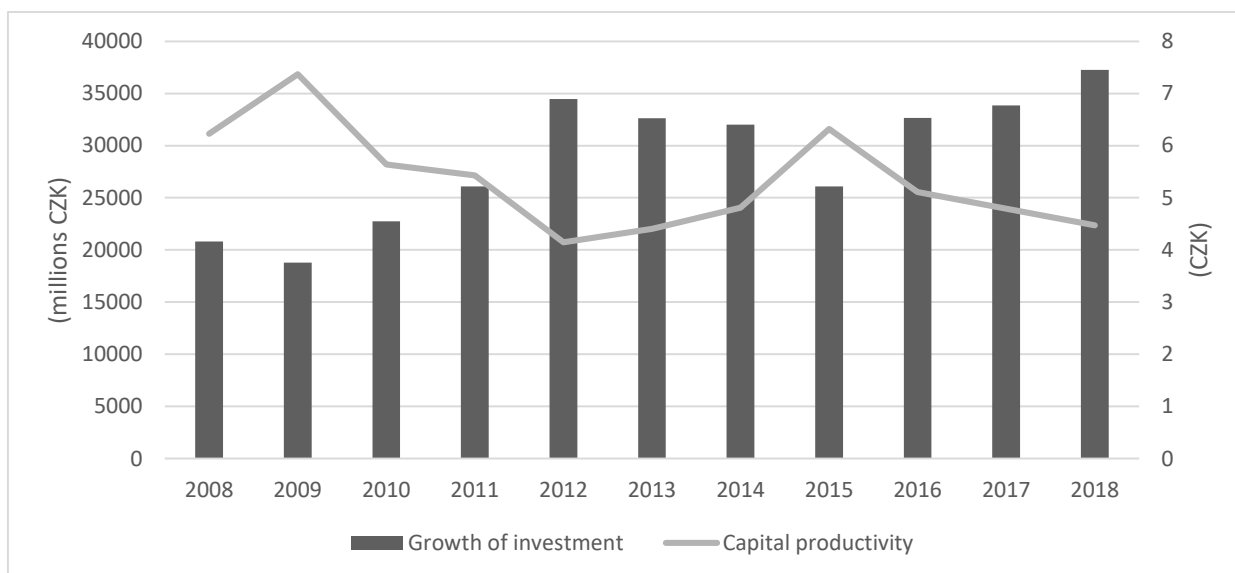
Source: <https://www.sketchbubble.com/en/presentation-sharing-economy.html>

Enterprises with sharing economy in recent years emerged as a disturbing approach to the traditional way of planning, modelling and business. This phenomenon has gained significant traction in a wide range of areas, including entrepreneurship, innovation, technology and management on a larger scale. A sharing economy promises a more sustainable world by allowing access to unused resources at a fraction of the cost. The discovery of sharing business models sheds light on a number of tensions in already "disrupted" industries due to the very insoluble nature of the challenges posed by the sharing economy (Munoz & Cohen, 2017). The traditional sectors of the economy may be on the upswing share of the economy to respond by integrating its principles into their business models.

3.2 Agriculture and sharing economy

Agriculture is one of the oldest sectors and has been the backbone of the Czech national economy for centuries. Today, agriculture has become part of a digital revolution that has automated most of its processes to better track production. Agricultural holdings therefore make significant investments. The question is whether these investments will be reflected in the efficiency of capital use. The graph 1 describes the development of investment activity of enterprises expressed by the development of the indicator of gross fixed capital formation in agriculture. From the picture we can see the growing investment activity of agricultural holdings over time. The second indicator in the graph is the development of capital productivity. The capital productivity index shows the time profile of how productively capital is used to generate value added. capital productivity (production / gross fixed capital formation). Comparing the development of both variables, it is clear that investment activity is growing, but the efficiency of capital utilization is almost the same, with an exception. From this, it can be concluded that the enterprises do not make full use of the acquired machinery or buildings and have the spare capacities they could offer on the market to other agricultural operators.

Table 1 Development of investments and capital productivity in agriculture of the Czech Republic



Source: Own processing based on data National Account

Despite the spread of economic-sharing initiatives in agri-food systems, recent what exactly sharing means from an organizational perspective. Miralles, Dentoni and Pascucci study (2017) identifies five models of sharing the economy with distinctive sharing resources and organizational mechanisms: consumer groups; commercial community gardens; as well as networked, private and publicly owned community gardens for their own consumption. These models also show considerable differences in their origin, objectives and constraints of participants, which may, to some extent, be linked to the nature of their organization. Fonte and Cucco (2017) complete another concept in creating joint cooperatives or sharing agricultural machinery. Sharing in agriculture is now primarily focused on the area of garden sharing and the use of other concepts is mostly lacking.

Agricultural enterprises, as well as companies in other sectors, are constantly struggling with global competition in prices and costs. Many farmers are looking for solutions to limit their losses. The possibility is to create digital platforms for sharing agricultural machinery and hence agricultural services. A similar concept can be found in Denmark - FarmBackup. The FarmBackup concept is an online marketplace for agricultural services. FarmBackup is an online platform for on-demand farming that optimizes the use of farm equipment by connecting supply and demand. It is an example of a modern service design that knows its target agricultural group.

What is the goal of these digital platforms in agriculture? These services are intended to help farms and individuals make better use of their resources and even to earn more. Why have a tractor or combine of the month in the garage? Hiring farmers to farmers can actually benefit their economy by reducing costs and inefficient use of resources. It is up to the owner to decide on the terms of lease. This makes machine replacement a flexible solution that does not affect regular production. It is also necessary to recall that agricultural equipment is very expensive and even in the Czech Republic it is already possible to buy a machine together with another farmer, which is supported by the Ministry of Agriculture of the Czech Republic through the Rural Development Program - Section - sharing equipment and resources in agriculture. The ministry's intention is to help small economic operators in rural areas to find joint savings to an extent that they do not achieve when operating independently. The aim of the program is to enable cooperation in the field of primary agricultural production through the joint purchase of agricultural machinery and joint cooperation of farmers in the processing and marketing of agricultural products into non-agricultural products. On the other hand, there is a requirement of 5 years of sustainability which can be a big problem for some farms.

The market for services in agriculture in the Czech Republic is not large. Agricultural services are offered by farms engaged in agricultural production or by farm-oriented farms. One possibility for increasing the use of resources (machines, buildings) in agriculture is to create a digital platform where it is possible to offer and share their machines alone or with the operator. This is because farms use their equipment only during the season, but it is unused for the rest of the time. Agricultural equipment is very expensive, and sharing can truly benefit their farm economies in higher additional sales and more efficient use of resources. In the Czech Republic, there is no web-based digital platform for sharing services in agriculture (machines, machines with operator).

Sharing services in agriculture has both advantages and disadvantages.

Key benefits of digital services sharing platform in agriculture:

- increased competition on the market supply side - impact on prices,
- economies of scale (reducing fixed unit cost),
- higher additional income for machine owners,
- better supply response to market demand,
- increasing the availability of agricultural services,
- increasing technical and information literacy of users,
- users can verify the reliability and quality of services (platforms include references and ratings),
- saving scarce resources,
- reducing transaction costs (crossings).

Main disadvantages of digital services sharing platform in agriculture:

- digital platform operators often benefit from a sharing economy,
- prices for the services provided are lower, which affects the profitability of purely service-oriented enterprises,
- the willingness and capacity of the market to adopt new technologies.

In a market where companies do not use new technologies, the use of B2B platforms is complicated and does not increase the efficiency of business operations (Grifoni et al., 2018).

4 Research results

The sharing economy is associated with the development of digital platforms that enable a smooth and unimpeded contact between the service provider and the customer. The share of the sharing economy in total economic output is constantly growing. One of the possibilities where the principle of sharing economy could be applied is the area of agriculture, specifically agricultural services. This is an area with a high potential of unused capacities, especially agricultural machinery. Grifoni et al. (2018) points out that the willingness of farmers to use new technologies and business models will be a limiting element. Using a sharing approach in the field of agricultural services promises sustainability in agriculture in the future, allowing access to unused resources. It brings a number of benefits to businesses, but it will be up to farms to choose whether to use the sharing economy concept.

Acknowledgement

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Economic Impacts of Changes and Policies in the Fields
of Finance, Accounting and Taxation

CFEBT Risk Triangle: Case Study of Enterprises in Insolvency Proceedings

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Abstract: The paper deals with the CFEBT triangle method beyond the scope of true and fair view of accounting focused on the evaluating accounting risks and frauds. The research is performed on the financial statements of 44 accounting units for 5 accounting periods which are made up of companies in financial distress and heading for bankruptcy. Calculations on the data set of 225 financial statements include the analysis of the score of CFEBT risk triangle: risk of cause and risk of occurrence causes in the condition of Czech accounting regulations (CAS) and international standards of accounting recording (IFRS). Deeper analysis is focused in case study on the CFEBT risk of impacts. The results of CFEBT risk analysis show that the risk was detected in the years 2012 and 2013 based on the evaluation of the risk of cause.

Keywords: Creative Accounting, Fraud, CFEBT Risk Triangle, Case Study, insolvency.

JEL Classification: G32, G34, M41

1 Introduction

The fight against creative accounting, reaching beyond the unambiguous true and fair presentation in accounting, has gained in importance especially after the burst of scandals of a number leading European and American companies (for example Enron, WorldCom, Tyco, Lehman Brothers) as well as a host of domestic cases. The importance of current problems related to the disruption of the concept of true and fair view of accounting is based on consequences of large scale frauds and an increasing number of cases when data are distorted in smaller companies. Although creative accounting has not had a major impact on all countries, no organization can force it with its accountants or managers, the perception of a certain lack of transparency in the disclosure of some home information consultants who resorted to unethical in behaviour (Falcon, Sanchez, & Vizcaino, 2019).

Creative accounting is probably old almost as far as accounting itself. Accounting creativity as euphemism contributes to most unfair reporting of business operations. Creativity in these practices is motivated by greed and is intended to deceive the public, potential investors and shareholders and increases the rate of business failure at a declining pace (Akpanuko, & Umoren, 2018). Creative accounting is the process of transforming accounting information from what it actually is to what the company wants it to be, using various techniques for changing accounting statements to bypass or ignore existing rules (Remenaric, Kenfelja, & Mijoc, 2018). According to Jones (2011) is creative accounting defined as excluding fraud, i.e. “using the flexibility in accounting within the regulatory framework to manage the measurement and presentation of the accounts so that they give primacy to the interests of the preparers not the users”. It means that is not illegal, working within the regulatory system. The purpose of these instruments is to achieve an accounting advantage and benefit. This means more favourable view of the underlying transactions too. The main problem here is the negative impact of creative accounting to mislead external users who read “fixed records” very often butchered. The numbers presented to investor are manipulated in order to protect managers. Using creative accounting practices, companies can change their image regarding obtained performance (Marilena, & Corina, 2012). This situation can further lead to fraud.

The border between creative accounting and fraud is very tight and flexibility of accounting serve its own interests. For this reason, it is necessary to focus primarily on the risks that both creative accounting and fraud involve. Due to such a threat, there have been drastic steps taken in order to ensure greater security and more effective fraud prevention (Cantoni, & Xiang, 2013). The Oxford Dictionary defines fraud as ‘criminal deception; the use of false representations to gain an unjust advantage.’ There are many kind of fraud which affects the organization and the two most common involve external fraud which is perpetrated by outsiders and there is also internal financial fraud which is usually perpetrated by insiders. Effective punishments are a key element of any fraud prevention. This mechanism therefore increases the legitimacy of supervision and creates a 'harsh' publicity (Wang, Ashton, & Jaafar, 2019).

According to the ‘Auditing Standards Board’, there are two kinds of misstatements that are of relevance when it comes to the auditing of financial statements and the problem of fraudulent financial reporting. The first fraudulent misstatement

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comes about as a result of fraudulent financial reporting and this involves the intentional misstatements or omissions to disclosure facts in the financial statements in order to deceive and mislead those using the financial statement. The next kind of misstatements comes about as a result of misappropriating assets, and these can include theft or even defalcation (Clarke, 2017). Increased number of credit and debit card transactions in recent years has led to a rise in frauds in financial institutions (Velayudhan, & Somasundaram, 2019). Therefore, many companies invest in a very effective IT system which is able to ensure better security (Rakes, Deane, & Paul Rees, 2012).

To uncover the methods and consequences of 'creative accounting' has therefore gained in much importance in the recent years. Detection of frauds lies in the identification of frauds that is done as fast as possible after any such fraud is committed. According to Carminati, et al. (2018) there is a raised need for effective fraud analysis systems. The main challenge in detecting bank frauds is currently inherently dynamic behavior. Fraud examination may be described as an investigation related to prevention, detection, investigation and prosecution of criminal activities of accountants and managers. Methods engaged in the detection of creative accounting are based on a detailed examination of corporate accounting records. By using individual tools and techniques, the objective of these models is to verify whether there exists a possibility of manipulation of the financial statements or other accounting records. An increase in effectiveness of internal control systems should proceed from complex relations between accounting and management of companies such that companies reduce the information asymmetry between creators and users of accounting records by setting up suitable 'anti-fraud' systems detected by them on the basis of a data analysis, by measuring the risk of accounting frauds adequately and therefore the ascertained risk may be responded to by introducing measures placed in the 'right' direction.

This paper deals with the evaluation of accounting risks and fraud. In the case study of selected enterprises that initiated the insolvency proceedings. The results of the identified risks were evaluated through the CFEFT risk triangle of accounting errors and frauds. The main objective of the paper is also identifying accounting risks and frauds in case of enterprises in insolvency proceedings using CFEFT anti-fraud approach in evaluating the quality of the information capability of accounting records for their users.

2 Methodology

The research examines the total of 44 accounting units with accounting periods 2010-2014. Accordingly, 220 financial statements were analysed in total. The database Albertina CZ Gold Edition was used as the main source of information on accounting units. For evaluation of financial health and bankruptcy, information was drawn from balance sheets and profit and account statements. Companies in financial distress and heading for bankruptcy are considered non-prospering companies. All selected companies are seated in the Czech Republic.

44 companies were classified as non-prospering - these companies meet the following conditions:

- registration in the Insolvency Register;
- insolvency proceedings were initiated against them in 2015;
- bankruptcy or reorganization was adjudicated against them in the same or the following year;
- data exist to the full extent for the 5-year period 2010-2014

With respect to the legal form, these companies especially include limited liability companies [s.r.o.] (n = 36). Joint stock companies [a.s.] are represented only marginally (n = 6); the same applies to cooperatives (n = 2). The set contains no other legal forms.

The companies are classified into various branches according to the classification CZ-NACE (Classification of Economic Activities according to the Czech Statistical Office). C. The Processing industry (n = 12), G. Wholesale and retail (n = 16) and F. Construction (n = 9) are represented to the largest extent. The other branches with a more significant representation include E. water supply (n = 2) and A. Agriculture, forestry and fishery (n = 1). The other companies operate in services (n = 4, including L. Real estate activities; N. administrative and support services; H. Transport and warehousing; M. professional, scientific services etc.).

With respect to the size of the companies, the number of employees and categories of annual turnover in 2014 were examined. In general, it may be stated that medium-size companies prevail in the set (for the number of employees and annual turnover). As regards the number of employees, companies with no more than 50 employees (n = 36) prevail, and followed by companies with 50 to 250 employees (n = 6), and only 3 companies employ more than 250 employees (n = 2). Micro companies with no more than 10 employees were removed from the set. The most numerous group by turnover is represented by companies with turnover up to CZK 60 million (n = 35). Other groups include 4 companies with turnover from CZK 60 to 200 million (n = 4) and 3 companies with turnover from CZK 200 to 500 million (n = 2). Companies with turnover above CZK 500 million (n = 3) are the least frequent companies within the set.

The CFEBT Risk Triangle is used to analysis of financial statement data. The calculation of the CFEBT score proceeds from the hypothesis that there is a tendency to head for similar results upon observance of changes of cash flow without influence of taxes and generated earnings (CFEBT) before tax for at least 5 accounting periods. The M-score include three levels to evaluate: at the first level it is an analytical test, at second level it is analysis of non-monetary expenses and revenues and at third level it is complex overview of interconnections of generated outputs of cash flow and CFEBT in operating area.

The first level of M-score of the CFEBT model is defined as follows:

$$CFEBT = \frac{\sum_{t=1}^n CF_t - \sum_{t=1}^n EBT_t}{\sum_{t=1}^n EBT_t} \cdot 100 \quad (1)$$

where:

CF total increase or decrease in cash flow before tax

t observed period of time

EBT Earnings before tax

The second level of M-score of the CFEBT model (a modified CFEBT score) complies with the established hypothesis as to the connection between the generation of cash flow and earnings:

$$CFEBTm = \frac{\sum_{t=1}^n CFm_t - \sum_{t=1}^n EBTm_t}{\sum_{t=1}^n EBTm_t} \cdot 100 \quad (2)$$

where:

CFm total increase or decrease in cash flow before tax modified by reported future cash in- and out-flows

t observed period of time

EBTm Earnings before tax modified by non-monetary expenses

The third level of M-score of the CFEBT model expresses the ratio between operating cash flow generated during the observed period and modified earnings for the observed accounting period:

$$CFEBT_{om} = \frac{\sum_{t=1}^n CF_{om_t} - \sum_{t=1}^n EBTm_t}{\sum_{t=1}^n EBTm_t} \cdot 100 \quad (3)$$

where:

CF_{om} operative cash flow before taxes

t observed period of time

EBTm earnings before taxes modified by non-monetary expenses

The risk of cause of accounting errors and frauds is further analysed by the calculation of 7 financial indicators (Return on Assets - ROA), Cash Flow Return on Assets - CFA, Return on Equity - ROE, Cash Flow Return on Equity - CFE, Expense Personnel Productivity - EPP, Financial Personal Productivity - EPP and Total Accruals to Total Assets - TATA) and 14 selected accounting items for the whole group of selected comparable accounting units. In order to test the risks of causes of accounting errors and frauds, the analysis employs individual tested elements for the observed accounting periods of the selected accounting units in the calculation of the 7 selected financial indicators and 14 accounting items and their median value, frequency of occurrence in the set, and the subsequent calculation of the deviation from the median value, standard deviation, including the proportion of the deviation and standard deviation. For more information about methodology see Drabkova (2013, 2015).

3 Research results

The case study comprises 220 financial statements of 44 selected accounting units for the years 2010-2014, which subsequently entered liquidation. The analysis scrutinizes the accounting units that entered insolvency proceedings after the end of the observed five-year period. The financial statements also undergo a risk analysis in two vertices of the CFEBT risk triangle of accounting errors and frauds, when a risk of manipulation with financial statements is examined. It is the risk of financial statements that may be to blame for erroneous interpretation of financial statements during the observed five-year period, when decision-makers made their decisions based on the reported accounting data.

3.1 CFEBT risk TRIANGLE of Accounting Errors and Frauds: Risk of Causes of Occurrence (Case Study)

Table 1 analyses risks of occurrence (motivation) of accounting errors and frauds for the whole set of 44 accounting units and 7 selected financial indicators in the individual observed accounting periods of 2010-2014. The risk items are evaluated by determining an ideal representative of the analysed group (through the median value of the set) and the proportion of a deviation and standard deviation from this identified representative. The selection of financial indicators tallies with the original hypothesis - which is to be verified - of the relation between the creation of cash flow and earnings less taxes, but including the accrual indicator TATA.

Table 1 CFEBT risk triangle - risk of causes of occurrence for 2010-2014

Indicator	ROA	CFA	ROE	CFE	EPP	FPP	TATA
Number of risks (accounting period)	8	7	11	10	6	8	7
Proportion of risk items of the set (acc. Period) in %	3.85	3.37	5.29	4.81	2.88	3.85	3.37
Number of companies with risk	6	5	9	8	4	7	5
Proportion of companies with risk in %	13.64	11.36	20.45	18.18	9.09	15.91	11.36

Source: Own processing

The highest number of risk items was detected for the calculation of profitability of the equity capital, based on cash flow - for 10 accounting periods in total, and earnings for 11 accounting periods. Table 2 presents results of the detected risk items for 14 selected accounting items. Similarly, an ideal representative was sought within the set based on the determination of the median value of the set and significant deviations from these values. The highest number of risk items was detected for fixed and current assets and short-term payables.

Table 2 CFEBT risk triangle - risk of causes of occurrence for 14 accounting items for 2010-2014

Accounting items	Accounting period		Companies	
	Number of risks	Proportion of risk items of the set in %	Number of companies with risk	Proportion of companies with risk in %
Total assets	1	0.48	1	2.20
Fixed assets	2	0.96	2	4.40
Current assets	4	1.92	3	8.80
Temporary assets	4	1.92	4	8.80
Equity capital	1	0.48	1	2.20
Liabilities	1	0.48	1	2.20
Temporary liabilities	4	1.92	3	8.80
Proceeds from sale of goods	0	0.00	0	0.00
Proceeds from consumption	0	0.00	0	0.00
Production consumption	3	1.44	3	6.60
Personnel expenses	1	0.48	1	2.20
Net book value of disposed fixed assets and materials sold	1	0.48	1	2.20
Change in reserves, adjustments	2	0.96	2	4.40
Income tax for ordinary income	3	1.44	3	6.60

Source: Own processing

3.2 CFEBT risk TRIANGLE of Accounting Errors and Frauds: Risk of Impacts (Case Study)

Next, CFEBT risk area of impact of accounting errors and frauds is detected (table 3), where the individual CFEBT scores are calculated in order to detect the level of discrepancy between the creation of cash flow and earnings in the observed periods of the years 2010 – 2014 for the individual companies. Determination of risks R comprises: % of discrepancy value for the individual levels of the CFEBT score, whereas the deviation can be positive (+) or negative (-). On the third level, a negative value of M-score constitutes the proportion value of the discrepancy affecting the financial and investment areas, and a positive value of M-score represents a percentage proportion of discrepancy falling within the given company's operating activities.

Table 3 CFEBT risk triangle - risk of impact of CFEBT score for 2010-2014

M-Score Level	CFEBT*		CFEBTm**		CFEBTmo***	
Type of risk	R-	R+	R-	R+	R-	R+

Discrepancy	>-50%	>50%	>-10%	>10%	>-30%	>30%
Number of companies	40	3	27	14	5	7
Number of companies (%)	90.91	6.82	61.36	31.82	11.36	15.91

Source: Own processing

Notes: *: R- for 1st level CFEBT score > -50; R+: for 1st level CFEBT score > +50; ** R1- for 2nd level CFEBTm score > -10 ; R1+ for 2nd level CFEBTm score > 10 ; ***: R1- for 3rd level CFEBTmo score > -30 ; R1+ for 3rd level CFEBTmo score > 30.

Table 3 implies that it was ascertained for the first level of the CFEBT score that the total of 43 companies show a discrepancy between the creation of earnings and cash flow exceeding 50% for the period 2010-2014. The second level of modified M-score compares the creation of earnings and cash flow in terms of the economic substance of transactions reported for the observed period 2010-2014. For 41 companies, a discrepancy was found between earnings and the creation of cash flow exceeding 10% for the economic substance. The third level of the CFEBT score determines how the detected discrepancy between earnings and cash flow affects operating or financial and investment activities. In total, a risk of negative discrepancy exceeding 30% was detected for 5 companies in the financial and investment areas, and in addition, a positive discrepancy between cash flow in the operating area and modified earnings on the level of economic substance with an impact exceeding 30% was identified for 7 companies.

3.3 Discussion

The present paper performed a risk analysis of manipulation of accounting records beyond the scope of true and fair view of accounting. The risk analysis detected risks using the CFEBT risk triangle of accounting errors and frauds and the causes and impacts thereof from the perspective of users of accounting records for a selected group of accounting units. The risk analysis of causes and impacts of accounting errors and frauds in the selected accounting units detected a risk of manipulation of accounting statements in the area of stock the increase in which was not accompanied by the economic substance of the given transaction, i.e. generation of profit.

The detection of risks of accounting errors and frauds constitutes a theme that bears a particular importance to auditors. External auditors conduct a set of individual tests of a true and fair view of economic processes in financial statements. At the same time, users of financial statements rely on auditors, believing that the latter are able to detect accounting risks. Despite of that, auditors will often fail when detecting such risks, especially for the reason of restriction of auditing procedures and increasingly sophisticated fraud schemes (Ruankaew, 2016). According to current research, auditors will unveil only 3.8% of 2,410 cases investigated by CFEs (ACFE, 2016). Interesting study of Chinese CFOs show that companies with female managers are significantly less likely to engage in accounting fraud (Liao, Smith, & Liu, 2019). This poses an area for future work.

Prediction models for identifying accounting fraud and risks included many different qualitative characteristics of fraud companies not only quantitative variables. Song, Oshiro, & Shuto (2016) presented through univariate analysis main variables useful for detecting accounting fraud which are: accrual quality, activities manipulation, conservatism, and market incentives. These variables could be considered when auditors making decisions about creativity or fraudness. Similarly, Ababneh, & Aga (2019) found that political connections and quality of financial and accounting information reporting influence level of creative accounting and decision-making effectiveness.

These facts support the need for complex solutions in form of a testing system of mutual relations between accounting data over a longer period of time. The approach of the CFEBT risk triangle is complex and views the risk of financial statements subject to the development of the economic substance of data reported in financial statements.

4 Conclusions

This contribution presents results of long-term research into detection and assessment of the risk of manipulation of accounting beyond the true and fair view of accounting, or, as the case may be, the risk of accounting errors and frauds by applying techniques of creative accounting in order to manipulate significant accounting information. Deeper analysis in case study is focused on the anti-fraud triangle of accounting errors and frauds. The results of the CFEBT risk triangle detected risk in selected accounting units. The results of deeper financial analysis confirmed the risk identified on the CFEBT risk triangle.

The proposed anti-fraud system, which proceeds from a triangle of risk of accounting errors and frauds, remains a subject of further research and is to be tested using data of selected accounting units, as regards the size, prevailing scope of business and risk-rate under the conditions of CAS and IFRS, such that this system may be used as a tool of risk detection of financial statements for as broad a group of users as possible. Thanks to this anti-fraud system, the process of risk management in enterprises can be tangible and highlight some of the problematic methods of creative accounting.

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Current State of Euroization in non-EMU Countries

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Abstract: The European Union is in a state of incomplete economic and monetary union. Monetary integration seems to be stagnating. However, closer dates for possible access to the EMU by EU countries still using the national currency (non-EMU countries) are mentioned by Bulgaria (2022), doubtfully Croatia (2023?) and Romania (2024?). The population of non-EMU countries, except for Romania, is not particularly inclined to adopt the euro.

This article focuses on the characteristics of supporting the introduction of the euro in non-EMU countries. The aim of the article was to describe possible links between support for the introduction of the euro and selected variables. Literary review focuses on the topic of euroization. In the analytical part, the links between the survey on support for the introduction of the euro in countries that are supposed to adopt the euro, inflation, the exchange rate are put into context.

Although no statistical significance was revealed among variables, research findings disclose 3 categories of economies outside EMU, which are characterized by some support for the introduction of the euro and the quality of national currencies. Two of the three categories are essentially euro-based economies that, due to their exchange rate regime, appear in the "gray" Eurozone with the "illusion" of their own currency. Prudent communication of this situation can be used by policymakers for potential intensification of euroization as well as deeuroization. Especially for international trade, which is intense between non-EMU and EMU economies, transparent communication is a welcome element to mitigate exchange rate risk.

Keywords: currency, euroization, monetary union, exchange rate, public opinion.

JEL Classification: F15, F31

1 Introduction

The European Union is in a state of incomplete economic and monetary union. Since 2015 when Lithuania accessed to the European Monetary Union (EMU/Eurozone) there have been nine, respectively due to Brexit eight EU members that are out of the EMU (non-EMU countries). One of these eight countries – Denmark – has the right to remain outside the euro area (opt-out). According to Maastricht treaty the rest (i.e. seven countries) shall adopt the euro as soon as Maastricht criteria are met. However, there are in fact some ways how to postpone this obligation as long as possible. One of them showed Sweden. In 2003 56.1 % of Swedes refused euro adoption in a referendum (Cowell, 2003, September 15). European Commission or any other legal body of the EU can hardly publicly criticize Sweden for this act because euro's PR would be seriously hurt. And if a currency shall be "good money", trust of acceptance is much needed. Another way how to delay euro adoption is simply not to enter ERM II (and this hesitation could be explained by the lack of support from the population).

With a very slowly decreasing number of EU economies staying out of the Eurozone and with a stagnating political will to adopt euro (especially in the Czech Republic) the theme of euroization is rather disappearing from academic research. Naturally, authors from Balkan countries, in which this topic is more current, are an exception (see e.g. Bošnjak, (2018) who deals with financial euroization in Croatia or Savić (2019) who summarizes assumed benefits of euro adoption in Croatia in relation to entering ERM II in 2020). That is why the aim of this paper is to describe a current state of euroization in all non-EMU countries from the perspective of different variables as well as to refresh and update older approaches on new data.

2 Euroization

When a country switches from its national currency to another foreign currency this phenomenon is called euroization. According to a foreign currency that replaces domestic one you can also come across dollarization, yenization, etc. In this article the term "euroization" is preferred because of thematic focus on the Eurozone. A theory that seeks to identify if this phenomenon may have more benefits than costs is Mundell's theory of "Optimum Currency Area".

And why euroization happens? As Horníková, Hurník and Kotlán (2005) state, currency has to fulfill the necessary basic functions of money – medium of exchange and store of value. If these two functions are violated (i.e. inflation is

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high; currency does not circulate due to loss of confidence), euroization may occur. There are basically two forms of euroization (Horníková, Hurník, & Kotlán, 2005). The first one is spontaneous, uncontrolled or unofficial. A government may then fight against euroization e.g. by structural reforms in order to deeuroize its country (recent example of this attitude was Croatia). Or the unofficial euroization may turn to the official one. In such case a country seeks to adopt foreign currency de jure.

Euroization in the form of the EMU is definitely euroization de jure. The Eurozone and a national economy strive to achieve benefits that are contained in the theory of Optimum Currency Area. However, while in the case of unofficial euroization the benefits of using a foreign currency are quite clear, in the case of a well-functioning currency, quantifying the benefits and costs is not a simple discipline. Komárek, Čech and Horváth (2003) employed “standard” OCA criteria in order to work out cost-benefit analysis (ratio) for the Czech Republic. Their results showed that costs connected to the euro adoption would be relatively low because according to their computations Czech economy is not structurally different. The transition itself can then be done in several ways. EMU creators applied the sudden death procedure (see Mundell, 2002).

Now it is possible to specify the research aim from the Introduction more in detail. This article is especially focused on possible unofficial euroization. An outcome of an opinion poll (see 3.1 below) is taken as a sign of euroization. It can be said that it is a soft indicator of this phenomenon. Conversely, e.g. the level of deposits or loans as well as the number of banking transactions, whether of households or enterprises, could be considered as hard indicators. In fact, Hobolt and Leblond (2009), who studied referendums in Denmark and Sweden, argue: “...exchange rate fluctuations matter, because people attach symbolic value to their national currency and are less likely to surrender a strong currency. They are also less willing to accept the euro when it is seen as weak vis-à-vis other world currencies. Our case-study and time-series analyses of the two euro campaigns corroborate these propositions.” In addition, Horníková, Hurník and Kotlán (2005) studied “hard” degree of euroization in the Czech Republic. This degree was measured as a ratio of the demand euro deposits over the demand deposits in the domestic currency and the euro. The results showed that based on their then data (years 2001-2003) the level of euroization was rather insignificant at quite stable 4% level (cf. 150% in Croatia). Horníková, Hurník and Kotlán (2005) also pointed out that the degree of euroization varies across the economy. Leaders of euroization are businesses involved in international trade.

2.1 Current State of Preparation for Euro Adoption in non-EMU Countries

In the Introduction there was mentioned that there are nine EU members staying out of the Eurozone to the year 2019. However, Great Britain is leaving the EU and that is why only eight countries and their future plans regarding the euro adoption are presented below (in alphabetical order; exchange rate arrangements were taken from the Annual Report on Exchange Rate Arrangements and Exchange Restrictions 2018 (IMF, 2019) and are therefore valid for 2018):

- Bulgaria entered the EU in 2007 and that is why Bulgaria shall adopt the euro as its official currency once the Maastricht criteria are met. According to Reuters (2019, June 26) Bulgaria hopes to enter ERM II by the end of the year 2019. Its currency – lev – has already been pegged to the euro. Bulgarian public finances are considered as healthy. However, in comparison to the rest of the EU countries, this country is one of the poorest and most corrupted.
- Croatia is the EU member state since 2013. This economy historically belongs to one of the most unofficially euroized European countries. Croatian government as well as Croatian National Bank have made efforts in order to deeuroize. But the question of euroization is likely to become redundant soon, because Croatia plans to enter ERM II in 2019 or 2020 and finally adopt euro in 2023 (Reuters, 2019, July 8). Exchange rate arrangement of Croatian currency – kuna – was classified by the IMF as a stabilized arrangement to the euro.
- Czech Republic is not currently operating with a closer date for EMU accession. Major political parties do not have the adoption of the euro as a topical issue. Exchange rate arrangement of Czech koruna is floating (since 04/2017 when CNB stopped interventions against koruna).
- Denmark has an opt-out from joining to the Eurozone. However, Danish exchange rate arrangement of its krone is a conventional peg, precisely ERM II (Denmark is participating in ERM II ever since ERM II has been introduced) (Danmarks Nationalbank, 2019). In 2000 Denmark confirmed its opt-out status when the Danes rejected to join the single currency in the referendum (Hobolt & Leblond, 2009, p. 203). Currently, adopting the euro seems to be out of topic even, paradoxically, Denmark has long been meeting the Maastricht criteria.
- Hungary is not currently operating with a closer date for EMU accession. Hungarian policymakers are hesitating whether to join the Eurozone. According to the governor of the Hungarian central bank, Hungary will adopt the euro in the coming decades (Sarnyai, 2019, February 7). Hungarian forint exchange rate arrangement is classified as floating.

- Poland is not currently operating with a closer date for EMU accession. Poland ruling party (Law and Justice – PiS) has no immediate intention to join the Eurozone. For the time being, politicians have argued Poland's low economic performance relative to Western countries (Shah, 2019, April 17). IMF classified exchange rate arrangement of Polish zloty as free floating.
- Romania belongs to one of the countries that publicly present its intentions to adopt the euro. The government proclaims that the country will adopt the euro by 2024. However, the years 2025 or 2026 seem more realistic (Romania Insider, 2019, February 4). Romania is not yet very successful in meeting the Maastricht criteria (Romania Insider, 2019, January 31). Romania does not make an effort to tie its currency to the euro. Its exchange rate arrangement is classified as floating.
- Sweden is not currently operating with a closer date for EMU accession. In fact, Sweden refused euro adoption in 2003 in the referendum despite Sweden obliged to adopt the euro in its Treaty of Accession that is subject to the Maastricht Treaty. Since then, the question of adopting the euro has not been so intense. Although sometimes new debate occurs. As Lindeberg and Billner (2019, March 03) from Bloomberg point out, since 2014 Sweden's krona is getting weaker and weaker the local central bank – Riskbank – is coming under pressure from euro supporters (in this case ex-prime minister of Sweden Goran Persson who ran Sweden from 1996 to 2006).

To sum it up, only one of eight countries nowadays practice its exchange rate arrangement classified as ERM II. Paradoxically, this is Denmark, which has negotiated an opt-out. Only three countries (Bulgaria, Croatia and Romania) announced closer dates of euro adoption. Two of these three countries practice more or less pegged their currency to the euro (Bulgaria – currency board; Croatia – stable arrangement) and that is why these two countries in fact live in a “grey Eurozone” (in fact, as well as Denmark does) with the feeling of own currency. And this is almost one monetary union option that Mundell admits (Mundell, 2002). In the remaining four countries (Czech Republic, Hungary, Poland and Sweden) there is clearly no momentum for the introduction of the single currency. Therefore, an opinion "do not fix what is not broken" appears.

3 Methods and Data

As it was mentioned above one may believe that an opinion poll testing attitude to euro adoption may be a sign of a soft indicator of euroization. That is why Eurobarometer's opinion polls from the countries yet to adopt the euro are introduced in one of the following subchapters. At the same time, the "in favor to adopt" view will be treated as a dependent variable.

The rest below presented variables (exchange rate, inflation) that should express currency quality will be considered as independent variables.

As regards statistical analysis, when looking at variables, the results must be confronted with the pitfalls of time series analysis. For example, simply selecting the start of a time series can affect the result.

3.1 Opinion Polls in non-EMU Countries

Every year Flash Eurobarometer is carried out for the needs of the European Commission. Among other things, i.e. general awareness of the euro, it measures opinion poll in the countries that are according to Maastricht treaty obliged to adopt the common currency (that is why Denmark is missing in this poll). Table 1 below presents specific values of votes for the euro adoption in given countries as well as a brief look at the 5-year trend.

One can see from Table 1 that the country whose population inclines to the euro for the whole period the most is Romania (above 60% in the whole period with a peak in 2014; 74% support is even the highest measured value for all countries). However, as shown by slope of a trend which is -0.9, the support is slightly decreasing. In fact, the current biggest supporter of the euro adoption is the population of Hungary (66%).

On the other side of the “popularity ranking” stand the Czech Republic and Sweden. While there is lukewarm support without significant fluctuations in Sweden, the situation in the Czech Republic is quite different. From the minimum of 12% support in 2012 (which is the lowest measured value for all countries in the whole period at all), the current values approach nearly to 40%. Also, the positive slope of the trend is the highest in the case of the Czech Republic (+2.4).

To sum it up, the data from Table 1 shows that only in two countries – Romania and Hungary – the majority is in favor of adopting the euro. Paradoxically, however, the political representation of Hungary does not seek early adoption of the euro (see above). The results in countries that are planning to adopt the euro in the foreseeable future (Croatia and Bulgaria) are just against the euro adoption now. And finally, the political representation in the remaining countries rather respects the attitudes of its population and therefore a closer date of the euro adoption has not been set yet.

Table 1 Opinion Polls in Member States Yet to Adopt the Euro (support for euro in %)

Country / year	2011	2012	2013	2014	2015	2016	2017	2018	2019	5Y Trend (slope)
Bulgaria	56	53	52	51	55	47	50	51	47	slightly decreasing (-1.2)
Croatia*	-	-	-	55	53	48	52	47	49	slightly decreasing (-0.9)
Czech Rep.	<u>13</u>	<u>12</u>	<u>13</u>	<u>15</u>	<u>29</u>	<u>29</u>	<u>29</u>	<u>33</u>	<u>39</u>	growing (+2.4)
Hungary	54	58	54	64	60	57	57	59	<u>66</u>	growing (+1.4)
Latvia**	45	46	42	-	-	-	-	-	-	-
Lithuania***	44	44	41	46	-	-	-	-	-	-
Poland	45	44	38	45	44	41	43	48	46	slightly growing (+1.1)
Romania	<u>63</u>	<u>64</u>	<u>67</u>	<u>74</u>	<u>68</u>	<u>64</u>	<u>64</u>	<u>69</u>	<u>61</u>	slightly decreasing (-0.9)
Sweden	NA	NA	NA	NA	32	30	35	40	<u>36</u>	growing (+1.8)
NMS total	48	47	45	52	49	45	47	51	49	slightly growing (+0.6)

Source: Own processing based on the data from Eurobarometer (https://ec.europa.eu/info/about-european-commission/euro/public-opinion-euro_en)

Notes: The figures presented in the table are a sum of the answers „very much in favour“ and „rather in favour“ of introducing the euro. Extreme values in the whole period as well as in the last year of observations are underlined. As Eurobarometer states, the data were collected for the fourth month of the year.

*member state of the EU since 07/2013. **member state of the EMU since 01/2014. ***member state of the EMU since 01/2015.

3.2 Non-EMU Countries and Their Foreign Exchange (NC/EUR)

The required data presenting the development of non-EMU currency exchange rates were obtained from the Eurostat database. Specifically, the data present average value of a given exchange rate for one-year period. On one hand, the advantage of average is that it somehow captures changes throughout a year. On the other hand, the average is unable to reflect the short-term trend of the exchange rate before the forthcoming survey.

Regarding the analyzed countries and the development of their exchange rates in relation to the euro, the following findings may be presented (the monitored period corresponds to the range in Table 1, respectively precedes by 1 year; i.e. 2010-2018):

- Three countries have their currency fixed to euro. Bulgaria has the hardest peg – currency board – and that is why there are no exchange rate changes. Denmark stays in ERM II and there were only minor fluctuations in the past 10 years (DKK/EUR min 7.438 and max 7.457). And finally, Croatian exchange rate arrangement is classified as stabilized arrangement and this is also reflected in minimal exchange rate fluctuations (HRK/EUR min. 7.28, max. 7.63).
- Currencies of two countries (Romania and Sweden) are experiencing a weakening trend since 2013.
- Polish zloty is rather stable.
- Czech koruna strengthens slightly.

3.3 Inflation in the Non-EMU Countries

While above mentioned exchange rate represents outer currency quality, inflation represents inner quality. As well as the data about exchange rates, data presenting annual inflation was obtained from the Eurostat database. The monitored period is years from 2010 to 2018, i.e. there is 1-year shift compared to Table 1 (see Model Design below).

Looking at the complete data, it can be stated that there are no significant differences among the monitored countries. Since 2013, with the exception of Romania, it has practically not been possible to observe a difference in the size of inflation exceeding 2 percentage points. At the same time, these values do not deviate significantly from the ECB's target.

The above mentioned do not indicate that the level of recent/current inflation will be an excessive motivator for the possible adoption of the euro. However, when looking deeper into the past, in 1990s Romania, Poland, Croatia, and Bulgaria experienced quite high levels of inflation (200% and more; according to the data from the World Bank – World Development Indicators) and these historical events may still influence general opinion of the local population. More precisely, Poland fought inflation the fastest and most successfully, and therefore, from this point of view an assumption of inflation for the potential adoption of the euro may not be as strong. Someone may point out that the same three countries (Romania, Croatia, and Bulgaria) are the only countries with the closest plan for euro adoption (see subchapter 3.2). At the same time, countries with long-term low inflation are not too much of a fan of euro adoption (see Table 1).

3.4 Model Design

In this subchapter, a possible relationship between the dependent variable and the independent variables is proposed. Based on the above presented variables the following formula has been designed:

$$Y_t = \alpha + \beta_1 Y_{t-1} + \beta_2 ER_{t-1; NC/EUR} + \beta_3 inf_{t-1} + \varepsilon_t, \quad (1)$$

where α means that there always be a certain number of people for euro adoption; Y_{t-1} expresses that current level of population for euro adoption (Y_t) depends on the previous support in time $t-1$; $ER_{NC/EUR}$ represents the exchange rate of a national currency to euro; inf is inflation that represents currency quality. Time t means that if an opinion poll takes places in 2019, this poll might be influenced by the latest year-round statistics – in this case statistics for the year 2018.

It is more than likely that the proposed model could be refined by adding additional variables. For example, Hobolt and Leblond (2009, p. 2015) include four additional variables. The first one is what they call “the misery index” – the sum of unemployment and inflation rates is employed in order to capture the overall mood in the society. The second one captures attractiveness of the euro against the American dollar – FX USD/EUR. The third one is “consumer confidence index” that shall serve as a measure of consumers’ feelings about current and future condition of their economy. And the last one, which is used by Hobolt and Leblond (2009), shall express public support for the government.

From my point of view, the formula 1 that is presented in this article is indeed simplified compared to Hobolt and Leblond’s one. On one hand, adding more variables would definitely provide new information; especially a variable that would represent a kind of political as well as economic mood in the society would be useful. On the other hand, the variables that are employed in the formula 1 are directly linked to the quality of the currency (inflation reflects perceived internal quality, while FX rate external). And therefore, from my point of view, this simplification is justifiable.

Following relationships between dependent variable and independent variables are expected:

- First, the higher the inflation the higher support for euro.
- Second, the stronger national currency in relation to euro the weaker support for euro.

4 Research Results and Discussion

In order to analyze the data, multiple regression analysis was applied. The results of the analysis that should have revealed a potential relationship among inflation (inner quality of a currency), the exchange rate (outer quality) and opinion polls are shown in Table 2 below.

First, it was impossible to conduct the analysis for two countries – Denmark and Sweden. In case of Denmark, as it was mentioned in 3.1, Eurobarometer does not collect information on the Danish opinion of the euro. Regarding Sweden, the lack of input data was an obstacle for the multiple regression analysis.

Table 2 Theoretical models for non-EMU countries

Country	Model (R ² ; p-value)	Intercept (p-value)	β_1 (p-value)	β_2 (p-value)	β_3 (p-value)
Bulgaria	Poll = 48.556 + 0.043*poll _{t-1} – 0.042*infl _{t-1} (0.002; 0.996)	48.556 (0.106)	0.043 (0.932)	NA ^a	-0.042 (0.955)
Croatia	Poll = -292.384 – 0.887*poll _{t-1} + 51.333 ER _{t-1} + 1.701*infl _{t-1} (0.472; 0.836)	-292.384 (0.683)	-0.887 (0.652)	51,333 (0.637)	1.701 (0.798)
Czech Republic	Poll = -101.952 + 0.854*poll _{t-1} + 4.038 ER _{t-1} + 1.623*infl _{t-1} (0.835; 0.048)	-101.952 (0.360)	0.854 (0.026)	4.038 (0.331)	1.623 (0.645)
Denmark^b	–	–	–	–	–
Hungary	Poll = 29.135 – 0.477*poll _{t-1} + 0.191 ER _{t-1} + 0.051*infl _{t-1} (0.277; 0.697)	29.135 (0.606)	-0.477 (0.484)	0.191 (0.338)	0.051 (0.964)
Poland	Poll = 3.984 + 0.055*poll _{t-1} + 4.038 ER _{t-1} + 1.623*infl _{t-1} (0.066; 0.960)	3.984 (0.971)	0.055 (0.920)	8.872 (0.721)	-0.150 (0.888)
Romania	Poll = 93.346 + 0.100*poll _{t-1} – 7.482 ER _{t-1} – 0.114*infl _{t-1} (0.45; 0.977)	93.346 (0.312)	0.100 (0.864)	-7.482 (0.694)	-0.114 (0.904)
Sweden^c	–	–	–	–	–

Source: Own processing

Notes: ^a Exchange rate BGN/EUR is fixed (independent variable is constant) that is why inclusion of this variable is irrelevant.

^b Opinion poll data are not available (Eurobarometer does not collect public opinion data due to Danish opt-out). ^c Number of inputs is insufficient and therefore the analysis cannot be done.

Further, there are five countries (Bulgaria, Croatia, Hungary, Poland, and Romania) for which is the supposed model statistically insignificant (p -value > 0.05). And therefore, the relationship between inflation, the exchange rate and opinion poll cannot be inferred. At least not based on this test and data.

And finally, in case of the Czech Republic the whole model seems to be statistically significant (p -value < 0.05) with high R^2 (0.835). However, intercept and coefficients β_2 and β_3 are statistically insignificant. It means that the development of the opinion poll, in fact, depends on the value of the previous one. Hobolt and Leblond (2009, p. 221) also expected and tested such a possible phenomenon in their analysis in Swedish and Danish environment.

In conclusion, contemporary data and the test applied do not suggest that the outcome of public opinion is influenced by the two variables chosen, which should represent the quality of the national currency. It would therefore be appropriate to include other variables to explain the support for the introduction of the euro.

One of the limiting factors of this study is as follows. Possible disadvantage of the selected data, on which the results presented above are based, is that the values of independent variables are several months apart from the opinion poll. On one hand, this approach has also been used in older researches (see e.g. Banducci, Karp, & Loedel, 2003). On the other hand, as Hobolt and Leblond (2009, p. 206) point out, this approach can hardly capture short-time dynamics that are typical for referendums.

5 Conclusions

Although there are officially eight EU countries out of the European Monetary Union some of them thanks to their exchange arrangement live in fact in a “shadow Eurozone”. According to IMF survey (IMF, 2019), Denmark practices conventional peg (actually ERM II), Bulgaria currency board (one of the hardest pegs) and Croatia stabilized arrangement. As IMF (2019, p. 5) states it is usual that when a country with one of the fixed arrangements undergoes large structural changes it results in an exit from such a regime. In the case of the three above mentioned economies, it would be quite natural if they join the Eurozone or in the case of Denmark at least stay within ERM II. Paradoxically, Croatia has tried through structural reforms to deeuroize, in order to eventually euroize. However, Sweden showed that if there is a lack of political will and the public is not inclined to adopt the common currency, there is a way how to avoid or at least postpone euro adoption (see Hobolt & Leblond, 2009 or Miles, 2004).

