

Faculty of Administration and Economic Studies in Uherské Hradiště  
Jagiellonian College in Toruń

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# German Automakers in Lead of Innovation Excellence

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## Abstract

This paper presents the innovation performance of German automakers and the automotive industry. The importance of this industry for economic growth, employment, sustainability and for Germany as an appropriate location for industry will be pointed out. The need for research and innovation (R&I) can be derived from that, because innovativeness is the basis for the lead. The research question deals with the innovation excellence as a booster for success and profitability as well as the reason for a high impact on economy. The innovativeness of the automotive industry will be demonstrated with selected figures. Important aspects of innovation management will be explained. Methodologically, empirical, analytical and theoretical approaches are used. Statistical data, topical literature, surveys, and logical conclusions will lead to justified arguments.

It can be stated that the German automotive industry provides an important contribution to the economy in terms of spending money for R&I, employment, investment and expenses for buying parts from suppliers on the input side. On the output side however profitability is created through new products with higher value and higher sales volume at lower cost position. So innovation helps to increase prosperity of companies, employees and economy.

*Keywords: automaker; excellence; innovation; research; lead*

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## 1. Introduction

Innovativeness is the basis for competitiveness, profitability and sustainability of companies. The need for research and innovation (R&I) is driven by shortened product life cycles, increasing rivalry on the markets rising and competitive pressure. Furthermore there are strong signals readily identifiable, which notify a radical technological and structural change going along with a downturn in the automotive industry. In addition to that the Corona pandemic disease compelled a shutdown of complete car factories in Germany.

To start with, the current state of the performance and the outcome of innovation efforts will be highlighted using selected figures of the output side. Secondly, specific issues of innovation management will be highlighted and substantiated with empirical data. Last, but not least statistical performance data indicating serious purpose of innovation management on the operational side will be displayed.

The contribution to science is to demonstrate the outstanding innovation performance of German automakers and where it comes from. These factors of success should be focused to guide this industry through adverse conditions.

Companies are generally in need of new products to attract customers. Research and innovation management is the source, where innovations come from to find their way into

innovative products (Hofbauer & Sangl 2018). The more attractive, the more are customers willing to pay for. This is the only way to differentiate from competitive offers. The same principle applies to industries and national economies. Innovativeness is a mandatory prerequisite for growth and sustainability of companies in competitive markets (Hofbauer et al. 2009). Innovations are also crucial for the competitiveness of countries and thus determining the standard of living of the people and wealth of nations (Hofbauer & Sangl 2017).

The German automakers are highly innovative, accordingly there is a high competitiveness and profitability to be noticed. But experts can already observe strong signals of structural and technological change. There is little doubt that the German automotive industry is heading into problems. These problems could lead into a severe crisis of German economy. Worldwide sales volume of the automotive industry dropped 5% at mid-year 2019. The domestic market in Germany declined by 9.3% in 2019. German car manufacturers lost 20% of export in the two most important markets China and the US (Kröger 2019). The forecast for 2020 indicates a decline as well. Due to Corona pandemic and a complete shutdown there was a decline of 20% in the first quarter 2020 compared to first quarter of previous year. Automakers and suppliers had to react and already dismissed people and announce more layoffs for 2020.

For the time being there are numerous challenges like electrical and digital revolution, strict engine exhaust regulations, diesel scandal and moreover the imminent threat of an economic downturn. Global trade wars on the markets, driving bans in cities, insufficient electrification infrastructure and missing conviction of customers about e-mobility deteriorate the situation on the demand side. Summing up there are huge challenges coming up and the automakers have to react in a proper way to achieve quickly competitiveness in these new areas. Otherwise a downfall of this important industry may be the consequence, if the innovativeness won't be sustained. There are a lot of urgent tasks, and automakers need support and money for innovation. R&I-budgets are immediately needed for alternative fuel, for optimization of conventional power drives and extension of electrical mobility as well as for the digitalization of the factory and the car itself. Furthermore competitors from other industries like google, amazon, apple, uber are going to penetrate the mobility market and attack traditional automakers. They earned a lot of money in their respective businesses and the cash reserves are in search of new business opportunities in mobility areas. Their capital strength is a major advantage to cover huge budgets for research and innovation (R&I).

The reasoning for this article is to analyse and present the innovativeness of German automakers and their suppliers. From this follows the question of research: Is there an outstanding innovativeness of German automakers? In order to answer this question quantitative and qualitative arguments will be used. Statistical data will demonstrate measures and comparisons, which help to answer properly the question of research.

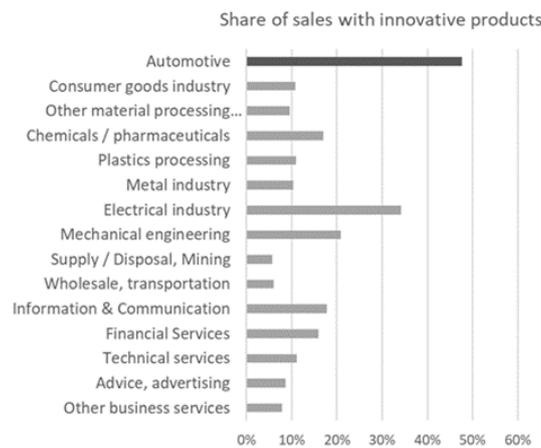
The benefit of this paper is the presentation of the German automakers combined with a singular systematic matching of innovativeness and impacts of innovation application. The purpose is to identify the essential sources for innovativeness and success and the relation to the outcome of innovation activities. Comparisons with other industries will be made in order to prove the question of research.

## **2. Initial Situation and Outcome of Innovation Performance**

The outcome of innovation performance shows various results of innovation activities. Regarding quantitative reasoning about output factors, there are sales volumes, respectively share of sales with innovative products, advantages concerning cost reductions and protection

of intellectual property in terms of patents. One of the most convincing fact is that the sales structure of German automakers industry accounts for nearly 50% of innovative products. Exactly 49.6% of total sales with roundabout 423 bn EUR is achieved with innovations. This is a noteworthy output of invested innovation input. In German industry in total only 15.5% of total sales volume is generated with innovations, the remaining 84.5% of sales volume on industry average is generated with established products. The comparison in figure 1 shows the share of sales with innovative products for the different industries in Germany. As already lined out, the automotive industry has a share close to 50%. Here the automotive industry is in the lead with a big gap to the electrical industry as the second one.

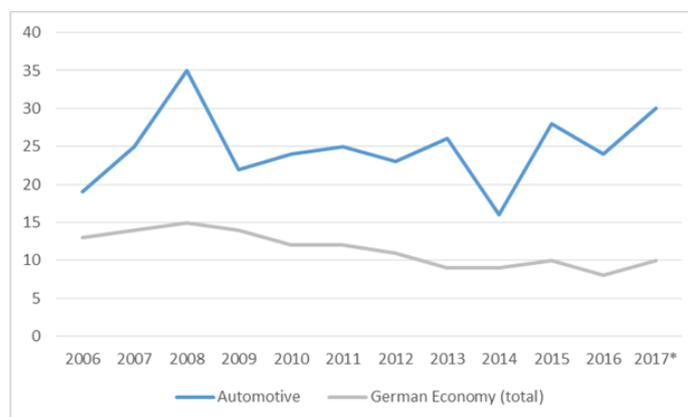
**Figure 1: Share of sales with innovative products for different industries**



Source: ZEW 2019b

Innovativeness is required for profitability. Thus not only the cash inflow from the sales volume is important, but also the cost position and corresponding expenses. Companies have to monitor their cost position very detailed and strive for cost reductions. This is why huge amounts are spent to achieve cost reductions. Figure 2 displays the proportions of innovation-related cost reductions for automotive industry and German economy in total.

**Figure 2: Proportions of innovation-related cost reductions (%)**



Source: ZEW 2019a

This fact underlines the significance of innovation management for the competitiveness. The value added of innovative products should be increased and the cost position should be reduced. The spread in between is called margin and this in turn is a reliable indicator for profitability.

Further important outcomes of innovation activities are knowledge and know-how. Therefore the number of patent applications is a suitable indicator for successful R&I. The patent applications in Germany showed an increase from 59.444 up to 67.895 from 2010 until 2018 (DPMA 2019). Thereof 12,273 applications arose from the transport sector in 2018. This was a plus of 5.8% in comparison to previous year.

The numbers indicate a rising innovation activity as well as an increasing technological progress comparably increasing with technological value added. Patents help to protect the know-how of a company and this support to gain competitiveness is an important precondition for value creation. The top 3 automotive companies for patent application in Germany were (DPMA 2019): Robert Bosch GmbH with 4,230, Schaeffler Technologies AG & Co. KG with 2,417, and Ford Global Technologies, LLC with 1,921 applications.

The innovation index of the top 5 automotive companies worldwide (Center of Automotive Management 2018) shows on the first place Volkswagen with an index of 195, followed by BMW Group with 115, Daimler with 101, Toyota with 62 and on fifth place Tesla with 58. The index is a composite of degree of innovation, originality, customer value and level of maturity.

All these indicators and arguments demonstrate a high level of innovativeness for the German automotive industry. These facts support the thesis that the automakers are in lead and far ahead of other industry sectors in Germany and abroad. The statements also indicate that the German automakers are definitely committed to active research and innovation and prepared for global growth. The key points of success are: perfectly managed innovation processes, executed in cooperation with external innovation partners and to apply immediately for patents to protect intellectual property. Thus it can be summarized, that the results of innovation activities of German automakers are well above average.

### **3. Problem Definition and Question of Research**

The scientific problem of this article can be defined as how to detect and identify innovativeness. Innovativeness is inevitable for the sustainability of companies. There are various indicators to measure innovativeness. The Global innovation index 2019 shows the rankings of the most innovative countries worldwide (World Intellectual Property Organization 2019). The scores are determined through factors like business sophistication, level of human & capital research and creative outputs. The rankings show Switzerland on the first place with a score of 67.24, followed by Sweden (63.65) and the US (61,73). Germany is ranked on 9th place with a score of 58.19 (100 = most innovative).

A more detailed insight is provided on the level of branches and companies. R&I management is one of the most important entrepreneurial functions. The outcome in terms of new products or applications are essential requirements for prosperous enterprises. An innovative enterprise may be characterized by means of: targeting global growth, entering new markets, new product introduction, development of additional benefits, increase of market share as well as enlargement of sales and profit (Hofbauer & Sangl 2018). Innovations substantiate competitive advantage (Hofbauer et al. 2009).

Empirical studies of successful and leading companies show that there are some core elements required for success. These issues can enable and enhance innovativeness (Sangl & Hofbauer 2017). Excellent process management is basic amongst others. The following elements are supposed to be critical for their outstanding performance. They can be characterized as strategic or operational (Frietsch et al. 2015): The strategic issues are commitment to active research and innovation and striving for global growth as a corporate goal. On the operational side there are excellent process management, scheduled knowledge management, systematic scientific cooperations, and efficient patent application for know-how protection.

But there are also various obstacles, which prevent to exercise promising strategies and to execute successful operations. The reasons are twofold: external and internal causes. External impacts are caused by different players and circumstances, like competitors, customers, suppliers, economic situation, technological change, legislation, standardization requirements or others. The companies in a specific industry sector have only limited possibilities to influence or even change these parameters coming from outside the company. They have to react properly and adapt their strategies and business operations due to the changed constellation. Basic management literature and scientific investigations advise to detect and identify weak signals at the right time and to respond before problems arise. Currently there are obvious signals to observe for the German automakers. Internal actions and parameters of performance however can be influenced and controlled by the companies in own responsibility. The companies have to develop competitive strategies and optimize their business operations according to the market and environmental constellation. Based on the innovativeness this means mainly the ability to perfectly manage the innovation process. It is a matter of fact that innovations are unique and always associated with risk and expenditures when they are developed and introduced for the first time. But innovations are the decisive prerequisite for growth and sustainability of companies in present and future markets. Therefore the innovation management processes should systematically initiate and support R&I (Hofbauer & Sangl 2018). In order to do this, a systematic innovation management process is required (Hofbauer & Wilhelm 2015). On the one hand it needs a creative environment to generate various promising innovative and productive ideas. And on the other hand a precisely managed innovation management process is an essential prerequisite for successful realization.

With regard to assumed innovativeness of German automakers, the analysis is about the dimensions of innovation input and outcomes. The basic hypothesis of this paper is, that the German automakers are far ahead of average with respect to innovation management and corresponding results. Thus the main question of research can be formulated as follows: Do the German automakers have an exceptional innovativeness? And in case that this question is approved, the causative question is about the reasons of extraordinary innovative performance.

This article pays attention to the research question under consideration of above mentioned key points. In case of provided evidence of innovativeness, a strong recommendation will be given to support a leading innovation position in times of radical change, discontinuities, downturn and rising competition.

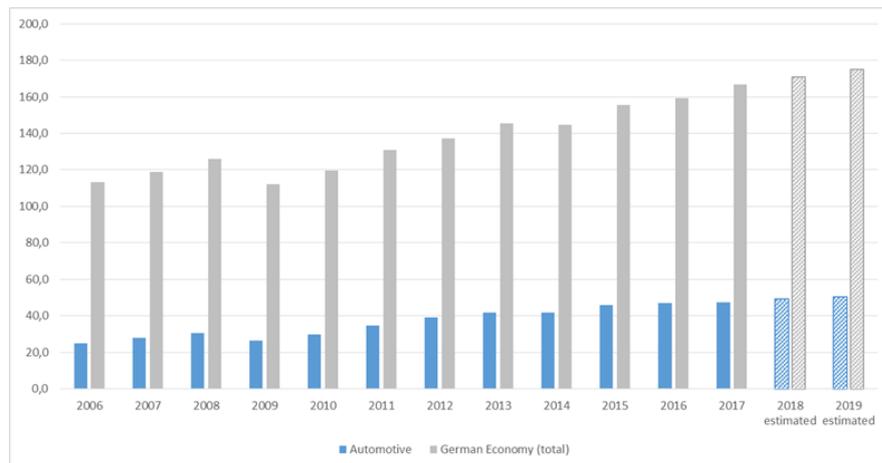
Chapter 4 will show empirical data of selected practices of innovation management in the automotive industry.

#### 4. Reasoning of Innovativeness of German Automakers

Innovations in terms of products and services are essential for competitiveness and profitability. The analysis of the innovation activities of the German automakers show that there is a substantial and considerable outcome in terms of sales volume, share of sales with innovations in comparison to other industries as well as patent applications. On the other side there also must be huge and extensive factor allocations on the input side. Both sides of German automakers have a significant impact on companies and economy (Hofbauer & Sangl 2018a).

The meaning of innovation activities will be displayed in terms of facts and figures. Large budgets are invested in the search of innovations and there is a huge impact of new products on the profitability and competitiveness of an enterprise. The overall expenditures of the German automakers for innovation are displayed in figure 3. The short bars show the expenditures of German automakers for each year. The long bars show the figures of the German economy in total. The scale and all numbers are in bn EUR. After the crisis in 2009 one can see a steady increase of the expenditures. From 2011 onwards the progression of the automotive industry (short bars) was above average of the German industry in total.

**Figure 3: Innovation expenditures of German automakers (bn EUR)**



Source: ZEW 2019a

The meaning of innovation activities will be displayed in terms of facts and figures. Large budgets are invested in the search of innovations and there is a huge impact of new products on the profitability and competitiveness of an enterprise. The total innovation expenses for German enterprises amounted in total 166.9 bn EUR in 2017. These figures show that the innovation expenses are a serious economic factor, though representing only a fraction of 3.14% of total sales. The forecast is estimated with an increasing tendency up to 172.5 bn EUR (2018) and 175.9 bn EUR (2019) (ZEW 2019a).

A closer look on all companies in Germany provides more insight about activities. In total there are 106.700 innovative companies identified. This counts for a share of 36.0% of all industrial companies. Table 1 shows also figures about product and process innovation as well as novelties and cost reduction.

**Table 1: Innovators in Germany (bn EUR)**

	in 1.000	percentage
Total number of companies	296.6	100.0
Companies with innovation	106.7	36.0
... with product innovation	74.4	25.1
... with process innovation	71.2	24.0
focus on novelty	22.2	7.5
focus on cost reduction	29.9	10.1

Source: ZEW 2019b

The results of these innovation activities for German companies show a huge impact of innovation activity on economy (Hofbauer & Sangl 2018a). In 2017 total sales with innovative products scored the amount of 822.5 bn EUR, this figure increased 14.5% compared to previous year and represents 15.5% of total sales (ZEW 2019a). The automakers nearly reach 50%.

In order to analyze the top position of Germany and to explore the position of innovative companies, a breakdown according to branches is additionally useful. The intensity of innovation describes the percentage of innovation spendings of total sales of all companies within a specific branch. Table 2 shows the figures according to the German innovation survey, a publication of the *Centre for European Economic Research* in Mannheim (ZEW 2019b). The branches show different percentages due to their different market conditions and requirements. The branches vehicle manufacturing (10.2%), electrical industry (8.7%) and chemical/pharma (6.9%) have the highest shares.

**Table 2: Intensity of Innovation according to branches in Germany**

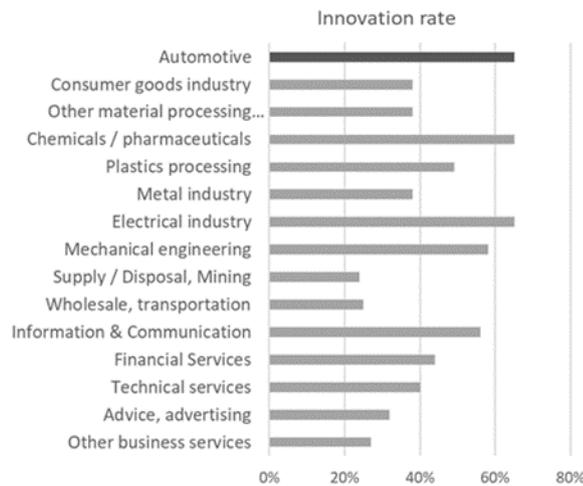
vehicle manufacturing	10.2%	textil, leather, clothes	3.3%	food and tobacco industry	1.4%
electrical industry	8.7%	glass industry	2.6%	consulting and advertising	1.2%
chemical/pharmaceutical industry	6.9%	rubber industry and polymer processing	2.6%	water and disposal sector	0.8%
technical/R&D services	6.7%	transport industry	2.3%	business services	0.6%
telecommunication industry	6.6%	metal production and processing	2.2%	energy, mining and mineral oil industry	0.6%
engineering industry	5.6%	media services	2.1%	financial service industry	0.5%
furniture industry, toy sector, repair industry	3.3%	timber and paper industry	1.5%	wholesale sector	0.2%

Source: ZEW 2019b

Thus we can conclude, that the German core industries vehicle manufacturing, electronics and chemical/pharma hold the top position in the field of innovation.

Figure 4 shows the comparative innovation rate of different branches in Germany. The innovation rate displays the percentage of innovative companies within the respective industry. One can see, that the automotive industry is among the three leading innovative industries, namely automotive, chemicals/pharmaceuticals and electrical industry. Automotive scores exactly for 62.3%.

**Figure 4: Innovation rate of German branches in %**

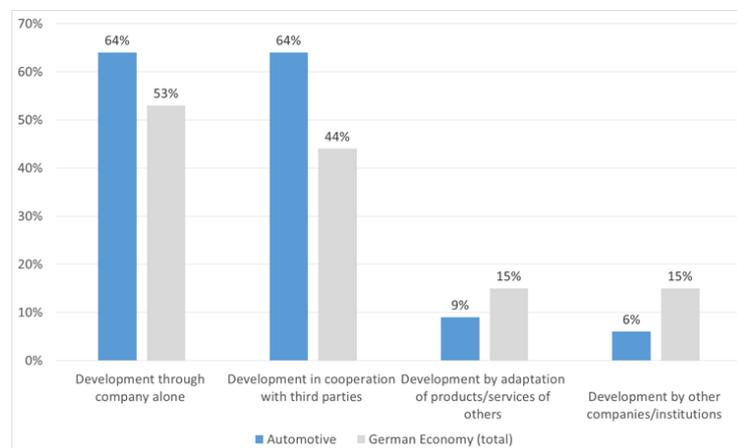


Source: ZEW 2019a

The comparison pinpoints that there is a wide range between the different sectors, but this is quite normal as the innovation intensity represents the degree of competition and even the profitability of the business.

Figure 5 shows different participants in the development of innovations.