Regarding the main goal stated in this article, conducted analysis did not reveal statistically significant relationship between opinion polls (dependent variable that is taken in this research as a sign of soft euroization), inflation and exchange rate (independent variables; these variables shall express an inner and outer quality of a national currency). This can probably be explained by quite stable exchange rates of national currencies in relation to the euro and by stable and low inflation which is anyway close to the aim of the European Central Bank. However, it is possible to point out that three countries that openly present their intention to join the Eurozone in the near future (Croatia, Bulgaria, and Romania) experienced unlike the others a very high level of inflation in the 1990s.

In summary, it is possible to recognize three categories of non-EMU countries. First group practices a kind of fixed exchange rate regime, experienced high level of inflation and is willing to adopt the euro in the near future. Second group uses floating, level of inflation is historically rather low, and this group does not present an intention to join the Eurozone soon. Third “group” is represented by Denmark. This country stays in ERM II (fixed exchange rate regime), inflation is low and the country has no intention to join the EMU.

Prudent communication of above-mentioned situation can be used by policymakers for potential intensification of euroization as well as deeuroization. Especially for international trade, which is intense between non-EMU and EMU economies, transparent communication is a welcome element to mitigate exchange rate risk.

In my other ongoing research, the attention is paid to the foreign trade of non-EMU countries from the perspective of euroization. It is believed that business is more rational regarding the use of euro. The preliminary observations suggest that foreign trade of non-EMU countries is slightly euroizing.

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Taxation of Consumption in Connection with Population Aging

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Abstract: Demographic changes in the form of population aging in European countries, including the Czech Republic, increase the pressure on public budgets. After the end of the economically active period, people are entitled to social security guaranteed by the state's pension policy. Social security payments are among the most important social transfers made from public budgets. Experts point out that increasing taxation will be necessary in this regard. The question is which taxes should be increased in terms of tax equity and their impact on the population. The author works with the hypothesis that consumption taxes are suitable to address demographic changes due to their impact on all consumers regardless of property ownership or economic activity. The author considers it fair that the tax increase should affect all citizens. They should not be burdened only by the economically active, as a large part of them purchase housing, care for children or aging parents, which significantly increases their cost of living.

Keywords: population aging, consumption, indirect taxation, excise taxes

JEL Classification: G20

1 Introduction

In the Czech society, population aging is perceived as an increasingly pressing problem, which has not yet been conceptually solved. The social security system in the Czech Republic is well functioning and efficient, but based on the current situation it cannot be assumed that it will be sufficient in the future, when, most likely, the demographic structure of the population will change gradually. The number of economically active people compared to the current situation is decreasing and the number of people over 65 years of age is increasing. The solution will require a comprehensive approach.

An increase in tax revenues in the following years is necessary, as stated by the Office of the Czech Fiscal Council (The Czech Fiscal Council, 2018). The question is which groups of taxes would be appropriate from the tax impact viewpoint and would cause fewer distortions. The answer is not simple. Every solution has its pros and cons.

The article deals with the discussion on raising taxes on consumption as one of the tools for increasing tax revenues. The authors work with the hypothesis that consumption taxes are a suitable part of a more comprehensive solution to demographic changes due to their impact on all consumers regardless of property ownership or economic activity. The authors consider it fair that the tax increase should affect all citizens. What seems to be more equitable is the spreading of the tax burden on all citizens using consumption taxes.

In this context, the article deals with value added tax, excise and energy taxes. Road tax and import duties are not examined in detail in the article. The reason is that the road tax is specific in that it is a tax on the use of a car for gainful activity. It is not a typical consumption tax as such. Import duties cannot be adjusted within the Czech Republic as the common customs policy of the European Union applies here.

2 Methodological basis

The issue of consumption is approached both in terms of economic theories and in terms of empirical studies. Another area that underlines the importance of the topic is the demographic development in the Czech Republic. The population aging and the uncertainty of the replenishment by foreigners bring the need to solve the situation of tax revenues and expenditures on social transfers which are directed to the economically inactive population.

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2.1 Consumption from the view of macroeconomic theory

According to Fischer, the author of the publication *Macroeconomics* (Fischer, 1994), consumer purchases account for over 60% of aggregate demand. The understanding of consumption and its changes leads to the understanding of savings and other indicators of the functioning of the economy of a given society (e.g. a state). Consumption constraints consist of disposable income and are generally closely related to and correlated with it.

Frank Modigliani's macroeconomic life cycle theory of consumption and savings (Modigliani, 1986) is based on an individual's lifelong consumption plan. The age structure of the population is an important determining factor. Fischer (1994) demonstrates, inter alia, that growth in wealth and working income increases consumption spending.

Friedman's theory of consumption of permanent income (Fischer, 1994) also refers to a longer-term income estimate. The study shows that frequent fluctuations in income lead to lower consumption than when income is less volatile. Fischer (1994) also shows on the IS-LM model that the offsetting of growth in consumption by reducing taxes must gradually adapt to the long-term state of the economy.

2.2 Empirical studies on the consumption

Empirical research on consumption shows different sensitivity of consumption response to current income. For example, Flavinová (1985) concludes that consumption is excessively sensitive to changes in current income. Similar results were obtained by Campbell & Mankiw (1991). Fischer (1994) provides possible reasons for this sensitivity. The first is that households do not predict income behavior in the best way possible and do not use all available information. In fact, households are unable to adequately adapt to income changes due to liquidity constraints. This is particularly true for low-income households.

Kotlikoff and Summers (1981) report in their study that people are saving mainly because of their want to leave an inheritance to future generations. Financial security in old age does not force current retired people to consume everything they have saved. A survey of the propensity to consume in the older population by Danziger, Gaag, Smolenski and Taussig (winter 1982-1983) shows that older people save more from their income than young people, which is also mentioned in Fischer (1994). Similar results have also been found in Japan (Ando & Kennickell, 1986), however with the commentary that people in old age move to their children and combine their wealth.

Estimates show that in the US approximately half of the people manage their consumption based on permanent income and life cycle, and the other half essentially consume their entire current income. (Campbell & Mankiw, 1991)

Poterba (1988) examined the effects of tax cuts on consumption and confirmed that tax cuts actually increase consumption.

2.3 Demographic development in the Czech Republic

The Czech Statistical Office (CZSO) maps the demographic development in the Czech Republic (Czech Statistical Office, 2019) and, based on the 2011 census, adjusted the outlook for demographic development up to 2100 (Czech Statistical Office, 2018).

The population of the Czech Republic has long been growing. Since 2003, population growth has been interrupted only once, in 2013. According to age, the senior group of people will change most significantly. (Czech Statistical Office, 2019a).

2.4 Taxation in the Czech Republic

The tax mix of the Czech Republic expresses the share of tax revenues in the total tax revenue. Rybová (2017) states that in the Czech Republic this indicator develops evenly without significant year-on-year fluctuations.

The year 2018 represented an increase in total tax revenues for the state budget of the Czech Republic compared to previous years. The following table provides an overview of revenues received into the state budget in 2018. Consumption taxes account for approximately 36% of the total tax revenue of the state budget.

Table 1: Tax revenues of the state budget in 2018 (in bil. CZK)

	2018	Index 2018/2017
Tax revenues Total	1,238.92	107.2
Tax revenue without social security premiums	725.82	105.3
of which:		
Value added tax	278 , 98	104.9
Excise and energy taxes	159.28	102.9
Corporate income tax	117.46	102.0
Personal income tax	withhold- ing 146.54	113,9
of which:		
-	12.40	115,1
- paid by payers	127 , 83	114,4
- paid by taxpayers	6,31	102,9
Real estate acquisition tax (including real estate transfer tax)	13,64	108,4
Waste deposit fees	1,65	106,4
Removal of land from the agricultural land fund	0.41	156.6
Gambling tax (incl. lottery and gambling levies *)	4.69	85.8
Other tax revenues	3.17	63.4
Social security contributions	513.11	110
- of which	456 , 24	109,6

* VHP... slot machine

Source: Ministry of Finance, 2019

However, consumption taxes include a wide group of taxes. According to OECD methodology, the following taxes are included in this group:

- Value added tax
- Excise duties - mineral oil tax, alcohol tax, beer tax, wine and intermediate products tax, tobacco tax, raw tobacco tax
- Energy taxes – a tax on natural gas and some other gases, tax on solid fuels, electricity tax
- Road tax
- Gambling tax
- Import duty

2.4.1 Legal and effective impact of the tax

When a tax is imposed or changed, one may inspect the tax effectiveness, its impact and transfer. The Tax Act may impose a tax on a specific individual who pays his/her income tax, i.e. the legal impact of the tax. However, this impact may not be final. The tax paid by an individual or a company may be shifted in the product, factor or capital market. This is the effective, or real, impact of the tax. (Fullerton & Metcalf, 2002)

As the income increases, consumption taxes may impact individuals either regressively³, progressively⁴ or proportionally⁵. According to Musgrave & Musgrave (1994), selective excise duties imposed on essential goods "tend to be regressive" while a tax imposed on luxury goods "tends to be progressive". Svátková, Klazar, Slintáková, & Zelený (2007) state that what leads to these conclusions is the assumption that the share of consumption in income is higher for low-income people than for people with higher income.

The authors of the study on the tax impact on annual and lifetime income (Fullerton & Rogers, 1991) mention the reasons for the regressivity of consumption taxes, in both cases of lifetime and annual income. The first reason is that the poorer spend most of their income on the consumption of goods burdened by a consumption tax. Wealthier individuals consume more free time than the poorer, which is not taxed.

³ As income increases, the share of the tax amount in the income is declining.

⁴ The share of tax increases as income increases.

⁵ The share of the tax remains unchanged as income increases.

The existence of taxes on the market causes inefficiencies, the so-called market distortions or excessive tax burden. The amount of excessive tax burden is a function of the substitution effect. Kubátová (2018) gives an overview of the substitution effects of the most important taxes. It is possible to mention the situation of selective excise taxes (including energy taxes) and value added tax. For selective excise taxes, there is a substitution between the consumption of different kinds of goods (taxed x untaxed or higher x lower tax rate). In the case of value added tax, as a general value tax, there is a substitution between consumption and leisure, or between present and future consumption. On the excessive tax burden, the author states that it is growing faster than the tax itself. Therefore, two small taxes bring less inefficiency than one large tax.

Kubátová (1998) investigated the incidence (impact) of consumption taxes in the Czech Republic using the Kakwani index of progressivity or regressivity. In the case of excise duties in the Czech Republic, the author concluded that the impact of excise duties on alcoholic beverages and tobacco products is mostly proportional. The most progressive impact was recorded for wine tax, the most regressive for beer tax. The tax on alcoholic beverages is proportional because of its correlation with the taxpayer's income. Tobacco tax is proportional in the Czech Republic, but more detailed results show that there is an alternation between regressivity and progressivity (within the proportionality interval) for different income groups.

The analysis of the impact of the harmonization of consumption taxes in the Czech Republic was prepared by a team of authors from the University of Economics (Svátková, Klazar, Slintáková, & Zelený, 2007) who used their own microsimulation model. The conclusions on VAT suggest the progressiveness of the impact, possibly due to the differentiated taxation of the different types of goods and services that households buy⁶. The results concerning selective excise duties were not clear. With the breakdown of households by annual average income, one may inspect that excise duties have a regressive character. In the case of the lifelong approach to impact analysis, the overall impact of excise duties can be considered progressive. The tax burden of the poorer and wealthier citizens approached one another during the monitored 1993 – 2004 period.

3 Results

In the Czech Republic, political representation does not favor increasing the tax burden on the population. Those are rather political attitudes towards voters, but from the perspective of public budgets, reducing the tax burden is unsustainable in the long term. Demographic changes bring the need for a conceptual solution to the social security of people who have exceeded their economically active age. Experts from the Czech Fiscal Council agree that it is not possible to continue reducing the tax burden, but on the contrary, it is necessary to gradually increase it in a suitable way. This is due to the creation of reserves for increasing social security requirements, particularly in the payment of old-age and other types of pensions.

The question of which taxes are appropriate is up for discussion and the answer is not simple. Every solution has its pros and cons. The authors of this paper work with the hypothesis that consumption taxes are appropriate as part of a more comprehensive solution to demographic changes because of their impact on all consumers regardless of property ownership or economic activity. The increase in taxation should not only burden the economically active, as a large part of them are burdened with higher living costs for various reasons (they purchase housing, take care of children or aging parents etc.).

3.1 Increasing the tax burden in relation to demographic changes

One way of addressing the impact of demographic changes on public budgets is to increase property tax rates. In the Czech Republic, property taxation can be considered low compared to other European countries. For example, the author of a book on how to measure and present the results of the economy (Šteinfeld, 2015) commented on property taxation, stating that the income from this tax is so low that these taxes should be abolished. On the other hand, it can be stated that more smaller taxes cause less inefficiency in the market environment than one large tax, see Kubátová (2018). In addition, from a tax equity perspective, taxes should be imposed not only on income but also on the property and its use for gainful activity. Increasing property taxation may be an alternative or complement to increasing consumption tax for the solution to increasing entitlements to social security benefits. Property ownership is the domain of wealthier citizens⁷. The increase of this tax should not represent a liquidation for the owners and at the same time, the real estate market access could occur, at least partially. At higher taxation, owners would not hold empty investment flats. An increase in property tax would affect property owners. In the case of a lease, the tax could be passed on to the tenant in the rent price. This would, of course, affect the poorer sections of the population.

⁶ Before the Czech Republic joined the EU, VAT had been more progressive than before that.

⁷ This is partially due to high property prices in the Czech Republic.

Consumption taxes are another option for increasing the tax burden. In terms of their impact on consumers, these taxes would be more appropriate than the previous groups of taxes, which burdened only a select group of citizens. Consumption taxes burden all consumers, regardless of property ownership or income. The tax burden is thus distributed to a larger number of people than in previous cases; the proportion of the burden on individuals may be lower. The involvement of all citizens in taxation seems fairer. Šteinfeld (2015) states that from the point of view of the accounting model, for which he advocates in measuring economic performance against the gross domestic product, consumption taxation is the most effective way of taxing, since it increases the efficiency of the economy. Increasing consumption taxation would mean reducing consumption and thus reducing the cost of the economy as a whole. Rather, high consumption from an accounting point of view limits the amount of cash available for savings or investments, and thus limits the increase of the company's wealth as well.

The increase in income taxes concerns economically active persons, especially between the ages of 20 - 64 years. One of the options is to increase the progressivity of taxation by increasing tax rates. Here it is possible to avoid tax by preferring leisure. A high tax burden is not desirable.

Growth in social security, as currently set in the Czech Republic, would increase the tax burden on labor. As with direct taxes, there could be pressure on rising unemployment. Labor income (in the sub-base of the tax on employment and self-employment, §6 and §7) would be burdened more than income from capital assets or rent or other income. This would lead to an unfair differentiated burden on different types of income.

Increasing the levy only on social security or labor taxation would burden most of the economically active population.

3.2 Taxes on consumption

Taxes on consumption include both value and specific taxes. Changes in value added tax revenues are due to:

- change in rate,
- change in absolute consumption,
- and price changes.

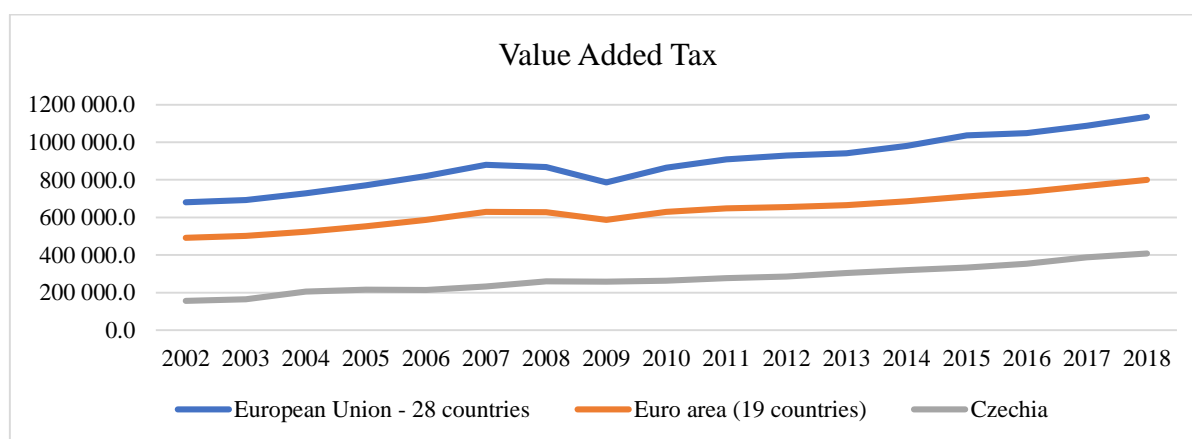
The amount of revenue from specific taxes, i.e. excise and energy taxes, is influenced by:

- absolute consumption
- and the tax rate.

Price changes do not affect the revenue from specific excise duties except for cigarettes. As prices of alcoholic beverages or mineral oils rise, at a constant rate and consumption, specific tax revenue does not increase. Rates are therefore increased quite often for some products. The price of alcoholic beverage, however, also includes VAT, which increases as price rises.

If products, goods and services were subject only to specific rates, they would have to be increased more frequently than if they were subject to specific rates under both excise duty and VAT, which is an ad valorem tax. Value added tax revenue increases as sales prices increase and the tax rate may change at a lower frequency or may remain unchanged.

Scheme 1 Value added tax in the Czech Republic and average of Member states of the European Union (in mil. CZK)



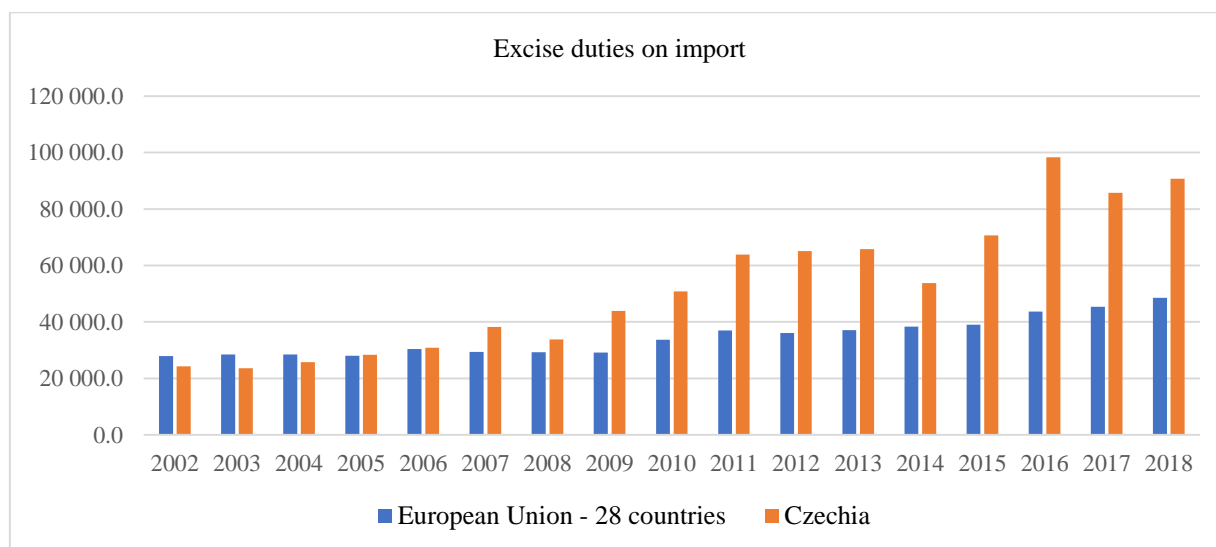
Source: Eurostat (2019)

Consumed products are subject to a tax that changes with the change in the composition of the product (for example, when the content of pure alcohol is changed), i.e. a specific excise duty, and to a tax that changes with the price of the product, the value added tax (VAT). An increase in the tax due to a price change is justified because price changes occur more frequently than changes in the composition of the product.

3.2.1 Strengthening the value component in the calculation of excise duty

For cigarettes, a combination of a fixed rate and a percentage of excise duty together with VAT is used. The above-mentioned percentage of excise duty strengthens taxation linked to the change in price secured by value added tax. The rise in the price of cigarette packs will be reflected in both excise duty and VAT. As the price levels rise, the value added tax declared on output increases. However, the increase in this tax revenue does not increase in proportion to the rise in the price level. It can be assumed that as the final price increases for the consumer, the price claimed by the input payer will increase. By contrast, it reduces the total VAT revenue to public budgets.

Scheme 2 Excise duties on import in the Czech Republic and average of 28 Member states of the European Union (in mil. CZK)



Source: Eurostat (2019)

At the same time, the sum of excise duty on a specific product is also charged to the VAT rate. So a tax is paid on a tax. Excise duty should not theoretically be included in the "added value" of a product. The situation is also similar for import duties.

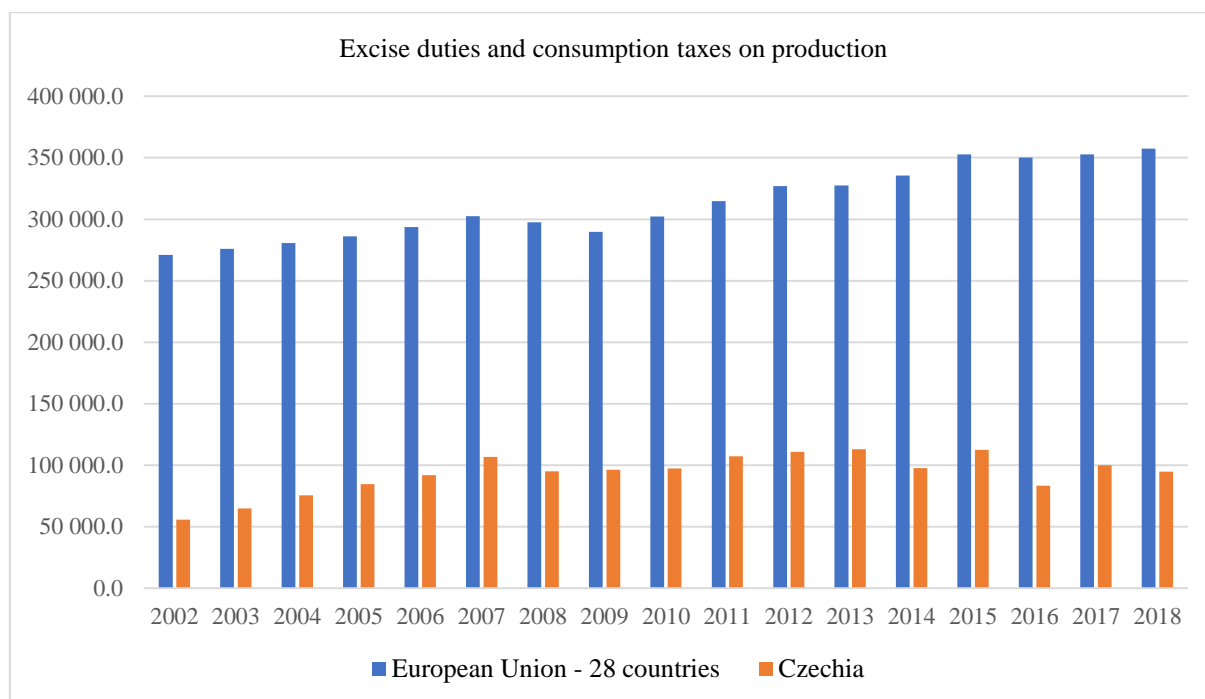
The calculation of excise duty on cigarettes is different. It is not based solely on a specific rate but also includes a percentage calculated from the final price for the consumer. Under the European Council Directives, the percentage has become compulsory in the calculation of excise duty.

Cigarettes are the product that is subject to the most common increase in the rate of excise duty. The reasons for the increase in rates can be seen particularly in consumption and fiscal policy in order to increase tax revenue. The causes, however, may come from the external environment, outside the Czech Republic:

- Movement of the Czech crown exchange rate, from which the minimum tax rate from EUR to CZK is derived
- Change of the minimum tax rate in the European Council Directive

The change of the exchange rate of the Czech Crown to the euro would result in changes in rates of other products.

Scheme 3 Excise duties on production in the Czech Republic and average of 28 Member states of the European Union (in mil. CZK)



Source: Eurostat (2019)

Tendencies to strengthen the value component in the taxation of selected products can be found in other European Union countries. The European Council Directives also set minimum specific rates and percentages of the selling price also for the following tobacco products:

- Fine-cut tobacco for rolling of cigarettes;
- Cigars and cigarillos;
- Other smoking tobacco.

Table 2: Advantages and disadvantages of excise tax increase in terms of public budgets

Advantages of excise tax increase	Disadvantages of excise taxes increase
Increasing public budget revenues, especially the state budget;	Increase of the tax burden for the poorest sections of the population;
Higher rates on products mainly imported from abroad;	Possibility of substitution of the taxed product by a non-taxable product;
Introducing or strengthening the value element and thus reducing the frequency of legislative adjustments;	Substitution with a product with a lower rate of excise duty;
Possibility of differentiating between products of essential needs (e.g. mineral oils) and luxury products or products burdening the society (alcoholic beverages, tobacco and tobacco products).	Tax revenues do not increase as the price of the taxed product increases.

The impact of the tax varies according to different conditions, e.g. competition in the market.	Rates need to be reviewed over time.
Low elasticity of demand for taxed products.	Easy transfer of tax to another consumer;
Restricting the consumption of only selected products;	Demographic changes are likely to reduce consumption of certain taxed products;
A combination of raising a specific or value tax rate;	
A low number of taxpayers;	

Source: Own processing

4 Discussion of the results

The consumption theory presented above shows that persons receiving regular income do not tend to reduce consumption. It is debatable whether some consumption taxes should be raised more than others, and which of those it should be. The authors prefer the increase of taxes on selected goods that are not necessary goods. Older people consume less alcoholic beverages and cigarettes than younger people. Higher taxation on cigarettes and alcoholic beverages affects the elderly less. According to information from the Ministry of Health of the Czech Republic, consumption of tobacco products and alcoholic beverages in all age groups has been decreasing in recent years. The highest number of smokers is found at the age of 15 to 24 years. Increasing this excise duty would be less burdensome for seniors than other age groups aged 15+.

Opponents of raising taxes on consumption draw attention to the regressivity of the impact of these taxes on taxpayers. The results of Kubátová (1998) and Svátková, Klazar, Slintáková, & Zelený (2007), however, show that the impacts of these taxes are proportional to slightly regressive.

Šteinfeld (2015) advocates taxing consumption and considers it the most effective taxation, as there is no reduction in the Czech Republic's wealth, which the author measures using the accounting method. He adds, however, that the increase in the Czech Republic's wealth is due to the preference of domestic products.

Based on the discriminatory analysis, Rybová (2017a) states that the importance of excise duties is increasingly influenced by the level of rates than by the consumption of the taxed product.

5 Conclusion

Increasing the tax burden in terms of foreseeable demographic trends can be considered correct. But its timing is problematic. We are currently talking about the end of the boom and the possible beginning of the economic recession. The period of economic growth is more suitable for raising the tax. This past period has probably not been fully utilized. No provision has been made for future increased social security expenditure. On the contrary, measures were proposed to reduce the tax burden. Government measures can be considered more pro-cyclical. In addition, in the period from the government measure draft to its effectiveness, there may be changes in the economy that can alleviate criticism of the procyclicality of the measure.

Looking ahead, it would be good to use this period to carefully prepare for the next phase of the boom. To prepare a strategy in the area of income policy for the period of at least 50 years to which other acceding governments should commit. At the same time, it should be clear in advance what amount will serve as a reserve for social security in the State Social Security Fund and not allow it to be used for other purposes.

In connection with the results, government proposals to increase the so-called "vices taxation" can be considered appropriate. These are just some of the consumption taxes, i.e. raising rates on alcoholic beverages, tobacco and tobacco products, and gambling. Addiction to specific products also represents an influence. However, higher taxation could discourage young people from developing an addiction. Fletcher, J. M. et al. show in their study that young consumers are those who are most sensitive to tobacco prices (Fletcher, Deb, & Sindelar, 2009). That would be the best that we could do for the future from a health perspective. A similar educational effect could also occur in the case of gambling. As empirical research and experience in other countries have confirmed, excise rates must be high enough for the 'educational' effect to occur.

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Literature Review of Transitory Earnings

Miroslava Vlčková¹, Tomáš Buus²

Abstract: To look into extraordinary corporate profits persistence (transitiveness) is important for accounting and corporate finance, regarding financial planning, accounting for intangible assets, valuation of companies and their assets and liabilities. Inappropriate methods of intangible assets accounting and valuation can influence the economy through intensification of financial markets' fluctuations.

Therefore, the academic accounting and financial literature thoroughly discusses transitory profits. Available evidence shows that 1) extraordinary gains are transitory, and total profits gradually reverse to their average; 2) earnings deflated by share prices (P/E) also revert to average and negatively correlate with profitability.

Keywords: expectations, partial adjustment, mean reversion, transitory earnings.

JEL Classification: G12, G17, M49

1 Introduction

The aim of this paper is to provide an overview of available models related to the transitory earnings of the companies. These models are divided into sections: a) autoregressive and autocorrelation models; b) partial adjustment models; and c) other models.

During the last 50 years, there has developed an extensive research on the time series of earnings. Many of literature source concludes that changes in accounting earnings are unpredictable. It means that earnings follow a random walk. Due to Feenstra, Huijgen and Wang (2000) there exist two empirical results:

- a) book rates-of-return themselves follow a mean-reverting process;
- b) changes in rates-of-return correlate strongly with changes in earnings.

Freeman, and Senyo (1992) say that most of the studies which deal with the transitory earnings suppose linear relation between unexpected returns and unexpected earnings. On the other hand of linear model, nonlinear model explains more the differences between earnings response coefficient and price-earnings shares. Nonlinear relation is analysed on the base of the absolute value of unexpected earnings is negatively correlated with earnings persistence.

Ayersa and Freeman (1997) provided empirical analysis about the differential timing of returns in connection of earnings by industry-wide and by firm-specific. They found that returns in connection with industry-wide earnings begin earlier than returns associated with same-year firm-specific earnings and end also earlier. It is very important for investor's decisions. It follows that cross-industry strategies in trading based on earnings forecasts have to be implemented earlier than within-industry trading strategies.

2 Literature review

Earnings are composed of four components, two of which are persistent and two of which are transitory. Although all earnings information is available to investors, due to Elliot et al. (2019) there should be displayed earnings metrics at four levels:

1. Disaggregated earnings that separately summarize persistent and transitory elements.
2. Aggregated earnings that combine persistent and transitory elements.
3. Core earnings that display only persistent earnings elements.
4. Control condition where no salient earnings metric is displayed. This setting is ideal for examining motivated reasoning because overweighting salient transitory earnings is likely to be particularly consequential for bias in investors' behaviour.

Vlčková, Buus (2018) say that estimates of calculated transitory earnings models and measurement methods should be affected by the creative accounting. The creative accounting exists in connection with charging and may cause results to be distorted.

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Transitory Earnings Models

Models which describe transitory earnings are:

- a) autoregressive models (AR),
- b) partial adjustment models (PA),
- c) other models.

Autoregressive Models and Autocorrelation Models

Beaver's (1970) was one of the first author which analyse mean reversion (MR) models on the basis of earnings time series. He describes AC function value and how it is influenced by white noise, moving average and random walk. His analysed formula was in the shape:

$$x_t - x_{t-1} = \beta(x_{t-1} - x_{t-2}) + \varepsilon_t, \quad (1)$$

$$x_t = \beta x_{t-1} + \varepsilon_t, \quad (2)$$

where:

$x_{j,t}$	earnings
t	time period
β and $\varepsilon_{j,t}$	error term.

Beaver's (1970) also examines AC of earnings, returns and prices. He finds that earnings per share (EPS) to net worth per share (i.e. book value, BV), earnings yield and undeclared earnings show the features of moving average, contrary to total return on share. That was impressive because the other studies during these years found random walk as the earnings generating process (e.g. Ball, Kothari and Watts (1972), Little (1962), Ball and Brown (1969) or Watts and Leftwich (1977)).

Dechow et al. (1999) analyse autoregressive features of abnormal earnings in the way of Equation (2) because their transitory earnings are difference between actual ones and BV times 12 %, and the earnings variance in subsequent periods is approximately the same. Even though Dechow et al. (1999) and Beaver (1970) worked with different data and with the difference of almost 30 years, they got similar results. For example, Dechow et al. (1999) find approximately the same autocorrelation function value (Equation 1) of net income per share as Beaver (1970) did (Dechow's 38 % compared to Beaver's 32 %).

Geroski and Jacquemin (1986) as well as Goddard and Wilson (1996) apply AR models on abnormal profitability from Europe (The United Kingdom, France and Germany). The abnormal profitabilities are estimated as differences from economy-wide average profitability. They find persistence on the average about forty to fifty percentage. Geroski and Jacquemin (1986) concentrate on comparison in the field of industries and Goddard and Wilson (1996) provide interval estimates of persistence rates and they also include a measure of monopoly into of their model and all of a sudden, they found that increased degree of monopoly increases the sensitivity to the economic cycle.

Goddard et al. (2005) use similar model based on AR of return on assets (ROA) and on other endogenous variables and estimates wide range of earnings persistence rates (Equation (1) mostly between 0.2 and 0.5) for different industries and different countries in Europe using generalized method of moments. Ewing and Thompson (2007) measure the asymmetry of profit MR at the economy as whole They surprisingly found that negative deviations from trend persist longer, maybe due to strong influence of 70's oil shocks in their sample. They estimate mean reversion rate at 18 % p.a. for the positive variations and 6 % for the negative variations.

Frankel and Litov (2009) and Dichev and Tang (2009) rearranged Equation (2) into:

$$\sigma^2(x_t) = \beta^2 \sigma^2(x_{t-1}) + \sigma^2(\varepsilon_t), \quad (3)$$

$$\beta = \sqrt{1 - \sigma^2(x_t) / \sigma^2(\varepsilon_t)}. \quad (4)$$

Equation (4) shows that MR is the faster the higher is share of error term variance in the time series variance. Dichev and Tang (2009) provide statistical explanation of what has been already observed by Fama and French (2000).

Partial adjustment models

Many analyse MR and PA models. Little (1962), Ball and Brown (1969), Lev (1969), Brooks and Buckmaster (1976), Frecka and Lee (1986), Fama and French (2000), Allen and Salim (2005) or Jiang and Kattuman (2010) apply the PA models in analysing the time series properties of corporations' profits. Model used by Lev (1969) is in Equation (5), and reformulated weighted average in Equation (6):

$$x_t - x_{t-1} = \beta(y_{t-1} - x_{t-1}) + \varepsilon_{j,t}, \tag{5}$$

$$x_t - x_{t-1} = \beta y_{t-1} + (1 - \beta)x_{t-1} + \varepsilon_{j,t}. \tag{6}$$

where:

y_t the target, usually peer-group average

Lev (1969) actually started his model design description with the PA model where the target is future known (or expected) normal level (Equation 7), which is weighted average in Equation (8):

$$x_t - x_{t-1} = \beta(y_t - x_{t-1}) + \varepsilon_{j,t} \tag{7}$$

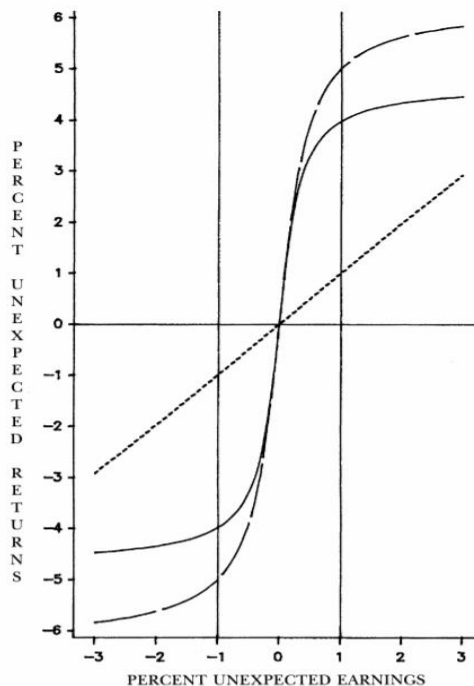
$$x_t - x_{t-1} = \beta y_t + (1 - \beta)x_{t-1} + \varepsilon_{j,t}. \tag{8}$$

Fama and French (2000), Allen and Salim (2005), or Jiang and Kattuman (2010) use Lev's (1969) PA model with unknown target. Their variables are for example market-book ratio, dividend payers, capital intensity, gearing, etc. Market capitalization is a function of expected earnings.

O'Hanlon (1995) says that contrarily to the Lev (1969), Little (1962) or Ball and Brown (1969), the new authors contain the new incentives to the modelling of time series earnings.

Valuation theory suggests that analysts and investors should place more emphasis on forecasting high persistence earnings than low persistence earnings (Freeman, and Senyo, 1992). In the figure 1, you can see hypothetical nonlinear functions relating unexpected returns to pricedeflated unexpected earnings by Freeman, and Senyo (1992).

Figure 1 Nonlinear functions relating unexpected returns and earnings



Source: Freeman, and Senyo (1992)

Other models

Wu and Ho (1997) try to overcome limitations imposed by Lev's (1969) PA model design by measuring dependence between ratios. That allows them also to split the measured effect between the industry-wide dynamic and company-specific adjustment towards the last known industry average

$$\log(x_t/x_{t-1}) = \alpha + \lambda \log(y_t/y_{t-1}) - \gamma \log(x_t/y_{t-1}) + \varepsilon_{j,t}. \quad (9)$$

This split of earnings between the industry-average and company-specific part with additional PA term brings collinearity problem. However, with separate regressions for industry dynamic and convergence, only the convergence towards industry average is significant. The collinearity problem also can be seen at $(\lambda - \gamma)\log(y_{t-1})$ in rearranged Equation (9), because Wu and Ho (1997) estimate λ and γ jointly

$$(1 + \gamma)\log(x_t) - \log(x_{t-1}) = \alpha + \lambda \log(y_t) - (\lambda - \gamma)\log(y_{t-1}) + \varepsilon_{j,t}. \quad (10)$$

Taking that into account, only PA seems to be significant, not the industry dynamic of the financial ratios that they examine. Contrary to that Davis and Peles (1993) find that most of the MR can be attributed to industry-wide effects. Equation (10) shows that if it were not for overspecification of their model, Wu and Ho (1997) could introduce MR model, which measures only company-specific MR:

$$\log(x_t) - \log(y_t) = \alpha + \lambda [\log(x_{t-1}) - \log(y_{t-1})] + \varepsilon_{j,t}. \quad (11)$$

Konings and Roodhofs (1997) transition matrices are much less complicated, thus much less subject to hidden assumptions, methodological issues, or industry-wide factors, which could inflate the MR. They show that no systematic convergence towards mean can be observed and that the changes of financial ratios at individual companies are random. However, according to Peles and Schneller (1989) and Davis and Peles (1993), who use more sophisticated version of AC (or transition) tests, there is convergence in financial ratios, which is not caused by mechanical MR.

3 Discussion and conclusions

Large body of papers forms portfolios, whose average profitability or margin are then investigated its mean reversion. Mueller (1977) by regressing abnormal profits against time tests the hypothesis of monopoly persistence and although he finds significant reversion of abnormal profits to zero, he cannot reject the tested hypothesis. The portfolio approach tells us by convergence of profitability of extreme deciles that there is some mean reversion, but it is known little about its nature. The lowest decile profitability can get to the average even by half of the companies becoming extremely profitable and the other half being still extremely lossy.

Accounting methods show how to measure the impact of economic events on the income statement. Reporting profitability to stakeholders is essential for financial accounting. Reported revenue may not disclose all the information in the accounting data that is required to assess the profitability of an enterprise. Many papers focus on the information content of earnings components to find the market reaction to some components of earnings. The disadvantage of most models is their insufficient explanatory value, provided that the actual distribution of errors deviates from the assumed probability model. Autoregressive models are frequently used models because of their ability to capture quite difficult autocorrelation patterns through a series of coefficients that are relatively small compared to the length of the autocovariance data functions. In addition, there are a number of easy-to-implement mathematical relationships between coefficients. Other discussion of literature on transitory earnings and profitability show that earnings MR research should concentrate on margins or ROIC rather than on the traditional measures as ROE, ROA, EPS, etc. However, the main purpose of this paper is to prepare ground for methodologically correct analysis of earnings mean reversion expectations.

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Mathematical - Statistical Modelling and Optimization in Practice

The impact of subsidy support upon fruit growing in the Czech Republic

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Abstract: Fruit growing, even despite its comparatively low share on the total output of agriculture of the CR, has been producing the principal – so-called special - commodities from the nutrition viewpoint. This marking is coming from the special needs requested by fruit production. Fruit growing is strongly dependent upon the uncertain climate factors. With unstable harvests it is not possible to offer investment funds enough for establishing and renewing fruit orchards. This is then negatively reflected in economic attractiveness of the sector and is the cause of entrepreneurs' unwillingness to enter the sector. Therefore, several kinds of financial support are aimed at fruit production. The target of the paper is an analysis of the impact of subsidies upon the current state and future development of this sector. The researchers have started from the orchards register data, kept by the Central Agricultural Testing and Control Institute. Data sources have been supplemented by data from the Czech Statistical Office, the CR Ministry of Agriculture and the Fruit Union of the CR. Statistical analysis has been aimed in particular at the Programme of fruit orchards restructuralisation support within the system of integrated production. The production orchards areas have been decreasing significantly but the structure changes have aimed at more efficient use of resources. In a more detailed analysis it has been found that, changes in subsidies lead to changes in plantations. An improvement of the production orchards age structure may have been reached over the recent years, considering inclusion of the orchards entering the stage of fruitfulness and the young orchards, but a total loss of areas has been effected anyway.

Keywords: agriculture, fruit growing, subsidies, time series, correlation.

JEL Classification: C22, Q10, Q18

1 Introduction

Fruit growing in the Czech Republic has had a longtime tradition. The first significant documents about fruit growing are available from the Middle Ages already. Within the period over the 13th to 15th centuries a larger quantity of apple and pear varieties started occurring. In the 17th century the first fruit nurseries were established. A great expansion started in the 18th century when fruit growing got an organized form through fruit associations spreading new knowledge. Since the 19th century one can speak of intensive fruit growing in Bohemia. Extensive books on pomology were edited and suitable varieties for fruit growing in the separate country areas were defined.

After 1918 the organized fruit growing research was developed, introducing new ways of fruit growing into large-scale production. After World War Two the production started concentrating in specialized enterprises in suitable production areas.

Establishing of intensive low-orchard fruit orchards with a higher production potential began in the second-half Sixties of the 20th century. A massive development of intensive fruit growing then occurred in the Seventies and Eighties (*Ovocnářská Unie, 2019*).

After 1989 the return of land to original owners started. Big fruit growing enterprises felt themselves uncertain and not much money was invested into fruit growing business. The postrevolution development brought mostly size diminution of plantations and growth of fruit growing intensity. At that time a big number of small, family-type as a rule, farms appeared. *Blažek (2001)* is mentioning, first of all, lack of investment money considering the structural changes in the economy as a whole. The introduction of National subsidy support for the fruit orchards restructuralisation greatly assisted in the solution of critical situation in fruit growing. Up to the present time more

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than 9,000 hectares of modern fruit orchards have been planted, with attention to quality and resistance of the varieties planted (*Ovocnářská Unie, 2019*).

After entering the internal EU market a further rise of the fruit sector competitiveness had to come, what currently means first of all establishing of high yield potential plantations together with reduction of chemical matters application. The result of such activities then, in particular, are the healthy Czech fruits from the integrated production, found by the customers in the market network under the SISPO denomination (SISPO = Union for fruit growing integrated systems).

Fruit growing is strongly dependent upon stable climate conditions. These have started recently changing rather to extremes capable to destroy a substantial part of the crop within the spring period already, or just before the harvest time in summer or in winter. This can project even into the fruit growers economy, since it is not possible to create sufficient investment funds for the orchards renewal due to unstable harvests. *Kudová (2006), Kudová, Chládková (2008)* have paid attention to the assessment of economic situation in the fruit growing sector in a series of papers, especially to assessment of attractiveness of the sector from the fruit grower viewpoint. They assessed the attractiveness of fruit sectors as a below-average one.

The SWOT analysis of the CR fruit sector (*Buchtová, Dobiáš, Mašková, 2015*) shows that, the strenghts are expertise and high-quality scientific research base, higher organisation of producers with advantageous size of individual subjects and also consumer interest in the domestic production. *Dědina, Šánová, Laputková (2017)* have indicated also the high share of carefully grown production as a strenght – e.g. thanks to inclusion into the integrated growing systems. As the sector weaknesses the following are mentioned: strong competition in the sector, high investment costs, lower technical level, lack of processing capacities and pressure on prices caused by cheap imports. *Buchtová, Dobiáš, Mašková (2015)* indicate as weaknesses also the bad varietal and age structure as well as the poor relationship of consumer fruit against fruit for processing. Opportunities can be seen in deeper cooperation of producers, increase of productivity, intensifying and in the increase of fruit consumption, too.

On the contrary, rising prices of the output, lack of own investment funds, need of seasonal workers recruitment and bargaining skills of the retailers are the threats. The specificity of fruit offer on the side of Czech producers is seasonality. Fruit harvest comes since springtime till autumn and the freshness demands on this fruit are increasing.

The accumulated fruit offer at this time reduces prices, while fruit demand remains more or less constant (*Kudová, 2010*). If the producer does not succeed in selling the production for consumption, which is the most advantageous one economically, then another chance is offered by processing industry or by own product processing. As *Nordey (2019)* have given it, the heterogeneity of quality and maturity of fruit at harvest is a widespread problem in numerous species that needs to be addressed all along the supply chain to reduce postharvest losses and to ensure constant quality for consumers. Managing fruit shelf life is essential to insure optimum fruit quality for consumers. From the lines given above it can be seen that, fruit growing faces a great number of specificities, projecting themselves negatively in the economic indicators of this sector.

The Common Agricultural Policy of the European Union strives for the European model of agriculture underlining the multifunctional agriculture development. Subsidies are the instrument for agricultural policy enforcement within the specific natural and economic conditions of the EU Member States. A detailed analysis of the impact of subsidies upon agricultural primary production structure has been provided by *Prášilová, Procházková, Žovincová (2018)*. Czech fruit growing is supported from financial funds of the European Union and by the domestic support covered from national resources. From the study by *Helming, Tabeau (2018)* recommendations for the agricultural policy impacts assessment can be derived. The authors used a computable general equilibrium model and a partial equilibrium model to this purpose. The results have shown that, the policy makers should carefully consider the benefits and disadvantages of both the direct and indirect subsidy impacts upon farm economics, soil use, environment and regional development. Subsidies for fruit species with very high labour intensity and species with high labour intensity apply to fruit growing.

The following fruit tree species can be classified in the category with „very high labour intensity“: apple, apricot, pear and cherry. Support for the species with „high labour intensity“ then can be considered for plum, peach, cherry, blackcurrant, redcurrant, raspberry and strawberry. The support has been designed for orchards planted since 1995 and later, only (*Ministry of Agriculture (a), 2018*).

The countryside development programme contains a sub-measure called Integrated fruit production, within the agri-environment-climate measures. As *Veřvodová (2016)* has given it, the integrated production represents a way

of farm management, the basic aim of which is securing a perennially sustainable management. Such a system is, first of all, ecosystem-friendly. An important feature of the integrated production is efficient protection against diseases, pests and weeds while reducing the risk of adverse effects of protective equipment. The measure is farm-wide, which means, the farmer is entering it with all the fruit orchard areas, registered at the given moment in the LPIS (Land Parcel Identification System) and the register of orchards. Another sub-measure concerning fruit growing is ecological agriculture. The object of this subsidy support is the land under organic management (*Ministry of Agriculture (b), 2018*).

The national subsidies are fully covered from the Czech Republic resources. Often there are targeted programmes, directed at specific areas or at the support of a selected specific commodity or segment of agriculture. At fruit growing the clear subsidy programmes „Restructuring support of fruit orchards“ and „Construction of drip irrigation support in fruit orchards, hop gardens, vineyards and fruit nurseries“ are aimed (*Ministry of Agriculture (c), 2018*). The purpose of „Restructuring support of fruit orchards in the system of integrated production“ is an improvement of fruit trees health status and improvement of the fruit produced quality. *Leibl, Petr (2001)* is pondering necessity of existence of this subsidy support, considering the high investment costs and the long payback period of new planting and orchard building.