**Figure 5: Participants in development of innovations**



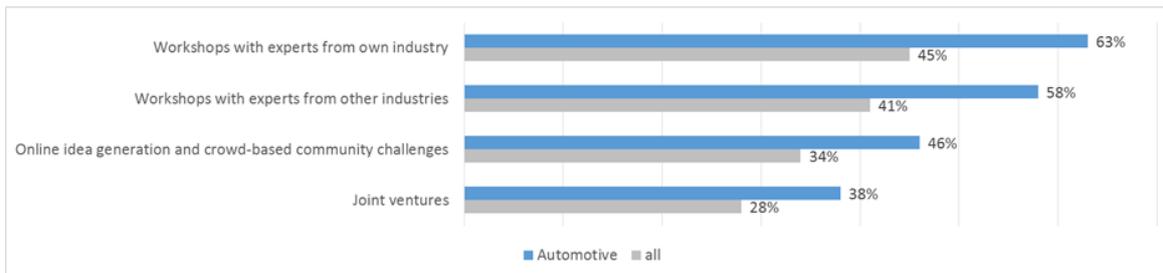
Source: ZEW 2018a

With regard to innovativeness it is also important to analyze qualitative criteria like the openness of companies or industries in general. Figure 5 shows different development partners for innovations within the automotive industry, showing who is involved in the process.

To open the innovation process is an important issue to take advantage in competitive markets. Companies face increasing competition with pressure to innovate. Thus they are forced to push innovation activities with higher budgets, because innovations are drivers for profitable growth, competitiveness and sustainability. New technologies as well as cost and time pressure have changed the practice of innovation activities. Closed innovation has changed into open innovation. Figure 5 discloses that there are as much innovation projects done together with third parties as on a stand-alone basis (multiple choices possible). In comparison to total industry on average the automotive industry in Germany is about one third ahead of the other sectors with regard to open innovation.

There are many ways to execute open innovation and utilize ideas from outside. Figure 6 shows four different ways to collect ideas. Workshops with experts from own industry, experts from other industries, joint ventures and online/crowd based creation. From that figure can be derived that the automotive industry is again far ahead of German industry on average.

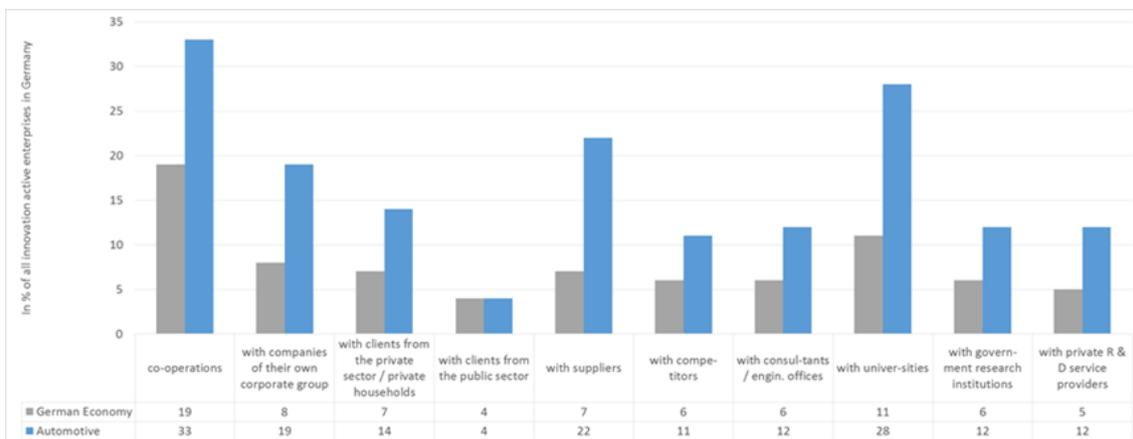
**Figure 6: Selected sources of new ideas from outside the company**



Source: ZEW 2018b

Figure 7 shows the variety of cooperation partners from outside for automotive industry versus German economy in total.

**Figure 7: Selected sources of new ideas from outside the company**

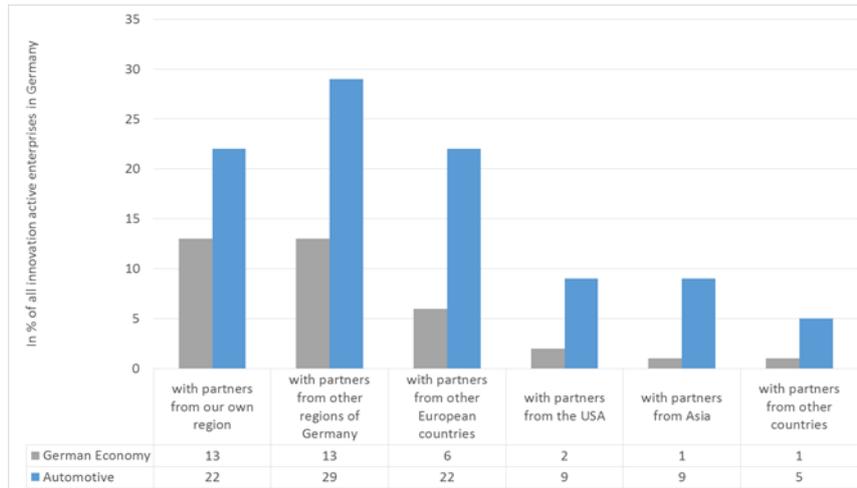


Source: ZEW 2018b

From figure 7 one can derive that the German automotive industry has already opened to external sources of innovation.

Figure 8 provides information about the geographical origin of innovation partners. The distribution gives strong advice that the German automotive industry is ahead in global cooperation, too.

**Figure 8: Cooperation partners with regard to geographical origin**



Source: ZEW 2018b

All the outlined arguments in this chapter strongly suggest that the innovation performance in the automotive industry is far above average. The innovation management is well organized and is up to date utilizing expert knowledge also from outside and including all tools to accelerate the R&I activities within a perfectly managed innovation process. Summing up this chapter of qualitative criteria, it can be stated that also in view of these issues the German automakers are in lead with their innovation activities.

## 5. Conclusion

Innovations in terms of new products and services are essential to create value for the company and for the customer. Innovation activities are vital for successful companies and prerequisites for establishing competitive advantage and value added. This paper deals with the significance of innovation in general and the accomplishment of the German automakers in particular. The indication of a disruptive change especially for the German automotive industry is in evidence. A variety of influencing factors merge to a situation of radical change. Big trouble seems to be inescapable. This article gives attention to the research question in order to detect a leading innovation position, which is worth to be defended in times of discontinuities and rising competition. The arguments based on statistical data show that there are outstanding results achieved by the German automakers. Corresponding efforts on the input side were highlighted in this elaboration as well.

The factors of success of innovation management have been outlined on a theoretical basis. These factors also apply to the German automakers. Remarkable issues are a strictly managed innovation process and the targeted appliance of open innovation techniques. The

evaluation indicates that the German automotive industry is well positioned for national and global competition.

In the empirical part the current situation of the German automotive industry was pointed out in several dimensions. Statistical evidence was given with absolute and comparative figures. The overall assessment shows an outstanding performance of the German automakers, in comparison to domestic industries as well as in comparison to car manufacturers abroad. Table 3 illustrates in summary the range between the automotive industry and the average of all sectors based on selected figures.

**Table 3: Range of innovation measures on average in Germany**

	automotive industry	all industries on average
share of innovative companies	62.3%	36.0%
innovation intensity as expenses in % of sales	10.2%	3.14%
share of sales with innovative products	49.6%	15.5%

Source: own graph, based on ZEW 2019a, 2019b

In consideration of the formulated research question and careful assessment of arguments, it can be stated that the German automakers have an exceptional innovativeness and outstanding innovation power. The question about the reasons of extraordinary innovative performance has been answered with qualitative and quantitative arguments. The key points are the excellence in executing process management, including internal and external knowledge management with the support of cooperations and protecting quickly the outcome in terms of intellectual property.

Summing up it can be concluded that this innovation power is key for the German economy in regard to innovativeness, employment, prosperity, competitiveness and in the end for the welfare of the nation. So it can readily be deduced that there is a huge and urgent need for action to support this industry.

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# The Role of Qualitative Analysis in Transport Infrastructure Planning

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## Abstract

The main role of planning new traffic sections and routes is to reduce traffic congestion. It is also about more efficient development of transport and transport systems in the regions. An essential factor that needs to be applied is the role of qualitative analyzes. Qualitative analyzes need to be applied ex ante in the planning of transport sections and routes. Administration and economics in the field of transport are increasingly using this type of tools, which are discussed in the following article.

*Keywords: Transportation; Qualitative analysis, Administration, Economics*

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## Introduction

In transport infrastructure planning, various studies apply qualitative analysis techniques progressively to facilitate research, development and implementation of various policies which attempt to understand travelers behavioral perspectives, attitude and opinions. There are various existing studies which mostly focus on quantitative methods but they are also backed by empirical evidence from the secondary sources and qualitative analysis. The breadth and depth of qualitative analysis are key for most of these studies. This paper aims at reviewing various scholars' standpoints on the role of qualitative analysis in transport infrastructure planning. In the transport sector, more so in the area of planning this method is useful, and as a science, it aids in explaining the effects of various forms of infrastructure and how they are planned. The use of qualitative studies in the area of transport infrastructure planning is enormous, but often combines quantitative measure to produce reliable results.

## Showcasing Attitudes in the Population

The techniques that are used in the transport industry for policy-makers to determine the attitudes and behaviors of individuals are complementary with other models. A greater tendency has been seen (commonly in the UK) where researchers gain insights using focus groups as an option that is not costly when examining the attitudes of subjects (Fischer, 1999).

Azevedo, Behar & Reategui (2010) allude that through qualitative research individuals can find out about the range of attitudes in a particular population, but offer minimal data on how they are distributed, hence its limitation in this area. However, the output of this type of research is not easily manageable; hence the critical question of why it is used by researchers who want to gain insights on transportation infrastructure planning and trends. The answer is that qualitative research is wide and possesses two significant qualities which include depth and breadth as indicated in figure 1 below.

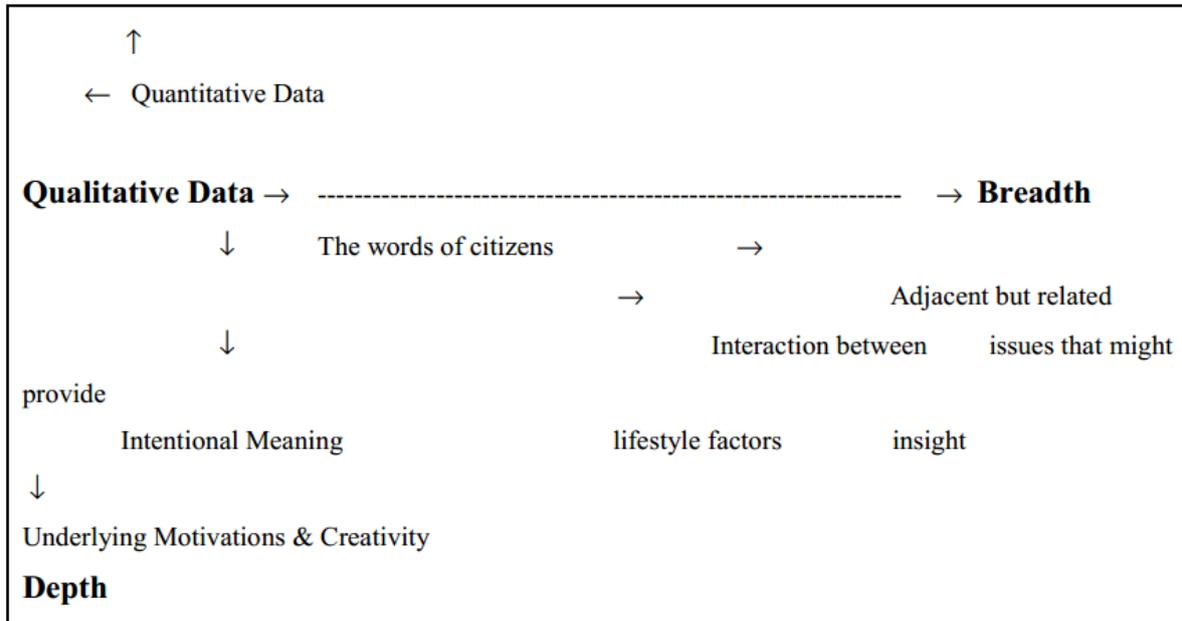


Figure 1: Qualitative Analysis Breadth and Depth  
 Source: Onwuegbuzie, Leech & Collins (2012)

Further, the different techniques used under qualitative research aid in responding to issues in the transportation industry via different stages which include before quantification, parallel with quantification and after quantification. The rigorous process involved allows for participants in the transport industry to give their views for purposes of future plans. It allows the use of questionnaires to ask relevant questions from the respondents who give their views and such are analyzed for inferences and changes in the transport industry (Vugrin, Warren & Ehlen, 2011). Planning becomes easy because of the collected data which is commonly valid and from a group of people who are affected by the phenomenon under investigation. It is, therefore, right to say that this form of analysis enables planners through their research functions to explore issues in a population, and this helps in getting the quantification required. The idea is relevant in situations that are new or dynamic, like an area in transport infrastructure planning that wants to know drivers' attitudes to motorway provisions.

For instance, a study was conducted in the UK in the segment of transport planning where the researcher wanted to find out driver attitude to the provisions of motorways (Vugrin, Warren & Ehlen, 2011). The factors looked at centred on the perception of the public on the motorway provision and involved several group discussion. Motorway drivers were sampled from different regions and social settings. The qualitative research brought to light different benefits to the provision of the motorway system and they included safety, lighting, provision areas, quality of road surfaces among others. Besides, other respondents were of the view that

the motorway was a reality while others saw it as a myth. With the data collected planning was enabled in the UK motorway transport system, and this became an investment priority.

## **Behaviour and Mode Choice**

Qualitative analysis has the role of helping policy-makers in the transport industry understand the perceptual and emotional factors impacting the sector for purposes of coming up with better methods of operation. Perceptions of people regarding the transport system, including their mobility often affect the choices they make when travelling. Through qualitative analysis, planners in the sector understand the attitudes of individuals towards their mode of transport choice, including the reasons behind those choices, to design mobility services that meet their needs and requirements.

Qualitative methods that allow for the identification of individual behaviour are currently supporting information on transport infrastructure planning. The methods address subjects that are complex and often used to analyze interactions between different people while considering contexts that are concrete (Liamputtong, 2009). The subjective nature of researchers in this field which is commonly criticized takes part in the process of research and this enriches the data being analyzed (Wheeldon & Faubert, 2009). The qualitative approaches applied to the transport infrastructure portion focus on experiences that are subjective, and this relates to people in the transport industry. While quantitative approaches focus on understanding the distribution of and frequency of planned projects, qualitative forms a basis to understand how those concerned feel about the measures under consideration. Therefore, qualitative techniques are appropriate when the micro question are being answered while the former works on answering the macro-level queries (Wheeldon & Faubert, 2009). Nevertheless, both techniques are vital as they can be used as separate entities or a multidisciplinary that works towards giving solutions to queries under research.

In the transport industry, qualitative research help in explaining the different relations that quantitative approaches establish. For example, Wessel, (2019) highlights that in the planning sector, the research endeavours to determine why certain parameters are important than others when building bridges, and this information is supported by macro solutions from quantitative data. These answers are provided by way of engaging in open questions that are placed in the questionnaires. The approaches are primarily interpretative and descriptive through ethnographies. Through analytical induction qualitative analysis is able to illustrate the existing theories without necessarily using any hypothesis. The information gathered on the ground through focus groups or questionnaires presents information to planners on how they can easily work on their projects in relation to the information from the population being studied (Wessel, 2019).

Studies done in the transport industry have yielded critical yet vital insights that relate to individual behaviours when particular modes of transports are chosen (Banister & Berechman, 2001). The information collected has brought about important models that are able to forecast how behaviours affect the industry-leading to the development of sophisticated infrastructure that are used by individuals. The data collected in this area of study relate to quantitative research because it only deals with behaviour and void of any analytical skills that require the understanding of frequencies or ratings. The changes found in behaviour allow for changes in the system to ensure conformity to the needs of the individuals in society. The analysis thus plays a major role in ensuring that inputs from those who use different modes of transport are used before inferences are made. However, to understand the complexities

involved in the choices made by individuals researchers employ multidisciplinary actions where both quantitative and qualitative methods are used (Mweshi, 2020).

Corbin & Strauss (2008) confirm that qualitative analysis is founded on environments that are natural, and this are places where participants can discuss issues or give opinions in regard to their needs. Through the answers provided, researchers are able to offer policy-makers with first-hand information on the natural environment based on the questions asked. However, with the innovations currently being consumed, online representations are common, and such are not reliable because they are never representative of the whole population. Since such analyses are personal, planners in the transport sector can be creative in the way they ask their questions to even get more information which might encompass two or more planned projects. For example, planners working on roads or motorways can shift and demand to know how waterways can be incorporated and the benefits that might be accrued to the users. Through such functions, qualitative research presents ideas that are holistic, hence able to cover different variables in a single session. By studying behaviour, planners can change different aspects of the conclusions made to ensure that every party involved is satisfied with the overall layout of the project once it is initiated.

### **Allows the use of other Written Information**

Qualitative analysis is vital in identifying patterns or data from other written works to form judgments that allow planners to come up with viable solutions to present problems. In this regard, the researchers or planners get already written material through content analysis and use the same to formulate decisions that can be used by planners in the transport industry (Wheeldon & Faubert, 2009). This is a common method that has been used in the past and currently helps several policy-makers to come up with projects which are required in society. When such information is used, the relevant individuals first verify if it is true and try to implement it to suit the situation under investigation. It goes without saying, when such techniques are used individuals take minimal time to make decisions because most of the written content is already researched, with conclusions and recommendations embedded.

Content analysis is based on the study of contexts, words and themes that relate to a particular question under investigation (Wester & Peters, 2000). The meanings of words and texts found are used to offer interpretative and descriptive data that is easily consumed by planners when seeking information. It is a technique that objectively and systematically finds different characteristics in materials, and the information can be transformed into different categories to give way to quantitative research to find data that is helpful, and this might include ratings or frequencies. Similarly, grounded theory offers hypotheses and concepts through inductive analysis and this is used to formulate inferences in the absence of any other mathematical formulations.

Qualitative analysis is also superior in finding information for users in the transport industry which can be used to plan on projects and future operations. Through grounded theory, concepts can be generated in an inductive process where no research hypothesis or results are used (Xu & Storr, 2012). This form of analysis also avoids the use of conceptual frameworks and delves straight to matters that pertain to the research questions under investigation. Planners can, therefore, proceed to use the information on the basis of assumptions and make rectifications while in the process of completing different projects. It uses several characteristics that enable planners in the industry to make sense of the large amount of data that has been

derived. Similar to quantitative analysis, the technique allows for data testing, and this involves the ideas that have been generated from the information gathered.

Through analytical induction, empirical data is used to look at the theories that are in existence, and the information is used to generalize the results or expand on the different gaps that might exist. Besides the use of content analysis in the transportation infrastructure planning paradigm other methodologies offered by qualitative analysis regard the use of conversational analysis whose main tenet is to focus on a particular socio-linguistic area. Through this method, researchers can only look at particular options provided by the completed research works and make inferences in relating to the project that is being contemplated. Policy-makers get to understand the previous operations and work towards making changes in response to the needs and requirements of the project that is being handled.

Thematic coding, on the other hand, deals with patterns in works that have already been completed. It deals with case studies and allows planners to look at cases that have been accomplished to come up with new ways of automation or changing projects to suit the end-users. This method is satisfactorily accomplished through objective hermeneutics and narrative interviews. Further, discourse analysis which is a common practice in quantitative research uses social contexts in the macro-sociological level. The information gathered can only be relied upon if other methods are used to quantify the variables that are being used, hence the need for a multidisciplinary approach.

Using qualitative analysis is easy, and offers a platform for researchers to describe the survey tools and participants that have been used (Morse & Mitcham, 2002). It not only clear but often indicates the quality issues related to the final conclusions made. With the triangulation strategies provided, researchers can verify data and this is important as it tends to avoid bias. Similar to quantitative research, qualitative analysis allows for the coding process, analysis and the relations between the different variables that have been employed. With qualitative research, planners are able to get a variety of data and information from different sources which together form a basis for making judgments, and this makes it superior. Currently, the transport industry is using more information from the qualitative research paradigm and this helps planners to understand patterns and choose best practices when making vital decisions on projects.