2 Methods

2.1 Data source

Statistical analysis has been based on data by the CR Ministry of Agriculture, CR Fruit Union, Central Agricultural Testing and Control Institute and Czech Statistical Office. For the analysis as such, the time series have been used of fruit trees and bushes over 1989 – 2017 and subsidies paid over 2005 – 2017. In 2017 a structural survey of fruit trees was done in all the EU Member States which has to be done after every five years according to the European Parliament and the Council (EU) ordinance No. 1337/2011 on European statistics of permanent cultures. The aim of these repeated surveys is to obtain data comparable in the long term about varietal composition, age structure and cultivation intensity in the production orchards of the main fruit tree species. They are a fundament for defining production potential of the EU fruit orchards and agricultural policy formation. The data obtained this way have been analyzed in the paper, too.

2.2 Exponential smoothing of time series and forecasting

Development of the production orchards and plantings and development of subsidies paid on production orchards restructuring has been modeled and forecasted using time series exponential smoothing. Exponential smoothing belongs among the adaptive models also known as the models with variable parameters. Models of this kind can react faster to structural changes in time, which are just characterized by irregular changes in the time series trend. The adaptive models start from an assumption that, for the forecast of future development the most precious ones are the newest time series observations. The more recent data obtain higher weights while the older ones get lower weights on the contrary, what is taking into account the loss of information value in time. The assumption for use of this method and the adaptive methods for forecasting in general is stability of the forecast errors distribution in time (*Hindls et al., 2000*). According to *Cipra (2014)* the smoothed value after exponential smoothing is a special case of moving average. *Cipra (2014)* has also treated discounting of the more distant (older) values.

The exponential smoothing model works with n values, available at present time. The assumption says that, there are empirical values y_{n-k} , $k = 0, 1, \dots, n-1$, where k is the age of observations.

Thanks to this, the model is expressing aging of the information carried by the empirical value given. The model is an additive one, which means, it is expressed by the sum binding between its components (*Hindls et al., 2000*).

$$y_{n-k} = T_{n-k} + \varepsilon_{n-k} \quad (1)$$

The trend component value T_{n-k} can be described by the function:

$$T_{n-k} = \beta_0 - \beta_1 k + \beta_1 k^2 + \dots + (-1)^k \beta_k k^k, (2)$$

where k is still understood as the observation age at the time moment n . Trend function parameter estimates are obtained based on the least squares method expressed as followed:

$$\sum_{k=0}^{n-1} (y_{n-k} - T_{n-k})^2 \dots \min (3)$$

The adaptive model group differentiates the single observation values, therefore weights w_k are completed into the least squares method and the amount of these is given by the exponential function:

$$w_k = \alpha^k, \quad 0 < \alpha < 1 \quad k = 0, 1, \dots, n-1 (4)$$

As *Hindls et al., (2000)* are giving it, the α symbol represents the smoothing constant, varying within 0 and 1 limits. The condition then looks like this:

$$\sum_{k=0}^{n-1} (y_{n-k} - T_{n-k})^2 w_k \dots \min (5)$$

Considering the statistical software Statistica version 13 applied, the α is describing the time series level, the β constant presents changes in the trend, and in case of a subdued trend, a reduction can appear in shape of the φ constant. Finding the appropriate trend function type is then mostly dependent on the analysis of empirical data. The paper offers a criterion based on the comparison of sums of squares of deviations of the empirical time series values from the smoothed ones: Mean Absolute Percent Error (MAPE):

$$\text{MAPE} = \frac{100}{n} \sum_{t=1}^n \frac{|y_t - y'_t|}{y_t} (6)$$

$y_t, y'_t \dots$ empirical and smoothed t. s. values.

The model with the lowest MAPE criterion values is generally preferred. It is important to realize, anyway, that none of such criteria is of a universal nature, rather they offer a partial information on the quality of the model studied (*Hindls et al., 2000*). Statistical computations have been performed in the STATISTICA software, version 13, environment.

2.3 Time series correlation

The impact of subsidies upon the restructuring support of production orchards has been assessed based on time series correlation. When studying the relationships between time series often it is considered possible to describe these by an additive model, i.e., each time series can be expressed as a sum of the regular and irregular components. For the assessment of causal relationship between variables the correlation tightness measurement method of the random component series can be applied, i.e., series after removal of trend, optionally after removal of the seasonal component.

Let us assume that, we want to study the correlation relationship between the X measure time series, whose trend is expressed by the function (with the lowest MAPE value):

$$x'_t = f(t) (7)$$

and the Y measure, where the trend with the lowest MAPE value will be described by:

$$y'_t = f(t) (8)$$

Establishing the residual deviations of empirical values from the smoothed values of the both time series studied:

$$e_{xt} = x_t - x'_t \quad \text{and} \quad e_{yt} = y_t - y'_t (9)$$

it can be found whether the deviations e_{xt} and e_{yt} are ordered in time at random or not, i.e., whether autocorrelation in these does not exist. If the testing will show us an insignificant autocorrelation, it can be assumed that, the selected function $y'_t = f(t)$ describes the time series trend properly. Correlation tightness of the two time series can then be measured using the coefficient of correlation (*Hindls et al., 2007*).

3 Research results

3.1 Analysis of the changes in Czech fruit growing dimension and performance

Over the 15 years since accession to the European Union Czech fruit growing has reduced its performance by almost a fifth. In terms of value the share of fruit growing on agriculture can be expressed using the measures from the General

Agricultural Account. Currently the account for 2017 has been finalized. Fruit growing has a share of 1.04 % on the total production of agriculture (a figure of 1.29 % is being presumed for 2018). In absolute terms the fruit production in 2017 was appreciated at 1.39 billion CZK (*Czech Statistical Office (a), 2018*). Fruit production orchards' share on farmland was at 0.35 % only (2017). The orchards area has been managed using various regimes and systems. Noted is the management in integrated production system and in the ecological regime. In the integrated production regime In 2017 there were 8,484 hectares, which is 61 % of the production orchards current area. Further subjects awaiting granting the mark are covering 1,442 hectares. Altogether the areas cover 71 % of the production orchards.

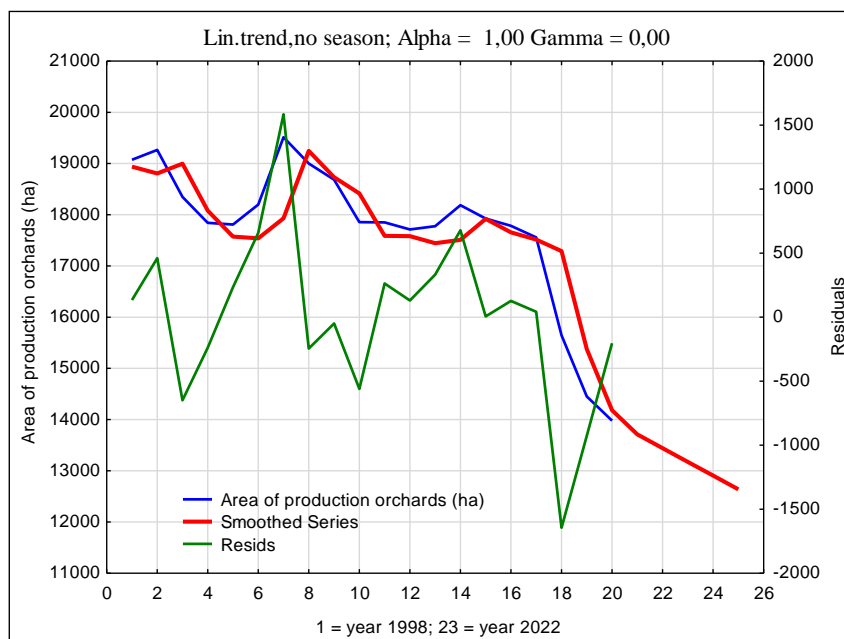
While over 2000 – 2004 harvested the Czech fruit growers 194,000 tons of fruit annually at an average, over 2014 – 2018 this was 157,000 tons only. The decrease was 19 %.

As the Graph 1 below shows it, in 2003 the increase of fruit orchard area started, first of all thanks to the chance of subsidy support use already before the CR accession to the European Union. Production orchard hectare areas returned to the values from 1999, what was the current maximum and in 2004 these reached the top level of the whole period. The growth in this year made it 7.23 %. Over the 5 years following the areas kept falling year-on-year by 1.9 % at an average and since 2013 only they have remained below the level of 2002 permanently.

In the extreme decrease of fruit orchards in 2015 (area decrease 10.89 % = 1,912 hectares) two events have played a significant role, in particular. The first one concerns the change in fruit orchards' culture definition, this one having been toughened, and the second one concerns the food imports embargo declared by the Russian Federation. This decision had the most significant impact upon apple market. The last important external effect, affecting the situation of production orchards, are changes in the climate conditions on CR territory.

Over the last four years analyzed 3,579 hectares of orchards vanished. The chosen exponential smoothing model (Graph 1) indicates MAPE = 2.64 % and it forecasts a year-by-year average decrease by 2 % in the production orchards area for the next 5 years. In 2021 the total production orchard area should fall this way below 13 thousand hectares.

Graph 1: Exponential smoothing model of production orchard area development over 1998 – 2017 and the forecast for 2018 – 2022

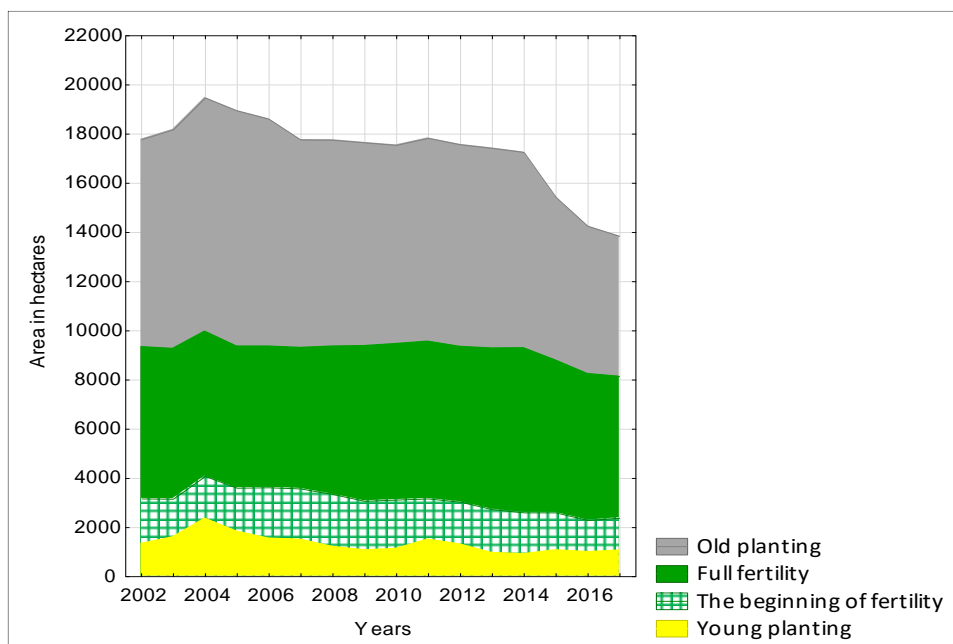


Source: Czech Statistical Office (b) (2018), own processing

3.2 Fruit orchards age structure development in the CR

Since the Eighties of the 20th century already, the degrading fruit orchards age structure was dealt with centrally. Since 1995 new planting started being supported by State subsidies. The impulse to this action was the difficult economic situation of farmers within transition to the market system. Of course, the decrease of orchard areas continued further and it brought a situation, when the superannuated orchards share overgrew the share of the fruitful ones (Graph 2).

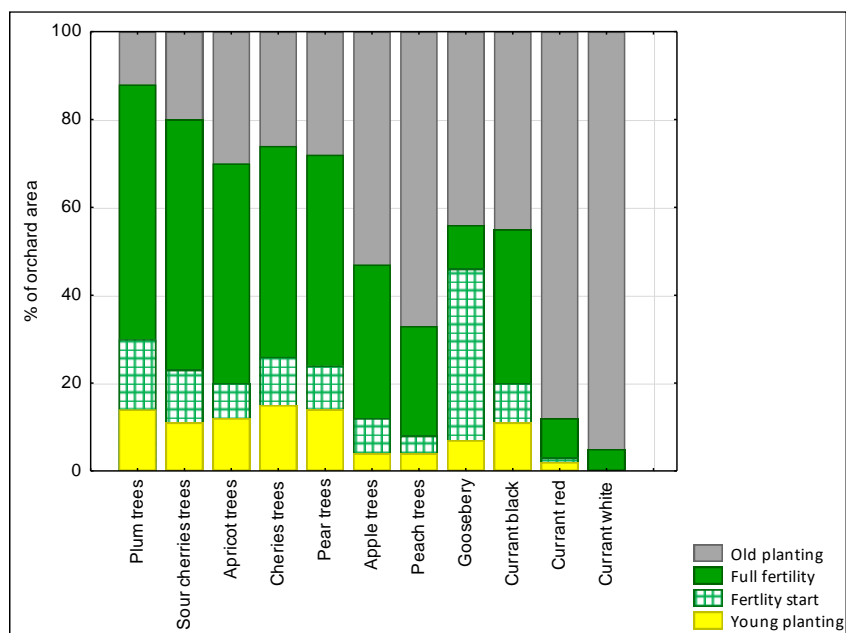
Graph 2: Age structure development of production orchards in the Czech Republic over 2002 – 2007 (in hectares)



Source: Ministry of Agriculture; own processing

The worst situation occurred in 2005, when the share of overaged plantings made it 50.1 %. As Graph 2 shows it, the ratio of the fruitful ones (start of fertility + full fertility) and the fruitless plantings has been improving over the last 15 years. In the turning year 2004 the fruitful plantings covered 39 % of areas. During the following years the share of fruitful plantings grew gradually and in 2015 it crossed 50 % for the first time. In 2017 the share of fruitful plantings made it 51.1 %, whereas 41.6 % of fruit production orchards were classified to be in full fertility, i.e. roughly by 10 % more orchards than at time of the CR accession to EU. But, from the absolute figures viewpoint, the full fertility orchards area has fallen significantly since 2014 down to the values of the years 2006 and 2007.

Graph 3: Age structure of fruit species in the CR at 2017 (in %)



Source: Buchtová (2018); own processing

Graph 3 shows the actual age structure of the fruit crops. An excellent structure from the age viewpoint is being presented particularly by plums and cherries. Definitely alarming is the situation with peaches and currants. Moves between the separate age categories are mainly determined by the biological development of the separate fruit trees.

3.3 Analysis of the structural survey results in the orchards

All the fruit growers, who on the 1 May managed 0.20 hectare of fruit orchard at the minimum, destined for market, were included into the structural survey Ovocné sady 2017 (Fruit orchards 2017) in the Czech Republic. According to the results of the structural survey, both the number of fruit growers and the area of fruit orchards destined for market fruit growing decreased significantly during 2012 – 2017 years. The number of growers fell, compared with 2012, by more than a quarter, from 2,388 down to 1,755 hectares (=26.5 %). The area of fruit orchards decreased from 21,347 down to 16,417 hectares (=23.1 %). The average size of the orchards rose from 8.94 up to 9.35 hectares (+4.6 %). The decrease of fruit orchards total area was largely connected with change of the definition „fruit orchard culture“ and shifting of non-compliant orchards into other agricultural cultures. Overaged fruit orchards also were to a larger extent liquidated during this period without replacement by new plantings.

Apple trees were the most significant fruit species in 2017 same as in previous surveys. These were cultivated on an area of 7,819 hectares what meant almost one half of the fruit orchards total area (47.6 %). The second most widespread fruit species were plum trees, occupying 2,329 hectares (14.2 %). Sour cherry orchards occupied 1,427 hectares (8.7 %), apricot 1,152 hectares (7.0 %), cherry 1,017 hectares (6.2 %), pear 870 hectares (5.3 %) and peach 340 hectares (2.1 %). Small fruits (currants, gooseberries, raspberries, blueberries and bilberries) were cultivated on a total area of 984 hectares and occupied 6.1 % of the orchards area. Nuts (walnuts, hazelnuts, almonds and edible chestnuts) were cultivated on 215 hectares (1.3 %) and other fruit tree or bush species occupied 254 hectares (1.6 %). In the South Moravia and Central Bohemia regions 38.6 % of the total fruit orchards area were located. Most apples, cherries and sour cherries were cultivated in the Central Bohemia Region, peaches and apricots in the South Moravia Region, plums in the Zlín Region, pears in the Ústí nad Labem Region and small fruits in the Liberec Region.

Compared with the 2012 survey, planting density in the CR of all the fruit species studied increased significantly. Mostly this is connected with the overaged orchards liquidation and with reassignment, too, of tree stands with low numbers of viable fruit trees or bushes into other farm culture species.

3.4 Statistical analysis of the impact of subsidy support upon fruit orchards restructuring within the integrated production system

The subsidy support of new orchard planting started in 1994 as a reaction to the needs of modern fruit growing. The programme Support of fruit orchard restructuring within the integrated production system was selected as the decisive subsidy support programme for the analysis as such, the aim of which is improvement of the fruit trees health status and quality improvement of the fruit produced. Object of the subsidy is the area of newly planted fruit orchard, the programme should lead therefore to age structure improvement of fruit production orchards, which is bad in the long term look. Such improvement can be reached by new orchards planting or old orchards grubbing up. Improvement of the fruit produced quality is then reached by subjects certification in the integrated fruit production system. The amount of subsidy rate per 1 hectare is subdivided into three levels, differing in the orchard density and fruit species. The rate of 240,000 CZK per hectare applies to the following tree species: apple, pear, apricot, peach, plum, cherry and sour cherry at the minimum number of 800 trees per hectare. The rate of 120,000 CZK per hectare applies to the same fruit tree kinds at the minimum number of 400 trees per hectare. The last rate level is 60,000 CZK per hectare and it is oriented at planting of small fruit (currant, gooseberry, blueberry) on 0.5 hectare minimum with 3,000 pieces per hectare minimum.

Table 1: Correlation coefficients matrix

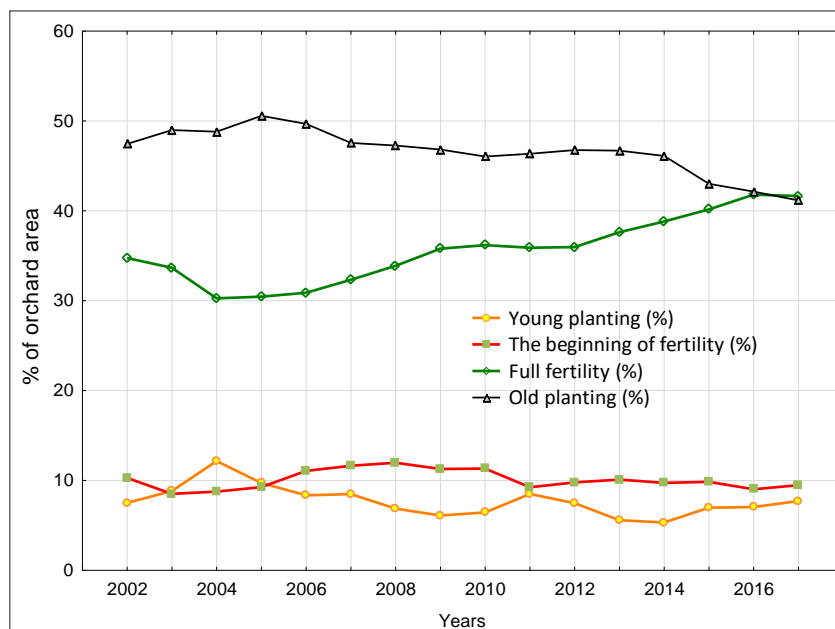
Variable	Variable						
	Orchard area	Young planting area	Pips and stone fruit area	Berries area	Subsidies for orchard restructuralisation	Subsidies for fruit tree planting	Subsidies for fruit bushes planting
Orchard area	1,00						
Young planting area	0,59	1,00					
Pips and stone fruit area	0,99	0,57	1,00				
Berries area	0,86	0,77	0,85	1,00			
Subsidies for orchard restructuralisation	-0,19	0,23	-0,20	0,19	1,00		
Subsidies for fruit tree planting	-0,34	-0,20	-0,36	-0,13	0,04	1,00	
Subsidies for fruit bushes planting	0,34	0,61	0,31	0,66	0,40	0,42	1,00

Source: Ministry of Agriculture, own processing

Note: Statistically significant coefficients of correlation ($\alpha = 0.05$) are marked in colour.

It is obvious from Table 1 above that, the subsidies have a positive impact upon the age structure improvement of fruit production orchards (a positive reaction by the way of young plantings). A strong correlation has been shown in the berry bushes, both in relation to the total areas, and to young plantings. Graph 4 below demonstrates the highest share of new orchards at the starting fertility stage for gooseberries. In spite of the age structure of fruit production orchards improving in direct connection to the subsidies, a significant decrease of the fruit orchard total areas can be observed (Graph 4).

Graph 4: Age structure development of fruit production orchards in the CR over 2002 - 2017 (in %)



Source: Buchtová (2017), own processing

Since 2005, when the share of old plantings reached its top (50.6 %), this share has been permanently decreasing. In the last period studied so far (2017), the share of full fertility orchards (41.6 %) is higher than the share of old plantings (41.2 %). The young and fruitful plantings have occupied 58.4 % of the fruit production orchards total area. Seen from this viewpoint, the subsidy support of orchards restructuring can be assessed successful. On the other side, this aim has been reached not through a growth of new orchard areas, but primarily by the total loss of overaged orchards. The share of plantings supported has moved around 20 % of the total yearly plantings at time of the CR accession to the EU. In the years following it was increasing and in 2008 it reached its maximum - 80 %. Over the recent years it keeps moving between 50 – 60 %.

4 Conclusions

Czech fruit growing has reduced its performance by almost one fifth over the 15 years since the Czech Republic accession to the European Union. The loss rate of the fruit growing sector, given by the lower production and low prices, has reflected itself over the recent years in the significant reduction of fruit orchard areas. During the last four years 20 % of the fruit production orchard areas vanished.

The orchards in Czechia have an inconvenient age structure with a high rate of superannuated plantings. In apple trees more than 52 % areas belong to the overaged. Production of peaches has practically finished in Czechia, where there is about 70 % of the superannuated orchards and of the red and white currants, where this share makes it more than 90 %. Renewal of the old plantings is taking place on a part only, of the original areas. For the intensive fruit growing in the CR, pointing at lower growing shapes and increasing of the planting density is typical. The ratio of the fertile (start of fertility + full fertility) and infertile plantings has been improving during the last 15 years. The subsidy programme Orchards restructuring support in the integrated production systems has been fulfilling the expected targets and influencing primarily the fruit production orchards structure in the desired directions. During most of the time series section studied improvement of the ratio of old and fertile orchard areas occurred.

As Ludvík (2019), the chairman of CR Fruit Union is pointing out, Czechia's self-sufficiency in fruit production has fallen below 50 %. Poland became a great competitor to the Czech apple growers and has doubled Polish apple production during the 15 years in the EU up to 5 million tons. Now Poland is the largest apple grower in Europe with a big overweight

(Hosnedlová, 2017). Apple imports to Czechia have doubled since the EU accession up to a level of 70,000 to 80,000 tons, roughly. The share of Polish apples on imports has been risen during the last 4 years from 27 % up to 52 %. Profitability of Czech fruit growing became fully dependent on subsidies after the EU accession.

All in all, the production fruit growing is aiming at still higher efficiency, under the market pressures. New plantings have been limited by financial severity, crop instability and sector economics. The instability is hindering savings creation for financing of future investment into the areas expansion. If the situation does not improve, a further undesirable fruit orchard areas decrease will follow in the CR. (In)ability of this sector to cover the Czech Republic population's consumption will be developing proportionally.

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Making a portfolio of the participation funds in supplementary pension savings via fuzzy mean absolute semi-deviation model

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Abstract: Saving for a future usage (mainly for pension age) is very common matter for (young) people today. Dependence only on old-age pension can be very limited, especially in times of unstable (losing) pension system in the Czech Republic. One of the most favourite savings products is a supplementary pension savings within which the shares of investment in particular participation funds are configurable according to the client's preferences. That portfolio making process may not be easy. A suitable supporting tool helping us to make such a decision can be a quantitative approach based on the mathematical programming principle – fuzzy mean absolute semi-deviation model. At first, the original variance (from Markowitz model) is replaced by another risk measure called absolute semi-deviation because a trend in return development of the funds is similar. The covariances reflecting the relations among funds' returns can be excluded. Minimizing risk function becomes linear. Moreover, such a risk measurement technique does not penalize a positive deviation from a mean. Secondly, a fuzzy form enables to express a typical instability (vagueness) of return via a fuzzy set, or triangular fuzzy number. This model can be applied to make an effective portfolio of participation funds from the perspective of usually two most important characteristics – return and risk. Based on the analysed results of the introduced methodological approach, a suitable portfolio is selected for two most frequent investment (savings) strategies, called conservative and dynamic, on the Czech market.

Keywords: absolute semi-deviation, fuzzy, participation fund, portfolio making.

JEL Classification: C61, G11

1 Introduction

Until 2013, the pension insurance in terms of the third pillar was relatively rigid in the Czech Republic. Only one investment (savings) strategy was actually possible. Since its transformation to the supplementary pension savings (still in the third pillar), a range of investment opportunities was extended. The pension company usually operates three, or four participation funds in which free financial resources can be invested in various shares according to the client's preferences. In addition to state aid, the component of capital return can vary considerably. Therefore, a decision making about a portfolio composition would become irresolute. To help in such a situation, a suitable supporting methodological approach is necessary.

We know several techniques how to make a portfolio of assets (not only participation funds). The process can be mainly based on a human intuition, or sentiment. It rather reflects a qualitative analysis, maybe supported by some quantitative information about the expectable returns. Then the shares of all portfolio components are estimated. The clients sometimes decide on an investment based on practically one-criterion view. Some of them highly accentuate the return without being fully aware of the risk of such an investment. Another people are significantly focus on the risk because they are extremely scared of possible losses. Other real-life situation is represented by the clients of "larger" bank offering this product who are sometimes injudiciously influenced by their home bank "profiling" strategy. Such a unilateral decision can cause missing a more interesting portfolio composition.

More complex quantitative approaches including various aspects of decision making with supplementary pension savings are found in the field of operations research, or decision making theory. All these methods are based on the mathematical programming optimization model. Some methods reflect a multi-stage character of the decision making, for instance the model from Kilianová & Pflug (2009). These dynamic models allow to revise a portfolio during a reporting time based on the actual conditions, or client's preferences. Many models can accept the typical elements of uncertainty for such a decision making problem – return or risk. Return is often expressed as a stochastic element represented by random variable with some continuous probability distribution, for instance Consigli et al. (2012). A stochastic return

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enables an application of stochastic dominance concept for making a portfolio of the participation funds as designed, for example, Kopa et al. (2018) or Consigli et al. (2019). Other group includes the methods taking into account a risk volatility (instability over time), for instance represented by Yang et al. (2015) or Li et al. (2017). Typical more complex quantitative approach is also represented by a well-known mean-variance optimization model proposed by Markowitz (1952, 1959). This model enables to make portfolios with an effective combination of return and risk under additional specified conditions. Like the previous quantitative approaches, here shares are also exactly calculated. Moreover, the uncertain elements can be also included. The risk measurement concept (variance) can be changed as needed.

After a review of the literature about making a portfolio (of participation funds), I recommend a mean-variance technique with particular revisions to make a complex and representative decision within the client's (rational) preferences. The first revision concerns a non-linear risk function taking into account the relations among assets' returns seems to be unnecessary because these relations are so weak in the case of selected participation funds. As a more suitable risk measure, I suggest applying an absolute semi-deviation (Konno and Wijayanayake, 1999) leading a linear risk function. Further, return is typically unstable over time. The vague (uncertain) return can be replaced by its mean. Then the variability, which can affect the final portfolio composition, is omitted. I propose to present this uncertainty via the instruments of fuzzy set theory. Return can be expressed as a triangular fuzzy number enabling the quantification of a vague return. Thus, the original mean-variance model is transformed to a better applicable version in our decision making problem – fuzzy mean (return)-absolute semi-deviation model. And what makes this model more advantageous than the others mentioned above? Firstly, there is no stochastic element. There is no need to determine the distribution of random variables, which can sometimes be a difficult process, especially on the financial market. The proposed approach applies a different view of uncertainty (through fuzzy sets) that slightly simplifies its quantification. Further, the model is one-stage. This static form significantly simplifies a formulation and subsequent finding a solution of the model. The static model is widely applicable because many real-life cases represent the holding long term non-revised portfolios. Another benefit of this method can be its understandability and algorithmic simplicity. Finally, the model can also be extended by multi-stage aspect or risk variability.

Thus, the main aim of this paper is to describe a developed fuzzy mean (return)-absolute semi-deviation model, including a transformation of originally fuzzy model to the strict form. The second aim is to show its applicability for a decision making within a supplementary pension savings product. A practical supporting power of a proposed methodological approach is confirmed in a real-life making a portfolio of participation funds offered by Conseq supplementary pension savings. This provider is selected (from 8 companies in the Czech Republic) by means of multi-criteria analysis performed by Borovička (2019). To cover the most real-life cases, the portfolio is made for two most frequent investment (savings) strategies. Conservative and dynamic strategies are specified. The portfolios are analysed and compared from the perspective of their composition and characteristics.

The article has the following structure. After introduction, mean-variance model is briefly described. Further, possible revisions in a risk and return measurement are discussed in more details. A fuzzy mean absolute semi-deviation optimization model is introduced. Next section provides an application to a real-life making a portfolio of Conseq participation funds. Finally, the article is summarized and the idea for future research are outlined.

2 Methodological framework

For a portfolio making problem, a well-known mean-variance optimization model was proposed. This approach takes into account two most important investment characteristics – return and risk. Return is strictly measured as a mean from a historical return. Risk is calculated as a variance of the portfolio return. A diversification idea reflects the relations among returns of the portfolio components through their covariances. This approach is understandable, easily applicable in practice. The mathematical model is standardly formulated as follows.

$$\begin{aligned} \max \quad & \mathbf{v}^T \mathbf{x} \\ \mathbf{x}^T \mathbf{Q} \mathbf{x} \leq & r' \\ \mathbf{x} \in & X \end{aligned} \quad (1)$$

where:

$\mathbf{x} = (x_1, x_2, \dots, x_n)^T$ vector of n variables representing the shares of n assets in the portfolio

$\mathbf{v}^T = (v_1, v_2, \dots, v_n)$ vector of returns of n assets measured by mean

\mathbf{Q} covariance matrix including a covariances/variances of the assets' returns

r' upper limit of the portfolio risk

$X = \{ \mathbf{x}^T \mathbf{1} = 1, \mathbf{x} \geq \mathbf{0} \}$ set including the portfolio (standardization) condition and non-negativity constraints for variables

2.1 Mean-variance model revisions

This model is technically open for its revision according to needs of a portfolio selection problem in practice. Firstly, the set X can be extended by additional constraints describing other requirements for a portfolio, e.g. minimum/maximum allowed share for the (selected) assets. Further, the risk and return can be expressed by another way. The risk can be represented via another measures (semivariance, absolute deviation, absolute semi-deviation, etc.). The original variance technique tries to diversify the portfolio by balancing the loss of one asset by the yield of another one. This principle can inadequately limit a portfolio return. Moreover, the risk function is non-linear which can prolong a process of finding a global extreme (optimum). The first (and main) drawback can be eliminated by a semivariance technique (Markowitz, 1959), because only positive deviations from the mean are included. However, a non-linearity is still present. This minor obstacle is removed through absolute semi-deviation approaches. The risk measure can be formulated as follows.

$$SD = \frac{\sum_{m=1}^M (\bar{v} - v_m)}{M} \quad (2)$$

where:

$v_m, m = 1, 2, \dots, M$	m -th historical return (lower than mean) of the asset
\bar{v}	average return (mean)
M	number of observations of historical returns lower than mean

Under this measure, the risk function, expressed as a weighted sum of assets' risks, is naturally linear. This measure is perfectly applicable when there are not strong relations among the assets' returns. Then an inclusion of the covariances is actually unnecessary. It should be added that an original diversification idea disappears.

Other known measures are based on a knowledge of probability distribution of returns (Value at Risk and its modification). In the end, the Conseq company also provides a risk of the participation funds. This indicator is determined as integer value from the interval $\langle 1, 7 \rangle$. The value is also derived from a historical development of return through its volatility measured by a standard deviation. After a review of the risk measures, the most suitable risk measure for a solved problem seems to be an absolute semi-deviation. It does not discriminate a positive return deviation. It does not require any additional information (e.g. type of probability distribution). A portfolio risk function can be considered linear due to an elimination of the return covariances which are unnecessary in the solved problem because the relations among returns of participation funds are very weak. As expected, the covariance analysis confirms slightly positive relations because a return development is mostly in the same direction. This fact reinforces the presence of participation funds from only one supplementary pension savings product.

The second element for a discussion is a return. On the capital market, this factor can be very unstable over time. The mean-variance (semivariance, etc.) measure substitutes this uncertainty via an average value. This technique is, of course, simplistic. A part of information is lost. However, a work with such a strict element is easy. If we want to describe a reality more plausibly, the uncertainty should be satisfactorily considered. A suitable tool for its quantification is a fuzzy set, or fuzzy number (Zadeh, 1965). Then a vague return can be presented by the triangular fuzzy number \tilde{F}_v with the following membership function.

$$\mu_{\tilde{F}_v}(v) = \begin{cases} 0 & v \leq v_l \wedge v \geq v_u \\ \frac{v-v_l}{v_m-v_l} & v_l \leq v \leq v_m \\ \frac{v_u-v}{v_u-v_m} & v_m \leq v \leq v_u \\ 1 & v = v_m \end{cases} \quad (3)$$

where:

v_l, v_m, v_u	lower, middle and upper value of return v
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It can be formally written as a triplet $\tilde{F}_v = (v_l, v_m, v_u)$. And why is just a triangular shape of fuzzy number selected? Firstly, this shape usually describes a "distribution" of return satisfactorily, or its vagueness as well. Secondly, a membership function is piecewise linear which makes work with the fuzzy number easier. Main computing operations with triangular fuzzy numbers are well-known and easily applicable in practice.

2.2 Fuzzy mean absolute semi-deviation model

The benefits and contribution of absolute semi-deviation measure and vague return as triangular fuzzy number approach are evidently good way to make a portfolio of participation funds under all specific conditions satisfactorily. Then, a mean-variance model is transformed to the fuzzy mean (return) absolute semi-deviation model formulated (with an interpretation related to the solved portfolio making problem) as follows.

$$\begin{aligned} \max z(\mathbf{x}) = \tilde{\mathbf{v}}^T \mathbf{x} & \quad \max z(\mathbf{x}) = (\mathbf{v}_1^T \mathbf{x}, \mathbf{v}_m^T \mathbf{x}, \mathbf{v}_u^T \mathbf{x}) \\ \mathbf{r}^T \mathbf{x} \leq r' & \quad , \text{ or } \quad \mathbf{r}^T \mathbf{x} \leq r' \\ \mathbf{x} \in X & \quad \mathbf{x} \in X \end{aligned} \quad (4)$$

where:

$\mathbf{x} = (x_1, x_2, \dots, x_n)^T$	vector of n variables expressing the shares of n participation funds in the portfolio
$\tilde{\mathbf{v}}^T = (\mathbf{v}_1^T, \mathbf{v}_m^T, \mathbf{v}_u^T)$	vector of fuzzy returns of n participation funds expressing the triangular fuzzy numbers
$\mathbf{v}_1^T = (v_{l_1}, v_{l_2}, \dots, v_{l_n})$	vector of lower values of the returns of n participation funds
$\mathbf{v}_m^T = (v_{m_1}, v_{m_2}, \dots, v_{m_n})$	vector of modal values of the returns of n participation funds
$\mathbf{v}_u^T = (v_{u_1}, v_{u_2}, \dots, v_{u_n})$	vector of upper values of the returns of n participation funds
$\mathbf{r}^T = (r_1, r_2, \dots, r_n)$	vector of risks connecting with a return instability of n participation funds
r'	upper limit of the portfolio risk
X	set including the constraints representing all (other) portfolio conditions

The elements of vectors $\mathbf{v}_1^T, \mathbf{v}_m^T, \mathbf{v}_u^T$ are calculated via the following proposed formulas.

$$\begin{aligned} v_{l_j} &= \min_{1 \leq k \leq K} (v_j^k) & j = 1, 2, \dots, n \\ v_{m_j} &= \frac{\sum_{k=1}^K v_j^k}{K} & j = 1, 2, \dots, n \\ v_{u_j} &= \max_{1 \leq k \leq K} (v_j^k) & j = 1, 2, \dots, n \end{aligned} \quad (5)$$

where:

v_j^k	k -th historical return of j -th participation fund
K	number of historical returns for each participation fund

Upper limit for a portfolio risk r' is determined on the basis of a decision maker's preferences that can be also shaped by a knowledge of the possible lowest and highest level of a portfolio risk. These extremes are specified through one-objective models minimizing, or maximizing the risk function $z_r(\mathbf{x})$ on the set X . Then the following can be formulated.

$$\begin{aligned} \mathbf{x}_{\text{MIN}}^r &= \arg \min_{\mathbf{x} \in X} z_r(\mathbf{x}), & \mathbf{x}_{\text{MAX}}^r &= \arg \max_{\mathbf{x} \in X} z_r(\mathbf{x}) \end{aligned} \quad (6)$$

Then the upper limit r' can be designed by the following formula.

$$r' = z_r(\mathbf{x}_{\text{MIN}}^r) + p[z_r(\mathbf{x}_{\text{MAX}}^r) - z_r(\mathbf{x}_{\text{MIN}}^r)] \quad (7)$$

where:

$$p \in \langle 0, 1 \rangle$$

The parameter p can reflect a decision maker's attitude to the risk. To solve the problem of fuzzy mathematical programming (4), the fuzzy goal principle (Bellman & Zadeh, 1970) is applied through *maxmin* optimization technique (Zimmermann, 1978). Thus, the model (4) can be transformed to the strict form as follows.

$$\begin{aligned}
& \max \quad \alpha \\
& \frac{\mathbf{v}_l^T \mathbf{x} - z_{v_l}(\mathbf{x}_{\text{MIN}}^{v_l})}{z_{v_l}(\mathbf{x}_{\text{MAX}}^{v_l}) - z_{v_l}(\mathbf{x}_{\text{MIN}}^{v_l})} \geq \alpha \\
& \frac{\mathbf{v}_m^T \mathbf{x} - z_{v_m}(\mathbf{x}_{\text{MIN}}^{v_m})}{z_{v_m}(\mathbf{x}_{\text{MAX}}^{v_m}) - z_{v_m}(\mathbf{x}_{\text{MIN}}^{v_m})} \geq \alpha \\
& \frac{\mathbf{v}_u^T \mathbf{x} - z_{v_u}(\mathbf{x}_{\text{MIN}}^{v_u})}{z_{v_u}(\mathbf{x}_{\text{MAX}}^{v_u}) - z_{v_u}(\mathbf{x}_{\text{MIN}}^{v_u})} \geq \alpha \\
& \mathbf{r}^T \mathbf{x} \leq r' \\
& \mathbf{x} \in X \\
& 0 \leq \alpha \leq 1
\end{aligned} \tag{8}$$

where:

α	grade of membership of the solution
$z_{v_l}(\mathbf{x}_{\text{MIN}}^{v_l})$, or $z_{v_l}(\mathbf{x}_{\text{MAX}}^{v_l})$	lowest, or highest possible level of the lower value of a portfolio return
$z_{v_m}(\mathbf{x}_{\text{MIN}}^{v_m})$, or $z_{v_m}(\mathbf{x}_{\text{MAX}}^{v_m})$	lowest, or highest possible level of the modal value of a portfolio return
$z_{v_u}(\mathbf{x}_{\text{MIN}}^{v_u})$, or $z_{v_u}(\mathbf{x}_{\text{MAX}}^{v_u})$	lowest, or highest possible level of the upper value of a portfolio return

These extremes are also determined through the same principle as in the case of risk represented by (6). All aforementioned models are linear. The set of feasible solutions is limited (at least) due to a portfolio condition $\mathbf{x}^T \mathbf{1} = 1$, and non-negativity conditions $\mathbf{x} \geq \mathbf{0}$. Then the optimal solution of such models can be easily found by simplex method.

Now, the most suitable portfolio composition under all specified requirements is found. Moreover, by gradually adjusting the value of upper risk limit r' through the parameter p , all effective portfolio (effective combination of fuzzy return and risk) are received. However, a vague value of the portfolio return may not be understandable for the client/investor. The investor needs a clear information about that – strict value of portfolio return. This value can be reachable via the following recalculation formula (for the optimal solution \mathbf{x}^*) based on the simple average.

$$v_{strict}^* = \frac{\mathbf{v}_l^T \mathbf{x}^* + \mathbf{v}_m^T \mathbf{x}^* + \mathbf{v}_u^T \mathbf{x}^*}{3} \tag{9}$$

Now, all effective combinations of “(strict) return-risk” are known. According to the client’s preferences, the most suitable „return-risk“ portfolio under all investment conditions can be selected.

3 Making a portfolio of the Conseq participation funds

The Conseq Finance company was established in 1994 for the purpose of securities trading. During the 1990s, this company expanded its activities by a management of individual portfolios and distribution of the open unit trusts. Increasing importance of these activities led to their separation from the trading activities through the establishment of a subsidiary Conseq Investment Management in 2000. At present, Conseq Investment Management is one of the largest managers from the perspective of the volume of assets under management in the Czech Republic. A stable and high-quality professional team takes care of clients’ satisfaction, which is mainly domestic institutional investors, domestic industrial enterprises, and also extent municipalities as well as a significant group of private clients (About us, 2019).

Offering products include supplementary pension savings that is very popular in the Czech Republic. The company offers three participation funds – Conseq Invest Equity Fund, Conseq Invest Bond Fund and Conseq Invest Mandatory Conservative Fund (List of participation funds, 2019). The funds differ in their investment portfolio which influences their “return-risk” profile. Conseq Invest Equity Fund allocates the capital on the equity markets in a various regions and states in the world. The aim of this fund is an appreciation of the funds in a longer-time time horizon. A potentially higher return usually leads to a higher investment risk, or threat of loss (Global Equity Fund, 2019). Conseq Invest Bond Fund tries to reach an appreciation of the capital in a medium-term time horizon through the investment in a diversified portfolio of bonds and money market instruments. The return and risk of this participation fund is expected somewhere between in other two funds (Bond Participation Fund, 2019). The third fund, Conseq Invest Mandatory Conservative, invests in money market instruments, term deposits or state bonds to receive a stable (potentially lower) return at the low level of risk (Mandatory Conservative Fund, 2019).

The existence of alternatives raises the question of what the portfolio composition for a particular investment (savings) strategy should look like. The aim of this chapter, or the whole article, is to answer this question.

3.1 Investment (savings) strategies and necessary data

The company offers assisted investment strategies - dynamic, balanced, conservative (Assisted savings strategies, 2019). These “products” are successful on the Czech market. However, the investment (savings) strategy can be flexibly customized according to the client’s preferences. In other words, the initial shares of the participation funds in the portfolio can be diverse. This possibility is probably most used by the more experienced clients in the world of finance who have a more concrete idea about their investment (saving). Then a portfolio composition must be determined under the client’s preferences. For the analysis, the two most frequent strategies are naturally studied. The *conservative strategy* is represented by the client safely saving mainly in more conservative participation funds to significantly eliminate the risk of a possible loss. S/he is satisfied with a lower, however stable return. On the contrary, the *dynamic strategy* is typical for the client who is not particularly afraid of a short-term negative return fluctuation to gain a solid (potentially higher) return in the long-term horizon. Thus, for this purpose, s/he is able to takes a higher investment risk.

As indicated above, two clearly most important criteria affecting the investment decision (portfolio making) are return and risk of the investment. Return is usually unstable in time. This element of uncertainty (typical for a capital market) can be quantitatively expressed via a triangular fuzzy number (3) with the parameters (5). These parameters are calculated from the historical yearly return (recalculated from the monthly data) from the period 2013-2019 which is the entire lifetime of the supplementary pension savings product. The risk is measured by a mean absolute semi-deviation (2) calculated from the same historical period. It is considered as stable over time. All data are shown in the following table (Table 1).

Table 1 Data of the Conseq participation funds

Participation fund	Return [%]	Risk [%]
Conseq Invest Equity Fund	(-9.69, 7.21, 19.53)	9.50
Conseq Invest Bond Fund	(-1.04, 1.58, 5.00)	2.07
Conseq Invest Mandatory Conservative Fund	(-0.98, 0.01, 1.39)	0.83

Source: Own calculation and (Conseq, 2019)

3.2 Finding a portfolio for both strategies

For both strategies, the portfolio will be diversified from the perspective of the number of the funds. All funds may be included in the portfolio. The minimum level of share is specified at 10 %. In addition, the share of low-risk conservative fund would be higher in a conservative strategy. It is determined at the level of 50%. Such a level formed from the similar perspective is specified for the higher-return equity fund in a dynamic strategy to have a chance for a potentially higher investment return. To make a portfolio for a conservative, or dynamic strategy, the following (defuzzied) mathematical models are formulated (from the fuzzy form (4))

$$\begin{array}{ll}
 \max \alpha & \max \alpha \\
 \frac{\mathbf{v}_1^T \mathbf{x} - (-4.47)}{-4.47 - (-1.86)} \geq \alpha & \frac{\mathbf{v}_1^T \mathbf{x} - (-7.95)}{-5.34 - (-7.95)} \geq \alpha \\
 \frac{\mathbf{v}_m^T \mathbf{x} - 0.89}{3.05 - 0.89} \geq \alpha & \frac{\mathbf{v}_m^T \mathbf{x} - 3.77}{5.93 - 3.77} \geq \alpha \\
 \frac{\mathbf{v}_u^T \mathbf{x} - 3.57}{9.01 - 3.57} \geq \alpha & , \text{ or } \frac{\mathbf{v}_u^T \mathbf{x} - 10.82}{16.26 - 10.82} \geq \alpha \\
 \mathbf{r}^T \mathbf{x} \leq 2.17 + p(5.50 - 2.17) & \mathbf{r}^T \mathbf{x} \leq 6.61 + p(9.95 - 6.61) \\
 \mathbf{x}^T \mathbf{1} = 1 & \mathbf{x}^T \mathbf{1} = 1 \\
 \mathbf{x} \geq \mathbf{q}_c & \mathbf{x} \geq \mathbf{q}_d \\
 0 \leq \alpha \leq 1 & 0 \leq \alpha \leq 1
 \end{array} \tag{10}$$

where:

- $\mathbf{x} = (x_1, x_2, x_3)^T$ vector of variables representing (in a row) a share of equity, bond and conservative fund
- $\mathbf{q}_c = (0.1, 0.1, 0.5)^T$ vector of minimum shares of the participation funds for a conservative strategy
- $\mathbf{q}_d = (0.5, 0.1, 0.1)^T$ vector of minimum shares of the participation funds for a dynamic strategy
- $\mathbf{1} = (1, 1, 1)^T$ vector of all ones

All extreme values of both objective functions (representing return and risk of the portfolio) are found on the set of feasible solution $X = \{\mathbf{x}^T \mathbf{1} = 1, \mathbf{x} \geq \mathbf{q}_c\}$, or $X = \{\mathbf{x}^T \mathbf{1} = 1, \mathbf{x} \geq \mathbf{q}_d\}$ for conservative, or dynamic strategy through (6). All linear mathematical programming models are easily solved in the environment of LINGO optimization software.

First a result for maybe the most frequent conservative strategy will be introduced. A portfolio composition is naturally influenced by the value of parameter p that reflects the client's preferences. A lower value of this parameter means a higher risk aversion. Thus, the conservative client favours a lower value to take into account his/her fear of a possible investment loss. Let us determine $p = 0.1$. Then the portfolio composition with its characteristics is in the following table (Table 2).

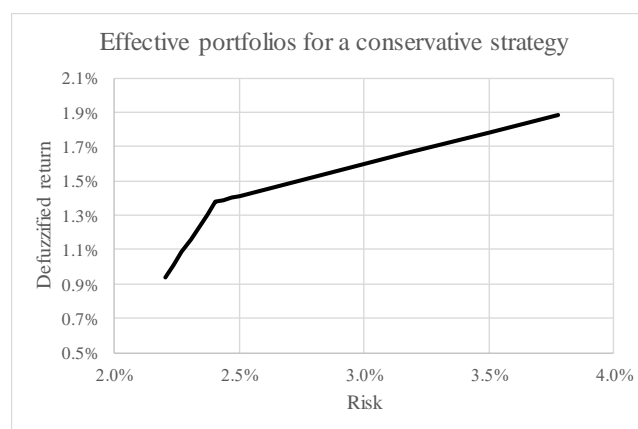
Table 2 Portfolio for a conservative strategy ($p = 0.1$) and its characteristics

Participation fund	Share [%]	Characteristics	Value [%]
Conseq Invest Equity Fund	10.97	<i>Fuzzy return</i>	(-1.96, 1.41, 4.79)
Conseq Invest Bond Fund	39.03	<i>Defuzzified return</i>	1.41
Conseq Invest Mandatory Conservative Fund	50	<i>Risk</i>	2.5

Source: Own calculation

It is not surprise that the share of conservative fund is the highest, followed by a bond fund. The equity fund share is almost at the lowest possible level determined by the client. The closer to the parameter p equal to zero, the closer to a minimum share of the equity and bond fund, or the 80 % share of the mandatory conservative fund. Portfolio „10%-10%-80%“ provides a minimum possible risk. As the value of the parameter increases, the share value of the conservative fund is rapidly reduced to the minimum possible level, as we can see in Table 2. Higher shares of the equity and bond fund bring a higher (defuzzified) return, calculated by (9). Of course, as portfolio return increases, the grade of membership of the result also increases. The effective combination of fuzzified return and risk (effective “return-risk” portfolio) under all specified conditions can be displayed as follows (Figure 1).

Figure 1 Effective portfolios for a conservative strategy



Source: Own processing

Another important fact must be mentioned. The path to the highest (defuzzified) return and risk does not lead over the portfolio “10%-40%-50%, thus containing the funds with a higher return in the highest possible share. If the return was calculated in the strict form as an average, this expectable fact would hold. However, the result (with the highest grade of membership) is different because a return variability is not omitted due to a fuzzy form of return. The conservative client (investor) has an image about the portfolios with the best attainable combination of risk and (fuzzified) return, or return under the specified upper level of risk. If the conditions of the investment (savings) problem, or the client's preferences, become different, the effective combination will naturally change. Such a change can be observed through the second type of investor.

An effort of a dynamic strategy is to obtain a potentially higher return. For this purpose, apparently higher level of risk must be accepted. Then, let us determine the parameter p equal to 0.7. The result can be seen in Table 3.

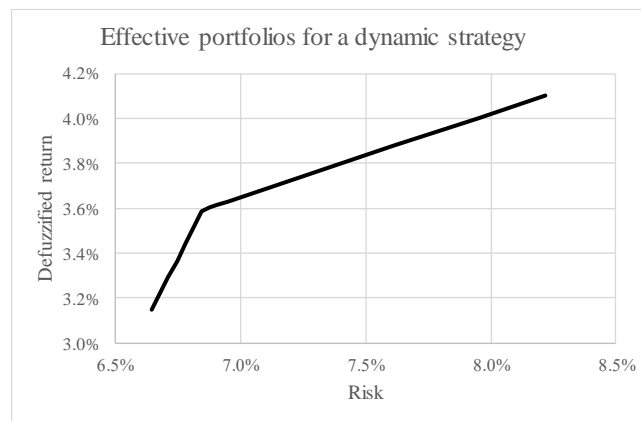
Table 3 Portfolio for a conservative strategy ($p = 0.7$) and its characteristics

Participation fund	Share [%]	Characteristics	Value [%]
Conseq Invest Equity Fund	63.26	<i>Fuzzy return</i>	(-6.51, 4.98, 13.83)
Conseq Invest Bond Fund	26.74	<i>Defuzzified return</i>	4.10
Conseq Invest Mandatory Conservative Fund	10	<i>Risk</i>	8.22

Source: Own calculation

It is not surprise that the highest share is connected with the equity fund that provides the highest return (with the highest level of risk). On the contrary, the mandatory conservative fund is represented with the minimum possible share in the portfolio. This solution has the highest grade of membership ($\alpha = 0.553$) over all values of parameter p . All effective portfolios from the perspective of their return and risk can be also graphically rendered as follows (Figure 2).

Figure 2 Effective portfolios for a dynamic strategy



Source: Own processing

According to the current attitude to the investment risk of the “dynamic” client, the portfolio with the highest possible return is composed.

3.3 Result comparison and discussion

It is obvious, that the portfolios for both strategies differ in the values of their two characteristics. As expected, return and risk are higher in the case of dynamic strategy. It is shown again that a “higher risk-higher return” principle is real on the capital (bank) market. The methodological approach offers a particular portfolio composition on the basis of brief preference information from the client (investor). This approach is flexible, the portfolio can be easily customized.

The uniqueness of the method lies mainly in capturing the main element of uncertainty – unstable return. Its expression as a triangular fuzzy number was testified. A possibility of considering return instability makes the result more representative, closer to the practice circumstances. As solving the problem shows, a form of return expression can affect a portfolio composition. Further, the mathematical models can be flexibly modified. For instance, the risk objective function can be reformulated to the standard Markowitz nonlinear form. Such a nonlinear model can be also solvable. However, as mentioned above, the covariances of returns are almost zero in this case. Then they cannot significantly affect a final portfolio composition.

Finally, the analysis is based on the historical data which is typical for the portfolio making problems. It is expected that history will repeat. Mainly in a longer-time investment horizon, an adequate selection of the historical period can reflect the future very well. Even so, it should be kept in mind that this is only an estimate. Therefore, we should not be surprised by their (partial) non-fulfillment.

4 Conclusions

This article deals with a proposing methodological approach for making a portfolio of participation funds with its subsequent application to the Conseq supplementary pension savings. Why? Because besides the investment (savings) strategies predefined by the institutions owning or managing the participation funds (in the supplementary pension savings), a portfolio composition can be also made individually. For this purpose, a supporting methodological approach is proposed and applied in a real-life decision making situation with this product. The “return-risk” models (Markowitz model and their modifications) are analysed. To consider a typical element of uncertainty (unstable return) and adequate risk measure, a fuzzy mean absolute semi-deviation model is formulated as a practical transformation of the original Markowitz

mean-variance model. Fuzzy return and different risk measure seem to be very helpful for making a satisfactory decision closer to the specific conditions and circumstances. The power of proposed approach is demonstrated in a real decision making process with the Conseq participation funds for two typical investment (savings) strategies. The effective portfolios are composed for these two most frequent types of clients. The results are adequately compared. As the interesting idea for future research is an integration of the unstable (vague) portfolio risk because this measure can be also change over time. It would be the next step towards getting even closer to reality.

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Current capacity gap in dementia/AD in the Czech Republic

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Abstract: At present, there are about 50 million people worldwide living with dementia/Alzheimer's disease. It is expected that by 2050, this number will triple. At the end of 2014, there were 152,700 patients in the Czech Republic, who suffer from dementia/Alzheimer's disease. The aim of this conference paper is to (1) present the service/place matrix on current capacities in the Czech Republic, who serve patients with dementia/Alzheimer's disease, and to (2) calculate the current capacity gap by regions. The current capacities will be presented in the format of a service (health, social, and informal care) / place (ambulatory, field, and in-patient services) matrix. The calculation of the current capacity gap will reflect prevalence of disease and regional benchmarks. Today, the estimated capacity gap is 16,004 beds in senior homes, 13,290 beds in special regime homes, and 2,325 beds in hospitals providing social services. In total, the gap in social services is 31,619 beds. The best performing regions are Olomoucký kraj and Moravskoslezský kraj. They have over capacities compared to the Czech Republic average. There is only one region – Plzeňský kraj with all three services types in deficit compared to national average. The calculation of the current capacity gap is very important for regions (who are responsible for dementia/Alzheimer's disease care delivery) to assess what capacities do they need and what strategies in dementia/Alzheimer's disease they need to implement to cover this capacity gap.

Keywords: Service/place matrix, capacity gap, dementia/Alzheimer's disease, Czech Republic.

JEL Classification: I10, I14, I15

1 Introduction

The World Health Organization recognized dementia as a global health challenge and called for all countries to include dementia in their public health planning (WHO, 2012). Caused mainly by aging, the prevalence of dementia (and Alzheimer's disease, which counts for approximately 60% of dementia cases), is growing rapidly. According to Alzheimer's Disease International (ADI), in 2015 46,8 million people were living with dementia worldwide, and the number is predicted to double in twenty years and to triple by 2050, which shows the severity of this challenge (ADI, 2015). Patients with dementia/Alzheimer's disease have a life expectancy of 7 to 10 years after the diagnosis, therefore with a growing number of patients, the burden on the health system, families, and caretakers and the society as a whole will be enormous.

There are several sources of the prevalence of dementia in the Czech Republic, ranging from 102,000 up to 152,700 people (see Table 1). According to the Report on Dementia in the Czech Republic, published by the Czech Alzheimer Society, there were 152,700 people with neurodegenerative diseases in early 2015. This number represents an increase of 10,000 people compared to 2013, which is an increase of 7% in a year (Mátl, Mátlová, Holmerová, 2016).

However, the number of patients in the Czech Republic is only estimated, as even in the most advanced countries, only about half of the people with dementia are diagnosed. Based on foreign prevalence studies, the number of people with dementia in the Czech Republic was estimated to be 143,309 at the end of 2014, of which more than two thirds with 97,778 to be female patients and one third with 45,532 to be male patients (Alzheimer Europe, 2013).

When considering the age structure, it is estimated that one in thirteen people over 65 years suffers from dementia, in the population over 80 years, it is 1 in 5 people, and in the population over 90 years, it is every second person (Mátl, Mátlová, Holmerová, 2016). According to Ministry of Health (2019), 102,000 people living in the Czech Republic have dementia, of which Alzheimer's disease represents 60% of cases. Above this, 75% of people are underdiagnosed! The topic of health and social burden of Alzheimer's disease was researched recently by Marešová et al (2015) and Auer et al. (2018).

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Table 12 Prevalence of dementia/AD in the Czech Republic

Prevalence (diagnosis)	Source
143,309 people (dementia)	Alzheimer Europe (2013), based on Hofman et al. (1991) and updated in year 2000 + European Collaboration on Dementia - EuroCoDe (2008)
152,700 people (dementia)	Mátl, Mátlová, Holmerová (2016) based on Czech Alzheimer Society
102,000 people (dementia) 62,000 with Alzheimer's disease	Ministry of Health (2019), based on UZIS data

Source: authors based on literature review

Aim of this paper is to:

1. Classify current capacities for patients with dementia/AD according to service/place matrix
2. Calculate the current capacity gap for patients with dementia/AD
3. Assess regional differences in capacities (Service Mix)

2 Methodology & Data

2.1 Classification of current capacities

In the Czech Republic, care of people with dementia/AD takes place in separate and unconnected sectors. Since the capacities of the health care system and social system are limited, many patients stay at home being cared by family members and other caregivers (non-formal care). A service/place matrix in Table 2 was used for classification of different types of services combined with place of service provision.

Table 13 Service/place matrix

	Home (field) services	Out-patient services	In-patient services
Non-formal care	Non-formal caregivers		
Social services	Formal care Personal assistance Respite care Emergency care	Daily centers Social advisory	Senior homes Special regime homes Respite care Hospitals Weekly centers
Healthcare services	Home care Hospices	Psychiatrists Neurologists Geriatricians Hospices	Psychiatry Long-term care Aftercare Neurology Geriatrics Spa Hospices
Gray economy	Personal services		Hotel type services

Source: Mátl, Mátlová, Holmerová (2016)

For quantification of current capacities (beds, consultation offices), the data was searched in different databases:

(1) *Outpatient healthcare services.* This part contains data about all doctor's practices with specialization in the field of psychology, sociology, and geriatrics (physical places of the practices). The source of data was the National Registry of Health Care Providers, where all providers register their practices/offices. The data were provided for the regions and the Czech Republic in total.

(2) *Inpatient healthcare services.* These data contain the following hospital wards: psychology, neurology, geriatrics, aftercare, treatment of long-term patients, and also healthcare facilities for patients with long term care (sanatoria) in which also patients with Alzheimer's disease can be treated for a certain time. In reality, only a small percentage of these capacities is used by patients with dementia/Alzheimer's disease (especially the psychiatry department is used for these patients very rarely). This data was acquired from the National Registry of Healthcare Providers and completed with the database of Healthcare Providers of Health Insurance company VZP. The information about the capacity (number of beds) was obtained directly from the providers and hospital wards or their official websites.

(3) *Social services.* The most important part of the care for patients with dementia/Alzheimer's is provided in the social area. The data were acquired for each region separately, from Regional networks of social services, Regional Action Plans for Development, Regional Mid-term Social Services Strategies and Regional Methodologies (see Table 3).

Table 14 Source of Data for the Service/Place matrix

Services	Data source
Ambulatory/outpatient healthcare services	National Registry of Healthcare Providers (2019)
Inpatient healthcare services	National Registry of Healthcare Providers (2019) Health Insurance company (Všeobecná zdravotní pojišťovna, 2019) Providers websites
Social care	Regional networks Action Plans for the development Mid-term social services strategies Regional Methodologies

Source: authors

2.2 Calculation of current capacity gap

To calculate the current capacity gap and regional differences, the following methodology was used:

1. Estimating the regional prevalence of dementia/AD based on the age structure of region. This was based on the assumption that the prevalence is 7.7% of people aged 65+. The number of people aged 65+ was from Czech Statistical Office (2014). According to this relation, the prevalence of dementia/AD in this model was 144,792 people, which is in line with literature review (see Table 1). The prevalence was also estimated for every region.
2. Comparing current capacities (service/place matrix) with estimated prevalence. In this step, the existing capacities were put into context with the estimated prevalence in each region. For each type of service, the leading region with the highest density of capacities was identified, and this was set as a benchmark. The gap of other regions compared to the leader was calculated.

2.3 Calculation of regional differences

First, clustering of services according to the Service/place matrix introduced in Table 2 was used. The services in the Service/place matrix were clustered into three groups: in-patient, out-patient and home (field) services. The in-patient cluster contained senior homes, special regime homes, social services in healthcare providers, respite care and weekly centers. To out-patient services only daily centers were included. In the home (field cluster) these services were grouped: personal assistance, formal caregivers and respite care.

To compare the situation in the 14 Czech regions, standardization using Z-scores (differences from an average divided by a standard deviation) used. The base of standardization is the service types clusters (home, in-patient, out-patient services) for all the fourteen Czech regions (named current capacity). The second step was the calculation of patients per current capacity. The lower the number, the higher the density of services. The third step - the difference of each region to average was calculated. In order to be able to calculate each of three clusters, the difference to average was divided by standard deviation to standardize the differences. These standardized differences were used to classify regions into four groups upon two axes, where the weights of axis are multiples of standard deviation.

3 Results and Discussion

3.1 Result 1: Service/place matrix

Table 4 summarizes the current capacities for patients with dementia/AD. There is a total of 2,260 outpatient care facilities, including 1,092 psychiatry practices, 1,064 neurology, and 104 geriatric practices. The largest number of these outpatient care facilities is located in the capital Prague with 280 psychology, 201 neurology, and 21 geriatric practices, resulting in a total of 502 facilities.

There is a total of 19,440 beds in the health care inpatient facilities, in the hospital wards or departments that treat patients with dementia/Alzheimer's disease, including 7,698 beds in psychiatry wards, 2,110 in neurology wards, 640 beds in geriatric wards, 5,167 beds in the departments treating long-term diseases and 3,825 beds in aftercare. Social care facilities can offer 53,487 beds to patients with dementia/Alzheimer's disease. From this capacity 34,706 beds (65% of total capacity in social care) are in retirement homes, 15,636 beds (29%) in special regime homes.

Table 15 Number of facilities for patients with dementia/Alzheimer's in the Czech Republic, 2019

	Home (field) services (FTE)	Out-patient services (FTE)	In-patient services (beds)
Healthcare		2,260	19,440
Geriatrics			640
Long-term Care			5,167
Neurology			2,110
Psychiatry			7,698
Psychiatrists		1,092	

Neurologists		1,064	
Geriatricians		104	
Aftercare			3,825
Social care	7,076	1,702	53,487
Daily centers		1,702	
Personal assistance	1,508		
Senior homes			34,706
Social services in healthcare providers			1,006
Respite care	440		1,408
Weekly centers			731
Special regime homes			15,636
Formal care	5,128		

Source: own construction based on collected data from sources specified in Table 3

Note: FTE = full time equivalent

3.2 Result 2: Capacity gap

The majority of the services for patients with dementia/Alzheimer's disease is covered by relatives. The current number of possible placements for these patients in the health, social or combined facilities is not sufficient, and there would need to be a large shift towards social care and opening new, for patients (or their families) affordable health and social care facilities to cover the growing demand for these services. Or there will be a shift to other possibilities such as personal assistance.

Today, the estimated capacity gap is 16,004 beds in senior homes, 13,290 beds in special regime homes, and 2,325 beds in hospitals providing social services (Table 5). In total, the gap in social services is 31,619 beds. This lack of beds is also underlined by existing waiting lists. Sixty-one thousand people are waiting to be placed in senior houses and twenty-two thousand people to be placed in Special regime homes (Novák, 2018).

Table 16 The capacity gap in social services (calculated as difference to the leader)

Region	Respite care	Weekly centers	Senior homes	Special regime homes	Social services in healthcare providers	Personal assistance	Formal care	Respite care	Daily centers	Service Clusters		
										I	H	O
PHA	0	0	-3,556	-2,388	-303	-190	-232	-134	-24	-6,247	-557	-24
VYS	-91	-78	-521	-740	-71	-67	-226	-40	-12	-1,332	-333	-12
MSK	-129	-160	-1,325	-1,492	-148	-80	-370	-130	-104	-2,964	-581	-104
OLK	-138	-91	-516	-989	-110	-111	-124	-37	-60	-1,615	-273	-60
PAK	-35	-48	-698	-803	-95	-55	-309	-56	0	-1,596	-420	0
HKK	-73	-74	-809	-1,084	-152	-52	-47	-10	-64	-2,045	-109	-64
LBK	-68	-26	-1,186	-633	-123	0	-44	0	-33	-1,942	-44	-33
ULK	-63	-85	-564	-333	-249	-134	-249	-5	-156	-1,146	-388	-156
PLK	-117	-59	-1,298	-557	0	-125	-162	-51	-118	-1,854	-338	-118
STC	-117	-49	-1,277	-1,943	-389	-171	-318	-98	-217	-3,609	-587	-217
JHC	-85	0	0	-1,221	-69	-122	-79	-66	-155	-1,290	-267	-155
ZLK	-49	-70	-638	-735	-170	-108	-169	-65	-83	-1,543	-342	-83
KVK	-76	-34	-580	-371	-69	-40	0	-36	-19	-1,020	-76	-19
JHM	-278	-70	-3,036	0	-378	-272	-692	-144	-325	-3,414	-1,108	-325
Total	-1,319	-842	-16,004	-13,290	-2,325	-1,527	-3,021	-872	-1,369	-31,619	-5,420	-1,369

Source: authors own calculation

Notes: I = In-patient services, H = home (field) services, O = out-patient services

STC – Středočeský kraj, HKK – Královéhradecký kraj, PAK – Pardubický kraj, VYS – Kraj Vysočina, JHC – Jihočeský kraj, PLK – Plzeňský kraj, KVK – Karlovarský kraj, ULK – Ústecký kraj, LBK – Liberecký kraj, JHM – Jihomoravský kraj, OLK – Olomoucký kraj, ZLK – Zlínský kraj, MSK – Moravskoslezský kraj.

3.3 Result 3 Regional view

The regional differences were calculated using Z-scores as differences to average divided by standard deviation. This methodology helps to compare the three type of services on the same measure – as multiple of standard deviation. Take the example of capital city Prague (PHA) – first line in Table 6. There are estimated 17,681 patients with dementia/AD, with current capacity in in-patient social services of 4,409 beds. This represent four patients per one bed. Compared with Ustecký kraj (ULK), where there are 2.1 patients per 1 bed. In Prague this means, that its difference to average (2.7 patients per bed) is - 1.3 patients/bed (gap). Divided by standard deviation (STD), the gap represents - 2.4 multiple of STD. In ULK, it's an opposite situation. The region has overcapacity of beds compared to average of 0.6 patients/bed, also expressed as + 1.2 multiple of STD. In a following way, we can interpret the other clusters. Namely, Prague has a surplus of + 0.2 multiple of STD both in home and out-patient social services.

Table 17 Capacities in regions expressed as difference to average/standard deviation

Region	EP	Current Capacity			Patients/current capacity			Difference to average			Difference to average/STD (Z-score)		
		I	H	O	I	H	O	I	H	O	I	H	O
PHA	17,681	4,409	969	351	4.0	18.2	50.4	-1.3	2.2	34.7	-2.4	0.2	0.2
VYS	7,155	2,812	285	140	2.5	25.1	51.1	0.2	-4.6	34.0	0.3	-0.4	0.2
MSK	16,432	6,650	838	245	2.5	19.6	67.1	0.2	0.8	18.0	0.4	0.1	0.1
OLK	8,922	3,533	497	130	2.5	17.9	68.8	0.2	2.5	16.3	0.3	0.2	0.1
PAK	7,167	2,641	199	152	2.7	36.1	47.2	0.0	-15.6	37.9	0.0	-1.5	0.2
HKK	8,068	2,671	587	107	3.0	13.7	75.3	-0.3	6.7	9.8	-0.6	0.6	0.1
LBK	5,953	1,552	470	93	3.8	12.7	63.7	-1.1	7.8	21.4	-2.1	0.7	0.1
ULK	10,822	5,229	546	73	2.1	19.8	148.0	0.6	0.7	-62.9	1.2	0.1	-0.4
PLK	8,128	2,868	364	55	2.8	22.3	148.9	-0.1	-1.9	-63.8	-0.2	-0.2	-0.4
STC	16,925	6,426	874	142	2.6	19.4	119.2	0.1	1.1	-34.2	0.1	0.1	-0.2
JHC	8,834	3,949	495	32	2.2	17.8	272.2	0.5	2.6	-187.1	0.9	0.2	-1.1
ZLK	8,260	3,317	371	93	2.5	22.3	89.1	0.2	-1.8	-4.0	0.4	-0.2	0.0
KVK	4,026	1,297	272	66	3.1	14.8	61.1	-0.4	5.6	24.0	-0.7	0.5	0.1
JHM	16,419	6,133	309	23	2.7	53.1	703.7	0.0	-32.6	-618.6	0.1	-3.1	-3.6
Total	144,791	53,487	7,076	1,702									
Average	10,342	3,821	505	122	2.7	20.5	85.1						
STD					0.5	10.5	173.1						

Source: authors own calculation

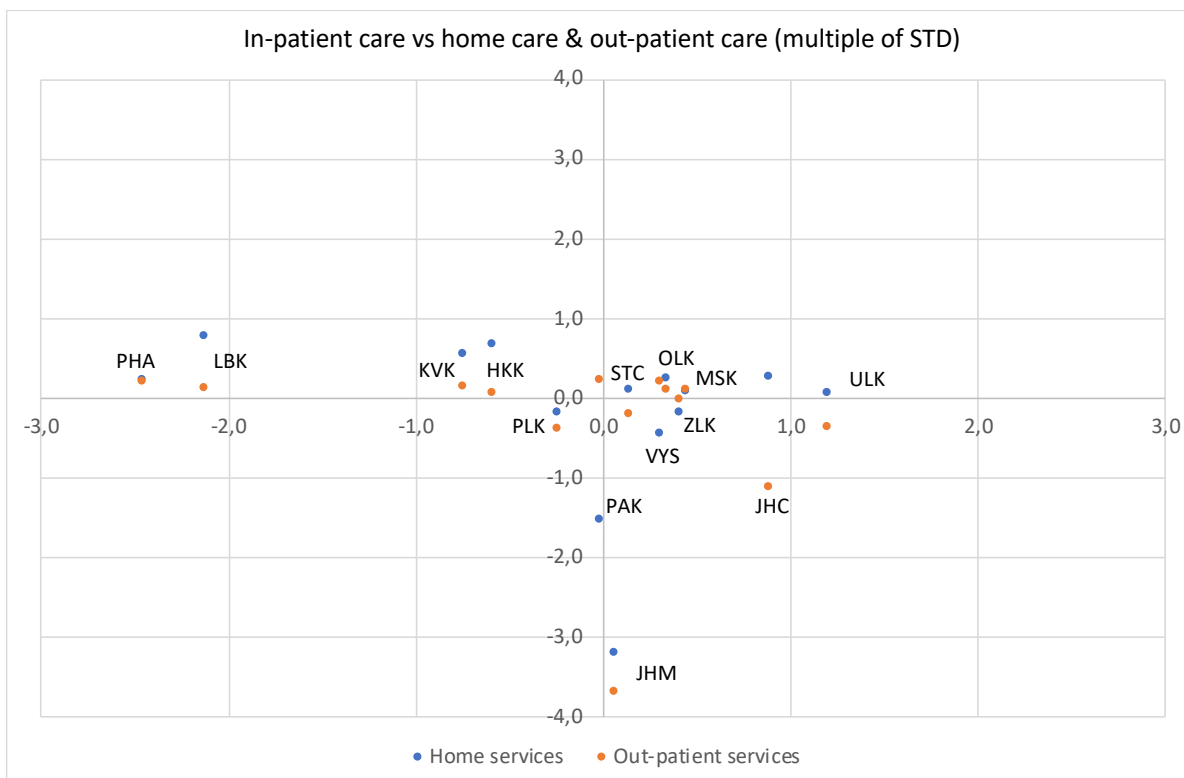
Notes: EP = Estimated patients with dementia/AD (prevalence 7.7% of 65+), I = In-patient services, H = home (field) services, O = out-patient services, STD = standard deviation

STC – Středočeský kraj, HKK – Královéhradecký kraj, PAK – Pardubický kraj, VYS – Kraj Vysočina, JHC – Jihočeský kraj, PLK – Plzeňský kraj, KVK – Karlovarský kraj, ULK – Ústecký kraj, LBK – Liberecký kraj, JHM – Jihomoravský kraj, OLK – Olomoucký kraj, ZLK – Zlínský kraj, MSK – Moravskoslezský kraj.

When comparing the services clustered into home, out-patient, and inpatient services, we can classify the regions into four categories, based on two axes measured by multiple of standard deviation (STD). The x-axis is inpatient services ranging from -3.0 STD up to $+3.0$ STD. The y-axis is out-patient and home services, expressed again as multiple of STD (-4.0 to $+4.0$) graphically represented by different colors in Figure 1.

The best performing regions are OLK and MSK. These two regions are in the $+/+$ quadrant, which means that they have over capacities compared to the Czech Republic average. PHA, LBK, KVK, and HKK are missing in-patient capacities, but compensated by stronger out-patient and home services. All these four regions are in quadrant $-/+$. On the contrary, in the $+/-$ quadrant the JHM region misses out-patient and home services, slightly compensated by in-patient services. There is only one region – PLK, that is representing the $-/-$ quadrant with all three services types. Also PAK was almost in this quadrant, but positive out-patient services made it an edge case. For the position of all 14 regions, see Figure 1.

Figure 6 Regional differences in capacities measured by multiple of standard deviation (Z-scores)



Source: authors own calculation

The shortcuts represent the higher-level territorial self-governing units in Czech Republic – the capital Prague (PHA) and following regions: STC – Středočeský kraj, HKK – Královéhradecký kraj, PAK – Pardubický kraj, VYS – Kraj Vysočina, JHC – Jihočeský kraj, PLK – Plzeňský kraj, KVK – Karlovarský kraj, ULK – Ústecký kraj, LBK – Liberecký kraj, JHM – Jihomoravský kraj, OLK – Olomoucký kraj, ZLK – Zlínský kraj, MSK – Moravskoslezský kraj.

3.4 Limitations of the calculation

There are two key limitations in this calculation:

1. The number of beds. Although data is actualized regularly and the facilities actualize their own capacity data, there were some disparities about the numbers of beds in a few facilities. Therefore, the actual number of beds and facilities can be slightly different. For the purpose of this paper, the number of 53,487 in social care despite its slight inaccuracy, is used as the baseline for calculations.
2. It is critical to say that this capacity is not used only for patients with dementia/AD. Since there is only limited evidence on the prevalence of dementia/AD in senior homes and special regime homes, for this calculation we assumed, as if these capacities were used only for dementia/AD patients, what is for sure, not the case. So the real capacity gap may be much higher if many capacities mainly in senior homes are occupied by people not suffering from dementia/AD. Incorporating the prevalence in social care is part of further research in this field.

4 Further research

Further research will be oriented on the incorporation of prevalence in Senior homes and Special regime homes as well as adding the model of prevalence based on stages of AD. Together with demographic model, this will allow calculating the future capacity gap in 2050. In line with this, also calculation of costs of AD using the prevalence method of Cost of Illness will be performed for all three types of services – social, healthcare and home. More specifically, the direct medical costs, the direct non-medical costs, and the indirect costs. For calculation of costs in health, social and home sector a demand/contracting methodology will be used.

5 Conclusion

Dementia and Alzheimer’s disease importance will grow with ageing population. Epidemiological data that would help policymakers to evaluate such impact and prepare health policy are often missing or inaccurate. In this conference paper the numbers of outpatient, inpatient and social care facilities providing care and services for patients with dementia/Alzheimer’s disease as well as their capacities were summarized and compared with the estimated number of these patients at present, to show the capacity gap in the services offered and to shed light on it as a challenge for the whole society.

The facilities and their capacities were summarized by regions to show which regions are doing the best. Even with a large number of patients that were not diagnosed yet and a large number of patients with family members taking care of them, the capacity gap is becoming significant in society. There is already an enormous deficiency in the number of beds, services provided, with plenty of patients on waiting lists for senior homes or special regime homes. Even with the current announcement of some providers, e.g. Alzheimer's home to enlarge its capacities from 400 to 3.000, this number will not provide sufficient capacities for the number of patients that are going to triple in upcoming decades.

The service/place matrix is a very useful tool for classification of services. The current capacity gap is approximately 31,619 beds in social services, but waiting lists are even higher – 83,300 people. The best performing regions are namely: OLK, MSK ... and also ULK and STC. The regions PHA, LBK, KVK, HKK, and PLK miss in-patient capacities. JHM, PAK, VYS, JHC, and ZLK miss out-patient or home services.

The findings of this conference paper can lead to further questions, on what should be done on the national and regional level to support proper capacity planning in the context of the aging population and the limited capacities of caregivers, relatives and social workers. On the other hand, the numbers show evidence that there is a market potential for opening new facilities in this area of health and social care and also for other types of services, such as personal assistance of formal caregivers for the elderly. Then, the affordability of such services for patients and their families in particular regions should be further discussed.

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Modelling of the impact of the regional climate change on the floodplain forest ecosystem in the period from 1951 to 2012

Milan Palát¹, Šárka Palátová²

Abstract: Phenological observation and data which are presented and elaborated in this study were observed in central Europe, in southern part of Czech Republic in the period from 1951 to 2012. The experimental site is situated in ecosystem of floodplain forest in alluvial plain of river Dyje near by town Lednice in South Moravia in the forest type group Ulmi-Fraxineta carpini. Over the time span of sixty-two years, the average annual temperature in this area increased by 1.5 °C and the average spring temperature increased by 2.0 °C. Overall, the phenological events of the tree component advanced the beginning of foliage by 10.0 days and full foliage by 9.2 days. For each of tree species the sums of effective temperature with threshold value 5 °C were detected. The conclusion of this study is that the phenology of trees, shrubs, herbs and birds in the floodplain forests of South Moravia was influenced by the regional climate change. Our contribution to the publication is focused on the tree floor. All the characteristics has changed in the correlation with the increase of the annual and spring air temperature.

Keywords: floodplain forest, phenological trends, trees, shrubs, herbs, animals.

JEL Classification: G32, G33, C35

1 Introduction

The aim of the analysis involved in the article is to define the significance of the impact of the regional climate change on the floodplain forest ecosystem. The experimental site is situated in ecosystem of floodplain forest in alluvial plain of river Dyje near by town Lednice in South Moravia in the forest type group Ulmi-Fraxineta carpini, where we evaluate the measurement of sixty two years. There are many publications by many authors (Bagár, R., Klimánek, M., 2000; Bauer, Z., 2006); Bauer, Z., Bauerová, J., Palát, M., 2008; Bauer, Z., Bauerová, J., Soukalová, E., 2009; Bauer, Z., Bauerová J., Lipina P., Palát, M., 2014, 2015; Gregor, F., 1956, 1957; Hubálek, Z., Šebesta, O., 2004; Král, M., 2014; Mrkva, R., 1968, 1969; Palat, M., 1991, 1997; Patočka, J., 1954, 1980; Šebesta, O., 2006; Tolasz, R., 2015). The conclusion of this study is that the phenology of trees, shrubs, herbs and birds in the floodplain forests of South Moravia was influenced by the regional climate change. In this article, we will focus on the tree floor.

2 Methods

Preparation and analyses of source data necessary to express characteristics from research were carried out in the Unistat systém including meteorological data. Statistical methods and methods of mathematical modelling were used to evaluate field data (Palát, M., 1991, 1997).

3 Research results

The results of All-aged category forest type Ulmi-fraxineta carpini at study area Lednice are presented in following figures and tables.

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Figure 1 All-aged category forest type Ulmi-fraxineta carpini at study area Lednice. Photo J. Bauerova, 4. 4. 2012



Figure 2 Development of the leaves of English Oak (*Quercus robur*) in the year 2005

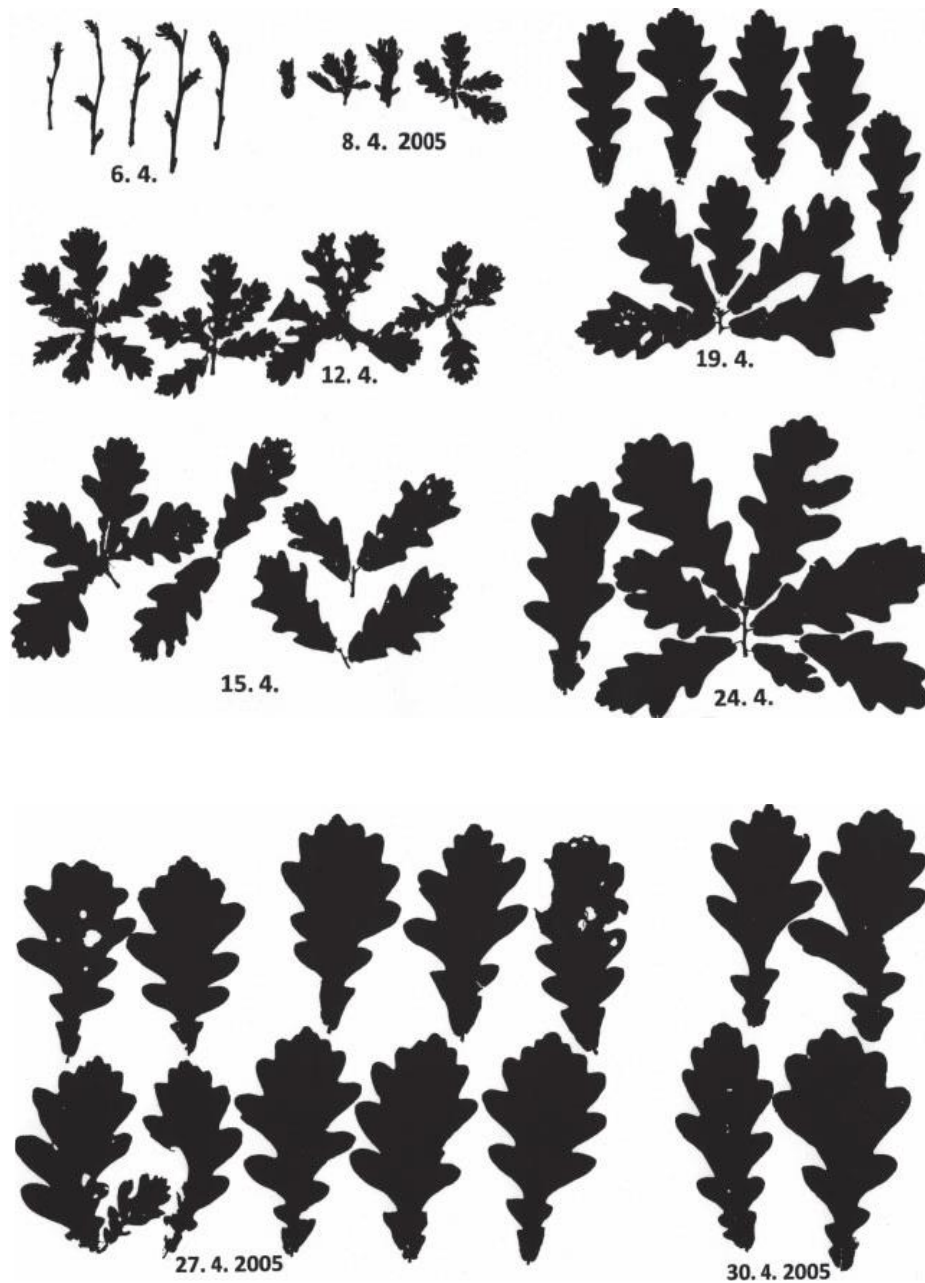


Figure 3 The average spring (the upper part of the picture) and annual (the lower part of the picture) air temperature from meteorological station in Lednice (177 m above sea level) from the period 1951–2012. (The average spring temperatures include dates from March, 23 to June, 22.) Explanations: y_J – regression line derived from the values of average spring temperatures; 12.00 is the value of straight line in 1951. D_J is the difference of the values of the straight line in the years 2012 and 1951 and represents the increase of the average spring temperature by 2.0 °C over the period of sixty two years. y_R – regression line derived from the values of the average annual temperatures; 8.75 is the value of the straight line in 1951. D_R is the difference of the values of straight line in 2012 and 1951 and represents the increase of the average annual temperature by 1.5 °C over sixty two years

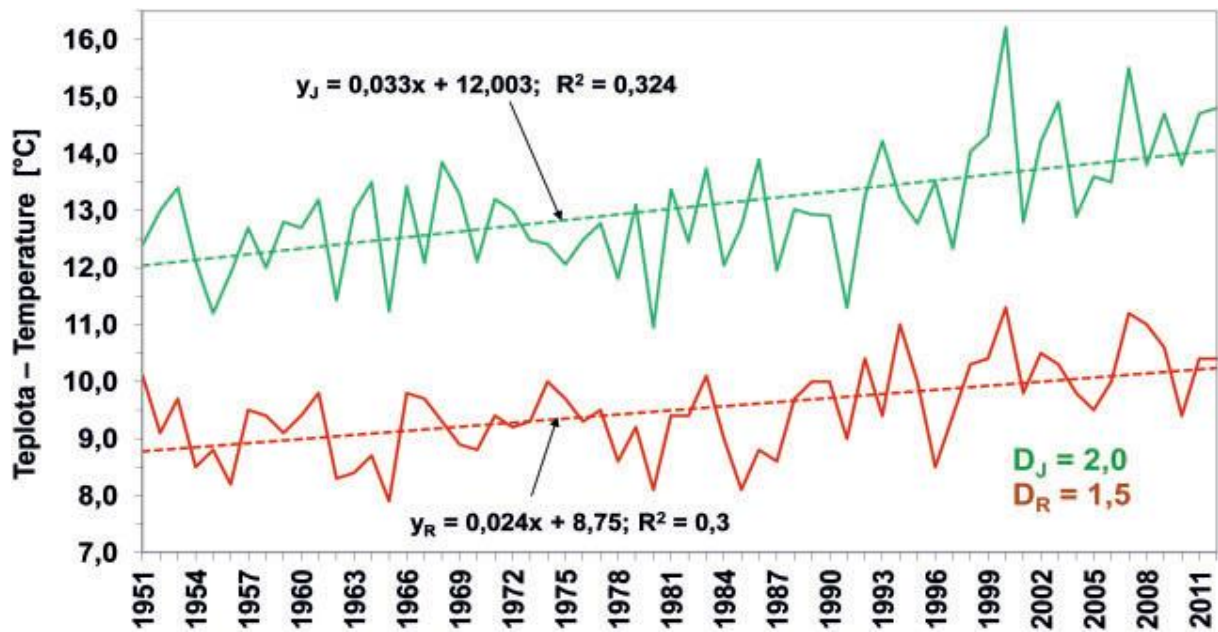


Table 1 Phenological shift in trees from 1951-2012

Species	Phenological shift in trees	
	Beginning of foliage	Full foliage
	D1 (days)	Dp (days)
<i>Carpinus betulus</i>	-12,1	-8
<i>Acer campestre</i>	-10,9	-8,4
<i>Ulmus laevis</i>	-11	-11,5
<i>Tilia cordata</i>	-8,9	-7,9
<i>Quercus robur</i>	-9	-10,2
<i>Fraxinus angustifolia</i>	-7,4	-9,3

Source: Own processing

Figure 4 The average spring The phenological shift of beginning of foliage (the lower part of the picture) and full foliage (the upper part of the picture) in the case of Common hornbeam (*Carpinus betulus*) in the period 1951–2012. Explanations: y_1 – regression line derived from the average dates of the beginning of foliage each year; 102.6 (103rd day from the beginning of the year) is the value of straight line in 1951. D_1 is the difference of the values of straight line in 2012 and 1951 and it represents the shift of average dates of the beginning of foliage by 12.1 days over the period of sixty two years. y_P – regression line derived from average dates of full leafing; 122.63 (123rd day from the beginning of the year) is the straight line value in 1951. D_P is the difference of the values of straight line in 2012 and 1951 and represents the shift of average dates of full foliage by 8.0 days over the period of sixty two years.

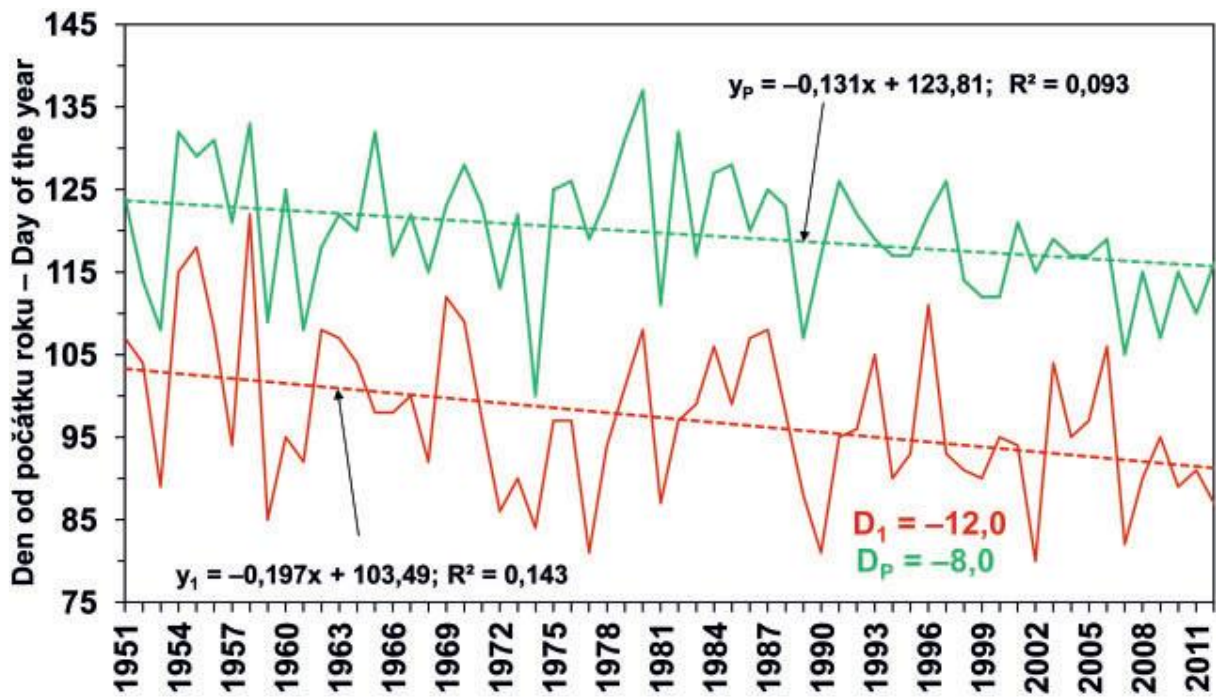


Figure 5 The phenological shift of beginning of foliage (the lower part of the picture) and full foliage (the upper part of the picture) in the case of Field maple (*Acer campestre*) in the period 1951–2012. Explanations of the values y_1 , y_p , D_1 and D_p as by Fig. 4

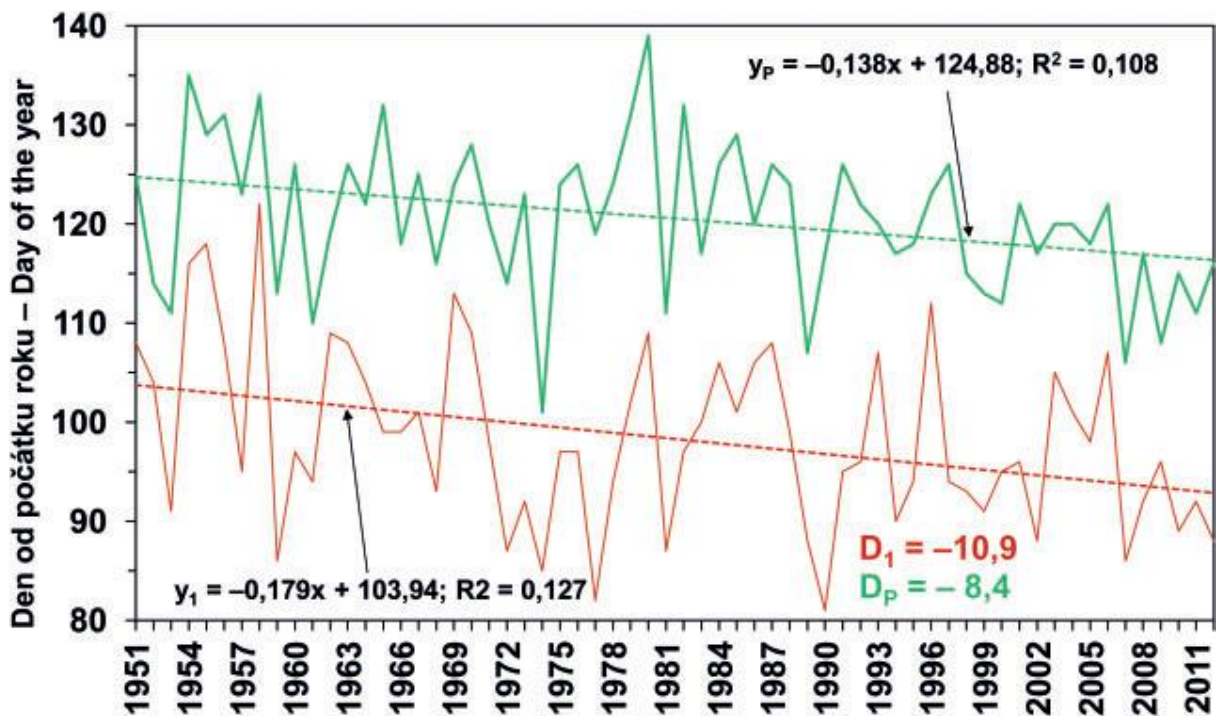


Figure 6 The phenological shift of beginning of foliage (the lower part of the picture) and full foliage (the upper part of the picture) in the case of European white elm (*Ulmus laevis*) in the period 1951–2012. Explanations of the values y_1 , y_p , D_1 and D_p as by Fig. 4