Under qualitative analysis context is vital, and reports are often centred on where the context was retrieved. In the area of transportation, planners use information from the national geographical segment which indicates how people are populated and their needs. Summaries are then enabled to get experiences from every participant and this is necessitated by the fact that every person has his or her own personal experiences when it comes to staying in a particular region. It thus gives independent information void of confusion and alterations because it follows a path that is recognizable. With this in mind, planners are able to come up with projects that suit a particular group of people in a certain region rather than the whole general public, hence making the analysis unique and reliable. The subjective nature of the analysis makes it probable to challenges because it refers to thematic analysis where patterns and themes are followed as opposed to critical evaluations using mathematical formulas. Since it is retrieved in its raw form, original knowledge or insights are gained by planners who end up coming with solutions that fit the requirements of the populations.

The other categories of qualitative analysis that have gained traction over the years include observational studies. Through this technique, planners in the transport industry are not required to formulate questions or hold discussions with participants but make observations and record data. This is a vital scope of understanding because most of the time those given such tasks of planning have relevant educational background and experiences in their areas of

operation. Through the approach, inferences are easily made with minimal interactions leading to low costs and less time consumed. In fact, most plans have been accomplished by this method, and only experts are used to giving final verdicts in response to the issues being discussed. The technique is reliable because such individuals not only use their own expert skills but perform experimental activities that provide proof of the provision of services to a particular group of people or region (Zadeh, 2019). In this regard, planners have a major role to play, and commonly their voice is final unless changes are made by the set budgets or government regulations. The relationship between such researchers and those affected is minimal and this is because the level of interaction is almost zero. With such a position, leaders are able to accomplish the task on a timely basis and avoid bias where choices have to be made on a particular issue under investigation.

### **Helps fill the Gaps of Quantitative Analysis**

There are several challenges researchers have when dealing with qualitative research, more so in the process of finding reliable information on planning in the transport industry. The different concerns raised relate to data analysis, management and collection. While such problems are also pertinent to other research works that use quantitative analysis, qualitative research is criticized because it lacks the required subjective interpretation and scientific rigour. Qualitative methods need the same rigour when dealing with the collection of data, the design used, interpretation similar to quantitative approaches. However, qualitative analysis is vital in researching important issues like transport planning because it offers insights that are not readily available when dealing with quantitative research. For example, information from respondents on their needs in regard to transport networks is important as it helps researchers to understand the critical components that require changes before any project is commenced.

The different qualitative techniques employed when gathering information for planners in the transport industry include interviews, focus groups, and observation and these are vital in filling the gaps left by quantitative approaches. The use of surveys in the process of planning and forecasting has several shortcomings, but often give relevant information that can be used in fulfilling the needs of quantitative research (Astalin, 2013). The decisions made from such surveys work when the issues are defined and the responses are being anticipated. The best part with surveys is that they give relevant questions that are restricted to a particular range to avoid unnecessary variables that quantitative research analysis might not require. However, the 'why' question is often hard to answer through such options because the questions are set in relation to the stated queries. Transport planners can use such information and get insights on how to frame their variables which leads to a multidisciplinary form of research. The qualitative analysis thus gives quantitative research more information which is then quantified into different metrics that can be used by planners in the transportation infrastructure paradigm.

Secondly, during data collection, qualitative methods use traditional approaches like telephone conversations where direct information is retrieved from the sample (Ikeda, 2009). Through this format, respondents can easily give direct information to the researchers or planners in the transport industry who will later incorporate it to the research where other parameters of measurements are used to bring about the required inferences. Those affected easily speak out, and with the direct communication, planners will know what is required hence fulfil their needs in the long-run. Low-income households, for example, are easily reached when

such techniques are used, and with the information collected the government is able to make changes to their needs in regard to the transport industry.

Moreover, such methods improve the interpretation and design of traditional methods of collecting data. For example, focus groups can easily decide the socio-demographic group to put in a survey, how to structure information, and the different incentives that can be used to ensure increased responses. After surveys, researchers through focus groups can easily explain the survey results to understand the implications of the results received (Mays & Pope, 2020). Therefore, qualitative techniques are superior and better at bringing to life the results of surveys to help planners understand what the different numbers found in the quantitative portion of research mean. This has made planners seek quantitative results when they need to understand the results found from undertaken research. The methods used in the qualitative analysis are now pertinent in the transport sector and helps in understanding the different challenges available in the area by looking at individual behaviour. The methods complement quantitative methods but always stand as modes of inquiry when used by planners in the industry.

### **Used as a Graphical Model/Representation**

Research has the aim of gathering data for analysis and interpretation. This is often the tenet of qualitative research but often goes further to offer graphical representations so that users of information can easily work on assumptions through graphs, charts, and usually descriptive in nature. The descriptive nature of the research makes it easy for users to understand the information hence giving them the opportunity to make inferences with ease (Davidson, Edwards, Jamieson & Weller, 2019). In regard to the transport infrastructure planning area of study, qualitative research offers policy-makers visual data which is easily interpreted leading to inferences and planning decisions. The use of such models allows for quick perusal and solutions to ensure completion of projects on time. Also, the information gathered can be interpreted by non-experts because of its representative nature.

The evolution of planning in the transport sector is known to have systems designed, and they are supposed to be efficient and useful not only to the planners but the end-users (Walta, et al., 2020). Usually, when planning is done, planners work towards ensuring that the expectations of the people are met, and they might include social equality, protection and spatial management. Being a linear process that leads to solving of problems, including evaluations, analyses and implementation quality analysis fulfils this gap by offering representations that are easily interpreted through objectivity. Optimal solutions can only be reached if clear paths are created, which enable developers to understand the needs of users and the budgets created for the projects. Through graphical representations, infrastructure developments are easily accomplished because the information provided is somehow easy to present to the designers and financiers.

The need for qualitative analysis in the transport industry cannot be overlooked. The process of planning in its entirety includes assessments of the potential benefits that can be accrued from projects, forecasts, and the creation of different solutions designed to bring about best solutions to the problems on the ground. It is vital to note that advanced planning programs were associated with the automobile transport where project heads were using maps and information from respondents to come up with variables and metrics that were analyzed to offer insights on the needs of the people. Project evaluations in the context of the industry and economic development has thus dominated research, hence the inclusion of qualitative studies as technologies that offer superior results to planners.

To understand the distribution of demand and production, geographical models are able to indicate traffic flow (Tonn, Kesan, Zhang & Czajkowski, 2019). Tonn et al, (2019) states that demand sensitivity is measured by looking at a distance relative to the need to travel, and this is accurately discussed under the gravitational model. Movement details can easily be read and interpreted when graphical representations and visualizations are provided, a function qualitative research fulfils in its entirety. Movement can also be described through laws of physics, and this is commonly borrowed from natural sciences. An example is the flow of water which in this sense is used to bring into context how traffic moves. With this notion, the representation is easy to use, when compared to mathematical applications that are commonly applied by quantitative analysis.

Travel aspects are often based on mobility, and this is a perception that can only be measured using macro-level parameters. This is a notion that is currently valid when considering the geographical nature of inhabitants and aids in explaining planning as an aspect that relates to people. Such characters have demanded in their niche, and with the right functions, planners can provide solid-based solutions to satisfy their needs. Homogenous models are no longer applicable and have been replaced by new forms of analyses which make use of non-movement mechanisms (Wheeldon & Faubert, 2009). Besides, the demand basis when considering the economic benefits accrued from different projects has expanded this phenomenon to include the levels of satisfaction on the part of users. Data sets in the form of graphic representations are, therefore, valid, and encompass the use of data, and decisions are made in respect to changing positions.

Overall, graphical representations through qualitative research help planners and decision-makers in the transport industry to compare different results through visualizations (Verweij, 2015). When results are compared it is easy for individuals to accept a particular decision or plan when compared to others because they are clearly represented without the need for deeper interpretations. When minimal analyses are provided leaders can place their efforts in discussing more concentrated segments, and this will ensure minimal time is taken to make the required decisions. Also, errors in such formations are minimal, and every member in the panel of decision-makers can easily provide insight because of the minimal mathematical and analytical formulations provided. In essence, qualitative forms of representation are easy to understand and offer insights that other methods provide, albeit on a different scale and degree.

## **Conclusion**

From the discussions, it is imperative to note that qualitative analysis is vital in the understanding phenomenon and can help transport infrastructure planners to come up with new models, frameworks and data which are generated from the population to make inferences on present and future effective projects. However, research in this area is not straightforward, it is, therefore, vital to justify why the method is being used in relation to the project aim. Planners are required to define the different stages used in the qualitative analysis before using the information on designing new infrastructural projects in the transport industry. Being a driver of the economy, the transport industry requires reliable information that can ensure minimal errors when projects are commenced to avoid hitches along the way. Overall, the information given by respondents, albeit descriptive, can aid in supporting new information paradigms that are already available to ensure concise and reliable data for project completion.

## Summary

Qualitative and quantitative decision-making methods offer a wide range of decision-making apparatus, which find their main use mainly in economic and managerial fields. Their applicability in spatially oriented sciences (geosciences) is very well known in connection with multicriteria analysis, less is used game theory, linear programming and others. Both the general global mathematical apparatus and their local variants are described in detail in the literature. Despite constantly improving information technologies and our own methodological procedures, rational decision-making is still difficult and obtaining a uniform result is thus unrealistic. The decision-making process itself, supported by information technologies, must therefore properly process both objective information from the external environment (existing data necessary for decision-making) and the subjective approaches (preferences) of decision-makers. While the subjective attitudes of decision-makers cannot be directly influenced, the processing of existing data into the required form suitable for decision-making can be set and objectified to some extent.

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## The municipal elections 2018 held in town Zvolen

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### Abstract

Zvolen is one of the oldest towns in Slovakia in its central part. Zvolen is situated on the confluence of Hron and Slatina river. The author puts emphasis in this article on the issue of the municipal policy and analyses the outcomes of electoral behaviour by residents in town Zvolen during the municipal elections 2018. In view of the election results author indicates the forecast of further development in Zvolen.

Keywords: Municipal Policy; Behaviour of electors; Elected representatives; Municipal council; Mayor

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### 1. Introduction

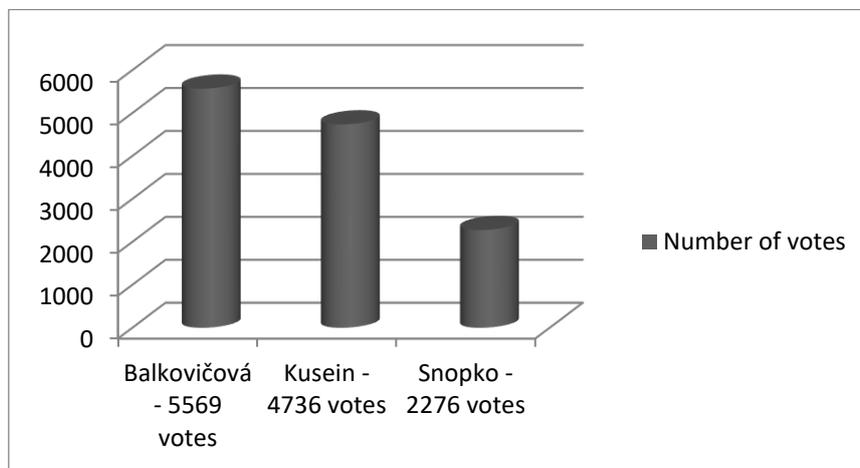
The municipal elections in the Slovak Republic for the election period 2018 - 2022 were announced by the decision of the President of the National Council of the Slovak Republic - the Act Law Nr. 2013/2018 Coll. The municipal elections held on 10 November 2018. The municipality and the regional municipality, called as Self-Governing Region, are independent territorial self-governing and administrative units of the Slovak Republic associating people with permanent residence in their territory (Article 64a of the Constitution of the Slovak Republic). Pursuant to Article 69 of the Constitution of the Slovak Republic the municipal authorities are the municipal council consisting of the deputies who are residing in the municipality and the mayor. The mayor is also a resident in the municipality. Deputies as well as the mayor of the municipality are elected by residents of the municipality on the basis of universal, equal and direct suffrage by secret ballot for four years. The municipal elections have one round. The members of the municipal council are those candidates who received the most valid votes in the constituency. The candidate with the most valid votes shall be elected as a mayor. In Slovakia the conditions for the right to vote and the organization of municipal elections are governed by Part 7 of Law Nr. 180/2014 Coll.

### 2. Initial facts

Zvolen is a district town in the Banská Bystrica region. On 1 January 2018 the town had 41 278 inhabitants (Zvolen.sk 2018). According to the number of the inhabitants, the town may have from 15 to 25 members of municipal council, because it is a town with more than 20 001

inhabitans and less than 50 000 inhabitans (§ 11 subpar. 3 h) of Law Nr. 369/1990 Coll.). Previous municipal elections for the election period 2014 - 2018 were held on 15 November 2014. Municipal elections 2018 for the election period 2018 - 2022 were held in Zvolen in a situation where the post of mayor of the town, as the highest executive body, was held by the economist - Ing. Lenka Balkovičová. Ing. Lenka Balkovičová has tried to get at the forefront of the town already in the municipal elections in 2010 with the support of political parties as The Slovak Democratic and Christian Union – Democratic Party (hereinafter referred to as SDKU – DS) and Freedom and Solidarity (hereinafter referred to as SAS). SDKÚ - DS has profiled itself as a centre-right liberal-conservative, christian-democratic political party and SAS has profiled itself as a liberal and eurosceptic political party. Ing. Lenka Balkovičová reached 28.7% of votes and lost the match with Ing. Miroslav Kusein who was the supporter of Direction-Social Democracy (hereinafter referred to as SMER-SD) and who achieved 51% of the votes (SME.sk 2010). SMER-SD is a social-democratic and a left-wing political party. A candidate for the mayor, Lenka Balkovičová, finally succeed in municipal elections in 2014 in which she stood as an independent candidate and received 5 569 votes. Her victory in 2014 ousted Ing. Miroslav Kusein, the acting mayor of Zvolen. The results which she achieved in municipal elections in 2014 defeated also Matej Snopko who was another independent candidate for the post of mayor of town and a deputy in the municipal council. Matej Snopko is well known in town Zvolen as an entrepreneur and former criminalist (ZVONLINE.sk 2014).

**Figure 1: The official results of the elections of mayor of Zvolen in 2014**



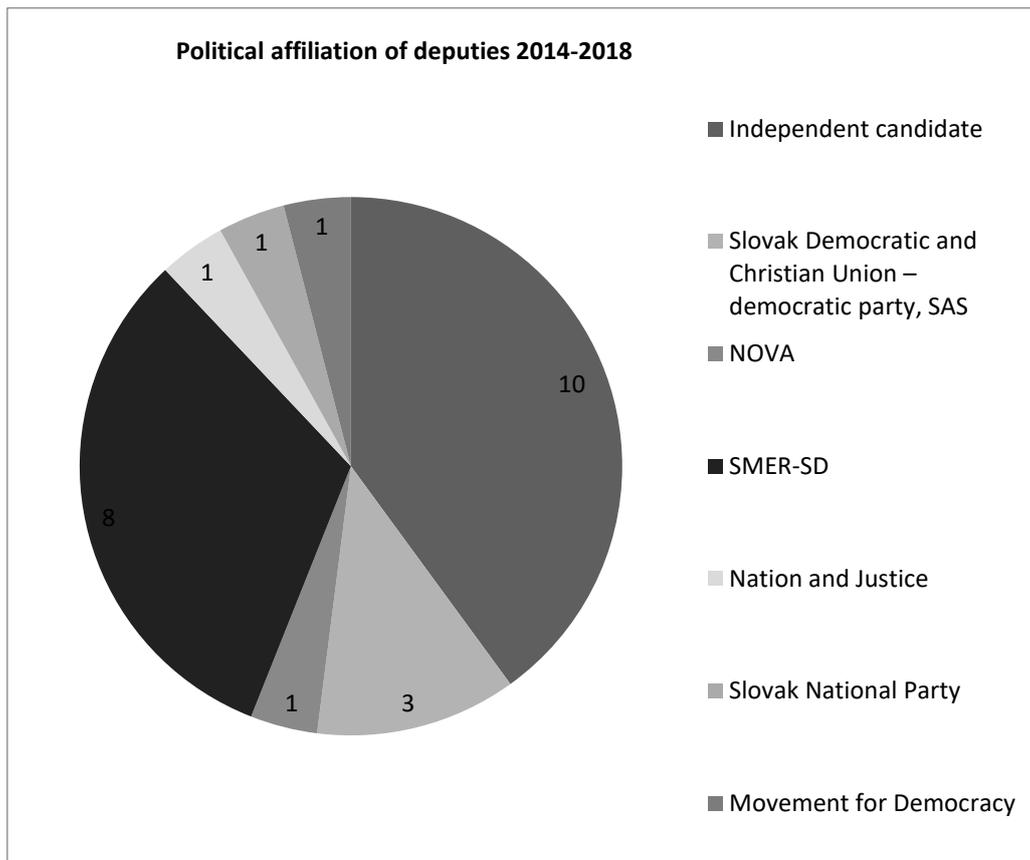
Source: Statistics Slovakia

### **2.1 Municipal Council of Zvolen in the electoral period 2014 - 2018**

For the favor of the voters in the six electoral districts of Zvolen were fighting in 2014 in municipal elections 115 candidates in relation to the 25 seats in municipal council. The constituencies in municipal elections in 2014 were as follows: the constituency Nr. 1 - Sekier, Záhonok, Lipovec, Môt'ová, Kráľ'ová, settlement Sekier with 6 deputies and 31 candidates, the constituency Nr. 2 - Zlatý Potok, Bakova Jama, Lukové, Zolná with 3 deputies and 16 candidates, the constituency Nr. 3 – Západ, Stráž with 7 deputies and 30 candidates, the constituency Nr. 5 – central city zone East with 3 deputies and 12 candidates, the constituency Nr. 6 - central city zone West with 5 deputies and 21 candidates (ZVONLINE.sk 2014). Voter

turnout was 35.99 %. The municipal elections in 2014 reached 12 796 participants from the total number 35 548 of registered voters (Statistics Slovakia). Of the 25 deputies in the municipal council, 40% were independent candidates, 32% were for the political party SMER – SD, 12% were for the political party Slovak Democratic and Christian Union – democratic party, SAS, 4% were for the political party NOVA, 4% were for the political party Nation and Justice, 4% were for the political party Slovak National Party and 4% for the Movement for Democracy.

**Figure 2: Political affiliation of deputies - starting point**



Source: zvonline

## 2.2 Some investments in town Zvolen during electoral period 2014 - 2018

The constituency Nr. 1 - Sekier, Záhonok, Lipovec, Môťová, Kráľová, Sekier Valley:

- repair of 2 km road to Môťová dam, installation of solar lamps, revitalization of dump at Môťová dam, reconstruction of pavement, construction of interconnecting pavement, reconstruction of kindergarten, construction of parking places near the cemetery.

The constituency Nr. 2 - Zlatý Potok, Bakova Jama, Lukové, Zolná:

- construction of a fitness field in nature, climbing walls, pavement repair.

The constituency Nr. 3 - Západ, Stráž:

- reconstruction of the courtyard, revitalization of the sandpit, building a playground for teenagers, reconstruction of streets, construction of parking places, revitalization of the former kindergarten, revitalization of selected roads and pavements, revitalization of barrier-free playground, construction of half underground waste containers, construction of 20 parking places.

The constituency Nr. 4 - Podborová, Borová hora:

- return the area of Borová hora to the town's property.

The constituency Nr. 5 - Central city zone East:

- construction and reconstruction of pedestrian paths, change in the transport system, an increase of parking places, modernising of inside areas, construction of the playing structures in the garden of a leisure centre Domino, open negotiations with Slovak railways on the obtaining the cultural house into the property of town.

The constituency Nr. 6 – Central city zone West:

- revitalisation of the primary school site at Hrnčiarska street, the renovation of the nursery school, renovation of the road with the location of ambulance service in town, the revitalisation of the inner courtyards, updating of public street lighting system, construction of containers for untreated mixed municipal waste.