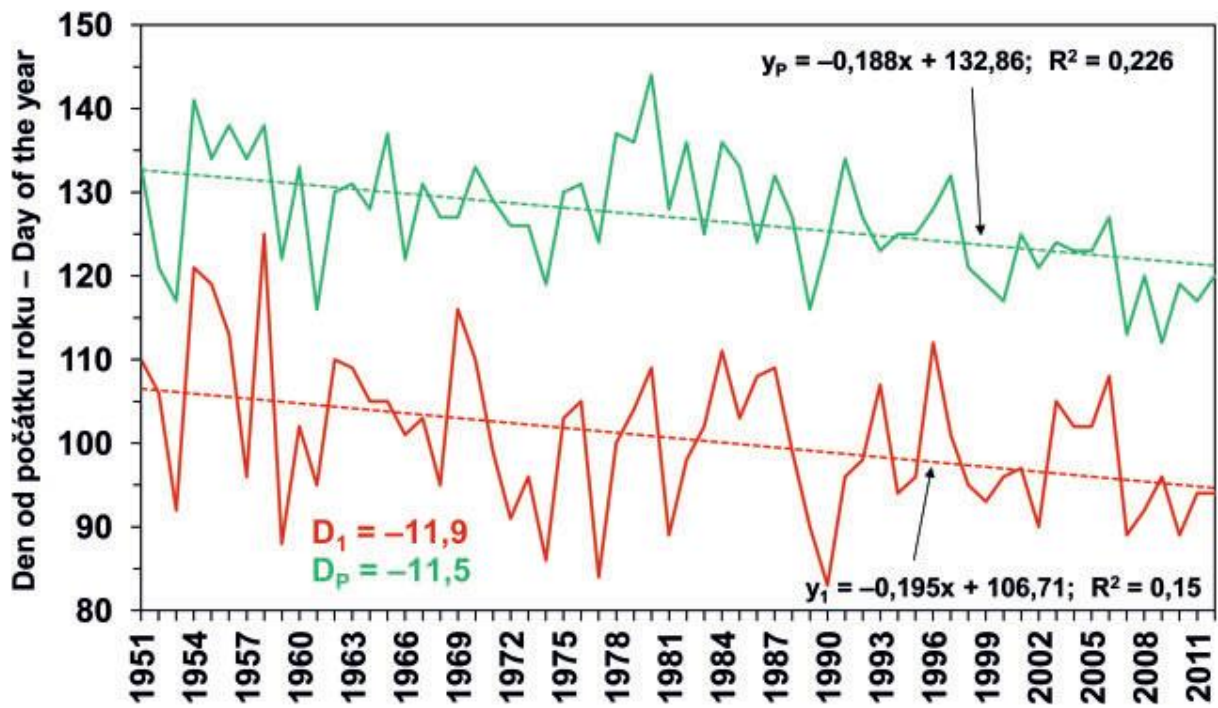


Figure 7 The phenological shift of beginning of foliage (the lower part of the picture) and full foliage (the upper part of the picture) in the case of Small-leaved lime (*Tilia cordata*) in the period 1951–2012. Explanations of the values y₁, y_p, D₁ and D_p as by Fig. 4

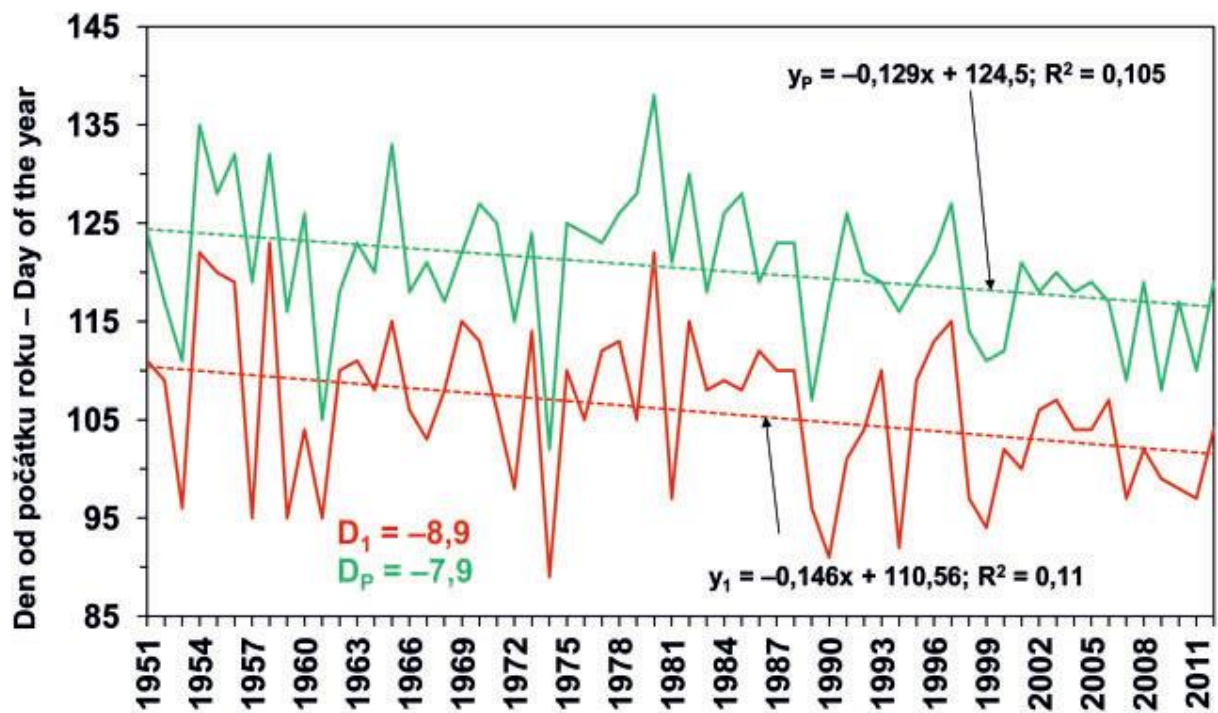


Figure 8 The phenological shift of beginning of foliage (the lower part of the picture) and full foliage (the upper part of the picture) in the case of English oak (*Quercus robur*) in the period 1951–2012. Explanations of the values y₁, y_p, D₁ and D_p as by Fig. 4

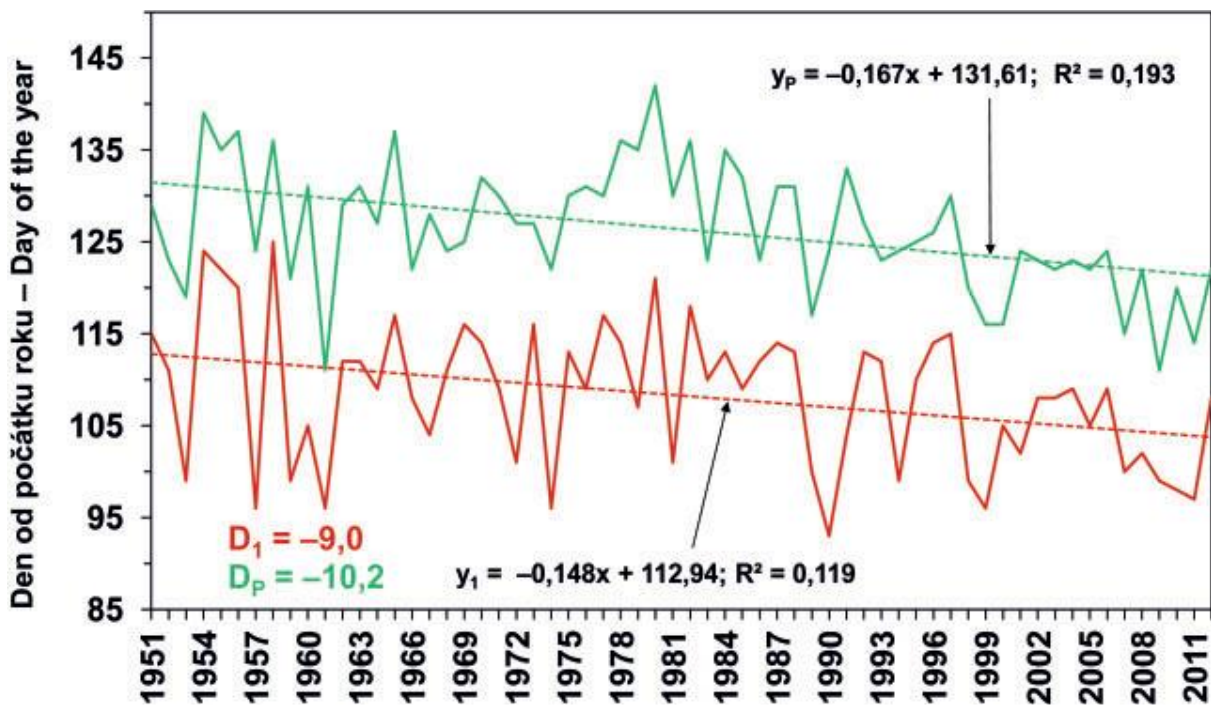


Figure 9 The phenological shift of leaf bud bursting (the lower part of the picture) and full leafing (the upper part of the picture) in the case of Narrow-leaved ash (*Fraxinus angustifolia*) in the period 1951–2012. Explanations of the values y_1 , y_p , D_1 and D_p as by Fig. 4

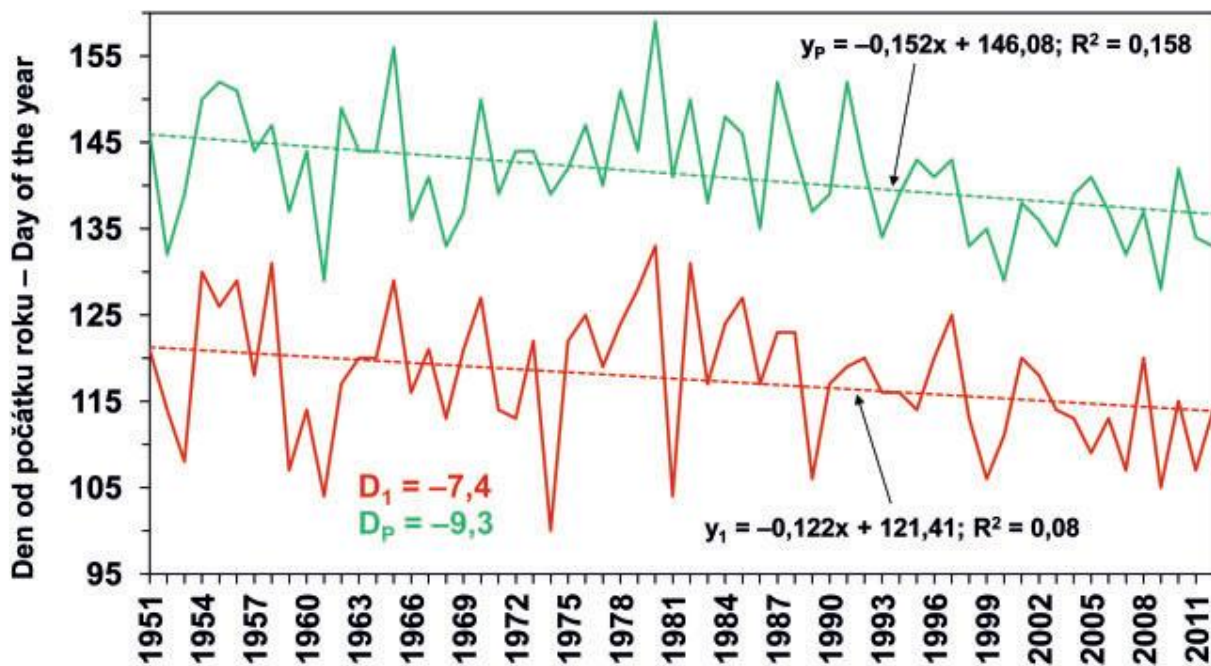


Table 2 Phenological shift in shrubs from 1951-2012

Species	Phenological shift in trees	
	First flower	Full flowering
	D_1 (days)	D_p (days)
<i>Prunus padus</i>	-10,3	-11,8
<i>Crataegus laevigata</i>	-10,0	-11,4
<i>Euonymus europaeus</i>	-11,0	-11,4
<i>Viburnum opulus</i>	-12,2	-11,5
<i>Cornus sanguinea</i>	-12,9	-13,7

Source: Own processing

Table 3 Phenological shift in herbs from 1951-2012

Species	Phenological shift in trees	
	First flower	Full flowering
	D1 (days)	Dp (days)
<i>Pulmonaria officinalis</i>	-13,1	-13,5
<i>Gagea lutea</i>	-13,5	-11,7
<i>Isopyrum thalictroides</i>	-11,8	-9,2
<i>Corydalis cava</i>	-14,2	-7,6
<i>Anemonoides ranunculoides</i>	-14,6	-8,4
<i>Ficaria verna</i>	-12,6	-7,4
<i>Viola reichenbachiana</i>	-12,3	-8,7
<i>Viola reichenbachiana</i>	-8,4	-6,0
<i>Paris quadrifolia</i>	-10,4	-11,8
<i>Allium ursinum</i>	-14,0	-15,9

Source: Own processing

Table 4 Phenological shift in birds from 1951-2012. The first laying day (FLD) is defined as the date when the first clutch in a given year is initiated. The mean laying day (MLD) is defined as the mean initiation date of all of the first clutches in the population.

Species	Phenological shift in trees	
	First flower	Full flowering
	D1 (days)	Dp (days)
<i>Sitta europea</i>	-7,8	-11,8
<i>Cyanistes caeruleus</i>	-10,7	-11,4
<i>Parus major</i>	-11,9	-11,4
<i>Ficedula albicollis</i>	-11,2	-12,3
Mean	-10,4	-10,6

Source: Own processing

4 Conclusions

The conclusion of part of this study is that the phenology of trees in the floodplain forests of South Moravia was influenced by the regional climate change. It has changed in the correlation with the increase of the annual and spring air temperature.

Overall, the phenological events of the shrub component advanced the beginning of flowering by 11.3 days and full flowering by 12.0 days. The conclusion of part of this study is that the phenology of shrubs in the floodplain forests of South Moravia was influenced by the regional climate change. It has changed in the correlation with the increase of the annual and spring air temperature.

The conclusion of part of this study is that the phenology of herbs in the floodplain forests of South Moravia has been influenced by regional climate change. It has changed in correlation with an increase of the annual and spring air temperatures. For each herb species, the sums of effective temperature with a threshold value of 5 °C were detected.

Selected bird categories reacted to the climate change correspondingly to the trees, shrubs, and plants. During the past 62 years in the researched type of floodplain forest, the earliest date of the first egg laid in the nuthatch population has shifted forward by 7.8 days, and the average date of the first eggs laid of all investigated nesting pairs in this population has shifted forward by 9.3 days. The earliest date of the first egg laid in the blue tit population has shifted forward by 10.8 days, and the average date of the first eggs laid of all studied pairs of this population shifted forward by 10.4 days. In the case of great tit, the earliest date of the first egg laid has shifted forward by 11.9 days, and the average date of the first eggs laid has shifted forward by 10.3 days. The earliest date of the first egg laid by the collared flycatcher has shifted forward by 11.2 days, and the average date of the first eggs laid of these nesting pairs has shifted forward by 12.3 days. The shift of the nesting phase of the collared flycatcher to an earlier time corresponds with the shift of its spring arrival date. The feeding activity of mosquitoes of the genus *Anopheles* has shifted forward by 9.3 days, and the first occurrence of the buff-tailed bumblebee (*Bombus terrestris*) has shifted forward by 12.6 days.

The conclusion of this study is that the phenology of trees, shrubs, herbs and birds in the floodplain forests of South Moravia was influenced by the regional climate change. It has changed in the correlation with the increase of the annual and spring air temperature.

Acknowledgement

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Human resources capacities in social care in the Czech Republic based on the prevalence of Alzheimer's disease

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Abstract: Dementia and Alzheimer's disease (AD) is one of the dominant causes of disability and dependency among older people. It is a condition which is affected by deterioration in memory, thinking and behavior. Therefore, there is a strong impact on the ability to perform everyday activities. This puts pressure on the families, the caregivers, and the health and social care system. Mainly due to these reasons, there is a strong emphasis on planning of human resources capacities. The aim of this article is therefore to estimate a gap in the number of employees needed in social services in the Czech Republic. For this purpose, data on (1) current social workers capacities in the Czech Republic per FTE were analyzed. These numbers were compared with (2) current prevalence of AD. By this comparison, the social workers capacities gap estimation was obtained. Social workers capacities gap estimation was calculated according to normative defined by Ministry of Labor and Social Affairs. This normative states that 3 social workers per 30 clients with dementia/AD are needed. This normative was confronted with a recommendation of the Association of Providers of Social Care 3 persons for 10 clients. The results of this conference paper will bring information of current capacities of human resources (social care workers) in accordance of type of service in the Czech Republic and emphasize the strong need of future capacities of social care workers in the context of growing AD prevalence in the Czech Republic. Findings of this paper can be very well used by the representatives of the social system in the Czech Republic and bring valuable information for future strategic planning.

Keywords: Human resources, social workers capacities, Alzheimer's disease, Czech Republic.

JEL Classification: I10, I14, I15

1 Introduction

Alzheimer's disease (AD) is the most common cause of dementia. It disrupts part of the brain, leaving the patient confused. The thinking, expression, memory and judgment are getting worse and personality is changing. In the last stages of this disease, people with this disease are unable to take care of themselves. A healthy lifestyle, namely both physical and mental exercise and diet change, can reduce the risk of developing the disease, but currently there is no cure for AD, only the progression of the disease can be slowed down by medication. The prevalence of dementia and AD is growing rapidly among the aging population of the world, leading the World Health Organization (2012) to recognize dementia as a global health challenge and to call for all countries to act and include dementia in their public health planning.

Worldwide, nearly 50 million people suffer from AD or other related type of dementia, but only one in four people with AD have been diagnosed (Alzheimer's, 2019). The increasing prevalence of dementia and AD and therefore increasing number of people with neurodegenerative diseases among the aging population is a global tendency that is also evident in the Czech Republic. The searing question for the whole society is to consider the sufficiency of the health and mainly social care capacities for these type of clients in upcoming years and to act in regard of the growing demand for caregiving services. People with dementia/AD have a life expectancy of 7 to 10 years after the diagnosis (Zanetti, Solerte, Cantoni, 2009) and their growing number represents a challenge not only for families and caregivers, but for the whole health and social system in the country.

According to the Czech Alzheimer Society Report on Dementia in the Czech Republic (Mátl, Mátllová, 2015), the disease occurs in every second person over 90 years, in every fifth person in the age over 80 and in every thirteenth person in the age over 65 years. In the early 2015, there was 153,000 people with dementia living in the Czech Republic, with a

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yearly prevalence of 1.48% that is increasing every year. Two-thirds of the patients were women, as their life expectancy is higher than in men (Mátl, Mátllová, Holmerová, 2016).

The increasing number of clients with AD is also reported by the health insurance companies in the Czech Republic. Všeobecná zdravotní pojišťovna (VZP), as the largest insurance company covering 60% of the population, recorded an increase from 32,000 clients with Alzheimer's disease in 2014 to 35,900 clients in 2015 (Zdravotnický deník, 2016). Although the disease is not diagnosed in many patients, the recorded increase in prevalence is significant.

In the Czech Republic, the care of people with dementia is divided into several parts, where some services are provided through the health system, some through social services and a large amount of services is still provided at home by family members and other caregivers (Mátl, Mátllová, Holmerová, 2016). Healthcare as well as social services depend to a great extent on personnel working in providing these services, hence the aim of this paper is a closer examination of human resources capacities in social care for clients with AD. In particular, we want to estimate the current status of social services workers and their capacity gap in the context of the prevalence of the disease.

2 Data and Methods

For the purpose of this conference paper aim, following data were used:

(1) Data on employees in social services were obtained directly from the Ministry of Labour and Social Affairs of the Czech Republic (hereinafter MPSV data) for the purpose of solving the TAČR TL01000300 project. The services were divided into four categories based on interviews with practitioners. The first three categories were identified as the three main ones related to AD clients:

- Personal Assistance and Domiciliary services;

Such services are provided to persons with reduced self-sufficiency. This condition occurs due to age, chronic ailment or disability and it requires assistance of another physical person. Usually it is provided in the natural environment of a persons' households or it can be provided in social services facility at the specified time

- Respite care, Day care centers;

It is a field, ambulatory or stay-in service with the aim to enable an attending person the necessary rest and free time.

- Week care centers, Retirement homes, Special regime homes;

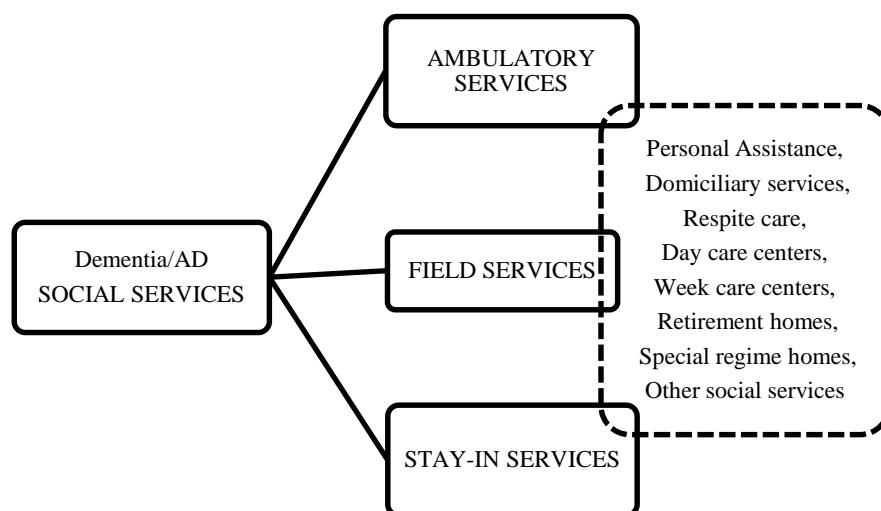
These services are provided as a stay-in services therefore it includes provision of accommodation and food services. The regime within these facilities is adjusted to specific needs of clients.

- Other social services.

Capacities per full-time employee (FTE) were then calculated in these four main categories

(2) The personnel capacity numbers were compared with current numbers of clients with AD in two categories, personnel capacities providing social services for clients at home (field services covering out-patient services and home care), ambulatory services and personnel capacities in social care facilities (stay-in services). See Figure 1 for details.

Figure 7 Social services for clients diagnosed with dementia/AD



Source: own processing based on Social Service Act No. 108/2006 Coll.

For the comparison, the numbers calculated in the other conference paper “*Current capacity gap in dementia/AD in the Czech Republic*” (Pažitný, Kandilaki, Komárková, 2019) were used, as well as the normative of the Ministry of Labor

and Social Affairs of Czech Republic (Vrbický, 2017) and the recommended standards of the Association of Providers of Social Care (2015).

In the locally defined normative of the Ministry of Labour and Social Affairs (Vrbický, 2017) for social service workers in social care facilities (including clients with AD), it is stated that at a time 3 social service workers per 30 clients are needed. This is meant in a way, that for every 30 clients there should be 3 social service workers at every moment. Contrary to this normative, Association of Providers of Social Care (2015) finds this very exhaustive for the social service workers and recommends at a time 3 social service workers per 10 clients. In both of these normative the number of social service workers is meant as a full-time equivalent (FTE), so number of real employees to cover one such FTE is much higher than 1.0.

By comparing data (1) and (2), a social services workers capacities gap estimation was obtained.

3 Results

From the collected data a dataset of current human resources capacities for clients of social system (including clients with dementia/AD) in the Czech Republic was created. Since we cannot differentiate social workers taking care only for dementia/clients, we assume that all these services are served to people with dementia/AD. This a limitation of our calculation.

A summarized outcome according to the type of care provided is listed in Table 1. The abbreviated labels describing columns of the tables represent different work positions in the health and social care services needed for the care of clients using personal assistance and day care. Apart of social workers (administrative officer), employee in social services which include direct service care, basic educational non-teaching activity, nursing activity, activities supervised by social worker are present.

Also, physicians and non-medical healthcare employees which are represented by general nurse, medical assistant, health-social worker, physiotherapist, occupational therapist, nutritional therapist, addictologists, nurses, ambulance employees and another specialist. Teachers are represented by educators, and special educators, psychologists, leisure teachers, assistant teachers, coaches, senior teachers and not least marriage and family counselors, other professionals who provide social services. Service personnel who takes care of laundry, catering, maintenance and cleaning staff). Management represented by a head of organization, service lead and other leading positions. Administrative staff includes secretarial and assistance positions, accountants, other administrative staff. Nevertheless, for purpose of this paper only positions directly linked to clients are analyzed. These are represented by social services workers and health service workers. The corresponding lines are highlighted in Table 1 in bold.

The columns in Table 1 presents the number of human resources capacities working as personal assistance or in domiciliary services, respite care, day care centres and in stay-in facilities for clients with dementia/AD in the Czech Republic in the year 2017. These data were collected from the database of MPSV and it is a sum of all human resources capacities from the regions of the Czech Republic.

Table 1 – Number of personnel capacities (FTE) working in social services in the Czech Republic in 2017.

	Personal assistance, Domiciliary services	Respite care, Day care centres	Week care centres, Retirement homes, Special regime homes	Other social services
Social workers (administrative officer)	669.9	284.6	1,460.8	4,293.8
Social services workers	6,567.6	1,936.5	17,772.3	11,138.7
Physician	0.0	16.0	42.1	9.9
Health service workers	48.8	285.9	5,783.7	1,194.2
Teachers/special educator	4.6	99.6	144.1	879.2
Service personnel	620.7	462.3	9,035.3	2,737.4
Management	503.0	231.7	1,389.1	1,423.6
Administrative staff	419.5	210.0	1,592.9	1,429.7
Total	8,834.1	3,526.7	37,220.2	23,106.5

Source: own construction based on MPSV data

For the comparison of the capacities with the number of clients needing their services, following Table 2 shows the population of the Czech Republic, in numbers of the total population. The estimated number of 153,000 patients with dementia/AD in the Czech Republic is in the report on the status of dementia in 2016 (Mátl, Mátlová, Holmerová, 2016).

Table 2 – Population of the Czech Republic and current number of patients with dementia/AD.

January 1, 2019	Patients			
	Total	Males	Females	est. 2015
Total	10,649,800	5,244,194	5,405,606	153,000

Source: own construction based on Český statistický úřad (2019)

Taking into consideration the normative of the Ministry of Labour and Social Affairs of the Czech Republic and the recommended standards of the Association of Providers of Social Care, the numbers of personnel available (in FTE) was compared with the numbers of personnel required and the capacity gap was calculated, as shown in Table 3.

Currently there are 153,000 patients with dementia/AD living in the Czech Republic, of which the majority, 122,899 patients are according to estimate at home. This number was calculated from the difference between prevalence (153,000) and capacities in special regime homes (20,351 x 0.8), senior house capacities (32,121 x 0.4) and hospital beds (19,440 x 0.05). The percentages used are based on estimates of authors and correspond to estimated prevalence of dementia/AD.

There is a total personnel capacity of 21,171.70 FTE providing social care for patients at home, composed of personal assistance and day care with personnel capacity of 6,616.40 FTE, respite care and day care centers with the personnel capacity of 2,222.40 FTE and a personnel capacity of 12,332.90 FTE in other social services. Considering the requirements of Ministry of Labour and Social Affairs of a minimum 2 persons per 15 clients and the recalculated FTEs to cover all hours in personal assistance or day care, there is a personnel capacity gap of 34,911.25 FTE for patients at home.

Regarding the personnel providing social services in social care facilities, such as senior homes or special regime homes, there are two regulations to be considered: [1] according to the Ministry of Labour and Social Affairs of the Czech Republic there is a requirement minimum of 3 persons for 30 clients, and [2] according to the Association of Providers of Social Care, to offer the best care for the clients, a minimum of 3 persons for 10 clients is recommended. To cover the services in social care facilities for 24 hours all year around the available personal capacities/FTEs must be recalculated considering the working time fond of social care personnel (includes holidays, further education, etc.).

Table 3 – Personnel capacity gap in the Czech Republic.

Number of clients with dementia/AD	153,000.00
Personal Assistance and Day care	6,616.40
Respite care and Day care centers	2,222.40
Other social services	12,332.90
FTE Social Workers for Patients at home	21,171.70
MPSV Standard:	
Personal Assistance and Day care (4.5 FTE)	1,470.31
Respite care and Day care centers (3 FTE)	740.80
Other social services (3 FTE)	4,110.97
FTE total according to MPSV standard	6,322.08
Patients at home	122,899.00
Required Personnel according to MPSV (2 per 15 clients)	16,386.53
Personnel capacity gap for patients at home	- 34,911.25
FTE social workers in social care facilities	23,556.00
FTE for 24h care (5.71 FTE)	4,125.39
Bed capacities in social care facilities	52,472.00
Required personnel according to Association recommendation (3 per 10 clients)	15,741.60
Personnel capacity gap according to Association	- 66,328.54
Required personnel according to MPSV standard (1 per 10 clients)	5,247.20
Personnel capacity gap according to MPSV	- 6,405.51

Source: own construction

At the moment, there is a bed capacity of 53,487 (Pažitný, Kandilaki, Komárková, 2019) in social care facilities in the Czech Republic. This number was collected from various sources containing National Registry of Healthcare Providers (2019) and Všeobecná zdravotní pojišťovna (2019). This bed capacity is not sufficient, as many clients are on the waiting lists. The number of human resources working in social care for the patients in these facilities is also insufficient, there is a personnel capacity gap of 6,405.51 FTE according to the normative of the Ministry and the gap is even larger according to the recommendation of the Association of Providers, namely there should be at least 66,328.54 persons (FTE) more for the optimal providing of the social care services for the clients.

4 Limitations

There are two limitations of our calculation:

1. Due to lack of data, we assume, that all capacities used predominantly by people with dementia/AD are for 100% used by these people, which is for sure not the case in real life.
2. The data are collected from different sources and years, what may little inaccuracies in calculations. We are always using data from the latest available year for each dataset.

5 Discussion

Comparing the current capacities available with the number of patients with dementia/AD show shortage in personnel. From Table 3 the current number of human resources working in different types of social services, is not enough for the total number of patients with dementia/AD.

There will be an enormous need for people in social services offering different types of care for the patients, either in the care for patients in their own home environment or in social care facilities such as senior homes and special regime homes, which experience large number of clients on waiting lists already. With the aging of the population, it is not expected that there will be more people in productive age to cover this difference. To increase the number of people working in social services, there would need to be a large shift towards professions in social care for elderly with dementia/AD, that would probably also need to be promoted by the regions as well as nationwide, to make these professions attractive for more people.

However, it is important to mention that the numbers in this paper are the total numbers of capacities working in selected fields of social work suitable for providing services to patients with dementia/AD and a large proportion of these capacities might be working with other patients/clients, e.g. personnel of senior homes, where not only patients with dementia reside.

Another important note is that the personnel capacities needed were calculated as the required minimum according to the normative of the Ministry of Labour and Social Affairs of Czech Republic and according to the recommendation of the Association of Providers of Social Care.

It is known that a lot of patients with dementia/AD were not diagnosed yet and from those who were diagnosed with the disease a large percentage is in the care of relatives. With the increasing prevalence and increasing number of patients, there will be much larger need for social workers capacities and an enormous gap between capacities required in this field and it will be a huge challenge for the whole society.

It should be noted that the number of patients in the Czech Republic is only estimated, as even in the most advanced countries, only about half of the people with dementia are diagnosed. Based on prevalence studies, the number of people with dementia in the Czech Republic was estimated to be 153,000 (Mátl, Mátllová, Holmerová, 2016) in the early 2015 and this number was used for the calculations of capacity needs in social care.

6 Conclusion

The collected data were divided into separate tables for different types of services provided and summarized for the Czech Republic, to bring insights about current capacities of human resources and to emphasize the strong need for human resources capacities, especially social workers in the context of dementia/AD prevalence in the Czech Republic.

Results of this paper and its findings can help the representatives of the social system of the Czech Republic. Also, it brings a valuable information for strategic planning and emphasize the social service professions which will be needed on the larger scale considering the aging population.

In future research, we plan to focus on refining of our calculations taking into consideration the limitations of the first version of this estimate. We also want to concentrate on personnel capacity gap estimates in individual regions of the Czech Republic and compare its specifics.

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Czech Bankruptcy Models Created in The Last 6 Years

Michal Kuběnka¹, Irena Honková²

Abstract: The paper is focused on the latest Czech models for the prediction of financial distress. It answers the question which of the selected models created after 2013 shows the highest accuracy in the testing of manufacturing companies. Four tested models were created in the Czech Republic and one in Slovakia between 2013 and 2016. The test sample included 1014 active businesses and 269 businesses that had gone bankrupt in the past. Financial statements related to the financial year preceding the year of bankruptcy (t-1) were used. Almost all analyzed models demonstrated a lower degree of accuracy than those indicated by their creators. And only the Slovak model is the opposite. The so-called MODEL 1 from 2016 reached the highest overall accuracy (88.03%) based on the arithmetic average of bankruptcy and prosperity predictions. Even though it was created on samples of companies operating in the construction industry.

Keywords: bankruptcy model, financial distress, accuracy of prediction.

JEL Classification: G32, G33, C52, C53

1 Introduction

Risks are linked to all activities of an enterprise. Enterprises make efforts to minimize or avoid them. Bankruptcy of a key supplier or a customer belongs among risks with a negative impact to the following existence of the respective enterprise. Bankruptcy models are ranked among possibilities as to how to evaluate relatively quickly the financial stability of a business partner.

Efforts to create an easy-to-use and at the same time precise model appeared already in the '30s of the twentieth century in USA. Concretely, P. J. Fitzpatrick (1932) published the first study dedicated to the prediction of financial distress on the basis of financial analysis methods; namely he tested usability of ratio indicators. The fathers of the standard types of the bankruptcy models are W. Beaver (1966) and E. I. Altman (1968), who is the most known author in the world. Models of consistent structure (combination of weights of the significance and the ratio indicators) continue to be created and used till now.

Methods of creating such models were extended and changed in time. Beaver (1966) and Altman (1968) used the MDA (multiple discriminant analysis) method. The principle is searching and finding linear combinations of independent variables with the best description of a company's financial situation. MDA analysis was later overcome by a logit analysis, on which Ohlson (1980) focused as the first author, or a probit analysis applied by Zmijewski (1984). The merit of the logit analysis is examining whether the analyzed phenomenon, modelled using a random variable, has occurred or not.

One of the most recent methods uses artificial neural networks (NN). The NN method was discovered in 1990. The Neural Networks are more accurate than previous methods, but only by several per cent, as was stated by Kim & Park (2012) or Chih-Fong & Chihli (2014). The big negative of this method is, however, impossibility to publish and share it for the free use and to analyze it. The reason is that the NN method works as the so-called black box. The inner computer algorithms of the NN method can't be analyzed by usual methods.

The aim of the investigation was to identify which of the latest accessible bankruptcy models in the Czech Republic is the most precise. The reason is not mistrust in model's authors, but efforts to ensure objective comparison of the models on the same sample of enterprises.

2 Methods

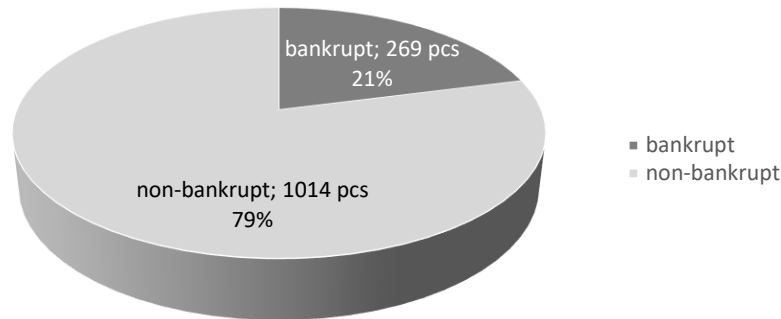
The author has found out 5 new models, which have been created in the Czech Republic over the last 6 years. Particular models were tested on a sample of 1,283 enterprises operating in the Czech Republic in the processing industry. Of this amount, 269 enterprises went bankrupt in 2014. Therefore their 2013 account statements were used. The rest of the test

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sample includes 1,014 account statements of the financially stable enterprises. These enterprises were financially stable in 2014. Therefore their 2013 account statements were also used. The author considers that the sample of 1,283 enterprises would be sufficient to draw conclusions from the measured values with a statistical significance. Data were gathered from the Bisnode's MagnusWeb database.

Figure 1 Structure of tested sample



Source: Own processing

The models were applied to particular enterprises, and their partial and total successfulness were evaluated. It is standard evaluation of the total accuracy of the bankruptcy model, as demonstrated, for example, by Huijuan (2015) or Berzkalne & Zelgalve (2013).

The model indicates an enterprise as bankrupt or non-bankrupt. Correctness of the prediction will be verified in the following year (or years), when the enterprise either goes bankrupt or remains financially stable. So, four combinations of the successfulness of prediction can occur. The table 1 presents them.

Table 1 Method of quantification of accuracy

		Prediction	
		Bankrupt	Non-bankrupt
Fact	Bankrupt	TRUE I.	ERROR I.
	Non-bankrupt	ERROR II.	TRUE II.

Source: Own processing

Accuracy of prediction could be consequently evaluated separately in two areas. As success rate of bankruptcy prediction for the financially unstable enterprises. We will call it „Success Rate of Bankruptcy“ with abbreviation SRB.

$$SRB = \frac{TRUE\ I.}{TRUE\ I.+ERROR\ I.} \quad (1)$$

As success rate of non-bankruptcy prediction for the financially stable enterprises. We will call it „Success Rate of Non-bankruptcy“ with abbreviation SRN.

$$SRN = \frac{TRUE\ II.}{ERROR\ II.+TRUE\ II.} \quad (2)$$

So, the total success rate (TSR) of a concrete model can be calculated as an arithmetical average of SRB and SRN as follows.

$$TSR = \frac{SRB+SRN}{2} \quad (3)$$

The youngest tested bankruptcy model was created in 2018. The team of authors comprising T. Kliestik, J. Vrbka & Z. Rowland didn't assign a specific name to this model and prefers to use a more-or-less mathematic designation - Ycz. So, hereunder we will name it as Model Ycz. When creating, the authors applied the multiple discriminant analysis. They analyzed in total 62,794 Czech enterprises, of which 50,058 enterprises were financially stable and 12,736 enterprises were in bankruptcy. The enterprises were from different branches (different branches in field of commerce, production and services). The created model works with 10 variables. The authors specify that the total accuracy of the model is 84.8%.

The bankruptcy model created in 2014 by M. Karas & M. Režňáková also doesn't have a specific name. So, hereunder we will name it as Model KR. This model was also created with the use of an extensive sample of 880 financially healthy and 628 bankruptcy enterprises. It means, thus, in total 1,508 Czech enterprises. The enterprises worked in the processing industry. When creating it, the authors used the linear discriminating analysis and the BoxCox transformation of variables.

The original accuracy of the financial stability prediction is 97.89%, the accuracy of the bankruptcy prediction is 69.91%. The total accuracy calculated as an arithmetical average is 83.9%. The created model works with only three variables.

In 2015, M. Pavlík created a model for one-year prediction with a provisional designation (=1). We hereunder will call it the Model P1. The author specifies the total accuracy of the model as 86.16% (based on a validation sample of 83.96%). The author used the logistic regression for the creation of the model. 2,061 enterprises were tested for the model construction within the period from 2005 to 2013 (1,022 financially healthy enterprises and 1,039 enterprises were in bankruptcy). The tested sample includes a wide spectrum of branches from field of production, commerce and services. The model works with six variables.

The P' model was created in 2013 by Delina & Packová (2013) by means of regression analysis. Data of 1,560 Slovakian enterprises of different branches (the branches of commerce, production and services) were used to create the model. 1,457 enterprises were financially healthy and 103 enterprises were bankrupt. The model includes 6 variables. The authors specify the accuracy of the model by an alternative method as the accuracy of the prediction of bankruptcy of 21.26% (of the total number of predictions of bankruptcy) and the return rate of bankruptcy of 71.84%. If we recalculate these values to the standard metrics, SRB reaches 71.84% and SRN reaches 81.19%.

The Model 1 was created in 2016 by Slaviček & Kuběnka (2016) on a sample of enterprises acting in the construction industry. They used only 33 enterprises for the creation of the model, of which 11 were bankrupt. This is unequivocally the smallest sample of the evaluated models. Logistic regression was used for the creation. The model works with four variables. According to the authors, accuracy of the bankruptcy prediction is 91% and accuracy of the non-bankruptcy prediction is 95%.

Comparison of the determined and original accuracy of SRB and SRN will be performed with taking into account a possible error in relation to the sample size. For this purpose, confidence intervals of the newly determined values of SRB and SRN will be also calculated. According to Kubenka (2018), the confidence interval can be calculated as follows:

$$P\left(p - z_{1-\frac{\alpha}{2}} * \sqrt{\frac{p(1-p)}{n}} < \pi < p + z_{1-\frac{\alpha}{2}} * \sqrt{\frac{p(1-p)}{n}}\right) = 1 - \alpha \quad (4)$$

where:

- p newly determined SRB or SRN of a model
- n size of the base (size of the tested sample)
- α determined at the level of 5%, $z_{1-\frac{\alpha}{2}}$ is the quantile of normal distribution

3 Research results

The results of the tests of accuracy of the models showed that the original accuracy specified by the authors of the models isn't consistent with the accuracy determined within this research. The confidence intervals were also calculated so that the sizes of the tested samples of the bankrupt and non-bankrupt enterprises were taken into consideration in the results. No conformity with the original value of SRN was found within these confidence intervals (see table 2) either. Conformity within SRB was found in only one case, namely in case of the SRB confidence interval of <69.13; 79.57> and the original SRB of 71.84% for the P' model. Analyzing the results of the determined SRN and SRB and the original SRN and SRN, we cannot find a rule, which would say whether the originally measured values and this evaluative measurement show lower or higher values.

Table 2 Results of prediction

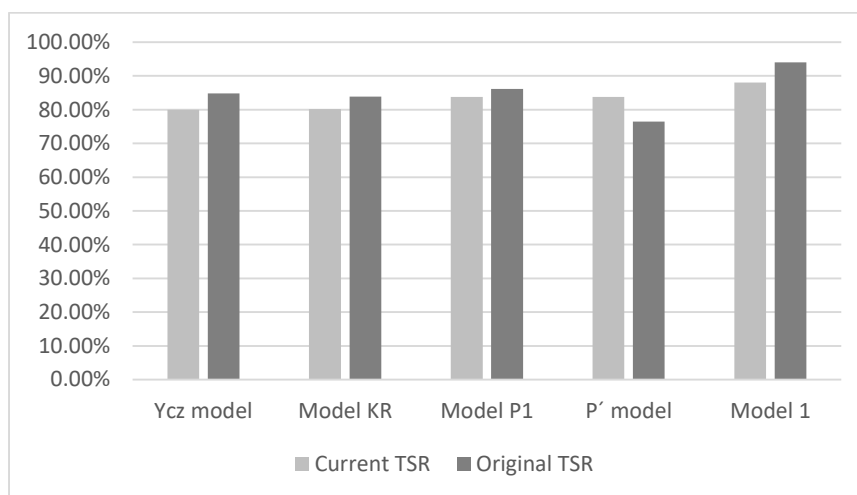
	SRN	SRN confidence interval	Original SRN	SRB	SRB confidence interval	Original SRB	TSR (total)
Ycz model (2018)	68.93%	<66.08; 71.78>	84.16%	91.08%	<87.67; 94.49>	87.30%	80.01%
Model KR (2014)	98.92%	<98.28; 99.56>	97.89%	61.34%	<55.52; 67.16>	69.91%	80.13%
Model P1 (2015)	98.42%	<97.65; 99.19>	84.54%	69.14%	<63.62; 74.66>	87.78%	83.78%
P' model (2013)	93.29%	<91.75; 94.82>	81.19%	74.35%	<69.13; 79.57>	71.84%	83.82%
Model 1 (2016)	89.45%	<87.56; 91.34>	95.00%	86.62%	<82.55; 90.69>	91.00%	88.03%

Source: Own processing

However, different results were obtained during total evaluation of accuracy (TSR) of the tested models when comparing with the original values of the specified accuracy ("original TSR"). As can be seen from the following graph, four of the five tested models have a lower total accuracy in comparison with the value declared by their authors. These differences vary between 3.77% and 5.97%. And only the P' model during testing showed a higher accuracy compared to the original one, namely even by 7.30%. This is an unexpected paradox, because it is an universal Slovakian model

created on the basis of account statements, which are influenced by the Slovakian legislative. But in spite of that, the model was included into testing because the authors supposed that the Czech a Slovakian accounting systems are very close to each other or even almost identical. And this, probably, was confirmed.

Figure 2 Current total accuracy vs. original total accuracy



Source: Own processing

Current accuracy of the Ycz model is lower by 4.79% compared to the original value. Current accuracy of the model KR is also lower, namely by 3.77%. The lowest decrease of accuracy (2.38%) belongs to the Model P1. The highest decline of accuracy was in the Model 1, namely by 5.97%. On the other hand, the Model 1 reached the highest accuracy of all the tested models. Table 2 shows that the lowest accuracy is reached by the Ycz model (80.01%) and the highest accuracy belongs to the Model 1 (88.03%). The ranking list of the current accuracy is showed graphically in Fig. 2.

4 Conclusions

The performed comparison of the selected newest models showed that their accuracy differs significantly in case of a different sample. For most of the tested models, the value of their accuracy was decreased compared to the original value specified by the model authors. An exception was only the P' Model of Delina & Packová. It is necessary, however, to say that the Model KR and the Model 1 were originally created on a sample of enterprises acting in the construction industry. Their testing on the sample of manufacturing enterprises could decrease their accuracy. However, the same situation was typical for the other models, which were developed as universal (not for a specific branch or a group of branches), which was a case of the Ycz Model and the Model P1, which were developed on samples overlapping the processing industry. Among others, they also included commerce, services and other branches.

The highest original total accuracy (original TSR 94%), according to its authors, is demonstrated by the Model 1. This model also shows the highest accuracy at the present (TSR 88.03%) of all the tested models. Also this model is different by the equanimity of accuracy of SRB (86.62%) and SRN (89.45%). The difference between them is just 2.83%. The equanimity of SRB and SRN of the other models is absolutely different. The difference (positive or negative) for the Ycz model is 22.15%, for the Model KR is 37.58%, for the Model P1 is 29.28%, for the P' model is 18.94%.

The theme of bankruptcy model accuracy evaluation has been always actual. And this has been already evident since the time of creation of the first bankruptcy models. Comparing with the prior researches, we can unequivocally declare that all tested models show above-average total accuracy, namely 80% and more. However, in the field of equanimity of SRN and SRB and also of total accuracy (TSR), we can - on the basis of the performed research - unequivocally recommend using the Model 1 of Slavíček & Kuběnka created in 2016.

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Comparisons of Health Care Systems in the Countries of the European Union

Magdaléna Drastichová¹

Abstract: The type of health system and the resources used determine health outcomes. The sample of 31 countries (the European Union (EU-28) plus Iceland, Norway and Switzerland) is clustered according to indicators reflecting these three aspects, as well as standards of living, to discover the extent of the relationships between these factors in these countries. The indicators used to reflect health outcomes are Life expectancy at birth (LE); Healthy life years in absolute value at birth for females (HLYf) and for males (HLY m); and Death rate due to chronic diseases (DR). Concerning healthcare inputs (resources), the indicator used is Current healthcare expenditure (CHE) (percentage of GDP). Two partial expenditure ratios in classification by healthcare financing schemes are also used to reflect prevailing healthcare system models. These are government schemes and compulsory contributory health insurance schemes. Data in two years (2015 and 2016) were used and a hierarchical cluster analysis (HCA) applied. The core cluster 2 countries, which are the new member countries, apart from Malta, Cyprus and Slovenia, are the worst performing countries. Cluster 1, containing the core developed countries – Austria, Germany, France, Switzerland and the Benelux countries, was evaluated as the second-best performing cluster in both years, although its average CHE ratios and GDP per capita are the highest. On the other hand, countries, which shifted from cluster 4 to cluster 3 (referred to as cluster 4-3 countries: Iceland, Ireland, Malta, Norway and Sweden) were evaluated as the best performing countries, along with the core cluster 3 countries (Italy and Spain), and Cyprus. The type of healthcare system model does not seem to be a factor that significantly affects performance. The positive relationship between GDP per capita and the CHE ratio can be identified after omitting some outliers (especially Luxembourg). Between these two indicators and the performance in LE and DR the relationship is much more significant than between them and the HLY indicators.

Key words: Hierarchical Cluster Analysis · Sustainable Development (SD) · Life expectancy at birth · Current health care expenditure

JEL Classification: I10, I13, I15, I18, Q01

1 Introduction

The health of the population is determined by both the type of health system and the resources used. The performance of the health system can be evaluated according to the relationship between resources and outcomes. However, the evidence for a causal link between healthcare expenditure and health outcomes remains elusive as problems emerge from the difficulty of isolating the contribution of the health service “input” as a determinant of health status “output” (Goldacre, 1996). The focus on type of health system can help determine certain aspects. Health systems are financed either through taxes, in the case of healthcare services owned by the state (i.e. national health services), or through income-related social contributions (i.e. social security systems) (Elola et al., 1995). While in theory these categories have distinct policy separations, in reality countries often have a blend of these approaches (Princeton Public Health Review, 2017).