### **3. Preparation for elections and an election campaign 2018**

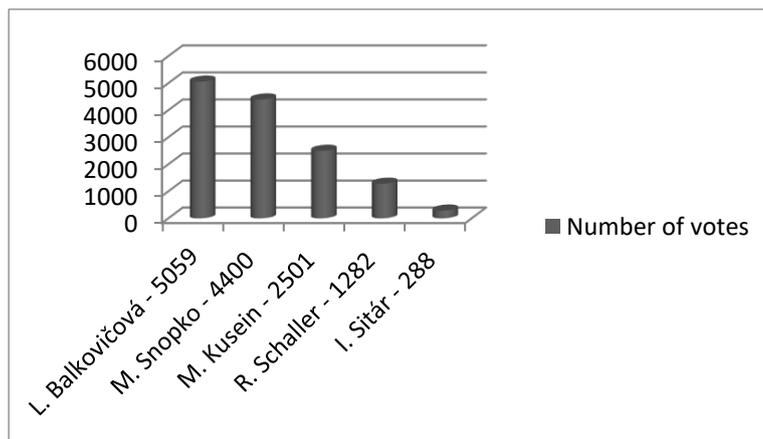
The election campaign before municipal elections in 2018 was run by personal meetings of candidates with the citizens of town Zvolen as well as by facebook. Promotional posters, billboards, banners, leaflets, newspapers and other printed matters and media were design for the municipal elections 2018 in town Zvolen. The planned candidate's debate for the post of mayor in town Zvolen was during the election campaign repealed. Pre-election debate didn't take place. Ing. Roland Schaller, the candidate for the post of mayor and the director of the Sliach airport, argued the bias of the presenter of the show as well as the range of selected topics for discussion. He perceived that it was a part of the Lenka Balkovičová's campaign as a re-candidate for the post of mayor of Zvolen (MARTIN24). Matej Snopko as the candidate for the post of mayor was also unable to escape the negative media campaign because of his lawsuit at the district court. During the campaign the candidates for the post of mayor also answered questions sent by residents of Zvolen to the discussion forum (MY Zvolen). There was also a TV debate broadcast by Central Slovak Television. All five candidates were invited to participate in the TV debate "Municipal Elections 2018" but only two of them, Matej Snopko and Miroslav Kusein, involved to debate. Lenka Balkovičová declined an invitation to attend the TV debate and Ivan Sitár and Roland Schaller apologised for not attending the TV debate.

### **4. The results of the municipal elections 2018 and interpretation**

In the municipal elections 2018 were participated 13 693 voters from 35 067 of eligible registered voters. Voters cast 13 341 valid ballot papers (Urad.zvolen.sk). The turnout in Zvolen in municipal elections in 2018 was higher than in municipal elections in 2014 and reached 39.04%. Despite the increase in voter turnout compared to year 2014, it did not reach the turnout as in year 2010 when 47.38% of voters came to the polling stations (Statistic Slovakia). There

was an increase in the number of candidates for the post of the mayor compared to 2014. In 2014, three candidates applied for the post of the mayor of Zvolen. There were five candidates in 2018 for the post of the mayor of Zvolen – Ing. Lenka Balkovičová, Ing. Miroslav Kusein, Matej Snopko, Ing. Roland Schaller and Ivan Sitár with the support by political party – Kotleba People’s party our Slovakia.

**Figure 3: The official results of the municipal elections 2018 in town Zvolen**



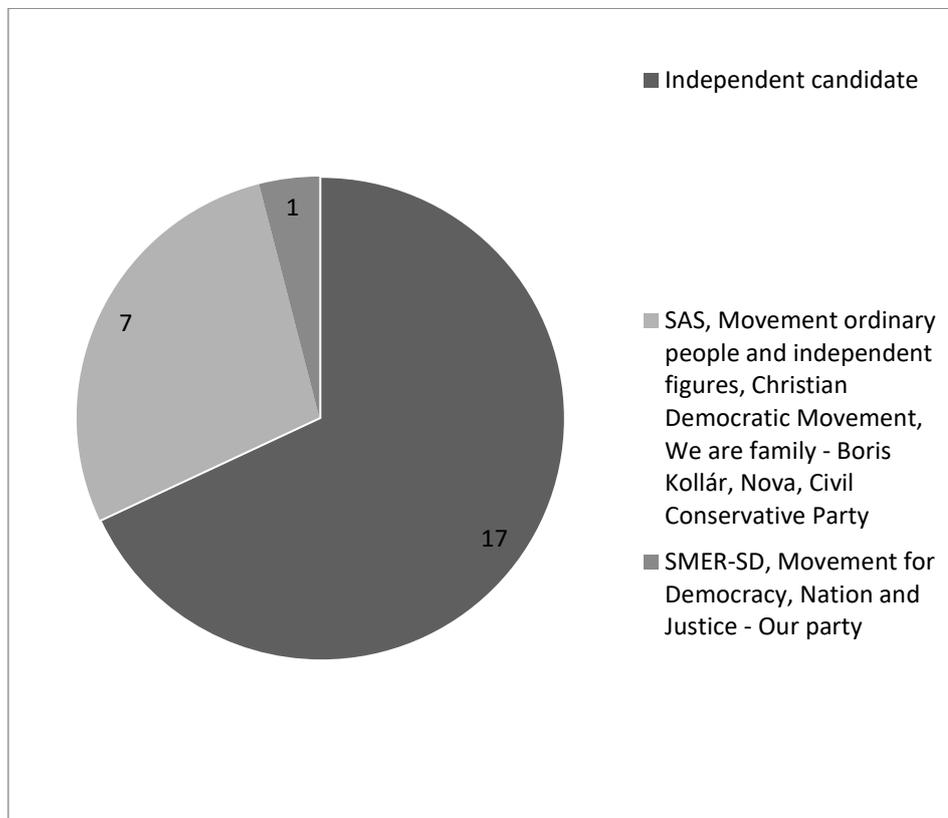
Source: Statistics Slovakia

Mayor, Ing. Lenka Balkovičová, defended her mandate in municipal elections 2018 and reached 5059 votes. Matej Snopko, the member of municipal and regional council, the face of initiative with name “Zvolen for people” and the biggest competitor of Lenka Balkovičová reached 4400 votes. Matej Snopko’s results in municipal elections in 2018 were much better than in 2014. He was only 659 votes away from reaching the post of mayor of Zvolen.

#### **4.1 The municipality of Zvolen in the electoral period 2018 - 2022**

There were ninetyeight candidates for six constituencies who were competing for the voters on 10 November 2018 in relation to seats in municipal council. The number of candidates decreased compared to year 2014 (Roháček 2014). Eleven municipal councillors in the legislative term 2014 – 2018 defended their positions in municipal elections 2018 and they stay on the benches in the municipal council of Zvolen another four years.

**Figure 4: Political affiliations of municipal councillors in Zvolen (2018 – 2022)**



Source: Report with the results of the municipal elections 2018

The municipal council of Zvolen has 25 deputies. After municipal elections 2018 in the municipal council are 68% independent candidates, which is an increase of 28 % on the year 2014. With the support of a coalition of right-wing parties ran 28% of candidates. SMER-SD reached 4 % in the municipal council of Zvolen. At present the municipal council has 22 men and 3 women. In spite of the fact that there has been an increase in independent candidates in our opinion, the uniqueness of the "independence" of the candidate disappears. Regard to previous political party affiliation of candidates we may have justifiable doubts about their independence. While Ing. Miroslav Kusein in previous periods openly proclaimed collaboration with SMER SD, he stand in municipal elections 2018 as the independent candidate. It can be doubted whether Ing. Miroslav Kusein was really independent and not a political candidate in municipal elections 2018.

#### **4.2 Interpretation of the results of the municipal elections 2018**

The final results of the municipal elections in Zvolen validated the long-term trend of the popularity of independent candidates. This trend is extended in many other towns in Slovakia not just in Zvolen. The number of non-attached members of the municipal council in Zvolen in 2018 has increased by 4,47% compared to year 2014 and it's a further upward trend. The fact that there is the upward trend of the independent candidates has shown that the behaviour of the voters is less determined by the candidate's political affiliation. This might be

caused by the fact that the policy and the politicians are perceived by voters in Slovakia as unreliable.

**Table 1: The number and percentage of non-attached elected mayors and members of municipal councils in Slovakia in 2018, 2014, 2010, 2006**

Election year	2018	2014	2010	2006
The number of non-attached mayors	1232	1104	979	895
Percentage	42.42 %	37.95 %	33.67 %	30.83 %
The number of non-attached members of municipal council	7301	6000	4764	3638
Percentage	35.36 %	28.91 %	22.66 %	17.10 %

Source: Statistics Slovakia

The difference between the elected mayor Lenka Balkovičová and Matej Snopko, as the second most successful candidate for the post of mayor of Zvolen, was 659 votes. However Lenka Balkovičová defended the post of mayor of Zvolen, it became evident that many people in Zvolen want change in a further direction of town. The most progressive alternative to the policy of re-elected mayor was citizens' initiative "Zvolen for people" with the leader Matej Snopko. The citizens' initiative won 12 of 25 seats in municipal council (Roháček 2018). Another seven seats in municipal council in Zvolen won initiative „Together for Zvolen“. The initiative "Together for Zvolen" was a supporter of Lenka Balkovičová. Ing. Lenka Balkovičová has campaigned with the wish to finalise on-going projects and plans in a further four-year period. Five other elected candidates for the post of municipal councillors of Zvolen ran in the municipal elections as independents or supported by a coalition of right-wing parties. One candidate for the post of municipal councillor of Zvolen ran with support of these political parties: SMER-SD, Movement for Democracy, Nation and Justice – Our party. According to the results of municipal elections it can be stated that in the municipal council will be more candidates who have been candidates supported by the coalition of right-wing parties than candidates with the support of left-wing parties.

## 5. The projection

The projection of the further development of Zvolen in the period 2018 - 2022 is that the mayor Ing. Lenka Balkovičová will continue her activities. Development of the town for period 2014 - 2020 was already declared in Action Plan and included several activities. According to the overview of fulfillment of the Program of development of the town in the period 2014 - 2017, the town has not carried out several attractive activities yet. The fulfillment was 23.81 % in 2017 (Development Program of the City of Zvolen 2018). Re-elected mayor of Zvolen announced within election campaign that in the next four years several large projects will be realized in Zvolen. Her priority activities in the period 2018 - 2022 are:

- realization of sports and recreational complex in Bariny,
- renewal of the surroundings of the railway station in Zvolen according to the prepared study,

- reconstruction of the square and Park of Ľudovít Štúr in front of the shopping centre,
- repair of school yards,
- reconstruction of the surroundings in front of the primary school in the city centre,
- settlement of ownership over land and reconstruction of the rest of the road to the dam,
- construction of roundabout at the entrance to the town from Banská Bystrica,
- improving parking situation and construction of a new parking house in town,
- the northern road bypass of the town of Zvolen.