There are four basic models for health care systems. In the Beveridge model, healthcare is provided and financed by the government (State) through tax payments. A crucial feature of this model is health as a human right. Thus, the government guarantees universal coverage and anyone who is a citizen has the same access to care. With the government as the sole payer in this system, costs can be kept low and benefits are standardized across the country. In the Bismarck model, an insurance system is used and it is usually financed jointly by employers and employees through payroll deduction. Health providers are generally private. However, the Social Health Insurance funds are considered public. Insurers

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do not make a profit. The National Health Insurance Model has elements of both the Bismarck and Beveridge models. Providers are private (the Bismarck model), but payment comes from a government (State)-run insurance program that every citizen pays into (the Beveridge model). The balance between public insurance and private practice allows hospitals to maintain independence and internal complications with insurance policies can be reduced. The last model is the Out-of-Pocket Model. Patients pay for most medical care out-of-pocket. The majority of countries use several sources and have the signs of several models. Thus, the dominant source (from the two sources analysed) is used for the assignment of countries to the models (Physicians for a National Health Program (PNHP), 2010; Princeton Public Health Review, 2017). According to Linden et al. (2017), among countries with large public shares of health expenditures, there are few differences in terms of health outcomes stemming from whether public funds are derived from taxes or social security contributions. In this regard, it is not possible to claim that one type of public financing system is better than the other. This is also a concern of this paper. This paper results from the analysis carried out in Drastichová (2018b). The performance of the 28 EU countries, along with Iceland, Lichtenstein, Norway and Switzerland, was evaluated and countries were clustered (using a hierarchical cluster analysis (HCA)) firstly according to their performance achieved in Life expectancy at birth (LE) and Death rate due to chronic diseases (DR), and secondly according to these two indicators along with Current health care expenditure (HCE) (Percentage of GDP). In this paper, not only quantitative, but also qualitative aspects related to health outcomes are included. As regards healthcare resources, not only overall expenditure, but also types of expenditure related to different health system models are included.

Not only efficiency, but also sustainability of health systems is crucial. Health is as an essential aspect of people's wellbeing (see more in Drastichová (2018a)). It is a central part of the social pillar of sustainable development (SD). The EU, in coordination with its Member States, is committed to supporting the implementation of the 2030 Agenda, which is a recent policy framework worldwide for SD. It is represented by the 2030 Agenda for SD and its 17 Sustainable Development Goals (SDGs) (adopted by the United Nations (UN) in September 2015). The EU's response to this Agenda is outlined in the 2016 European Commission's Communication (European Commission, 2016). SDG 3 involves the aspects of health and wellbeing analysed in this paper.

The aim of the paper is to determine the relationships between types of health system, resources used, and selected health outcomes in the group of 31 countries, consisting of the EU countries, Iceland, Norway, and Switzerland. Standards of living in the countries are considered as well. Besides overall expenditure ratios, two specific healthcare expenditure ratios are used, which reflect selected financing schemes, and which, in turn, represent basic healthcare system models. As regards methods, countries are assessed according to the results in eight indicators by means of a cluster analysis. The two kinds of expenditure refer to the health care system models of countries. It is taken into account that countries apply a blend of the approaches and other sources are often used, not only those analysed in these papers. Countries are assigned to the models according to the prevailing sources and it is not denied that their health systems can also have features of other models.

2 Methods

Cluster analysis, which is the main methodology applied in this paper, is a multidimensional statistical method which aims at sorting different objects (or cases, or observations) called clusters into groups in such a way that the degree of association between two objects is maximal, if they are part of the same group, and minimal otherwise (Mooi and Sarstedt, 2011). An HCA is applied to discover relationships between healthcare inputs and outcomes reflecting health care system models of countries in the sample. This method for cluster analysis identifies relatively homogeneous groups of cases/variables, based on selected characteristics, using an algorithm that starts with each case/variable in a separate cluster and combines clusters until only one is left. HCA of n objects is defined by a stepwise algorithm which merges two objects at each step, the two which have the least dissimilarity or distance (Everitt, 1993). Ward's method is used as a cluster method in this work. Since quantitative variables are used, the squared Euclidean distance was chosen from the measures for interval to specify distance. The variables used are measured in different units. Therefore, the Z scores were chosen from the available standardization methods (Aldenderfer and Blashfield, 1984; Meloun and Militký, 2002). This methodology is described in more detail in Drastichová, 2018a, b). When needed the values of Pearson correlation coefficient (r) are also calculated and indicated.

Eight indicators were chosen for the analysis and the data of Eurostat (2019a, b) and WHO (2019) are used. Health outcomes are represented by four indicators. Two of them predominantly reflect quantitative aspects, and in the last, calculated separately for men and women, qualitative aspects are also included. The first indicator applied is Life expectancy at birth (LE), which is defined as the mean number of years that a new-born child can expect to live if subjected

throughout his/her life to the current mortality. Death rate due to chronic diseases² (number per 100 000 persons aged less than 65 by sex) measures the standardised death rate of chronic diseases. The rate is calculated by dividing the number of people under 65 dying due to a chronic disease by the total population under 65. These indicators are included in the EU SDG indicator set to monitor progress towards SDG 3 on good health and well-being. SDG 3 aims to ensure health and well-being for all at all ages (see more on Eurostat, 2019a). The indicator of healthy life years (HLY) measures the number of remaining years that a person of specific age is expected to live without any severe or moderate health problems. HLY is a composite indicator that combines mortality data with health status data. It is separately calculated for men and women (see more on Eurostat, (2019b)). Both HLYf and HLYm data are unavailable for Switzerland (2015) and Iceland (2016), but data from these countries for the remaining indicators were included in the analysis. As mentioned above, HLY focuses on the quality of life spent in a healthy state, rather than the quantity of life, as measured by LE (as well as by DR). Accordingly, both aspects are reflected in the analysis.

As regards healthcare inputs (resources), the indicator used is Current healthcare expenditure (CHE) (percentage of GDP). Moreover, two partial expenditure ratios are used in the classification by healthcare financing schemes, which are government schemes (GS) and compulsory contributory health insurance schemes (CCHIS). These data are available on both Eurostat (2019b) and WHO (2019), where the more detailed classification is also available. Government schemes are healthcare financing schemes whose characteristics are determined by law or by the government and where a separate budget is set for the programme and a government unit that has an overall responsibility for it. Compulsory contributory health insurance scheme is a financing arrangement to ensure access to healthcare for specific population groups through mandatory participation determined by law or by the government and eligibility based on the payment of health insurance contributions by or on behalf of the individuals concerned (see more on Eurostat, 2019b). These two types of financing scheme determine whether the features of the Beveridge or the Bismarck model prevail in a country, while the third one has features of both of them. GDP per capita (in current prices, purchasing power standard (PPS) per capita, at market prices) (further only GDP per capita in PPS) is the last variable used in the analysis to reflect the standard of living in the countries of the sample.

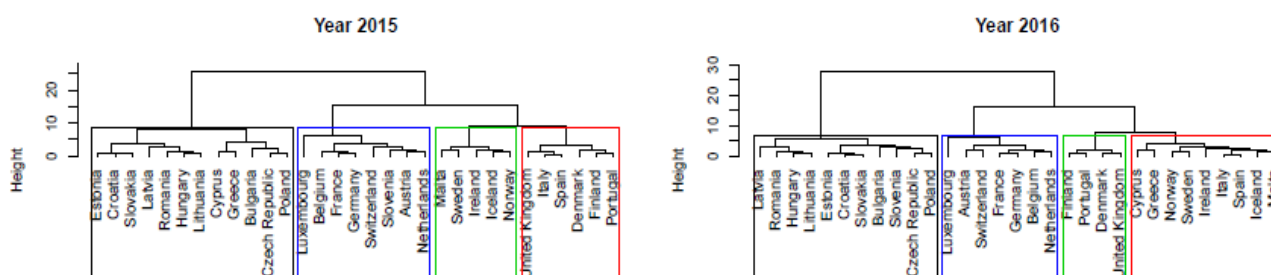
3 Research results

Subsection 3.1 contains the results of the HCA. In subsection 3.2 a deeper analysis and discussion are included.

3.1 Results of the cluster analysis

Eight indicators were used to classify the sample of 31 countries into four clusters by means of the HCA. There were four indicators for health outcomes, one for healthcare resources two for health systems (reflecting resources as well), as well as one for GDP per capita, reflecting the standard of living. Cluster dendrograms for 2015 and 2016 are displayed in Figure 1.

Figure 1 Cluster dendrograms created for the values of the eight indicators used in 2015 and 2016



Source: Own processing

Based on Figure 1, Table 1 displays the numbers of clusters to which countries are assigned in 2015 and 2016. The prevailing model is indicated in brackets. The countries that remained in the same cluster for both years are referred to as the core countries of that cluster. Therefore, there are seven core cluster 1 countries, ten core cluster 2 countries and 2 cluster 3 countries. Descriptive statistics for the clusters are displayed in Table 2, and the features of the created clusters can be derived from their values. Firstly, the means for eight indicators in four clusters for 2015 and 2016 are indicated, followed by their standard deviations. Cluster 1 is characterized by the highest average GDP per capita and overall CHE ratios, as well as the highest CCHIS expenditure ratios. Its average GS expenditure ratios were the second lowest in both

² Chronic diseases included in the indicator are malignant neoplasms, diabetes mellitus, ischaemic heart diseases, cerebrovascular diseases, chronic lower respiratory diseases and chronic liver diseases.

years. It did not exhibit either the highest or the poorest average performance in any of the four indicators representing health outcomes. The performance was the second highest for these indicators, except for the LE indicator for 2015, which was slightly lower in value than that of cluster 3, and the second lowest among clusters overall. Cluster 2 had the lowest average GDP per capita, overall CHE ratios as well as the lowest GS expenditure ratios. The CCHIS expenditure ratio was the second highest in both years. The lowest performance was identified for the indicators reflecting health outcomes. The average DR was the highest, and LE and HLYm the lowest in both years. However, HLYf was the second lowest in both years, following cluster 3 in 2015 and cluster 4 in 2016.

Table 1 Assignments to the clusters 1 – 4 in the years 2015 and 2016

C.	2015	2016	C.	2015	2016	C.	2015	2016
AT (Bi)	1	1	GR (Bi/Be)	2	3	PL (Bi)	2	2
BE (Bi)	1	1	HU (Bi)	2	2	PT (Be)	3	4
BG (Bi)	2	2	IS (Be)	4	3	RO (Bi)	2	2
HR (Bi)	2	2	IE (Be)	4	3	SK (Bi)	2	2
CY (Be)	2	3	IT (Be)	3	3	SL (Bi)	1	2
CZ (Bi)	2	2	LT (Bi)	2	2	ES (Be)	3	3
DK (Be)	3	4	LV (Be)	2	2	SE (Be)	4	3
EE (Bi)	2	2	LU (Bi)	1	1	CH (Bi)	1	1
FI (Be)	3	4	MT (Be)	4	3	UK (Be)	3	4
FR (Bi)	1	1	NL (Bi)	1	1			
DE (Bi)	1	1	NO (Be)	4	3			

Source: Own processing

Note: Bi – the Bismarck model; Be – the Beveridge model

For the other two clusters, the results are not that straightforward as the majority of the changes in assignments to clusters took place between cluster 3 and cluster 4. In 2015, cluster 4 had the second highest average GDP per capita, the second lowest overall CHE ratio, and the highest performance in all indicators representing health outcomes (the lowest DR, and the highest LE and HLY values). This cluster had the lowest CCHIS expenditure ratio and the highest GS expenditure ratio in both years, which is consistent with the fact that it contains only the countries with the Beveridge model. However, in 2016, cluster 3 was the cluster with the second highest average GDP per capita and the second lowest overall CHE ratio, as well as the best results in all the indicators representing health outcomes. In cluster 3, the GS expenditure ratio was the second highest and the CCHIS expenditure ratio was the second lowest in both years. However, cluster 3 had worse results than cluster 4 in 2015 and the opposite is true in 2016. In cluster 3 (2015), the average values of LE and the overall CHE ratio were the second highest. However, the same was the case for the DR value. HLYm and GDP per capita were the second lowest and HLYf even the lowest among the created clusters. In cluster 4 (2016), there was the second lowest average GDP per capita, LE and HLYm, the second highest DR and overall CHE ratio, as well as the lowest HLYf.

Table 2 Descriptive statistics for the four clusters created in 2015 and 2016

Ind.	M15 C1	m15 C2	m15 C3	m15 C4	Ind.	M16 C11	m16 C12	m16 CL3	m16 C14
DR	102.9	182.28	103.63	88.9	DR	97.39	183.66	90.80	109.68
LE	81.68	77.17	81.73	82.12	LE	82.16	77.09	82.51	81.23
HLYf	61.39	59.99	59.83	70.28	HLYf	60.96	60.20	68.81	59.45
HLYm	61.93	58.17	61.37	71.30	HLYm	61.97	58.40	68.53	60.58
CCHIS	6.34	3.37	0.31	0.23	CCHIS	6.54	4.06	0.46	0.33
GS	1.26	1.17	6.84	6.88	GS	1.42	0.83	5.89	7.06
GDPpc	40700.00	20066.67	29416.67	39560	GDPpc	42757.14	20400.00	32755.56	30625
CHE	10.00	6.80	9.48	9.25	CHE	10.28	6.96	8.85	9.67
Ind.	S15 C1	s15 C2	s15 C3	s15 C4	Ind.	S16 C11	s16 C12	s16 CL3	s16 C14
DR	16.95	50.06	10.12	12.69	DR	12.09	41.90	13.68	6.40
LE	0.83	2.45	0.91	0.40	LE	0.92	2.06	0.66	0.25
HLYf	4.02	3.84	3.98	3.72	HLYf	4.04	3.69	2.92	2.84
HLYm	2.88	4.12	2.38	2.80	HLYm	2.62	3.54	3.19	1.69
CCHIS	1.65	1.79	0.50	0.49	CCHIS	1.91	1.60	0.87	0.58
GS	1.07	1.04	1.14	1.56	GS	1.08	0.88	2.10	1.40
GDPpc	16291.80	3256.14	5085.04	9499.63	GDPpc	15529.2	3307.87	9944.61	5929.8
CHE	1.85	0.92	0.53	1.41	CHE	1.97	0.95	1.31	0.53

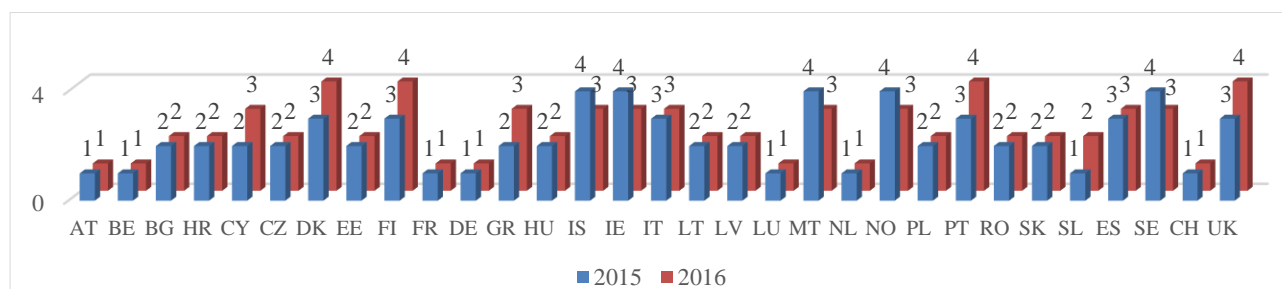
Source: Own processing

Note: m – mean; s - standard deviation.

Next, the values of standard deviation in clusters are described in more detail. Their values show the extent of differences between countries in particular clusters with respect to the analysed indicators. For the DR indicator, the lowest standard deviations were in clusters 3 and 4 in 2015 and 2016 respectively, and their highest values in cluster 2 in both

years. Cluster 4 had also their lowest values for the LE indicator, while the highest values were in cluster 2 again. Cluster 4 had the lowest standard deviations for HLY indicators, apart from HLYm in 2015, when its lowest value was in cluster 3. The highest values were in cluster 1 for HLYf and in cluster 2 for HLYm. Cluster 1 had the highest standard deviations for GDP per capita and overall CHE ratios in both years. For the CCHIS expenditure ratio, the lowest standard deviations are in cluster 4 (both years) and the highest values in cluster 2 (2015) and cluster 1 (2016). For the GS expenditure ratio, the lowest values were in cluster 2 in both years and the highest ones in cluster 4 (2015) and cluster 3 (2016). The lowest values were in cluster 2 for GDP per capita in both years and in clusters 4 and 3 in 2015 and 2016 respectively. It can be seen that in the clusters containing mainly the countries with the Bismarck model (clusters 1 and 2, see the division in Figure 4), standard deviations are higher for the CCHIS expenditure ratios, while for the clusters containing the majority of countries applying the Beveridge model (clusters 3 and 4), these standard deviations are lower. They are higher for the GS expenditure ratios in the second group.

Figure 2 Changes of assignments to clusters between 2015 and 2016



Source: Own processing

Several changes in the composition of clusters took place between 2015 and 2016 (see Figure 2). The majority of cluster 1 and cluster 2 countries remained in these clusters in both years and the changes predominantly occurred between cluster 3 and 4. Slovenia is an important exception, as it shifted from cluster 1 to cluster 2. Cyprus and Greece left cluster 2 and joined cluster 3 (cluster 2-3 countries). These two countries are borderline cases for GS expenditure ratios (see more in subsection 3.2), while, except for Austria, all countries with GS ratios lower than Cyprus and Greece, are countries with the Bismarck model (see also Figure 4). Five countries applying the Beveridge model were in cluster 4 in 2015 and all of them shifted into cluster 3 in 2016 (cluster 4-3 countries). The two other Southern countries applying the Beveridge model, Italy and Spain, were assigned to cluster 3 for both years (the core cluster 3 countries). Other four countries with the Beveridge model shifted from cluster 3 (2015) to cluster 4 (2016) (cluster 3-4 countries). Two Northern countries (Denmark and Finland), one Southern country (Portugal) and the UK are included in this group. These are the only four countries included in cluster 4 in 2016, while these countries, along with Italy and Spain, were included in cluster 3 in 2015. All these changes are consistent with the description of mean and standard deviation values and their changes in this subsection (above) based on Table 2. In 2016, Cluster 4 seemed to be homogenous (with the lowest standard deviations for almost all indicators), despite including countries from various geographical groups with differing standards of living (with the exception of the UK and Finland).

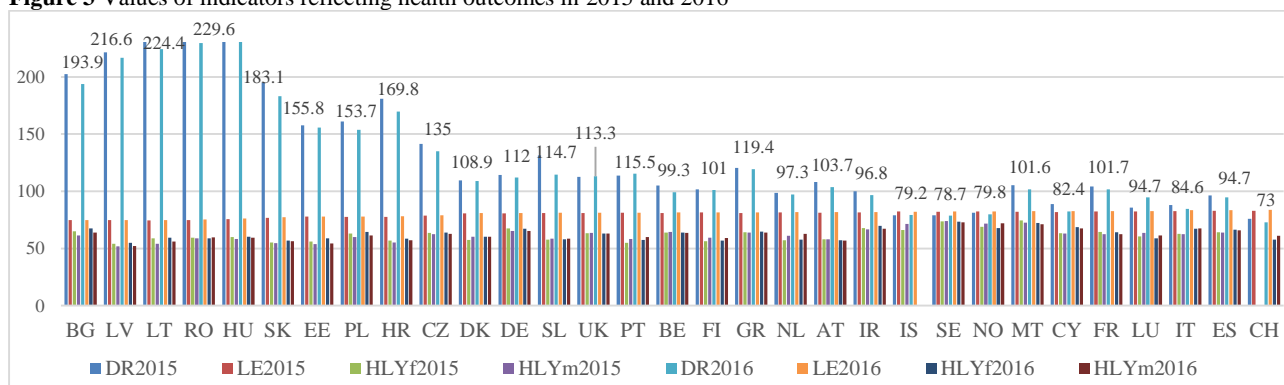
Cluster 4, containing Ireland, Iceland, Malta, Norway and Sweden (cluster 4-3 countries), was the best performing cluster in 2015 and cluster 3, containing these countries, Cyprus, Greece, Italy and Spain, the best performing cluster in 2016. All these countries have applied the Beveridge model (only in Greece it is not quite clear to which model it should be assigned). Cluster 1, containing only the countries applying the Bismarck model (the Benelux countries, Austria, Germany, France and Switzerland in both years, along with Slovenia in 2015) can be evaluated as the second-best performing cluster in both years. However, in 2015, the differences in the performance in health outcomes and the overall CHE ratio between clusters 1 and cluster 3 (the second worst performing cluster) are only marginal. The average LE value is even slightly lower in cluster 1, however HLYf is higher by 1.6 years (the highest difference between the indicators representing health outcomes). In 2016, cluster 1 achieved a significantly higher average performance than cluster 4 (the second worst performing cluster) in these indicators, especially in DR. On the other hand, as cluster 1 exhibited a significantly lower average performance than cluster 3 in 2016, there were even higher differences between cluster 1 and cluster 4 in 2015. One reason for these changes is that Slovenia left cluster 1, meaning average health outcomes improved. In particular, there was a significant decrease in average DR. It must be emphasised that cluster 1 had the highest GDP per capita in both years and the highest overall CHE ratio. GDP per capita was only slightly higher than that of cluster 4 in 2015, a higher difference was in 2016 between cluster 1 and cluster 3, which was the best performing cluster in 2016. The reason is that four Southern countries were grouped with cluster 4-3 countries in cluster 3. It is also clearly visible that in both years cluster 1 exhibited the highest CCHIS expenditure ratios and on the contrary cluster 3 and 4 high GS expenditure ratios. Its overall CHE ratio is not significantly higher than those of clusters 3 and 4 (apart from cluster 3 in 2016).

3.2 Detailed analysis of results

It is necessary to investigate the relationships between the indicators applied. The negative correlation between the two indicators reflecting quantitative aspects related to health outcomes, i.e. the LE and DR indicator, is obvious (r is around (above) 0.96 in both 2015 and 2016, see Figure 3). However, there was a higher positive correlation only between LE and HLYm (0.674 and 0.626 in 2015 and 2016 respectively). It was lower between LE and HLYf (0.415 and 0.358 in 2015 and 2016 respectively). For both years, the correlation coefficient between the overall CHE ratio and GDP per capita in PPS was positive, but low (0.321 and 0.297 in 2015 and 2016 respectively). However, Luxembourg is an outlier (with the highest GDP per capita and the third/second (2015/2016) lowest ratio of overall CHE) and if it was omitted, the coefficient would be higher ($r=0.666$ and 0.656 in 2015 and 2016 respectively). Moreover, there was a moderate correlation between GDP per capita/ overall CHE ratio and the DR/LE indicator. The coefficients were around 0.6 for both DR and LE in absolute values in both 2015 and 2016. There is a negative correlation between GDP per capita/CHE ratio and DR and a positive correlation between GDP per capita/CHE ratio and LE. Between GDP per capita/CHE ratio and HLY indicators the coefficient was positive, but often low. The highest correlation coefficient was between the CHE ratio and HLYm in 2015 ($r=0.497$) and the lowest between GDP per capita and HLYf in 2016 ($r=0.067$), taking into account the missing data.

No significant correlation was discovered between the standard of living, represented by GDP capita, and both the CCHIS and GS expenditure ratio (the correlation coefficient is around 0.2 between the GS expenditure ratio and GDP per capita; it is around zero for the second ratio). Similarly, the correlation coefficients between these two expenditure ratios and the overall CHE ratio differ. They are slightly above 0.4 for the GS ratios and above 0.1 for the CCHIS ratio in both years. Between these two indicators (the GS and CCHIS expenditure ratio) the correlation coefficient was relatively high and negative (-0.802 in both years). This confirms that in these countries either the features of the Beveridge or the Bismarck health care system model prevail. For the detailed assessment two other Figures are displayed. Figure 3 shows the values of four indicators reflecting health outcomes.

Figure 3 Values of indicators reflecting health outcomes in 2015 and 2016

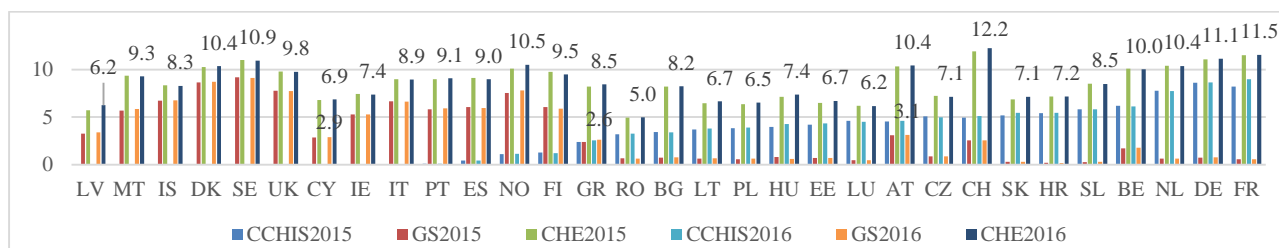


Source: Eurostat (2019a, b)

Notes: The values are order according to LE in 2016. The description is related to DR.

Figure 4 displays the overall CHE ratios along two partial ratios reflecting the features of health care system models applied. Figure 4 also shows a clear division of countries into those predominantly applying the Bismarck model (right part) and those applying the Beveridge model (left part). Greece is a borderline case for the CCHIS expenditure ratio, with more features of the Bismarck model (see MSCBS (2017)). If countries are ordered according to the GS expenditure ratio, Cyprus is a borderline case, being assigned to the Beveridge model, but an exception is Austria, which applies the Bismarck model, while having a higher GS ratio than Cyprus. Greece follows Cyprus, while Greece is also grouped with the countries following the Beveridge model in 2016 (in cluster 3). It has a lower value of GS expenditure ratio than Cyprus (see Figure 4). However, the CCHIS expenditure ratio of Cyprus was very low (0.02% in both years) in comparison to Greece (2.396 and 2.548 in 2015 and 2016 respectively) and Austria (above 4.5% in both years) and therefore, this is a country predominantly having features of the Beveridge model.

Figure 4 Overall CHE ratio, GS and CCHIS expenditure ratios, 2015 and 2016



Source: Eurostat (2019b); WHO (2019)

Notes: The values are ordered according to the CCHIS ratios in 2016 (the values of the overall CHE ratio and the selected GS expenditure ratios of countries described below are displayed).

Next, a more detailed analysis and discussion focuses, especially, on the factors leading to the assignment of countries to particular clusters, and changes in their cluster assignment. The majority of cluster 1 and cluster 2 countries are the countries applying the Bismarck model (the right part of Figure 4) and on the contrary, the majority of cluster 3 and 4 countries are those applying the Beveridge model (the left part of Figure 4). Since in cluster 2 the majority of the new member countries with lower values for GDP per capita and overall CHE ratios were included, no significant correlation was found between these two variables and CCHIS expenditure ratios. Nevertheless, Latvia is a cluster 2 country as well, although its CCHIS expenditure ratio was 0. This was also the case for the other four countries changing their assignment between clusters 3 and 4, which are among the most developed countries in the sample. Greece, for which a model was not clearly determined, was reassigned from cluster 2 to cluster 3, i.e. closer to countries with the Beveridge model. Although its CCHIS ratio increased, its GS expenditure ratio increased as well (from 2.38 to 2.638%). Another borderline country, Cyprus, also shifted from cluster 2 to cluster 3. It is claimed that there has been a tendency in recent years for countries with Beveridge-type health care systems to incorporate Bismarck characteristics or vice versa, leading to the health care policies in a number of countries to trend towards the mixed model (Princeton Public Health Review, 2017).

Based on the detailed analysis of the indicator values in the analysed countries (see also Figures 3 and 4), cluster 2 was the worst performing cluster and the countries included exhibited low values of overall CHE ratios, along with Luxembourg, Cyprus, Ireland, Iceland and Greece. The highest ratio was exhibited by Slovenia, followed by Bulgaria. Low GS ratios and high CCHIC ratios prevail in this cluster, with the exception of Latvia, for which the reverse is true, being the only country in the group to apply the Beveridge model. Croatia, Slovakia and Slovenia had the lowest GS ratios and the highest CCHIS ratios. Cluster 2 countries exhibited (in the order) the highest DR and the lowest LE values, while Slovenia had slightly better results in both indicators. However, as regards HLY indicators, the values of Slovenia were among the lowest, as were those of the majority of cluster 2 countries. The exception are Bulgaria, Czechia and Poland (the last one – especially for HLYf). Nevertheless, Slovenia's LE was higher than that of Germany and Denmark, its HLYm higher than that of Austria and HLYf than those of several cluster 3-4 countries. Therefore, along with the features of its expenditure indicators and relatively high GDP per capita (the second highest in the group of cluster 2 countries, following Czechia), this country is close to cluster 2 as well cluster 1 countries. The values of its overall CHE ratio are somewhere between those of cluster 1 and cluster 2 countries. The majority of core cluster 1 countries exhibited the highest overall CHE ratios, only those of Luxembourg are among the lowest in the sample. They also exhibited high values of GDP per capita (France had the lowest value among them). However, the values for the indicators reflecting health outcomes are more diffuse for all four indicators included. On the other hand, cluster 4-3 countries exhibited higher differences in the values of GDP per capita and CHE ratios, but predominantly performed well in terms of health outcomes (their performance is among the highest). Malta had the lowest GDP per capita and the highest DR values and Ireland the lowest LE values in this group, along with the second highest GDP per capita in the sample and a relatively low CHE ratio (the lowest in this group). However, cluster 4-3 countries had very good results in the remaining HLY indicators and all these countries can be evaluated as the best performing countries in the sample.

In 2016, these countries were surpassed in the LE indicator by Switzerland, Spain, Italy, Luxembourg, France, and Cyprus (in 2015 Ireland was exceeded also by Finland and the Netherlands, but Iceland only by Italy, Spain and Switzerland). In Spain, Italy, Cyprus, and Greece (with the exception of slightly lower HLYf values in Italy and Cyprus in 2015) HLY indicators are also among the highest. Greece exhibited medium LE values, but its DR values are relatively high. These were some of the reasons why these Southern countries were grouped with these countries in cluster 3 for 2016.

The core cluster 3 countries, the cluster 2-3 countries and the cluster 3-4 countries also have some similar features (the first two groups shared a common cluster in 2016 and the first and the third group in 2015). Greece had one of the lowest GDP per capita in the sample, that of Cyprus is slightly higher. In this aspect these countries are close to cluster 2 countries (in both years, especially 2015). For cluster 3-4 countries the values of GDP per capita are diffuse with the lowest exhibited by Portugal and the highest by Denmark. The values of Italy and Spain are close to one another (higher than those of Portugal, Cyprus and Greece). Cyprus also had relatively low CHE ratios, those of Greece are slightly higher. The values of the core cluster 3 countries are again close to one another (about 8.9% of GDP in 2016), and those of cluster 3-4 countries are more diffuse, with the highest exhibited by Denmark (10.35% of GDP in 2016). Those of

Finland and the UK are close to one another, while the lowest values are exhibited by Portugal, which was slightly higher than those of the core cluster 3 countries in 2016. As indicated above, the core cluster 3 countries exhibited very good results in health outcomes and their values are close to one another. In 2015 their performance in the HLY indicators was slightly lower, but their values increased, and in 2016 their results in health outcomes are comparable to the cluster 4-3 countries. Moreover, they exhibited higher LE values than these countries in both years. Similarly to Italy and Spain, Cyprus also exhibited very good results for all indicators (with higher values for LE than those of cluster 3-4 countries in 2016). The low performance of Greece was identified especially for the DR indicator, where its values are closer to the cluster 2 countries and Slovenia even exhibited lower values. Its LE is also lower than the values of all cluster 3, 4-3 countries and Cyprus, but in 2016 it was higher than the values of cluster 3-4 countries.

Although the cluster 3-4 countries had relatively high CHE ratios (the lowest being those of Portugal) and, apart from Portugal, relatively high values of GDP per capita, the performance in their health outcomes was often poor. All these countries had DR values higher than 100, with the lowest exhibited by Finland and the highest by Portugal. Finland also had the highest LE values in this group, while Denmark had the lowest (with all values being around the average). Regarding HLY indicators, only the UK was able to achieve values slightly above the average. The remaining countries had low values of both indicators (Finland and Portugal below 60 for both indicators in both years, Denmark for HLYf in 2015). Greece, Cyprus and also Portugal exhibited relatively low values of GDP per capita, only Cyprus exceeded Slovenia in 2016. Similarly, CHE ratios are among the lowest in Cyprus, they are below the average Greece and medium in Portugal. Denmark exhibited among the highest values of these indicators in the sample; those of Finland and UK are relatively high and close to one another. The predominant factor cementing cluster 3-4 countries into a group is poor results for some or all health outcomes.

Overall, it seems that the type of healthcare system model is not a factor that significantly affects performance. It cannot even be claimed that GDP per capita significantly determines overall CHE ratios, although there is a relationship when some outliers, like Luxembourg, are excluded.

4 Conclusions

The aim of the paper was to determine the relationships between types of health system, resources used, and selected health outcomes (DR, LE, HLYf and HLYm) in the group of 31 developed countries. Standard of living in these countries was also considered. In addition to the overall expenditure ratio, two specific health expenditure ratios were used (the GS and CCHIS expenditure ratio), which reflect selected financing schemes, and which, in turn, represent basic healthcare system models. HCA was applied to create four clusters in 2015 and 2016, based on the similarities and differences of countries in the sample.

Clusters 1 and 2 include the countries predominantly applying the Bismarck model and clusters 3 and 4 the countries with the Beveridge model. The core cluster 1 countries exhibited high values of GDP per capita and the highest overall CHE ratios, with the exception of Luxembourg, whose values are among the lowest in the sample. However, the values for the indicators reflecting health outcomes are more diffuse for all four indicators included. Therefore, using the average values, this cluster was the second-best performing cluster in both years. A higher average performance was achieved in 2016, when only seven core cluster 1 countries were included (Austria, Germany, France, Switzerland and the three Benelux countries), while Slovenia shifted into cluster 2. Slovenia exhibited some similarities to cluster 1 as well as to cluster 2. Its overall CHE ratio is medium and GDP per capita is the second highest among cluster 2 countries. It performed better in the indicators reflecting health outcomes than some cluster 1, cluster 2, and cluster 3-4 countries. Its performance was the highest among cluster 2 countries for DR and LE indicators (also surpassing Greece in DR in 2016). The cluster 4-3 countries, which include Sweden, Norway, Iceland, Ireland and Malta, along with the core cluster 3 countries, which include Spain and Italy, and one cluster 2-3 country (Cyprus), are evaluated as the best performing countries in the sample. Although the cluster 4-3 countries exhibited higher differences in the values of GDP per capita and CHE ratios, their performance in terms of health outcomes is among the highest.

Cluster 2 was the worst performing cluster. There was only one indicator reflecting health outcomes, in which this cluster did not have the lowest average performance. This was HLYf, for which Bulgaria had a relatively high value, comparable to cluster 3-4 countries, which exhibited the highest values for both HLY indicators. Other countries exhibiting poor performance were the cluster 3-4 countries, including Denmark, Finland, the UK, and Portugal. They were included in cluster 3 in 2015, along with Italy and Spain, and separately in cluster 4 in 2016. Accordingly, in 2016, cluster 4 had worse average results in health outcomes than cluster 3 in 2015, and these clusters exhibited the second lowest performance for the relevant years. The core cluster 3 countries significantly improved their performance in HLY indicators, and, less substantially, in DR and LE, and are grouped with the well-performing cluster 3-4 countries in 2016. Two countries, Greece and Cyprus, shifted into this best performing group from cluster 2 (2015). Cyprus significantly improved its performance in all the indicators reflecting health outcomes between 2015 and 2016 and it is evaluated as one of the best performing countries in the sample. The performance and improvements of Greece were lower.

Another reason for the shifts of these countries between clusters 2 and 3, reflecting different healthcare system models, is that these countries are borderline cases for GS expenditure ratios. The countries applying the Beveridge model exhibited higher values and the countries with lower values were those applying the Bismarck model (with several exceptions).

Moreover, Greece is a clear borderline case for the CCHIS expenditure ratio as well (the values of Cyprus were very low). All the countries applying the Bismarck model had higher values and those applying the Beveridge model lower values. Therefore, it is difficult to assign Greece to one of the models. There has been a tendency towards mixed models in recent years and many countries have exhibited features of both models. However, still the features of one of the models prevail and there is a significant negative correlation between the GS and CCHIC expenditure ratio.

Overall, it follows from the analysis that it is not possible to ascribe performance to a particular kind of healthcare system model. Latvia, which exhibited a very low performance in all the indicators reflecting health outcomes, was assigned to cluster 2 in both years.

It is more likely that the countries with lower standards of living also have lower overall CHE ratios, although no significant correlation was found in this case, either. However, after omitting some outliers, especially Luxembourg, it would be higher. There was a moderate negative/positive correlation between GDP per capita/the overall CHE ratio and DR/ LE respectively. No significant correlation was discovered between the standard of living, represented by GDP capita, and both the CCHIS and GS expenditure ratio. The negative correlation is clear between two quantitative indicators reflecting health outcomes (LE and DR), but not that obvious between them and the qualitative (HLY) indicators. The challenge is to improve methodologies for the analysis of the efficiency, effectiveness and sustainability of healthcare systems, which is a crucial component of the social pillar of SD.

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SMART Region - Developing and Limiting Factors

Cross-Border Cooperations between Austria and the Czech-Republic: Experiences from the Past and Influencing Factors for Innovations

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Abstract: South Bohemia and Upper Austria have a long history of cross-border contacts and cooperation. It is on the EU's target list to intensify these contacts and to foster regional development and innovations by cross-border cooperation. It is the aim of this literature paper to collect and present relevant insights from previous cross-border research projects completed by the authors' universities in České Budějovice and Steyr. In addition, the Austrian and Czech culture's influence on innovativeness and cross-border cooperation is discussed, providing an outlook on the need of further research.

Keywords: innovation, cross-border cooperation, regional development, Czech-Republic, Austria

JEL Classification: M16, O19, O30, Z13

1 Introduction

South Bohemia and Upper Austria are regions with a shared border, having a long history of cross-border cooperations. As an Upper Austrian research institution, the University of Applied Sciences Upper Austria has a strong interest in cooperating and analysing advances in cooperation efforts scientifically. Several successful projects from the past are a proof for both sides' intentions to cooperate and to both contributing to intensifying cross-border contacts. From the perspective of regional development, cross-border cooperations are of high relevance. For both regions, fostering innovations by SMEs is a central policy, too.

This paper aims firstly at presenting insights and experiences from selected cross-border projects from the past. Secondly, it presents deliberations about how characteristics from the Austrian and Czech culture may influence innovation and cross-border cooperations. Finally, a collection of research questions for future research projects, aiming at facilitating cross-border innovation potential, is presented.

EU policies striving for fostering synergies and regional development show that there is a real need and justification for closer and more frequent cross-border cooperation, especially for SMEs with limited resources. In the past, the EZT and the INTERREG-programmes were examples of the EU's strategical focus on Austrian and Czech cooperation projects. The INTERREG Austria-Czech Republic programme lines PA1 („Strengthen research, technological development and innovation“) and PA4 („Sustainable networks and institutional cooperation“) (2014-2020) are a proof for how important fostering institutional cooperations and innovation are for the European region. Internationalising, for example, on a big scale might be difficult to realise, but taking advantage of the very close „home market“ South Bohemia or Upper Austria, might be a realistic goal.

Whenever international cooperations are concerned, cultural challenges are not to be neglected. This also stands for the two regions, South Bohemia and Upper Austria, even though they have a long history of collaborating. In most cases, literature deals with the challenge-part of cultural differences. In this paper, one extra aspect should be included: The fact, that innovations are usually born during creative processes and creativity is triggered by diversity (Baumgartner 2019, HBR 2017). From this perspective it could be concluded, that cultural differences prevailing when engaging in cross-border cooperations, might even fuel innovations and thus contribute to a more innovative atmosphere in which SMEs can develop better.

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2 Goals, Methodology and Data

Based on an Interreg project oriented on cross-border innovation potential analysis of SMEs, we were collecting the secondary data about the behavior of SMEs in Upper Austria and South Bohemia. The primary data were obtained by interviewing the particular leading companies with following focus:

At first to analyze the preparedness of both countries to engage in cross-border projects. Secondly the cultural fit together with differences/similarities in innovative/entrepreneurial culture should be identified, together with, thirdly, the challenges for cross-border cooperation. Together with application partners like the local Chambers of Commerce or the South Bohemian Park for Research and Technology of the Business Upper Austria Agency were also interviewed:

- What are hindering factors for cross-border cooperation between Upper Austrian and South Bohemian SMEs and how can we overcome them?
- How can innovative/entrepreneurial attitudes be fostered by cross-border cooperation? What processes are needed?
- How can we make profit from cultural diversity for innovations instead of regarding it as a hindering factor?

2.1 Insights from Cross-Border Projects

Cooperation between the regions of South Bohemia and Upper Austria has a long tradition. In this chapter, some important project insights are presented, in order to give an overview about cross-border cooperation initiatives with impact on regional development and innovations. The choice of presented projects consists of those, in which the authors and their institutions were actively involved.

In 2012, the “European Region Donau-Moldau” was set up (EDM) with seven partner regions in South Bohemia, Upper Austria and Bavaria. It brought the regions closer together, by defining areas of cooperation, which ought to be further developed. One main outcome of the project is a “competence map”, where institutions of the regions can enter their core competences, when looking for cooperation partners (www.euoparegion.org). The map is still accessible online and has sustainably fostered cross-border innovations until today.

Picture 1 The European Region Donau-Moldau



Source: <http://www.euoparegion.org/uber-die-europaregion.html>

In 2013, the intercultural European Union project “RegioTalent” analysed cross-border contacts between South Bohemia and Upper Austria, having a high relevance for understanding the future potential for cross-border cooperations of SMEs (Schedlberger et. al. 2013). It found that cross-border contacts are desired and existing, especially among young people with higher education. There is, obviously, a strong interest to cooperate on both sides, being the ideal starting point for cross-border cooperations. The insight, that young people with higher education are more interested in cross-border contacts points at a higher potential for innovative start-up and SME cooperations, which are usually driven by the younger generation. (A study of KMU Forschung Austria found in 2016, that the average age of Austrian start-up founders are 30,5 years; cited by Lauf 2017) In the Czech Republic the situation of newly established SMEs in the form of start-ups is similar and many of them are directly connected in cross-boarder trade and cooperation.

However, in 2013, private cross-border contacts were more common than business ones (c.f. Table 1). The nature of contacts was analysed by asking the people with cross-border contacts if their contacts were mainly private, business related or both. The respondents reported that the major share of contacts was of a private nature (64.1% in Austria and 58.5% in Czech Republic). Pure business contacts play a much smaller role with 21.4% in Austria and 18.6% in the Czech

Republic. People reporting to have both private and business cross-border contacts are more common in the Czech Republic than in Austria (Schedelberger et al. 2013).

The researchers furthermore discussed the role of the borderland between Czech Republic and Austria: It can be called “interdependent or integrated borderland”, representing the most favorable condition for cross-border projects (Martinez 1994). What is still challenging the cooperation potential are cultural differences, which are, however, expected to be diminishing in younger generations.

Table 1 Nature of Cross-Border Contact by Country.

	Private	Business	Private and Business	Total
Austria (percent)	64.1	21.4	14.6	100.0
Czech Republic (percent)	58.5	18.6	22.9	100.0
Total N	135	44	42	221

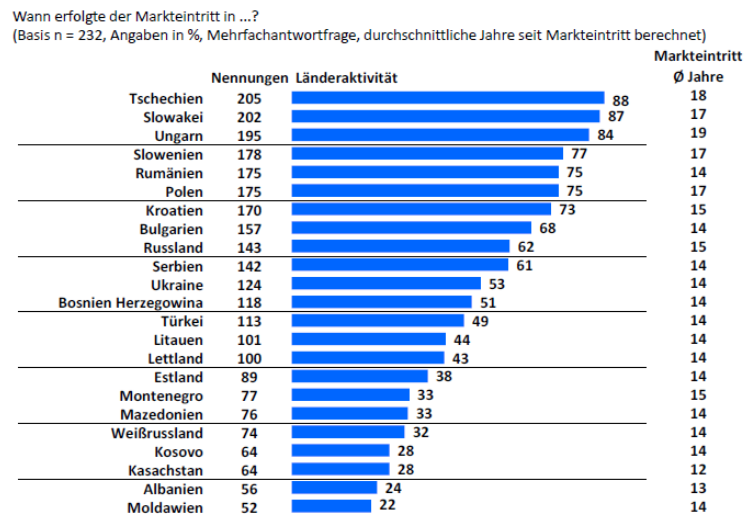
Source: Schedelberger et al. 2013 (LQMVS Data 2012)

In 2014, the project “Rewenio” collected feedback about how “welcoming” and “open” Upper Austria as a region, comprising public entities and companies is, with respect to expats and other cultures (especially concerning our neighbouring countries) (c.f. www.rmooe.at). The project was started aiming at improving the general “welcoming culture”, since reality showed that Upper Austria is facing a severe lack of qualified personnel, without being able to retain those very qualified ones coming from abroad (Wiesinger et al., 2015). Findings of the project underlined, that more openness was needed. From the HR-perspective of Upper Austrian companies, a strong desire for more cross-border “interaction” was noticeable throughout the project.

This was also obvious when having a look at an IMAS-Study carried out among Upper Austrian companies (n=511) in the course of the Rewenio-project: All the companies, which have already been employing well-qualified international personnel, stated that their personnel requirements will increase in the future (21%) or remain unchanged (18%). Of those companies, who have not yet been employing any foreign employees, 13% are planning to recruit new personnel from abroad (Wiesinger et al. 2015). These projects’ findings once more showed that frequent cross-border cooperation and positive experience with foreign business partners (especially in border regions), may lead to more interaction, a more frequent exchange of workforce or even innovation power by making use of synergies.

In 2016, the “Barometer Study” (CEE-Barometer 2016) was conducted, observing Austrian companies’ behavior in CEE Markets (n=250). It showed an ongoing attractiveness of the Czech market. The Czech Republic is largely considered to be a “home market” for Austrian companies. 54% name the Czech Republic among their top five markets and 61% wished for even intensifying their activity in CEE markets. On average, Austrian companies can make profit from their longtime-experience on the Czech market (average 18 years!), which would also enable younger start-up SMEs to learn from more experienced experts for the market. Market entry reasons to Czech Republic are “hard facts” like, ranked as No.1, geographical reasons, or No.2 the strategic importance, or No.3 the size of the market. As prerequisites for success, “soft facts” like language and cultural knowledge, contacts to local experts and local sales partners, openness and frequent contact were preferred.

Picture 2 Market entry in CEE – longterm experience of Austrian companies in CZ



Source: CEE-Barometer (2016), German language, “When did you enter the markets at first?”, n=232

In 2018, findings from the Interreg AT-CZ project “SIP-SME“ indicated that there is a lack of information about cross-border collaboration activities in innovation, which might be hindering the possibility to use the full regional innovation potential. This lack of information might also hinder local SMEs from initiating cross-border activities. On both sides of the border, the impact of lacking organizational innovation structures and objectives vs. the human factor “unwillingness of employees to innovate” has to be further investigated (Fratric et. al. 2018). With respect to peoples’ predisposition to innovate, intercultural research might deliver more insight. The outcome of the project can be found as a supporting SW-tool for managing innovations in SMEs on the web page: <https://en.sip-sme.org/sip-tool-1>.

2.2 (Cultural) Influence Factors on Innovation and Cross-Border Activities

Knippschild (2011), when analyzing three case studies of cross-border cooperation in the German-Polish-Czech Borderland, identified certain challenges which need to be tackled with. He mentions (among other influence factors) the following, making cooperation rather difficult: the size of a cooperation area and its impact on communication processes (p. 631), the structure of the cooperating public administrations (p. 632), the lack of transnational organisation and legal frameworks, language barriers, cultural differences and prejudices (ibd.), transaction costs, objectives, expectations and experience of the involved participants (ibd.).

Among other authors, Raposo et al. (2014) confirmed that cross-border cooperation activities have a positive impact on a firm’s performance and innovation capacity. Other authors as cited by Raposo et. al., discuss the favorable impact of geographic proximity, face-to-face-contacts and membership in regional networks or clusters on the development of innovations (ibd. p. 159).

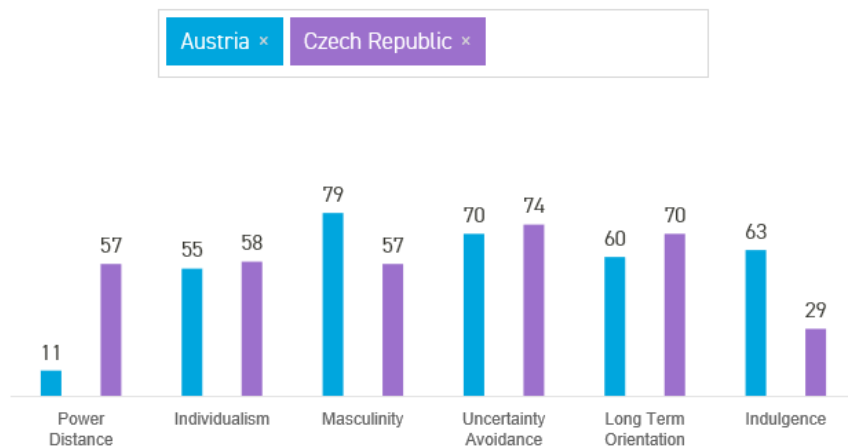
When talking about cross-cultural cooperation and innovations, it has to be mentioned that creativity needed for innovations is usually triggered by diversity (Baumgartner 2019, HBR 2012). So cross-cultural cooperation between South Bohemia and Upper Austria are not only significant from a regional development and policy point of view, but cultural diversity caused by the cross-border collaboration (besides aspects like geographical proximity, participation in networks and close personal contacts) and may lead to more innovative results.

When discussing relevant influence factors on innovation behavior and cross-border activities, the Flash Eurobarometer (e.g. 2012, 2017) provides insight. One could for example have a look at peoples’ attitudes towards employment. In the 2012 survey, 60% of the Czech respondents preferred employment over self-employment, and 55% of the Austrian respondents. There is no significant majority preferring self-employment in neither of the countries, pointing at the importance of having a “safe job” instead of a more risky self-employed situation. From the Eurobarometer 2017, one could consider the following aspect with relevance for cross-border collaboration. Do people consider globalization as an opportunity for economic growth? In Czech Republic, 49% of all respondents think so, in Austria 58%, meaning that the preconditions for believing in the benefits of cross-border cooperation might be slightly better in Austria.

As above mentioned, cultural differences between Czech Republic and Austria are important influence factors when it comes to innovative cooperation. Herbig and Dunphy (1998) attribute higher innovation capabilities to certain cultural dimensions like higher individualism, willingness to take risks, low power distance, long-term orientation, having a high

potential for improvisation, a low degree of uncertainty avoidance, etc. (as cited by Didero et al 2008). Furthermore, there could be searched for data, which indicated the degree of encouragement of creativity and entrepreneurial thinking in education systems (c.f. Marinkovic 2015). It is common knowledge, however, that cooperation run smoother, the smaller the “cultural distance” is. The cultural fit between Czech Republic and Austria can be discussed in accordance with Schroll-Machl and Novy (2005), who found that a typical Czech cultural standard would be to prefer a so-called “diffusion” of working and private life (p. 82), as well as a high relationship orientation (as opposed to task orientation. This would lead to the habit of taking more time for contacts and relationship building from the side of the Czech partners in cooperation, since Austrians are considered to be more likely to prefer “specific” life, separating more between private life and working life. Furthermore, in Czech Republic, clear structures are less appreciated, whereas improvisation is of high cultural acceptance and value, according to Schroll-Machl and Novy (p. 41). This aspect is especially interesting when having a look at the difference in Hofstede’s power distance (A=11, CZ=57, see Picture 3). The relatively high power distance for the Czech Republic might be partly explained by the former political system and its hierarchical structures and may obviously lead to a high potential for improvisation and aversion to structures at the same time. When coming back to Herbig and Dunphy (1998), neither the Czech nor the Austrians are typical innovation cultures, having a rather low individualism rate and a rather high uncertainty avoidance. What role exactly the indulgence dimension plays in the context of innovation, will have to be clarified in future research.

Picture 3 Hofstede’s cultural dimensions compared for CZ and A



Source: <https://www.hofstede-insights.com/country-comparison/austria,czech-republic/>

3 Conclusion and Outlook

The literature and project analysis underlined that there are certain hindering and fostering factors when cross-border cooperations are concerned. However, there is no doubt that cross-border activities contribute and impact innovativeness of the respective cooperation partners on both sides of the border. Therefore, it can be concluded that cross-border cooperations between Czech and Austrian SMEs are desirable, not only for funding reasons, but also for regional development, synergies, human capital aspects and cultural aspects.

There is data about cultural dimensions for the Czech Republic and Austria, however, not for South Bohemia and Upper Austria. In this case, further research has to be conducted in the form of in-depth cultural standard interviews, updating Schroll-Machl and Novy’s research and adapting it to the regions instead of countries. It will be furthermore interesting to find more evidence that diversity (i.e. a cross-border cooperation) leads to higher innovativeness than a within-the-country cooperation.

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SMART City/Region – Developing and Limiting Factors in the South Bohemian Region

Jiří Dušek¹

Abstract: The Smart Region/City concept aims to reach sustainable growth and a balanced relationship within and between cities and the countryside, it continuously improves the quality of infrastructure and services in many areas ranging from energy industry, transport, health care, social services and education to security. The Smart concept is unique because it involves cooperation among many different fields which are different at first sight and which should be integrated into one complex whole within the Smart Region or Smart City concept. The goal of this analysis is to map the current state and the degree to which the South Bohemian Region is involved in the Smart City/Smart Region concept, to map the level of this Smart concept implementation process and the opinion of the need for its support, and subsequently to find appropriate measures to increase the involvement in the concept. An integral part of this analysis will be to determine the development and limiting factors of the Smart City/Smart Region concept.

Keywords: developing factors, limiting factors, SMART City, SMART Region.

JEL Classification: O18, O20, R11

1 Introduction

Smart City or Smart Region are one of the concepts of applying the principles of sustainable development to the organization of a city/region using modern technology in order to improve the quality of life and make governance more effective. This concept is most widely used in the fields of energetics and transport, both of which can be dealt with more effectively by using appropriate information and communication technologies. However, the Smart City/Region concept does not only cover the above-mentioned areas, it can also be applied e.g. to water management, safety, public lighting, waste management, e-government or crisis management.

The Smart City concept is a program change driven by the political representation of the city and it is a gradual process, not a state. In contrast to conventional planning and operation of urban agendas, Smart City simplifies the process of engaging the professional and general public by using electronic tools (e.g. communication platforms or social networks). It enables the city's strategies to be made up not only by a professionally competent contractor in cooperation with the relevant department of the city, but also by work groups made up of experts from various institutions, local entrepreneurs and interest groups that are effectively coordinated by the city using electronic media. The resulting strategies can be submitted for comments in electronic public forums and then discussed with the public at open meetings so that the introduction of their final form is generally accepted by the citizens and reflects as many notions and ideas as possible at the same time. This approach also anticipates prudent investment in new technologies that will support these new programs. This has an impact on the investment costs but above all on the operating costs associated with the technology (Bárta, et al., 2015). There is an equivalent of the Smart City concept on a regional scale, on the level of self-governing lower units and it is called the Smart Region concept.

2 Smart City/Region Concept

In Europe, the Smart City/Region concept is a response to considerable urbanization and, to a large extent, a further step in the development of the EU's regional policy, which has so far focused on supporting larger regions. However, the ongoing concentration of economic power requires a special approach to tackling the problems of small regions, cities and municipalities, which are being pushed by citizens' demands for environmental improvements while maintaining economic performance that largely ensures quality of life.

Massive investments to improve urban conditions are becoming increasingly complicated and the tight budgets of smaller regions or municipalities are not prepared to carry out such activities without an external impulse (the state, the European Union). Smart City/Region involves industry, universities and not just the capacities of the city or region (human, financial) to improve conditions. In this partnership the city/region in fact creates conditions for pilot projects aimed at finding solutions that are beneficial to citizens, while looking for innovative economic models to finance further expansion of the system. It is an interconnection of existing processes towards seeking synergies for their higher efficiency (Král, et al., 2017).

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The Smart City/Region concept is not yet clearly defined in literature, but there are some common features of Smart City/Region that are common for most scholarly and conceptual documents on this subject. They include particularly the following attributes (Caragliu, Del Bo, Nijkamp, 2009):

- High-quality network infrastructure in the city and its effective use to meet the economic, social and other needs of the city's inhabitants.
- Urban development of the city which is friendly to business and innovation.
- Cities have an efficient public service apparatus that enables economic growth while ensuring social inclusion.
- Emphasis on the development of creative, innovative and high-tech sectors, including the development of qualified work infrastructure and appropriate infrastructure.
- Emphasis on environmental and energy sustainability of urban development.

The following definition of Smart City suitably summarizes the above-mentioned basic attributes (Hollands, 2008). In this definition, Smart City is understood as a modern urban concept, the basic vision of which is to achieve interconnection of highly developed urban infrastructure (energy, telecommunications, transport, environmental), business and education and educational institutions in the city into one effective whole with maximum functionality.

Smart City works with other “intelligent” technology concepts, especially Smart Grid, smart buildings and clean mobility. The emphasis on a comprehensive approach is also reflected in the European project of the University of Vienna, which has defined the basic dimensions of Smart City development as follows (Giffinger, et al., 2007): Smart Economy, Smart People, Smart Governance, Smart Mobility, Smart Environment, Smart Living.

It is important to point out that Smart City is not a purely technical field. It involves interconnection of a wide range of different professions, and even though state-of-the-art technologies are its integral part, they only act as one of the tools to ensure a high-quality life for the city's inhabitants and make energy and services more efficient. Just because a city has smart and energy-efficient street lighting doesn't mean it's Smart at the same time. Terminal devices, in most cases sensors, are the basic technical element of smart cities. Sensors are basically very simple devices that can measure a certain physical or technical quantity. Sensors are further integrated into sensor networks, which can generate a large amount of information on various changes in the environment. An important feature within a smart city is sharing collected information among different systems. To improve the interoperability of individual components, we need to share information with users and provide data among systems, ideally in real time. What makes the whole Smart City concept really smart is analysing a huge amount of data (the so-called Big Data) and then performing defined actions. Interconnection of products, services and people into one unit through the so-called Internet of Things (IoT) was made possible mainly by the following factors (Bláha, 2016): new technologies and cheap internet connection, availability of sensors and necessary hardware, massive use of smartphones, availability and speed of the Internet.

However, this very fast and almost uncontrolled development and technological complexity of integrating existing infrastructures with relatively young internet technologies, such as cloud services, smartphones and mobile applications, wearables, wireless technologies (Wi-Fi, RFID, NFC), etc., open doors to potential cyber threats.

This implies that the Smart City concept is relatively flexible and can be adapted to the level of development and to the needs of a particular city. For example, the initiative called Smart Cities and Communities supported by the European Commission (European Union, 2019) and the related mayor initiative Covenant of Mayors, 2008, focus primarily on 3 dimensions out of these 6 dimensions, namely on smart mobility, smart environment and smart housing (especially with regard to energy savings in buildings and networks). On the other hand, for example Amsterdam chose to focus primarily on innovation and entrepreneurship in its Smart City concept (Amsterdam City, 2019), i.e. on the dimensions of smart economy and smart people.

3 Methods

The aim of this analysis is to map the current status and the degree of involvement of the South Bohemian Region in the Smart City/Smart Region concept, to map the level of this Smart concept implementation and opinions on the need for its support and to propose appropriate measures of how to increase involvement in this concept accordingly. Using the SWOT analysis to determine the development and limiting factors of the Smart City/Smart Region concept forms an integral part of this analysis. The paper also contains data from the research of regional development of municipalities in the South Bohemian Region which was carried out by the author in 2007-2015 on a basic set of 623 municipalities in the South Bohemian Region.

4 Research results

4.1 Implementation of Smart concept in EU and Czech Republic

On the European level the concept of Smart Cities started to be used and developed mainly from the initiative of industry. In 2011, the *Smart Cities and Communities* industrial activity was established, involving the link between transport and energetics and aimed at reducing their environmental demands. A year later, the European Innovation Partnership on Smart Cities and Communities (EIP-SCC) was launched, including information and communication technologies and giving the Smart Cities concept a basic structure. However, this does not mean that the term “smart” did not exist in the context of the deployment of various smart technologies in cities or regions before 2011. This is evidenced by the Czech Smart Region Vrchlabí, which was launched as a pilot project of smart energy networks in the Czech Republic and a part of the transnational Grid4EU project in 2010. The activities of the city of Písek, whose strategic document *Blue and Yellow Book Smart Písek* was created in 2015, can be considered the first comprehensive strategic approach to the Smart Cities concept. Since then, many other smart cities have been developing in the Czech Republic, more or less based on the *Methodology of the Smart Cities Concept* (Collective of Authors, 2018).

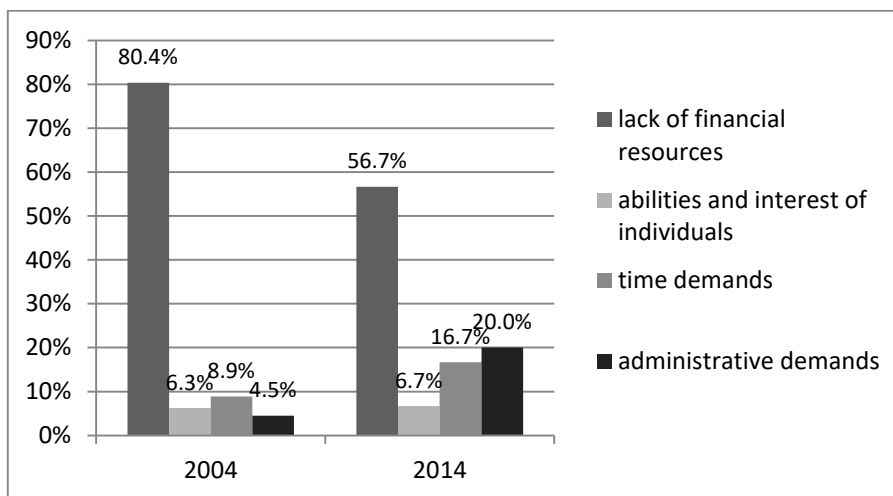
Sustainable mobility and the area of information and communication technology and effective territorial management are the dominant target areas for the implementation of the Smart concept in the Czech Republic. These areas are among the most frequently mentioned when identifying successfully implemented projects. In this category, projects in the field of ICT and effective territorial management account for 45% of the total number of projects already implemented and projects in the field of sustainable mobility make up 31% of the projects. Among the Smart Concept projects currently underway, projects for the ICT target area and effective territorial management account for 28% of the total number of projects which are currently being implemented, while the projects currently underway in the area of sustainable mobility account for 44%. These two target areas maintain a dominant position among the projects under preparation, where approximately one third of the intended Smart concept projects are directed into each of these areas. In the *Analysis of the Current Level of Involvement of the Czech Republic in the Smart City and Smart Region Concept in Relation to New Trends* the biggest obstacles to the implementation and the development of the Smart City/Region concept were identified to be: lack of financial resources, legislative obstacles, insufficient communication of ministries relevant to the implementation of the Smart City/Region concept, insufficient political will, overwhelming by devolved state administration and administrative demands (for details see Greg, et al, 2018). These findings also correspond to a number of other domestic and foreign researches – whether they are specifically focused on Smart City and Smart Region (see, for example, Růžička, 2018, or Dolejš, 2018) or generally targeted to the barriers of regional development as such. According to Schnabel, 2012, unfavourable framework political conditions and narrow profiles of all available resources are among the biggest problems in Germany. Local “selfishness” and the diversity of interests of individual participants are also a significant barrier. Other obstacles are perceived to be less significant by the respondents. The unfavourable framework political conditions mainly reflect the complexity of the German local and regional public administration.

In the Czech Republic, a number of development problems arise from the size structure of municipalities and that is why the lack of financial resources is the most frequently mentioned barrier (and also an incentive) to regional development. This was confirmed by the *Questionnaire Survey Focused on the Analysis of Selected Issues of Municipalities and Towns in the South Bohemian Region* which was carried out by the author in 2004 and 2014. In this survey, the “lack of financial resources” is seen an obstacle to regional development by up to 80.4% of municipalities. However, after accession to the EU, the situation improved noticeably, the figure being only 56.7%, which is a decrease by approximately one quarter. The 80% perception of the lack of financial resources as a serious barrier to development corresponds to similar results of research carried out, for example, by the Centre for Regional Development Research, University of West Bohemia in Pilsen. As regards barriers for regional development, considerable % growth during the programming period of 2007-2013 was recorded by the time and administrative demands of this cooperation and project implementation. The assessment of answers shows that respondents point to complicated and rapidly changing legislation, not fully prepared programming period, involvement of other partners, etc. It is therefore not surprising that almost 20% of Czech municipalities do not make use of the possibilities offered by the European funds or grant schemes of the state or regions.

Although the implementation of the Smart City/Region concept has been well advanced in recent years and today almost every major city has its concept or strategy, we are still encountering limits that prevent the concept from spreading more massively. Although technology is developing very quickly, in some areas it is clear that current opportunities are still lagging behind expectations. In contrast, the initial optimistic forecasts were not fulfilled in other respects and other solutions are being sought. However, technology itself is probably the smallest problem today. In many cases, the financial aspect is particularly limiting, because not all Smart projects are savings-oriented. They often consist in improving services, which costs something. Another major limitation is the lack of awareness of what Smart concepts really mean, what practical solutions they can bring and how they can improve citizens' lives. What must not be forgotten either is a significant complication (especially when working with data) in the form of legislation or historical contractual relations

still in progress. In some cases, these relationships may make it impossible to use existing datasets efficiently. However, it can be assumed that the above problems and barriers will gradually find solutions and new technologies will be able to penetrate all cities, municipalities and regions in a better way, not only in the Czech Republic but also in other EU countries (Kožený, 2019).

Figure 1 Obstacles to regional development in the South Bohemian Region



Source: Author's own research (within the *Questionnaire Survey Focused on the Analysis of Selected Issues of Municipalities and Towns in the South Bohemian Region*), 2004, 2014.

4.2 Results from analyse made in South Bohemia region

If we focus on the involvement of cities, municipalities and regions of the South Bohemian Region in the Smart concept, only 12 municipalities involved can be identified (see also PricewaterhouseCoopers, 2019, author's own research), of which 7 with a strategic document or analysis:

- České Budějovice - document entitled *Smart Cities Potential Analysis* (* 2018),
- Český Krumlov - analysis entitled *Smart City Maturity Scape* (* 2018),
- Milevsko - strategy document entitled *Live Milevsko* (* 2017),
- Písek - “ideological” document *Blue & Yellow Book Smart Písek* (* 2015),
- Předmít - strategic document *Our Smart Předmít* (* 2018),
- Strmilov - strategic document *Smart Village Strmilov - Smart Solutions for Small Towns* (* 2019),
- Tábor - strategic document *Smart City with a Face* (*2018),
- Bechyně - without a strategic document, implementation of a Smart project Charging Infrastructure for Electromobility (* 2019),
- Blatná - without a strategic document, implementation of a Smart project Capa Sitty Solar Benches (* 2017),
- Jindřichův Hradec - without a strategic document, implementation of projects Parking System and Smart Tourism (* 2018),
- Prachatic - without a strategic document, implementation of smart waste sorting, smart benches and systematic care for the elderly (* 2018),
- Strakonice - without a strategic document, implementation of monitoring how full the waste containers are (* 2019).

Out of the 17 municipalities with extended powers in the South Bohemian Region, 9 municipalities (i.e. 52.9%) participate in Smart concepts and as regards former district towns, 6 out of 7 towns participate (i.e. 85.7%). Only Český Krumlov is not involved, where guidance boards for parking lots have been in operation since 2003, but it is not a fully-fledged Smart technology. Among municipalities with extended powers, Dačice, Kaplice, Soběslav, Trhové Sviny, Třeboň, Týn nad Vltavou, Vimperk and Vodňany do not participate. On the sample of municipalities involved we can clearly demonstrate that so far the Smart concept has been the privilege of large, economically and politically strong municipalities, with the 7 largest cities in the South Bohemian Region involved in the Smart concept. On the contrary, except for Milevsko, 8 out of the 9 smallest municipalities with extended powers do not participate. Small towns and municipalities - Bechyně (5,097 inhabitants), Strmilov (1,425 inhabitants) and Předmít (332 inhabitants) - are a positive exception among large municipalities. The collected data/results can be generalized by saying that the differences regard-

ing the involvement in the Smart City or Smart Region concept increase with the degree of disaggregation (i.e. the involvement is higher at the level of large cities, former districts and lower units, such as administrative districts of municipalities with extended powers, than in smaller regions and municipalities of the South Bohemian Region).

Table 1 SWOT analysis of the Smart City/Region concept in the South Bohemian Region

Strong points	Weak points
<ul style="list-style-type: none"> ➤ mobility is the Smart topic which is discussed most (parking, entry of cars in the centre, speed measuring) ➤ pilot projects in the fields of mobility, eGovernment and digitalization, energetics, environment, social and health services, effective territorial and innovation management ➤ development of electromobility ➤ initiation of activities is based on the interest of the public and commercial sphere ➤ inspiring examples of good practice from abroad ➤ regional subsidy program to support Smart projects ➤ existence and sharing of large amounts of data concerning the city administration ➤ high readiness of technological tools already implemented ➤ existing infrastructure providing information ➤ strong background in scientific and research environment ➤ working groups dealing with Smart issues at the level of regions and selected cities ➤ support of the Smart concept in strategic concepts ➤ strengthening the innovation structure of the South Bohemian Region ➤ interest in developing the digital region and implementing innovative solutions ➤ creation of the Smart Region of South Bohemia Commission 	<ul style="list-style-type: none"> ➤ not much emphasis is put on dealing with certain topics ➤ no network infrastructure ➤ large area with low population ➤ problems with the implementation of eGovernment ➤ lack of data for effective work with certain agendas (e.g. in the field of transport) ➤ low level of knowledge and ability to work with data ➤ incompatible formats of historical data ➤ problems with data storage and backup ➤ low extraction of information from the collected data ➤ fragmentation and confusion of data sources ➤ data duplicity ➤ weak interconnection of stakeholders in the course of the region's development ➤ low awareness, communication and information about Smart activities ➤ financial, technical and human resources used in an inefficient way ➤ bureaucracy and administrative complexity of Smart projects ➤ the return of the investment is longer than the election period ➤ lack of interest in Smart issues and implementation of Smart projects ➤ demographic changes ➤ lack of technically educated persons ➤ poor commercialization of science, research and innovation results ➤ a short period of time to implement projects from the Smart City subsidy program, low program allocation
Opportunities	Threats

<ul style="list-style-type: none"> ➤ implementation of new innovative Smart projects ➤ building a nationwide network of electrical charging stations ➤ centralization of data and unification of subjects' awareness ➤ public education on working with data and using the Smart City / Region concept ➤ access to open data ➤ sharing data with entities of the same nature ➤ analysis of the existing data and its availability in the region ➤ data aggregation using analytical tools and learning how to work with available data across disciplines ➤ possibility of cooperation on the development of ICT with technological and research institutions ➤ elaboration of other strategies that will contribute to the development of the region ➤ creation of a communication platform to share knowledge and popularize the Smart concept ➤ development of eGovernment ➤ modernization and expansion of network infrastructure ➤ utilization of technological trends (e.g. 5G network, IoT, etc.) ➤ utilization of the growing potential in science and research institutions ➤ increasing the number of projects implementing smart approaches and solutions ➤ bringing together experts from different fields and disciplines to target projects in a better way ➤ establishing long-term cooperation with foreign entities ➤ applying the Smart Village concept to small villages and towns ➤ communication platform with all stakeholders in the territory, which will be connected with the region and cities ➤ knowledge transfer using previous knowledge from projects implemented for other regions ➤ significant support for technology transfer and support for the commercialization of research results ➤ support of towns, municipalities and regions in mutual cooperation 	<ul style="list-style-type: none"> ➤ suburbanization across a region with unsolved infrastructure ➤ failure to create an ecosystem of cooperation between entities ➤ Smart topics will be developed separately and non-systemically ➤ discontinuation of cooperation with stakeholders ➤ implementation of projects due to a large number of stakeholders ➤ vendor lock / blocked data ➤ failure to find professionals working with data ➤ security threat / abuse / disclosure of sensitive data from the GDPR perspective ➤ restrictions on working with data owned by other entities ➤ no link between information and data from the systems ➤ data is not shared to GIS and GEO portal ➤ lack of interest in working with digitized eGovernment services ➤ low usability of communication services ➤ security threat and unsecured data ➤ non-systemic changes in legislation ➤ subsidy programs for the implementation of projects will be cancelled ➤ no subsidy program for the next programming period 2021-2027 ➤ unwillingness to accept proposed solutions ➤ low amount of financial resources for the implementation of Smart solutions ➤ loss of support when political representation changes ➤ introduction of GDPR in other waves ➤ failure to provide citizens with information ➤ low cooperation with stakeholders ➤ the knowledge platform will be closed for sharing knowledge and experience ➤ the existence of barriers which will hinder the cooperating ecosystem ➤ cancellation of the Smart Region of South Bohemia Commission
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Source: Own processing based on strategic documents of towns, municipalities and the South Bohemian Region, 2019.

5 Conclusions

There is a paradox in the regions, cities and municipalities - the speed of building infrastructure is insufficient as regards the pace of development, there are inadequacies in public transport or on roads, but residents demand constantly improving quality of life. The problem cannot often be solved by expanding cities or parts of cities, so the latest smart technologies that transform existing infrastructure come into play. The Smart City/Region concept can integrate intelligent solutions into the infrastructure of cities and municipalities, successfully enhancing the efficiency of buildings, transport and energy systems. These steps lead to improving the quality of life of the inhabitants of cities and municipalities. Thanks to the utilization of the latest technologies, efficiency, safety and economic competitiveness is increased and pleasant and healthy living environment is created. Digitization and automation are fundamentally changing the entire infrastructure. By using intelligent algorithms that process data and start processes immediately, it is possible to optimize performance, efficiency, and improve the quality of life of the inhabitants of cities and municipalities (Siemens, 2019).

The analysis of strong points and weak points was prepared with regard to the forthcoming Strategic Development Plan of the Smart Region of the South Bohemian Region. Both the internal environment and external factors were analysed. The analysis of the internal environment consisted mainly in analysing the current state of implementation of measures in the areas of mobility, eGovernment and digitization, energetics, environment, social and health services, effective territorial and innovation management. The analysis also dealt with the level of utilization of information and communication technologies and a partial risk analysis was performed. The analysis of the external environment consisted in analysing higher strategic documents, relevant global and technological trends and also an analysis of key participants was performed. The results of the individual partial analyses have been generalized and they are included in the above SWOT analysis. Based on the performed analyses incl. the SWOT analysis, the initial general assumptions were identified and confirmed - i.e. the main positives and negatives/problems the Smart City/Region concept is currently facing in the South Bohemian Region (possible suggestions and solutions are listed in the SWOT analysis - opportunities):

- + introducing innovative technologies for citizens,
 - + using the Smart concept in a number of different sectors,
 - + a number of pilot projects in different areas,
 - + improving the quality of life in cities and municipalities,
- financial limitations of cities, municipalities and regions,
 - involvement only in large municipalities of the region,
 - insufficient awareness of the Smart City/Region concept
 - legislative obstacles.

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The role of the regional governance in the implementation of the Smart City concept in the Czech Republic

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Abstract: The implementation of the Smart City concept and the possibilities of its support are currently discussed topics at all levels of government and self-government. The paper aims to reveal the main challenges for strengthening the cooperation of the region and municipalities and to improve the system of management of the implementation of the concept of Smart Cities in Smart Regions (SC/R). Data collection was carried out in the form of analysis of relevant strategic documents and semi-structured interviews. The semi-structured interview questions were designed to allow for subsequent expert evaluation of the SC/R concept implementation process using analysis and comprehensive PDCA cycle evaluation. The opinions and suggestions of the representatives of regions /cities to support the implementation of the SC/R concept were subsequently categorized and summarized in the resulting overview of the proposed measures to support the implementation of the Smart City/Smart Region concept in the Czech Republic.

Keywords: Smart City, Smart Region, governance, implementation management, suggestions for support

JEL Classification: R11, R50, R58

1 Introduction

The Smart City concept encompasses a very diverse range of issues - information technology, business innovation, the governance, the inclusion of local communities or sustainability efforts. Its application in the context of Smart City and Community in Europe has been initiated by industry to promote integrated solutions to reduce the environmental burden of energy and transport (Hollands 2008). Originally this concept represented only individual “SMART” elements of the city (eg digitization of the city administration); nowadays these are holistic systems (Albino et al., 2015).

Since 2010, when the smart grid pilot project “Smart Region Vrchlabí” was implemented in the Czech Republic, many cities and regions have been involved in the implementation of the Smart City concept. The question, therefore, arises as to how the city or region can become “smarter”. At the initiative of the Ministry for Regional Development of the Czech Republic, a methodological aid Smart City methodology (MMR, 2019) was created to help representatives of regions and cities to find answers.

According to Slavík (2017), Smart City/Region (SC/R) represents the concept of strategic management of cities, municipalities or regions, using modern technologies to improve the quality of life in the city and subsequently to achieve the economic and social objectives of the city. The three key factors of SC components are technological (physical infrastructure, smart mobility and virtual technologies and digital networks), human (human infrastructure, social capital) and institutional (governance, policy, regulation and directives). In this article, we examine the perceived role of the region and regional governance in the implementation of the Smart City concept in the Czech Republic. The results of the quantitative survey were analysed to reveal the views of the representatives of the regions and cities on the role of regions in the implementation of the SC/R concept. Attention was also paid to finding views on the interconnection of RIS in the implementation of SC/R.

2 Methods

The most progressive implementations of SC ideas occur mainly in the large cities of Scandinavia, the Netherlands, Austria, and Italy (Manville et al, 2014). However, in the most progressive countries, it can be seen that the SC phenomenon also affected large and medium-sized cities to a large extent. For example, in “Making of a Smart City: Best Practices across Europe” Garrido-Marijuan et al (2017), clearly shows the involvement of medium and small cities. This is due not only to the natural diffusion of the SC process from large cities to smaller, and more developed countries and

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regions into less developed countries, but also to a concerted effort and support from the public sector, regional, local or national governments.

Smart management refers to interconnection within and across cities through services and interactions that can integrate public, private, civic and European organizations so that the city can function effectively as a single organism (Manville et al, 2014). The “smartness” of a region is understood as a capacity to leverage its human, structural and relational capital and its ability to integrate diverse actors in the region’s innovation practice. Such an innovative ecosystem of the region is also essential with Europe’s program for research and innovation strategies for smart specialization (RIS3).

To obtain information on the level of implementation of the Smart City concept in the Czech Republic and opinions on the role of regions, quantitative research was carried out at two levels of governance:

- regional governance level (in total, 13 representatives of the Regional Authorities),
- city governance level
 - large/regional cities: representatives of the City of Prague and 13 representatives of regional cities, and
 - smaller/former district cities and other towns (in total 63 representatives of all former district cities and other towns with smart city implementation experience were contacted - representatives).

Researchers failed to interview the representatives of one region (South Moravian) and some city representatives rejected the interview for various reasons (for example - no experience with SC/R concept). The final research sample included 12 regional government representations, 13 representatives of large/regional cities and 50 representatives of smaller/former district cities.

The semi-structured interviews were realized in May-August 2018 by a team of 4 qualified researchers. The semi-structured questions were designed to allow subsequent expert evaluation of the SC/R concept implementation process through PDCA cycle analysis and subsequently tested through a pilot interview with representatives in the South Moravian Region.

The final sample consisted of delegated representatives of regional and city management. Semi-structured interviews were mostly conducted with a group of respondents (nominated by region/city representative. Nominated respondents involved in the implementation of the SC concept in the city mostly consisted of representatives of the city management and officials responsible for the relevant agenda. After the consent was given, a voice recording of the interview and group discussion was made. In only four cases, no informed consent was given for audio record (5% of city representatives) and the interview was recorded by writing. The length of the interview ranged from 60 to 240 minutes. The results were then processed by coding standardized responses into the database of survey results.

The methodological framework for the evaluation of the SC/R implementation was structured into 48 hierarchically arranged questions/components, which can be divided into 4 consecutive higher units of the PDCA process of the Deming cycle: P (Plan) - questions evaluating the level of planning, D – the implementation questions, C – questions about data systems and control, A – questions about initiation and correction processes. Outputs represent the opinions of respondents (prevailing character of self-evaluation). The obtained data were analysed to reveal answers for following research questions:

- how the representatives of the regional government perceive their role in the implementation of the SC/R concept?
- how the representatives of and cities perceive the role of the regional government and the possibilities of expanding the CS/R concept at the regional level?
- Is there perceived coherence of RIS3 in implementation of the Smart City concept?

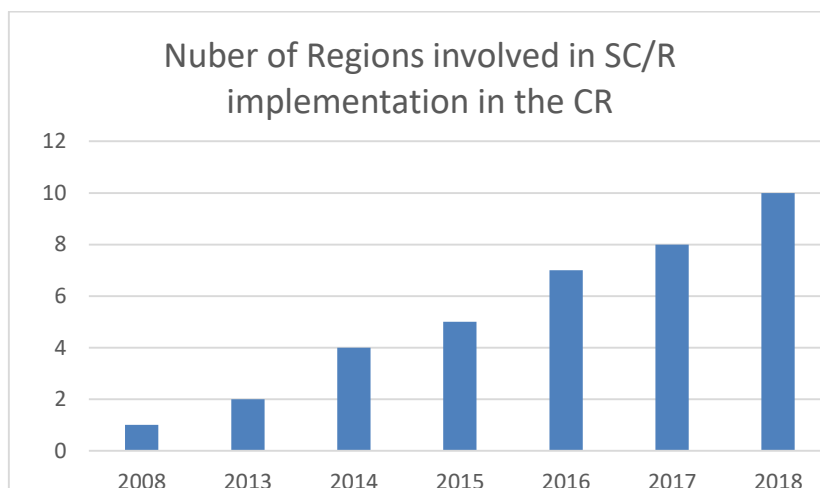
3 Research results

3.1 The regional government representative’s perception of their role in the implementation of the SC/R concept

The results of the survey show that the majority of regional authorities are very interested in the SC/R concept and perceive its positive potential for improving the quality of the activities they are responsible for. More than 80% indicated involvement in the implementation of this concept and its elements, while the remaining less than twenty percent have a higher degree of uncertainty regarding engagement. Approximately three quarters of the addressed regional authorities consider the SC/R concept and its elements to be beneficial for the given region, others consider it rather beneficial. All regional authorities involved in the project are familiar with the SC/R concept. However, the lack of a uniform definition results in a different perception of the content of this concept. Most often the term is interpreted as a rational process of increasing the quality and efficiency of public administration with the natural use of new technologies. However, the spectrum of perception is very broad, from the process of implementation of new technologies, through the concept of

work with data, increasing the efficiency of public administration using information and communication technologies, to very broad perception as a concept of improving the quality of life in the city or region. The interpretation of the Smart City/Region concept significantly influences the indicated origin of involvement in the smart concept implementation. Those who do not perceive the concept of SC/R as a holistic concept, but rather as a process of applying new technical and technological processes usually identify the earlier origin of involvement in the concept (before 2010) or they are often not able to identify the origin of SC/R implementation.

Figure 1 The number of regions involved in the SC/R implementation (based on indicated year of origin of the SC/R implementation)



Source: Database of survey results

The interviewed regional offices see the motivation for the implementation of the SC/R concept primarily in increasing the efficiency of public administration, especially thanks to the possibility of data-based management. Other motives are reducing costs, improving the quality of services provided to residents and visitors, and improving the quality of the environment and life in the region. The reasons that respondents most often cited as the reasons of any lower interest in the implementation of the SC/R concept were

- the perceived fashionability of this “policy label” (sustainable - healthy - now smart),
- limited regional administration competencies,
- limited ability to identify the most appropriate and to implement comprehensive measures for the region.

The implementation of SC/

R was considered as the result of a comprehensive systematic approach in only one of the regions, in the other 5 regions rather systematic approach was applied, and in the remaining regions the SC/R implementation is based on ad hoc approach. Most suggestions for the initiation of the SC/R concept come from regional representatives (politicians), experts (very often from the academic sphere), from other regions/cities and professional associations and companies. One-third of respondents said that the initiative is also coming vertically within public administration (from ministries) and from civil society representatives. A very important role in initiating and planning the implementation of the Smart concept play also good practice examples. Three-quarters of the regions would welcome another opportunity to learn about examples of successfully implemented projects in the Czech Republic and abroad, the remaining representation of the regions would rather welcome it.

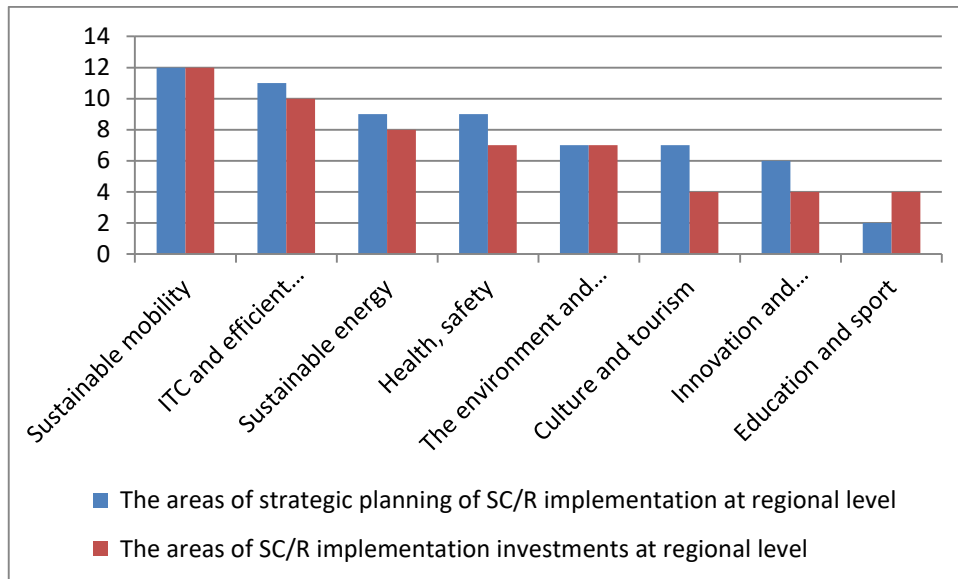
Limited support from politicians or the lack of full coherence between politicians and officials has a very negative impact on the possibilities of successful implementation of the SC/R in the regions. According to the perception of respondents, the implementation of this concept receives political support from the representatives in less than three-quarters of the cases, in three cases it can be said that this concept is rather supported, but in one case it is rather not supported. A lower level of consistency between policymakers and officials regarding the implementation of the SC/R concept was indicated in two regions, and in one region, non-compliance was indicated. The causes are mainly seen in the limited competencies of the local authorities in the area of the Smart concept and its components and frequent changes in the regional political representations. The implementation of the SC/R concept and its elements becomes the subject of political struggle. Also, the limited social demand does not raise interest among politicians in addressing this issue and therefore does not receive the required support from the representatives.

At present, the implementation of the SC/R concept in the regions is mostly cross-sectional as part of the work of employees of relevant departments. The share of work devoted to the implementation of the Smart concept in the total

workload of these employees is in these cases in the vast majority negligible. A specialized organizational unit for Smart Concept implementation was indicated only in 4 regions (Hradec Králové, Moravskoslezský, Ústecký and Vysočina).

The vast majority of regions have Smart Region strategy either processed or started work on its preparation. In about half of the cases, the strategy was fully elaborated by an external subject, while the other half is largely self-developed using an external consultant. Figure 2 summarises indicated areas of SC/R planning and SC/R project investment at the level of regional governance. In almost all regions the target area for the SC/R implementation is sustainable mobility. The planning and investment in information and communication technologies and effective territory management is the second most frequent target area followed by sustainable energy and health, safety and social services. Approximately half of the regions want to focus also on the environment and sustainable management of natural resources; culture and tourism; innovation and business development. The SC/R education and sports is the subject of planning in two regions and 4 regional representatives indicated investments to project realised in this area.

Figure 2 The indicated area of SC/R strategic planning and investments



Source: Database of survey results, own processing

Most regional authorities implement investment plans that are more in line with strategic documents. The most common reasoning that not all investment plans are fully in line with strategic documents are:

- the incomplete representation of all stakeholders in strategy development,
- the rapid pace of development in some areas of Smart concept implementation, so that strategic documents quickly become "obsolete",
- changing social demand and the priorities of changing political representations.

One-quarter of the regions have a separate chapter in the budget for the SC/R implementation. Regarding the forms of financing, all regions use and continue to assume the use of own resources and grant titles from both national and European sources. Four out of 13 regions have financed their sustainable energy projects through EPC and other 3 regions indicated this as a suitable form of financing for the future. One region used cooperation with the business sector through the PPP project while four regions would like to use this form of financing in the future.

Most regional representatives see room for improvement in the area of data collection and analysis. Only 3 regions collect data systematically across all areas of Smart Concept implementation. None of the regional representatives stated that the generated data would be systematically used. Almost two-thirds of regions report that they work with data in partial areas, but 5 of the regions work with data rather sporadically or not at all. This is often due to the short time since the implementation of the SC/R segments, or due to the ongoing implementation so that finding appropriate ways to use the data will become the subject of a solution soon.

Finally, Table 1 summarises the suggestions of how the representatives of regions see the possibilities of extending the Smart City concept to a regional scale.

Table 1 Perceived way to support spreading SC/R implementation in regions according to the role of regional governance in the SC/R concept implementation

Perceived role of region (PDCA)	Structure of suggestions	Suggested way to support spreading SC/R implementation in regions
Initiation and corrections	25.80 %	Information and extension (introduction of new technologies, sharing possibilities and experiences, new IT communication channels) Training of representatives of municipalities Creating incentives so that municipalities can realize (personnel capacity) Pilot project - initiation and possibilities to check functionality of new technologies and solutions
Planning (coordination)	45.16 %	Vertical and horizontal coordination, services for smaller cities, Assistance in solving specific problems related to the region's competences (business development, transport, security, population decline, health care, social services) Shared solutions Support projects initiated by municipalities – the selection of funded projects according to solution effectiveness, not by area; preference of regional responsible firms
Implementation	16.12 %	Ensuring technology compatibility (unified interface) Fund raising Projects in area of regional competences Joint projects to reduce costs Administration of project for cities with little capacities
Control	12.90 %	Data services (data collection, data concentration, central data analysis system) Central Hub - protection and early warning

Source: Database of survey results, own processing

3.2 Perception of the role of regional governance in CS/R implementation among city representatives

City representatives see the main role of the region as an initiator and coordinator of the implementation of the SC /R concept. However, 10 % of city representatives did not perceived any activity of the region. Most often they expect a clear setting of the strategic framework of SC/R implementation concerning national priorities and financial support. In terms of support, there is a difference between expectations of larger and smaller cities. Large regional cities expect from the regional governments to reduce administration and leave greater autonomy and the ability to tailor the focus and implementation of SC/R projects to the city's needs (especially region with a high level of project management capacity). They expect the regional governance to play a major role especially in areas and projects with spill-over effects, such as support of farm food for the cities, transport, tourism, water management. Smaller (former district towns) with limited staff and financial capacity expect a higher level of advisory, project administration and financial support. It was criticized, that the Public Procurement Act limits implementation of joint technology solutions to multiple cities and sharing services (software) with region or other cities is currently not possible. Also, it is necessary to solve the basic infrastructure problems of the region first and then to invest in high-tech solutions or solve it together. Both appreciate the positive effects of regional accelerators and start-ups.

Table 2 Suggestions of city representatives how regional authority can support the expansion of SC/R concept in the region

Perceived role of region (PDCA)	Structure of suggestions		Expectations and recommendations
	Regional cities	District cities	
Initiation and corrections	34,62%	29,17%	Information and extension services (possibilities and experiences) Initiation of IT solutions
Planning (coordination)	23,08%	31,94%	Vertical and horizontal coordination, Services for smaller cities, Planning and administration of complex projects Support projects initiated by cities
Implementation	42,31%	36,11%	Ensuring technology compatibility (unified interface) Pilot projects require a "snowball" of activity by area (e-mobility - expanding charging stations in the territory) Joint procurement to reduce costs Administration of project for cities with little capacities
Control	0,00%	2,78%	Positive motivation by target indicators Crisis management - assuming the realization of the coordinating and initiating role of the region, which is not the case

3.3 Coherence of Smart Concept Implementation on RIS3

In 8 out of 13 regions, the Smart Concept strategy is linked, either fully or to a limited extent, to regional innovation strategies based on the National Research and Innovation Strategy (RIS3). The regions of Liberec, Pardubický, Královéhradecký and Karlovarský have declared full interconnection of the Smart concept to RIS3. On the other hand, the Moravian-Silesian and Olomouc regions stated the total lack of interconnection of these strategies. The full coherence of these strategies is typical for those regions where the respective organizational units are responsible for both regional innovation strategies and strategies for the implementation of the Smart concept. If the regional innovation strategy and the strategy for the implementation of the Smart concept are managed by different organizational units, they are characterized by limited or zero coherence of these strategies. In this context, it is necessary to mention that the lack of coherence of the Smart strategy with RIS3 does not mean that the region does not work with RIS3. An example is the Olomouc Region, which declares the lack of interconnection of these strategies, but on the other hand, the Smart Project is the Olomouc Accelerator.

Regarding regional cities, in almost two-thirds of the cases, these cities do not or rather do not have their Smart Concept strategies linked to regional innovation strategies. Only 4 regional cities report that they have their strategy of implementing the Smart concept rather linked to RIS3 (Brno, Hradec Králové, Ostrava, Olomouc).

4 Conclusions

Presented views of representatives of cities and regions provide insight into the perception of the SC/R strategic management concept implementation in the Czech Republic. It is evaluated from the perspective of those who are responsible for the control and continuous improvement of processes of the SC/R implementation (PDCA cycle) at the regional level.

Both, regional governance and city representatives see the main role of the region as an initiator and coordinator of the implementation of the SC /R concept. Significant assistance in expanding the SC / R concept in the region is seen in the provision of advisory and administration services for municipalities with insufficient personnel capacities. Conceptual solutions also require funding to ensure that smart solution implementation is associated with the elimination of core infrastructure problems.

From the point of view of SC/R project realization phase, representatives of regions and cities see the main role of regional governance in the design and solution of complex joint projects with significant spill-over effects in the region (transport, food security for cities,) and elimination of problems with IT infrastructure and compatibility of partial projects in the region. Finally, regarding the control and adjustment phase of the SC/R implementation, regions should provide data collection and analysis services and provide open data, thus contributing significantly to improving the use of existing and inventing compatible, effective and region-specific solutions (bottom-up).

Unfortunately, not in all the cities and regions surveyed, this regional government activity is at the same level yet. Significant differences were distinguished between the indicated level of the SC/R implementation process at the regional government and average level achieved by cities in a given region. Increasing the efficiency and benefits of Smart Solutions in the regions can be achieved in particular by measures that reduce information asymmetry in Smart Technology and implementation costs (especially transaction costs) through the benefits of shared solutions and synergies.

Given the low degree of coherence between the implementation of the Smart concept and the Regional Innovation Strategies, increased attention should be paid to strengthening the innovation environment of the regions. It is necessary to involve all stakeholders and to continuously strengthen the regional innovation ecosystem, which is a prerequisite for the development of smart regions.

Acknowledgement

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Sources for Regional Bioeconomy Development

Miloslav Lapka¹, Eva Cudlínová²

Abstract: The paper presents the first results from the POWER4BIO Horizon 2020 project. POWER4BIO aims at empowering EU regions, with a special focus on central and eastern countries, for maximizing the mobilizations and use of endogenous biomass feedstock. POWER4BIO will support policy makers and other regional stakeholders to take the most suitable decisions in the transition to a bioeconomy era. What is the perspective of bio-based value chains in the South Bohemian Region according to stakeholders' opinion? What are the main barriers with the implementation of biomass value chains? These are two research questions presented to stakeholders in the initial group “hub” meeting. We use a bottom – up approach and semi-open questions. Results show the perspective of biomass value chains in the South Bohemian Region according to stakeholders' opinion: Wood wastes, agriculture by-products processing and food processing (from production to the use in canteens and restaurant waste). As regards barriers in implementation of biomass value chains, Czech society is not ready for the cultural, economic and institutional issues of the bioeconomy.

Keywords: bioeconomy, biomass, region, value chains

JEL Classification: Q57, Q16

1 Introduction

There is no doubt about the potential of the bio-based economy. It represents roughly €2 billion and provides employment for almost 22 million people across Europe. (Impacts of Bioeconomy, 2016, Bio-based products in our everyday life, 2018, European Commission – Directorate -General for Research and Innovation Unit F – Bioeconomy, 2018). Nevertheless, there are still many European regions that do not take full advantage of their potential in yielding sustainable products instead of fossil-based resources. One of them is the Czech Republic (European Commission, 2012, About project, 2019).

“POWER4BIO aims at empowering EU regions, with a special focus on central and eastern countries, for maximizing the mobilizations and use of endogenous biomass feedstock. POWER4BIO will support policy makers and other regional stakeholders to take the most suitable decisions in the transition to a bioeconomy era. An extensive catalogue of business model pathways adapted to real regional needs will be developed, considering all the value chains (from biomass providers to final markets), to fully realize their bioeconomy potential by the end of the project”. (Proposal POWER4BIO, 2018). There are two concrete steps of POWER4BIO project: Mapping bio-values chains at a regional level and encourage stakeholders towards bioeconomy. Biomass value chains means bio-based sources and their cycle from biomass providers to final markets in the context of this project.

Mapping: POWER4BIO will start by mapping the waste and raw materials available in each region, as well as the capacity the regions have in terms of know-how, business fabric, logistics, etc. to drive the transition towards a bio-based economy. An assessment will be carried out to analyse which current technologies are suitable for making use of and transforming the raw materials available (Deutsches Biomasseforschungszentrum Gemeinnützige - DBFZ, 2018).

Encourage stakeholders: The first step towards the construction of a regional bioeconomy strategy in empowering regional stakeholders to boost the transition towards bioeconomy regions in Europe is the establishment of Regional Bioeconomy Hubs (RBH). Bioeconomy hubs are dynamic systems of diverse interconnected stakeholders with horizontal and vertical links (all nodes of the value chain), cooperating closely in order to develop a particular field of bioeconomy. Ideally, they act as a bridge builder; improving communications, knowledge transference, sharing of experiences and the disseminating information, which in turn encourage innovative activities and a better response to external effects. Provided with an innovation friendly environment to carry out jointly agreed and politically supported objectives, within a defined time frame. Deutsches Biomasseforschungszentrum Gemeinnützige - DBFZ, 2018).

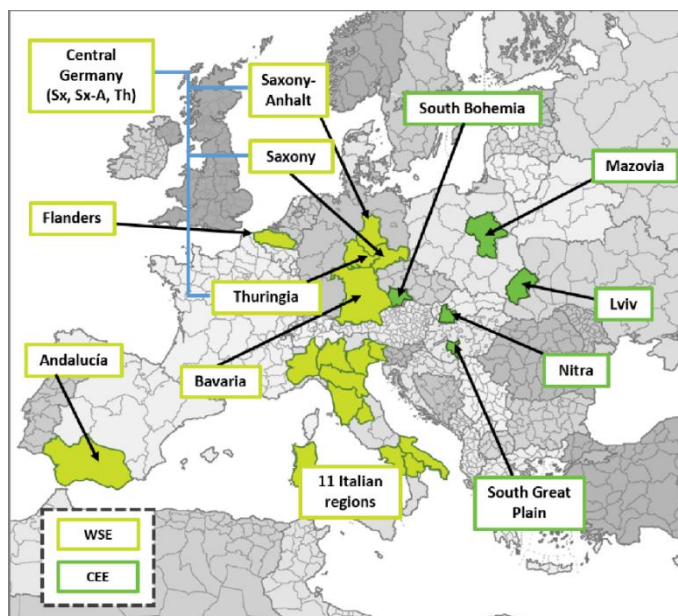
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Thanks to the two steps mentioned above we can develop two research questions: What is the perspective of use of bio-based value chains in the South Bohemia region according to stakeholders' opinion? What are the main barriers to their use?

The POWER4BIO consortium consists of 17 institutions from Germany, Belgium, Slovakia, Spain, Greece, Netherlands, Hungary, Italy, Poland, the Czech Republic and Ukraine and is coordinated by the Spanish Research Centre for Energy Resources and Consumption (CIRCE). POWER4BIO started its activities with the Kick-off meeting in Brussels in October 2018. The 30 months of activities involved in the project will take place in five regions in central and eastern Europe and another five in western Europe. The idea is for any region in Europe to be able to benefit from the results achieved. Altogether, there are ten regions involved representing an estimated population of 88 million Europeans, a GDP of €2.4 billion and a surface area of 450,000 km² (Beusch, 2019).

Figure 1 POWER4BIO Participant regions. Source: POWER4BIO Proposal (2018) - “emPOWERing regional stakeholders for realising the full potential of European BIOeconomy.



Comments: WSE: West-South Europe, CEE: Central-Eastern Europe

Speaking about bio-based economy or bioeconomy, we are speaking about a relatively new approach to traditional categories of neoclassical economy: sources and energy. Both influenced definitions of bioeconomy. Bioeconomy is a relatively new phenomenon which appears in many political documents and strategies all over the world (European Commission 2012). However, bioeconomy does not have any unified definition either in scientific or political documents. In this study, we use the definition of the European Commission (EC), which defines bioeconomy as “the production of renewable biological resources and the conversion of these resources and waste streams into value added products such as food, feed, bio-based products and bioenergy” (European Commission, 2012).

2 Region

The South Bohemian Region from the bioeconomy point of view. South Bohemian Region does not have a special strategy focused on bioeconomy, however, in the two key documents related to development of the area can be found several general aspects of bioeconomy. These two documents are the Development program of the South Bohemian Region 2014 – 2020 (2014) and the Regional Appendix to National Research and Innovation Strategy- RIS 3 - 2014)

The South Bohemian Region has specific biotechnology activities that create the potential to use these trends and related interacting changes in the local economic development. The newly established Czech Biotechnology Platform CEBIO aims to link the application and research spheres to improve competitiveness of all involved actors. There exist also the top research of the Biological Center of the ASCR, v.v.i. and University of South Bohemia, Czech Republic, with a number of research achievements in the field of biotechnology development. The two stages of facilities of the South Bohemian Science and Technology Park are primarily focused on the field of biotechnology.

On the regional level there exists a Bioeconomy Initiative at the University of South Bohemia organizing an annual Bioeconomy Course.

Despite = this, the academic structure of the South Bohemian Region cannot be counted between developed bioeconomy regions. Bioeconomy is not yet the main driver of industry and its technological innovation. (Development program of the South Bohemian Region 2014 – 2020, (2014), (Regional Appendix to National Research and Innovation Strategy - RIS 3 - 2014).

3 Methods

General method on how to establish our regional HUB concerns three development steps – Initial Phase, Set-Up-Phase and Steadying Phase.

The aim of the first meeting was build the main bases of the hub (Scheer, Zallinger, 2007, Sölvel, 2015). The first phase started with an initial group and an initial idea of what would be the focus of the potential cluster. This is a clear example of a bottom-up approach. (Kircher, Taden, Herzberg, 2018, Philp, Winickoff, 2017).

For the Initial Phase meeting we used a questionnaire. The general focus of the questionnaire has been distributed by the coordinator Spanish Research Centre for Energy Resources and Consumption (CIRCE) in terms of concentration on the sources for bio-values chains. The operationalization of this focus and formulation of the question has been our own work. We used a semi-open form of query concerning the two research questions mentioned above: What is the perspective of use of bio-based value chains in South Bohemia region according stakeholders opinion? What are the main barriers to their use?

We have had several meetings with some leading stakeholders testing our questions before distributing it to the initial group. Rate was more than 60 %, but the number of 21 was too small for the meaningful use of standard statistic methods, except of frequency analysis.

4 Sample description

There are results from 21 stakeholders, we addressed 35 respondents, all of them took part in the initial meeting. There are clearly visible two main groups of respondents – stakeholders from practice (business) and stakeholders from the academic field.

Table 1 Structure of respondents

No	Position
10	Practice
3	R&D institutions
3	Regional government institution
0	Ministries
1	Other field (please specify):

Source: Own Power4Bio research, N=21.

5 Research Results

Biomass Value Chains and their Barriers – Results and Interpretations. The best listed potential biomass value chains in the South Bohemian Region according to our stakeholders, have a different assessment. The green group has the most perspective biomass value chains, while the other colours (purple, turquoise and red) show less perspective biomass value chains.

Question 1. In which of the following sectors do you recognize the best potential biomass value chains in the region? Please, specify the order from 1 to 6 (1 best sources, 6 worst sources)

Table 2 Q 1.

Average Order	Sectors
2,42	Wood waste
2,58	Agriculture by-products processing
2,79	Food processing (from production to the use in canteens and restaurant waste)
3,11	Crops for bio-production
3,83	Energy crops (Crops for energy use)
4,83	Other

Source: Own Power4Bio research, N=21.

Comments: Wood waste has the highest potential, whereas energy crops the lowest, which is the most widespread current aspect of bio-economics in our country. Only 6 respondents specified the “Other” option, but most did not. Among the various examples mentioned are the use of cannabis and medicinal plants or the use of plant residues.

Question 2. What is your opinion about the listed barriers in each sector in the region? (in % of YES answers)

Table 3 Q 2.

Barriers Sector	Economic – sector is non profitable		Cultural - not established tradition in society		Institutional - no suitable institutions are created		Legislative - there are barriers in laws		Technological - technology and know-how unavailability		Mean	
Food processing, from primary production to waste	30	Yes	60	Yes	40	Yes	50	Yes	19	Yes	40	Yes
	30	No	35	No	30	No	20	No	62	No	35	No
	40	I don't know	5	I don't know	30	I don't know	30	I don't know	19	I don't know	25	I don't know
Agriculture by- products processing	29	Yes	25	Yes	20	Yes	15	Yes	20	Yes	22	Yes
	48	No	65	No	60	No	65	No	70	No	62	No
	24	I don't know	10	I don't know	20	I don't know	20	I don't know	10	I don't know	17	I don't know
Energy crops	29	Yes	35	Yes	15	Yes	15	Yes	5	Yes	20	Yes
	52	No	50	No	65	No	55	No	85	No	61	No
	19	I don't know	10	I don't know	20	I don't know	25	I don't know	10	I don't know	17	I don't know
Crops for bio- production	35	Yes	38	Yes	30	Yes	15	Yes	10	Yes	26	Yes
	35	No	48	No	55	No	45	No	75	No	52	No
	30	I don't know	14	I don't know	15	I don't know	40	I don't know	15	I don't know	23	I don't know
Wood waste	33	Yes	10	Yes	15	Yes	10	Yes	5	Yes	15	Yes
	48	No	80	No	65	No	60	No	85	No	68	No
	24	I don't know	10	I don't know	20	I don't know	30	I don't know	10	I don't know	19	I don't know
Mean of YES answers	31 %		34 %		24 %		21 %		12 %		25 %	
Mean of NO answers	43 %		56 %		55 %		49 %		75 %		56 %	
Mean of I DON'T KNOW answers	27 %		10 %		21 %		29 %		13 %		20 %	

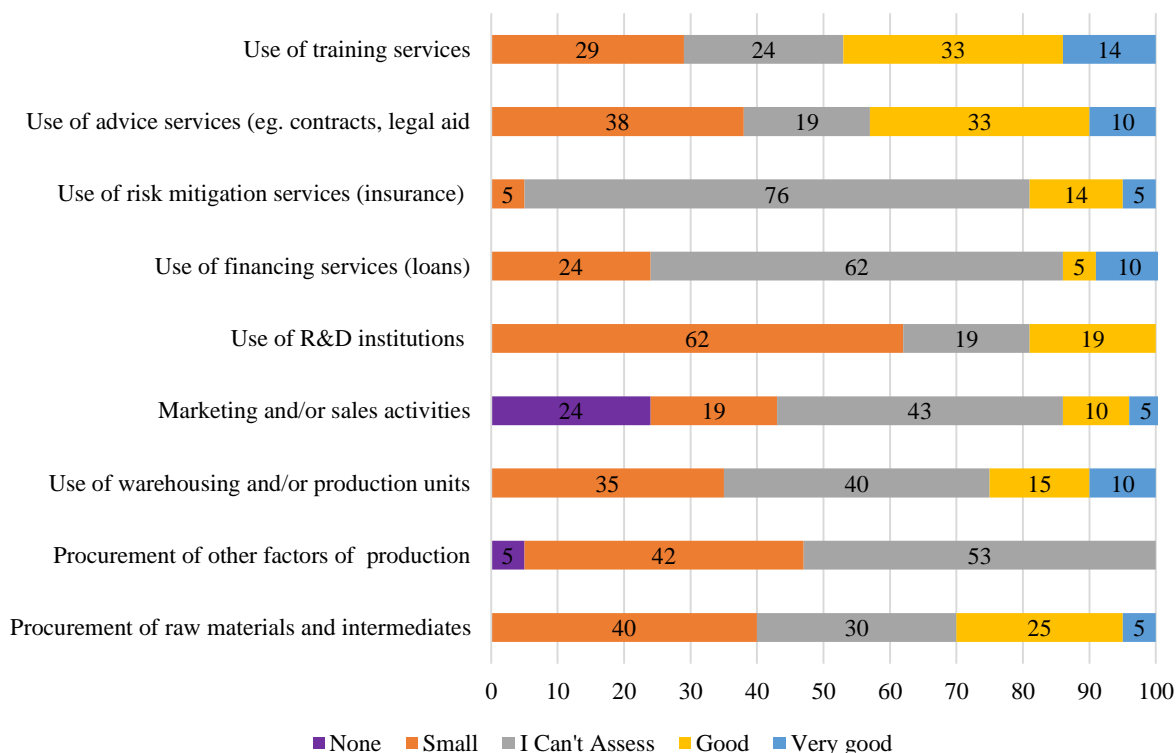
Source: Own Power4Bio research, N=21

Notes: There are used abbreviated answer options in the table. Numbers for Yes / No / I don't know are the percentage of answers. The sum in each cell should give 100% together, but somewhere it doesn't fit – because of some missing answers. The option “Other” has been used by only 2 respondent and is not on the presented table.

Comments: Results show we know how to deal with bioeconomy / biomass technologically. (Mean of yes answers and the shadow line in table 4). Cultural barriers were defined as traditional ways of thinking about biomass use influenced institutions, attitudes and the behaviour of people. Legislative barriers are important in the food cycle. Respondents are sure about the cultural barriers (only 10% don't know). On the other hand, there is uncertainty about legislative and economic barriers (29% and 27%, respectively – Means of I don't know answers). Barriers are not perceived as large (25% YES vs. 56% NO).

Question 3. How do you assess existing forms of business alliances for the bioeconomy in the listed sectors? (%)

Table 4 Q 3.



Source: Own Power4Bio research, N=21

Note: The option “Other” was not used by anyone and is not on the presented table.

Comments: The obtained results show, among others, an experience with listed sectors. In these consequences financial institutions rich low assesses – mean I can’t assess makes 76% and 62%. It looks like every stakeholder makes his own way, individually. There are extreme values in sector Marketing and/or sales activities – show ambivalent experiences. Use of R&D institutions shows low cooperation (62%). On the other hand, if cooperation exists, it is assessed by a good mark of 19%).

Question 4. What is the reasons for the relatively low level of cooperation in bioeconomy value chains? Instructions: please, specify the order from 1 to 10 (1 most serious, 10 least serious reasons)

Table 5 Q 4. (In average order in each category)

2,3	Lack of trust between businesses, organizations
2,8	Lack of market overview of potential partners
2,9	Small benefits of cooperation (advantages and synergies not apparent)
4,1	Confused legislation - risk of litigation
4,6	Lack of decisions by relevant institutions
	Too competitive mind-set
	Delayed privatization
6,9	Corruption environment
	Other only 4 answers

Source: Own Power4Bio research, N=21

Comments: Four group occurs.

Green – most serious – lack of trust between businesses, lack of market overview and no profit from cooperation in bioeconomy. Turquoise – missing or bad laws, lack of institutional decision, lack of responsible officials. Blue – strong competition and delayed privatization. Red – corruption. Corruption is the least serious.

Question 5. Who are the relevant partners for cooperation in the future prospective use of biomass in the region? Instructions: please specify the order of importance from 1–10 (1 most important, 10 no important)

Table 6 Q 5. (In average order in each category)

2,6	R&D institutions
3,6	Regional governance and municipalities
	Associations and clusters
	Technology parks and centres
	National business agencies
	Public administration institutions nationwide
5,9	Chambers of Commerce
6,3	Banking systems and financial services
7,2	Consulting companies and independent consultants
7,4	European Information Centres
7,8	Training institutions and agencies
	Other (please specify): only one answer

Source: Own Power4Bio research, N=21

Comments: Five groups occurs:

Green – most important are research and development (R&D) institutions, including universities. On the other hand, there is a lack of cooperation – like a small is marked in 62% (It corresponds with the results obtained in question 3). Turquoise – governance and municipalities. Blue - specific professional institutions. Pink – financial sector – not so relevant, corresponding with question 3. Maybe no experiences of stakeholders with their specific services. Red – despite the fact of good and even very good cooperation in question 3, they are not considered leading relevant partners for establishing bioeconomy. They are perceived as supporting partners. Average rate is about trust and relevancy of partners for bioeconomy development.

6 Conclusion

From the perspective of our research questions, these are the following perspective bio-based value chains in South Bohemian Region according to stakeholders' opinion: Wood waste, agriculture by-products processing and food processing (from production to the use in canteens and restaurant waste). Wood waste are best perceived, on the contrary, energy crops are worst, which is the most widespread current aspect of bio-economics in our country. However, they are also quite primitive (in terms of technology and value added) and our stakeholders do not see great potential in it. We consider it an important way of bio-based thinking, which is critical towards contemporary common land-use for so called green energy.

As regards barriers to the implementation of biomass value chains, Czech society is not ready for the cultural, economic and institutional issues of the bioeconomy. These cultural barriers were defined as traditional ways of thinking about biomass use influenced institutions, attitudes and the behaviour of people. It indicates, that Czech society is not ready for the cultural, economic and institutional issues of the bioeconomy. On the other hand, corruption is not connected with the serious barriers (instead of lack of trust, market overview or no profit) in our region. This is a very positive aspect for the economic environment.

For bioeconomy development, research and development (R&D) institutions seem to be most important, including universities and specific professional institutions and governance and municipalities. On the other hand, the financial sector seems to be not so relevant, and consulting companies, training institutions and EU information centres are not considered leading relevant partners for establishing bioeconomy. They are perceived as supporting partners. (similar in Leydesdorff, 2012). It seems cooperation with relevant partners is weak in our case; on the other hand, stakeholders are open to cooperation. This is evident in the case of R&D institutions, including universities.

There is a visible general awareness of an unclosed cycle in the socio- economic system and bio-ecological system in the attitudes of stakeholders. They indicated discontinuities like undeveloped bioeconomy market, unstable and missing legislation supporting bioeconomy, undeveloped logistics with bio-waste and the intervention of EU or states. These discontinuities in the socio-economic system influenced discontinuities in regional bio-ecological system: biomass in general, particularly wood, are not adequately used because there is not a sufficient and modern processing capacity.

Finally, there are proposed measures from stakeholders for the socio- economic system: Better regulation of energy waste production, better education about bio-based economy, placement of advanced products on the bioeconomy market. Measures proposed for the bio-ecological system: Avoid the out-of-day use of bio-sources - no primary production of agricultural crops for biotechnology, best practice implementation and support. Of course, these measures are linked as it is a requirement of the circular economy in bio-economics approach.

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Zero Waste as a Concept of Sustainable Consumption – A review

Nikola Sagapova¹, Iveta Šindelářová², Roman Buchtele³

Abstract: 21st century might be recognized as the era of many global changes followed by the overconsumption of the developed countries and the rapid development of emerging economies with their own desires to produce more, consume more within the framework of economic and population growth. However, the aforementioned facts have huge negative impacts on environment and put increased pressure on scarce global resources. These facts have sparked efforts to find new alternatives to deal with these problems with respect to economy and consumption as such. This review paper aims on the zero waste concept at households' level as a concept of sustainable consumption similar to the circular economy concept regarding their basic principles: reduce, reuse, recycle. Zero waste lifestyle triggered the demand for package free shopping. The change of consumer behaviour towards the shift from single-use products to reusable products can be also recognized.

Keywords: zero waste, circular economy, sharing economy, sustainable consumption

JEL Classification: D11, P46, Q59

1 Introduction to alternative forms of economy

The twenty-first century is marked with the development of information and communication technologies. ICT enabled the development of new phenomena, e.g. globalization, digitalization that have been shaping the modern society and economy but also helped to raise the awareness of current environmental problems. People's raising awareness of environmental issues became an important stepping stone that influenced the evolution towards alternative forms of economy. Warning reports and publications focused on environmental issues and sustainability as the potential solution to environmental crisis had played a crucial role in affecting the society but also the economy towards the seeking of alternatives alternative's seeking. Carson (1964) in her book *Silent Spring* opened a debate across society about the usage of dangerous fertilizers, especially DDT, in agriculture and pointed out its possible negative impact. Meadows et al. (1972) published the book *Limits of Growth*. Their model described the evolution of the planet as long as humankind continues to plunder the natural resources and disproportionate its consumption and production. This was followed by a publication by the World Commission on Environment and Development (1987) called *Our Common Future*. Compared to the previously mentioned publications, this report was very optimistic and described the possible solution of this crisis - the sustainable development.

The discourse of sustainable development can be considered as crucial. Environmental awareness and the change in human values towards environmentalism are the main reasons for the emergence of alternative forms of economy. Most of these forms are still in the initial phase. The new forms gradually strengthen their position on the market and their role in the society.

2 Methodology

The present paper neither a comprehensive nor a systematic review. The authors attempt to give a generic overview on issues associated with circular economy and zero waste with special focus on households level. For this review mainly scientific database sources (Science Direct, Scopus, WoS, Google Scholar) were used. The literature review was conducted by different authors, each of whom specialized in a specific issue related to these topics. The main domains encompassed by this paper are: circular economy, zero waste, sharing economy, community supported agriculture and urban gardening.

3 Circular economy

The concept of circular economy reacts on global megatrends such an urbanization, population growth and mainly resource scarcity. The concept of circular economy recognizes itself as a new sustainable development paradigm which,

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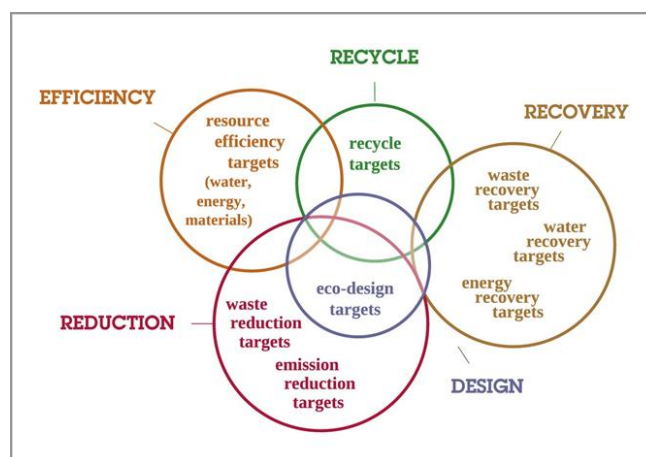
contrary to linear industrial economy, enables decoupling the economic development from resource consumption, prefers renewable materials and returns resources to productive uses (Babbitt et al., 2018). In wider perspective the circular economy can be found as a part of Sustainable Development Goals (SDGs) of United Nations. SDGs contain 17 global goals that were adopted by all United Member States in 2015 (UN, 2019). SDG number 12 “Responsible consumption and production” mentions not only green economy but also captures the principles of the circular economy (Government Offices of Sweden, 2015).

The modern practical application of the concept of circular economy in industrial processes and economic systems has gained momentum since the late 1970s. Obtaining circular product requires optimization in design and material use to create closed loops (Ellen MacArthur Foundation, 2013). Geissdoerfer et al. (2017) define the circular economy as a regenerative system where resource input, waste, emission and energy leakage are reduced through long-lasting design, remanufacturing, recycling, reuse etc. From the perspective of the resources, the circular economy can be defined as an economic model aimed at the increase of efficient use of resources through waste reduction, long-term value retention, reduction of primary resources, closed loops of products and material with respect to the environmental and socio-economic benefits (Morsetto, 2020). Circular economy, unlike linear economic system, takes into consideration the whole product life cycle including waste processing, and its closed-loop approach aims to reuse or recycle the materials.

Regarding the generated waste, the estimated amount of total global urban waste, including municipal solid waste, commercial and industrial waste but also construction and demolition waste, are enormous - between 7 and 10 billion tons per year (Wilson et al., 2015). The amount of solid waste generated and recorded in official statistics in 2007 was around 3.2 gigatonnes, of which nearly one half was landfilled (Tisserant et al., 2017). Landfilled waste represents not only an enormous loss of resources that could be potentially reused, but it also triggers the pressure on global primary resources (Zeller et al., 2019). Landfilling is justly perceived as the least preferable option of waste management and therefore should be minimized (European Commission, 2019).

The global problem with waste has to be solved by states/policy makers as well as business companies. The aim of the circular economy is not to recycle but to change the system from the beginning. The circular economy brings new opportunities in creating working places in the chain of new suppliers and vendor. The following figure (Fig. 1) provides a visualization of the circular economy targets. These targets can be described as: efficiency, recycle, recovery, reduction and design (Morsetto, 2020). The process begins by the choosing of materials, settlement of eco-design of the product and its re-usage/or recycling at the end of the product usage. Some authors, e.g. Sadi et al. (2012), describe 4R principles: reduce, reuse, recycle, recovery. Some other authors, e.g. Manickam and Duraisamy (2019) consider only 3R principles: reduce, reuse, and recycle.

Figure 1 Circular economy targets



Source: Morsetto (2020)

Since the first industrial revolution, economies have been producing and processing linearly: extract, produce, and throw away. The society insists on the idea that we have enough resources which led to the current situation of not reusing and not recycling the materials into the material flow. From this perspective, a circular economy represents quite new circular system with the renewal of materials from backwards to the material flow. The zero waste initiative belongs to the circular economy model due to following reasons: waste prevention, recycling, reusing of materials, connecting to process individuals, the business companies and state representatives.

4 Zero waste concept

Zero waste is a visionary concept facing up the current waste problems in society (Zaman, 2015) that also helps to change the perception of the waste itself. This change might be illustrated by the development of the waste narration. Whereas previously, the waste symbolized inefficiency and misallocated resources in modern society (Lehmann et al., 2013), nowadays the waste represents a resource to be used (Lehmann, 2010). The term zero waste was first introduced in the 1970's by the chemist Paul Palmer who noticed that discarded chemicals might be recovered instead. Zero waste at that time was motivated mainly by scientific curiosity and monetary aspect. Today, zero waste is motivated not only by the monetary aspect regarding economic savings but also by its visionary goal (Mauch, 2016) which in our opinion can be interpreted as an ecological motivation. Zero Waste International Alliance defines zero waste as ethical, economical and efficient visionary goal that guides people to change their lifestyles and practices to emulate sustainable natural cycles in which all discarded materials are designed to become resources for others to use, to design all products and processes to avoid the volume and toxicity of waste materials to conserve and recover all resources and not to burn or bury them. The implementation of the zero waste practices shall lead to the elimination of all discharges to land, water and air that are threatening the planetary, human, animal or plant health (ZWIA, 2018). Nevertheless, the zero waste idea is often misinterpreted as unrealistic concerning today's economic signals and the goal of zero waste becomes less waste in practice (Greyson, 2007).

The idea of zero waste has been implemented by many different sectors including waste management, mining, manufacturing, urban development and even policymakers. This concept is beneficial because it stimulates sustainable production and consumption, optimum recycling and resource recovery (Zaman, 2015). However, the concept is perceived and practised differently in different countries and institutions leading to various outcomes in new eagerness to become sustainable. Moreover, recycling might be seen as obsolete in zero waste thinking, as waste should be eliminated not through recycling but strictly through design elements that enable the reuse of all materials, and the waste is seen as a design flaw (Mauch, 2016). This paper focuses on consumer approach to zero waste, as we perceive huge lack of holistic approach to zero waste from the perspective of households in the academic sphere, whereas in real life, the number of people affected by this idea is growing.

5 Zero waste concept at households practice

Bea Johnson (2013) has had a major impact on individuals' and households' awareness of this concept, and she inspired consumers of countless countries to change their lifestyle. The zero waste lifestyle practised by households depends not only on reducing the waste production but in a wider context on a deeper thinking about all purchasing decisions as well as the consumer behaviour. The central motive is known as 5R principles, which present activities the households should practice to minimize their waste:

- refuse what you do not need (to prevent waste from entering the household);
- reduce what you do need (to focus on necessary purchases, but also to declutter the household, to donate);
- reuse by using reusables (to choose permanent alternatives, but also to repair, repurpose items);
- recycle what you can not refuse, reduce or reuse (to dispose of recyclable materials, but as a last resort);
- rot the rest (to compost).

From the practical point of view, the third principle opens a huge space for ideas and creativity as well as sharing, donating, gifting, swapping of goods or buying them from a second-hand. Polynczuk-Alenius (2015) concludes that the creative input of zero waste practising consumers may be viewed as an impact-oriented pro-environmental behaviour, derived as a combination of environmental citizenship and self-expression. In fact, the practices of zero waste oriented households are basically related to many other sustainability-related concepts such as sustainable, conscious or green consumption (e.g. Lehmann, 2010; Muldoon, 2006), circular economy (e.g. Murray, 2002), sharing economy (e.g. Greyson, 2007), urban gardening (e.g. Lehmann, 2011), voluntary modesty (e.g. Nováková, 2019), slow fashion (Antanavičiūtė and Dobilaitė, 2015), minimalism (e.g. Dopierała, 2017), or even anti-consumerism (e.g. Sanin, 2015), but with its own narration, point of view and moreover, business opportunities.

The development of zero waste lifestyle practised by households triggered the demand for package free shopping and enabled the growth of these stores. However, introducing unpacked goods to the market is not an easy matter. Package free shopping requires re-framing of the practice of shopping, re-materialization of the store and re-skilling of the consumer (Fuentes, Enarsson and Kristoffersson, 2019). Package free stores may induce more efficient use of resources by reducing packaging material and food waste. The social benefits might be presented by the support of small regional farmers and suppliers, higher transparency in the supply chain but also better informed consumers. Nevertheless, these benefits come at the expense of reduced consumer comfort due to the slower purchasing process, limited product diversity and the need to bring own packages, jars or containers. As another disadvantage can be stated a higher number of more

complicated negotiations with suppliers due to the change in procedures and dependency of food logistics on packaging, compliance with hygiene regulations or the need for closer attention regarding the condition of the goods offered in store (Beitzen-Heineke, Balta-Ozkan and Reefke, 2017). A German consumer survey revealed not only an enormous interest in shopping in package free stores but also barriers perceived by respondents. Amongst these barriers, they stated lack of important information such as ingredients and expiration date, storage of unpackaged food, impractical need to carry own containers or unsanitary of goods (PWC, 2015).

Anyway, consumption does not necessarily mean just shopping. Zero waste practised in households involves considering not only the direct aspects of consumption but also the indirect ones such as pamphlets, receipts, promotional fardol that enter the household. Although many of these might be recyclable materials, the aim of zero waste household is to eliminate waste, not to recycle more. This naturally also includes single-use products like bags, straws, cups etc. (Johnson, 2013). Probably less discussed but definitely with a huge impact when shifting from single-use products to reusable options, is the development of reusable menstrual technologies, including reusable cloth pads or modern medical-grade silicone menstrual cups (Gaybor, 2018). However, even the idea of composting menstrual fluid for green scaping, public lands and non-consumptive agriculture seems as a viable alternative, as this fluid is nitrogen-rich, and therefore added to fertilizers as it is usual in the case of blood meal (DaSilva, 2018). Moreover, the blood meal is one of the main fertilizers allowed in organic farming (Yunta et al., 2013). According to authors' knowledge, some of the women practising zero waste also compost their period blood or pour it directly to plants, however, there is a lack of research on this topic. Composting is the last core principle of zero waste household and helps households not only to reduce their organic and food waste but to gain a fertilizer instead (Vázquez & Soto, 2017). Some of the alternative phenomena related to zero waste lifestyle are described below.

6 Sharing economy

The role of materialism is the basis for understanding the principle of a shared economy, which has attracted unusually great attention years ago. Alonso-Almeida, Perramon & Bagur-Femenías (2019) describe the evolution of materialism. Traditional materialism, based on the ownership and accumulation of resources, loses its importance. The accumulation of assets in the context of traditional materialism used to be a status symbol. The new developing materialism expands the existing model with the enjoyment of experience together with the enjoyment of ownership. Materialism now works like a hybrid model. The authors of the article also underline the role of social networks as an accelerator of the shared economy. Schor (2014) states that enthusiasts see benefits in this alternative form of economy as unusually high earnings, efficiency and lower carbon footprint. On the contrary, its opponents argue that economic interests exceed the basic idea of sharing. Activities that are part of a shared economy are for example: the exchange of services, the sharing of productive assets or the increased utilization of durable assets.

The expected sustainability, cheaper access to resources and less dependency on asset ownership were behind the emergence of a shared economy (Botsman & Rogers 2010, in Frenken & Schor, 2017). Information technology is the accelerator of sharing economy extension (Frenken & Schor, 2017). Hamari, Sjöklint & Ukkonen (2015) also underline the role of information and communication technologies in the emergence and expansion of the sharing economy and common consumption. The authors have also focused in their article on people's motivation to participate in this alternative form of economy. Sustainability is the most important motivation for people who have high pro-environmental values. However, there is still a high proportion of the economic aspect in people's motivation because of the expectations of high profits. Benkler (2004), in Frenken & Schor (2017), describes cost reductions in lenders' economic calculations. On the consumer side, their transaction costs are reduced and their welfare increased.

7 Community supported agriculture

According to Spilková (2016), the community supported agriculture got into the Czech Republic in 2009. However, Japan was the first country where in the 60s this form was founded as a result of high contamination by industrial substances in food. This resulted in the first contracts between suppliers and consumers. This alternative system can be defined as production and consumption which is based on a very close relationship between two subjects – the producer and the consumer. The mutual partnership of these subjects is associated with a large number of advantages. On the consumer side, the main advantage is the regularity of food supplies. The producer, on the other hand, has the certainty of sales at a fair price (Hnutí Duha, 2016). Balázs, Pataki & Lazányi (2016) describe community supported agriculture as an alternative form of food distribution linked to lifestyle change, food activism and a gradual shift towards sustainable forms. These authors have researched the community supported agriculture in Hungary, and the result was that farmers involved in this alternative form play a main role in creating healthy, diverse and functioning food communities.

It is important to understand why the agriculture should have a local character. The negative impact of industrial agriculture is undeniable. Local agriculture has a positive effect on food quality. This is due to stronger links between market players. The second reason lies in the vulnerability and potential economic instability of the region due to the region's import dependence (Douthweite & Dleffenbacher, 1998, in Evropská výzkumná skupina KPZ, 2016). Valeška, Kettnerová, Pařízková & Frélichová (2014) state that due to community supported agriculture, local people gain control of production in the region, and it allows them to receive a fair income in exchange for their production. In addition, there is no environmental degradation associated with industrial form of production.

There are several types of community supported agriculture. The most widespread type in the Czech Republic is a *group of customers connected to an existing farm*. Consumers share risks and rewards with the farmer. Consumers work as an informal group. The type called *community farm* is not so widespread. It works on the principle that a group of individuals establish a farm and share the costs of production. *The agricultural cooperative* connects several farms and results in higher efficiency and specialization. Cooperatives in the Czech Republic, however, lack a direct relationship with customers. This type is followed by an *agriculture consumer cooperative* which already works with higher relationships with end customers. The end customers can participate in production, for example as landowners or be a part of distribution channel. The last type are *bio-clubs* which bring together consumers for the purpose of joint purchases of food (Valeška, Kettnerová, Pařízková & Frélichová, 2014).

8 Urban Gardening

Urban gardening is a movement that presents a response to the fact that in the Western part of the world, international transport networks dominate food supply to large commercial food retailers. Most of the food is not produced by local producers and the local character is lost (Hallsworth & Wong, 2013). In the American or Western European context, urban gardening differs from the Czech traditional gardening mainly by its community element. The main principle is a collective approach to the garden in the urban environment. First such garden was established in 2012 in Holešovice (Spilková, 2016). According to Obordo & Guardian readers (2018) in the American cities, urban gardening has, besides the production of fresh food, also an aesthetic function, as it refines old and abandoned urban buildings. Nikolaïdou, Klöti, Teppert & Drilling (2016) focused research on urban gardening in Switzerland. Based on their results, it can be assumed that in Western Europe innovative and hybrid forms of public space management associated with this movement will gradually emerge. Due to the densification process, smaller and more adaptable forms of gardening in urban space will be established. So far, the possible negative aspects can be found in the viability of the sub-projects and in the absence of uniform strategies or plans for urban gardening.

9 End note

In summary, different strategies are in practice for the transition towards more sustainable future through alternative economy concepts. The zero waste and circular economy both deal with the problems of waste minimization and utilization with regard to the increasing consumption of the growing population in the world. Their basic principles: reduce, reuse, recycle put strong background for interconnection of circular economy and the zero waste concept. Both are also recognized by the industry, policy makers and municipalities. However, the willingness of individuals and households to play a role in the sustainability issue is better connected to zero waste as far as the number of zero waste shops, events and opportunities for sharing goods is rising. Further aspects of households' sustainability oriented behaviour is represented by community supported agriculture and urban gardening, in which the households become direct supporters or even producers of the local food supply that can be shared amongst the community. The authors perceive a lack of the research in the field of holistic approach to zero waste at households' or individual's level, so they conducted also primary data based research that would hopefully be published during the year 2020.

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Eco-stabilization measures in frame of Common Agricultural Policy

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Abstract: Environmental measures have been adopted in Common Agricultural Policy (CAP) in order to contribute to the ecological stability of landscape. Since their adoption in the Czech Republic in 2004, the farmers profit from multiple system of payments per hectares on the condition of fulfilling the criteria aimed on sustainable use of soil, protection of water quality and conservation of biodiversity. Landscape consolidation is another instrument in frame of CAP with more than one billion CZK invested each year. On the basis of literature data, the effect of these CAP measures on selected longterm-monitoring indicators is summarized. The proportion of agricultural land endangered by water erosion is more than 50 %, the area of Vulnerable Zones by nitrates has risen by 14 % and abundance of birds specialized on agricultural land continues to decline. Examined indicators do not offer evidence of the effectivity of CAP in terms of improvement soil protection, water quality or biodiversity.

Keywords: Common Agricultural Policy, Ecological stability, soil erosion, water quality, biodiversity.

JEL Classification: Q15,Q18

1 Introduction

Common Agricultural Policy (CAP) targets the environmental and sustainability aspects of agriculture. European Commission's suggestions for CAP-Post 2020 concern more on environment and climate objectives than previously. The CAP goals are included in two pillars: Pillar I concerns direct payments to farmers and market intervention measures and these are funded from the EU budget. Pillar II includes rural development measures, which are co-financed by Member States. Pillar I. comprises direct support mechanism which decoupled from agricultural production (European Commission 2019).

In frame of multi-functional payment system farmers receive basic (Single area payment scheme, SAPS) payments under the condition they meet the following requirements: (1) the standards of Good Agricultural and Environmental Conditions, GAEC set by the Member State and aiming at preventing soil erosion, preserving soil structure and organic matter in the soil and ensuring a minimum level of maintenance; (2) EU standards in the area of public health, animal health, the environment and animal welfare (Statutory management requirements, SMR). If the farmer does not comply with the cross-compliance rules, the direct payments are reduced or stopped for him. The Water Framework Directive and the Sustainable Use Directive are also incorporated in the cross-compliance system (Massot 2019, MZE-1 2019).

The Pillar II., the European Union's rural development policy is the second pillar of the CAP since the reform of the so-called "Agenda 2000". This policy is co-financed by the European Agricultural Fund for Rural Development (EAFRD) as well as by regional or national funds. Ensuring sustainable management of natural resources and climate action is a part of this policy as agri-environment-climate measures. The introduction of these measures is mandatory. Organic farming, farming in Natura 2000 and in areas of natural or other specific constraints, is also supported by payments. Rural development programs of Member States must be approved by the European Commission (MZE-1 2019, Nègre 2019).

In addition to the single area payments (SAPS) each farm can receive also the 'green payment' or 'greening', the additional type of direct payment introduced with the 2013 CAP reform. Farm will receive this payment if it complies with agricultural practices with beneficial effect on the environment. There are three measures: (1) crop diversification; the farmer must grow at least two different species if the area under cultivation exceeds 10 hectares (or at least three species in case of more than 30 hectares); (2) maintaining Environmentally sensitive permanent grassland (ESPG), i.e. permanent grassland with importance for biodiversity, especially for protected grassland species and habitats; (3) Establishment of an ecological interest areas (Ecological Focus Areas, EFA) on at least 5% of arable land, i.e. hedges, fallow land, landscape features, crops that bind nitrogen, etc.. (Massot 2019, MZE-1 2019). Areas with natural or other specific constraints (ANC) form more than half of the area of the Czech Republic. The Landscape planning forms an important state instrument for enhancement of landscape eco-stability with the investment of more than 1 bill. / year (MZE-1 2019).

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Nitrate Directive aims on water protection against eutrophication and its Action Program on water protection is the most effective system of measures for its implementing. It is updated every four years and introduces mandatory management practices in defined Vulnerable zones to reduce the risk of leaching nitrogen to surface and ground water. Under Land parcel identification system (LPIS), information for farmers on measures to be taken by a farmer in a specific part of the land block is offered. The measures provided in Action Program must ensure that the amount of manure, organic and organomineral fertilizers applied on an annual basis is not exceeded (on average 170 kg of nitrogen / ha / year). Since January 2009, compliance with the requirements of this Directive is also reflected in the Cross-compliance checks, namely SMR1 "Protection of waters against pollution caused by nitrates from agricultural sources" (MZE-2 2019).

2 Methods

The aim of this contribution is to evaluate impacts of CAP environmental measures on selected longterm-monitoring indicators. All the data were obtain from literature (secondary) sources.

(1) Deal of arable soils endangered by water erosion; this indicator is evaluated by Research Institute for Soil and Water Conservation;

(2) Proportion of area of Vulnerable Zones from total area of the Czech Republic indicating the extent of water pollution by nitrates; Vulnerable Zones are declared for four years; after this period, a revision and redefinition of Vulnerable Zones is carried out depending on the evaluation of water monitoring; the basic criterion is concentration of nitrates in surface and underground waters with critical value of 50 mg per litre of water;

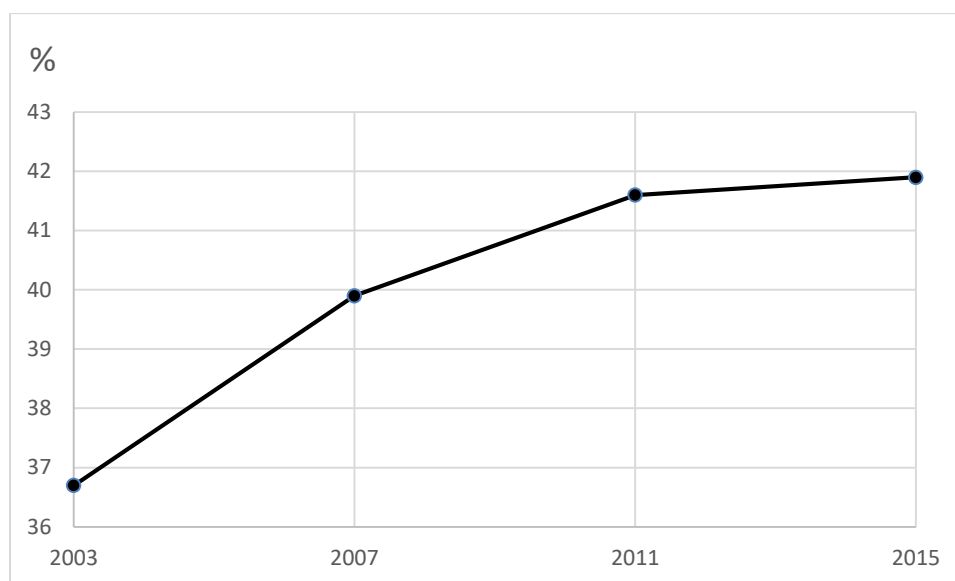
(3) Abundance of farmland birds; the abundance of birds is is the only quantitative long-term indicator of biodiversity which has been monitored in the Czech Republic and which indicates trends in size of species populations (contrary to species diversity which allows to estimate solely the numbers of species); the counting is provided by volunteers and data are summarized by Czech Society for Ornithology; since the birds are at the top of food chains, they reflect the accumulated changes in the environment, for example the abundance of insects.

3 Research results

The sustainable use of soils aimed on its protection against water erosion has been incorporated in frame of Cross Compliance as part of GAEC 4 and 5 since 2009. In 2018, more than 50 % of the area of arable land has been classified to be under risk of erosion (Kapička et al. 2018). Conditions for fulfilling the GAEC 5 designed by Ministry of Agriculture are suggested to be insufficient for solving problems with soil degradation. The erosions of up to 17 tonnes per hectare per year are tolerated, though a maximum of loss of 1 tonne per hectare per year on shallow soils and 4 tonnes per hectare per year on medium and deep soils have been suggested. The result is that currently 25 % of arable land is protected against erosion under the GAEC 5. Only 10 % of arable land were protected in precedent years – before the revision of this standard launched in January 2019. The recommended soil conservation technologies, mainly the protective belts of other crop or grassland are considered to be less effective in comparison to technologies ensuring the longest possible soil coverage, which should be more encouraged. Monitoring studies revealed that more than 70 % of erosion events occur on bare soil. The size of the soil blocks is closely related to the uninterrupted length of the soil blocks. In terms of erosion events, soil blocks larger than 10 ha appear to be erosion-dangerous, with more than 62 % of erosion events occurred (Kapička et al. 2018).

The proportion of area of Vulnerable Zones from the area of the Czech Republic has increased by 14 % (from 36.7 to 41.9 %) between 2003 and 2015 (Fig.1), i.e. during period of application of three Actions plans for water protections (MZE.MŽP 2017). Measures aimed on limitation of nitrogen inputs to waters by leaching from agricultural land thus failed to reduce area of these zones which have enlarged in contrary. The quality of waters and water organisms are more sensitive to eutrophication there leading eventually to a total collapse of functions and services of water ecosystem. The contribution of other than agricultural sources of pollution, like waste water from municipalities or artificial fertilization of ponds may play a role.

Figure 1 The proportion of Vulnerable Zones from total area of the Czech Republic.



Source: MZE.MŽP 2017

Thought the birds of agricultural land temporally profited from extensification of land management after 1989, their abundance has gradually decreased – even after 2004 when CAP has been adopted (JPSP 2019; Šťastný 2019). When focusing on farmland bird life strategies in more, grassland species profited from increasing deal of grasslands on agricultural land at the end of last century while arable land species populations has declined in the same period (Reif & Hanzelka, 2016). Similar negative trends were found in other EU countries. Although 48 % of the bird species associated with agricultural habitats have secure status, and 8 % are not secure but improved, 28 % of species are not secure and have deteriorated (EEA 2015). This is worse result than for birds in other ecosystems. The threats and pressures reported for agricultural habitats and species include both intensification and abandonment of agricultural land. (Inger et al. 2014). The collectivization of farms also contributed to elimination field roads, hedgerows, and field margins in order to merge small fields into large-scale soil blocks (Reif & Hanzelka 2016). The loss of nesting and feeding biotops and the reduction of feed sources (e.g. insects, seeds) are suggested the reason of this trend – even when the landscape features like hedgerows, wetlands, woodlands are protected on agricultural land in frame of standard GAEC 7. On EU scale, positive biodiversity impacts of agri-environment schemes on birds were found in special protected areas for birds on EU (Gamero et al. 2017). They generally mitigated the decline of farmland bird populations, but not reversed it.

The decline in insects populations, which has been recorded recently in Germany (Seibold et al., 2019), may further impact bird populations. In annually sampled grasslands, biomass, abundance and number of species declined by 67 %, 78 % and 34 %, respectively, and this decline was consistent across trophic levels. It mainly affected rare species and its magnitude was independent of local land-use intensity. Major drivers of arthropod decline thus act at larger spatial scales and are linked to agriculture management at the landscape level. Landscapes with a higher cover of agricultural land showed a stronger temporal decline in these indicators (Seibold et al. 2019). Decline in insect biomass was evident even in nature reserves, i.e. by 75 % in Germany over 27 years (Hallmann et al. 2017) and by 4–9 % yearly depending on insect family in Netherland (Hallmann et al. 2019). Comparable results on biomass decline in insects may be expected in the Czech Republic, but relevant data are not available. The decline in species numbers is generally better monitored than size of population, for example in case of butterflies in South Bohemia region (Hanč et al. 2019 referred by Čížek et al. 2019). According to Red lists of threaten species, the decline in species numbers of insects varies between 5 and 15 % during last century, depending on insect family. However, species numbers in the Czech Republic did not change substantially between 2005 and 2017, partly due to immigration of new species (Heyda et al. 2017, Čížek et al. 2019).

4 Conclusions

The examined indicators give evidence that CAP environmental measures adopted in last 15 years in the Czech Republic failed to halt undesirable trends in soil degradation, water pollution and biodiversity loss. Soil erosion proceeds on more than 50 % of arable land, proportion of area of Vulnerable Zones from area of the Czech Republic increased by 14 % and abundance of birds on arable land continuously declines.

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