It is assumed that the re-elected mayor will find sufficient support among the municipal councillors in Zvolen for the implementation of several mentioned activities. Several of these activities are the same with the goals of those who did not support Ing. Lenka Balkovičová during municipal elections, but they are interested in solving these issues. Re-elected mayor announced in relation to some of the identified activities the financial funds and support. However, there are also problems and issues in relation to which were visible diametrically different proposals for solutions by the initiative "Zvolen for People" during the previous period 2014 – 2018. The biggest argues were related in financial means for the reconstruction of the existing swimming pool in Zvolen. The issue was also the revitalization of the swimming pool "Neresnica" and the proposal for the construction of a brand new swimming pool. The initiative "Zvolen for People" clearly supports the revitalization of the already existing swimming pool "Neresnica" when a petition among the citizens was launched to save this swimming pool (Petície.com). The previous management of the town has been accused of not supporting the mentioned swimming pool by enough financial funds. The intention to invest into to the construction of a brand new swimming pool instead of maintaining the functionality of the existing swimming pool "Neresnica" was also considered by initiative "Zvolen for People" as illogical. Many residents of Zvolen share the view of this initiative in the sense that it is more effective to reconstruct the existing buildings in the town instead of building a brand new complex and funding long-term mortgage or using the reserve (Samosprava.zvolen.sk 2018).

According to our projection the differences of opinion will cover the issue of dam in the constituency Nr. 1. because many citizens in relation to dam call for creating the zone for relax and recreation. This issue was concluded by previous municipality of Zvolen in period 2014 - 2018 without visible results and with statement that the dam is run by management of river and not by the town and that the land surrounding belongs to private persons. According to these arguments we can indetify that an initiative in the direction of overcoming the mentioned barriers by re-elected mayor seems to be unrealistic and unwilling. The initiative "Zvolen for People" takes the opposite view to this issue and has intention to realize a recreational zone (Zvolenpreludi.sk 2018). The problem is also creation of enviromentally friendly urban public transport in town due to resignation of using compressed natural gas by the current bus operator.

## 6. The conclusion

Nearly half of the seats in the municipal council of Zvolen were filled in municipal elections 2018 by candidates supported by initiative "Zvolen for People". Initiative "Zvolen for

People” is a strong promoter of Matej Snopko who is the biggest critic of the re-elected mayor of Zvolen. According to the results of the municipal elections 2018, we indicated serious and growing interest of the inhabitants of the town in change. The citizens of Zvolen expressed during the municipal elections 2018 their sympathy for independent candidates. The credibility of political parties is decreasing in general. The abovementioned trend is all over the Slovak republic not just in Zvolen. The results of the municipal elections 2018 in Zvolen showed that there is a strong polarity among the inhabitants of Zvolen in the field of setting priorities related to the further running and strategic development of the town. The re-elected mayor will try to find a support for the implementation of some activities which were set by her or started in the previous period in the ranks of the municipal councillors. We assume that the re-elected mayor will find supporters for many of these activities among the independent municipal councillors and others who were supported by initiative “Zvolen for People”. The reason is that some of these activities were included in their election programmes. On the other hand, it is probable that there will continue argues and differences in determining future strategic development of the town. Initiative “Zvolen for People” has a chance of succeeding in the adoption of some proposals from its election programme.

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## Perception of eHealth tools implementation – the experience from the Czech regions

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### Abstract

The paper is embedded into the issue of electronization of healthcare in the Czech Republic, specifically on implementation of particular electronic instruments – e-prescription and e-sick certificate that should make the Czech healthcare system more fluent, transparent and effective. The research is oriented on realization and evaluation of questionnaire survey that was realized between practitioners of Jihomoravský, Zlínský and Olomoucký regions of the Czech Republic. Provided findings could be used by professional healthcare as well as the political representation.

*Keywords: Electronization, Healthcare, the Czech Republic, questionnaire survey*

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### 1. Introduction

The paper is embedded into the issue of electronization of healthcare in the Czech Republic. The primary focus is oriented on two tools of electronic healthcare (eHealth), e-prescription and e-sick certificate. The first tool was implemented into the praxis of the Czech healthcare providing in 2018; the second was implemented in 2020. Implementation of both tools is inseparable from daily work of practitioners. Regarding this, the questionnaire survey was realized between these subjects to find out, how they evaluate the positives and negatives, respectively the process of implementation and using of electronic tools itself.

The total amount of 353 questionnaires was included into the research. The practitioners of Jihomoravský, Zlínský and Olomoucký regions of the Czech Republic were addressed, according to the interest area of authors. The questionnaire survey was realized in December 2019 and January 2020. The results of survey was analysed using the instruments of descriptive and comparative statistics.

The paper is structured as follows:

- The second chapter provides basic theoretical fundamentals of the issues of eHealth and electronic tools implemented into the healthcare praxis.
- The third chapter introduces applied methodology.
- The fourth chapter summarizes the main findings of the questionnaire survey.
- The final part concludes.

## 2. Theoretical background

This section is dedicated to some theoretical fundamentals of healthcare electronization (eHealth in other words). eHealth can be perceived as developing sector between healthcare informatics, public healthcare and entrepreneurship that is embedded into healthcare service and information shared and enhanced through internet and ICT technologies (according to Ministry of healthcare, 2015, similarly also Kwankam, 2004). More globally, eHealth includes also way of thinking, opinions and attitudes of society, aiming on better, more effective healthcare providing using ICT (Ministry of healthcare, 2015). Process of electronization in healthcare is a part of global phenomenon affecting the whole economy and society, when using of ICT and electronic tools is connected with daily life and activities of people in all areas (e.g. Wickramasinghe et al., 2005; Sebetci and Cetin, 2016). Here we can, however, distinguish between so-called developed and developing world – in the first case, the ICT tools are usually used and enhanced to more sophisticated forms; in the second case, the main aim is to build sufficient ICT infrastructure and provide basic electronic services to most population (Kwankam, 2004, Wickramasinghe et al., 2005; Sebetci and Cetin, 2016).

eHealth is primarily based on interaction of various players (e.g. patients, practitioners, healthcare providers and workers etc., like introduced by Ministry of healthcare, 2015). According to Löhr, Sadeghi and Winandy (2010), Wickramasinghe et al. (2005), Kierkegaard (2013), Sebetci and Cetin (2016) or Mair et al. (2007), modern ICT technologies are in healthcare used with increasing intensity, but this intensity is still lagging compared to other sectors of economy (e.g. Parente, 2000 links this fact to its public-sector character). The main objective of electronization in healthcare is cost reduction, leaning of processes and agendas, reducing of personal costs and time savings (Parente, 2000; AbuKhoua, Mohamend and Al-Jaroodi, 2012; Dhavle and Rupp, 2015; Tan et al., 2009; Mair et al., 2007, or Šoltés et al., 2015).

Electronic tools in healthcare, that are the core object of this paper, includes various instruments in various forms – databases, registries, devices (e.g. in tele-medicine), communication technologies, tools for healthcare agendas generating etc. (AbuKhoua, Mohamend and Al-Jaroodi, 2012; Kwankam, 2004; Löhr, Sadeghi and Winandy, 2010). Effective and fluent implementation of electronic tools suggests, according to Dhavle and Rupp (2015), among other education of users, friendly and intuitive user interface, continuous evaluation and monitoring, strategic approach and political support. Very important is also the task of cybernetic safety and data protection (e.g. Löhr, Sadeghi and Winandy, 2010 or Mair et al., 2007). Quality and effectivity in using electronic tools is relatively complicated, on the other hand, Tan et al. (2009) or Sebetci and Cetin (2016) point at users' satisfaction to be one of the useful indicators in this regard.

In this paper, attention is paid about two specific electronic tools – e-prescription and e-sick certificate.

Using of e-prescriptions is one of the strategic areas of healthcare policy of the European Union (Kierkegaard, 2013), although it still exist several problems in this regard (e.g. inter-connectivity and compatibility of systems between states, legislative differences, different importance perception and political support etc.). Nevertheless, Kierkegaard (2013), Dhavle and Rupp (2015), Sebetci and Cetin (2016) or Tan et al. (2009) stress advantages e-prescription, like the possibility of sending precise, mistake less and understandable information from practitioner directly to pharmacy; minimization of illegal drug misusing; minimization of mistakes in drug issuing; increased control of using of drugs, contraindications etc.

Working-disability is perceived to be one of costly problems of economy (Gabbay, 2010). Regarding this, electronic tools grasping this agenda can be one part of solution for

minimizing costs related to working disability for all actors (employers, allowances providers, practitioners of employees). E-sick certificate could contribute to better control of misusing of working-disability and also brings cost- and time-savings for employers, employees or public sector organizations (see Mair et al., 2007 for comprehensive overview of benefits and risks).

Using of e-prescription and e-sick certificate is mandatory, based on acts no. 378/2007, no. 259/2017 and no. 164/2019. In case of e- prescription, the whole project is evaluated to be successful and beneficiary. The e-sick certificate was introduced at the beginning of the year 2020, so it is too early to postulate relevant judgements.

### **3. Methodology**

The prior objective of this paper is to realize and evaluate the questionnaire survey between practitioners, who use electronic tools e-prescription and e-sick certificate, and reveal their opinions and attitudes to electronization of healthcare in the Czech Republic. The assumption in this regard is, that most respondents perceived electronization of healthcare to be beneficiary in general, but the way of its implementation and practical using of electronic tools is evaluated with rather negative accent and prejudices.

The survey was realized on sample of 353 respondents – practitioners of Jihomoravský, Zlínský and Olomoucký region of the Czech Republic (addressed was 580 subjects, so there is 61% return rate, that provides us with relatively satisfactory research sample). Answers were collected in December 2019 and January 2020. Respondents were address via e-mail. The structure of questionnaire consists of (1) closed questions, when respondents choose one answer or choose the answer on the scale, (2) and final open question to give respondents the possibility to express their ideas and comments about electronization of healthcare and electronic tools implementation. For evaluation of results, tools of descriptive and comparative statistics were employed. The evaluation was realized for a total sample, and also between particular socio-demographic groups (according to region, gender and age). Answers given to final open question were executed by synthesis of findings into summarizing postulate.

The results of survey were visualized into graphs and tables.

### **4. Questionnaire survey**

In this section are introduced the main findings revealed about opinions and attitudes of practitioners about electronization of healthcare and using electronic tools of e-prescription and e-sick certificate in the Czech Republic.

Table 1 provides basic socio-demographic characteristics of respondents according to region, gender and age. Research participated rather majority of men; the most respondents practise in Jihomoravský region; and finally it is obvious, that the majority of respondents is in older than 45 years of age. The last fact could be important in relationship to the evaluation of healthcare electronization (older population is more likely to refuse modern technologies and have negative attitudes to electronic tools and technologies in general).

Evaluating the perception of term electronization of healthcare, almost 80 % of respondents seem to have the correct information and clear perception of the meaning of the term. Rather misrepresented perception of the term have mostly respondents in higher age groups.

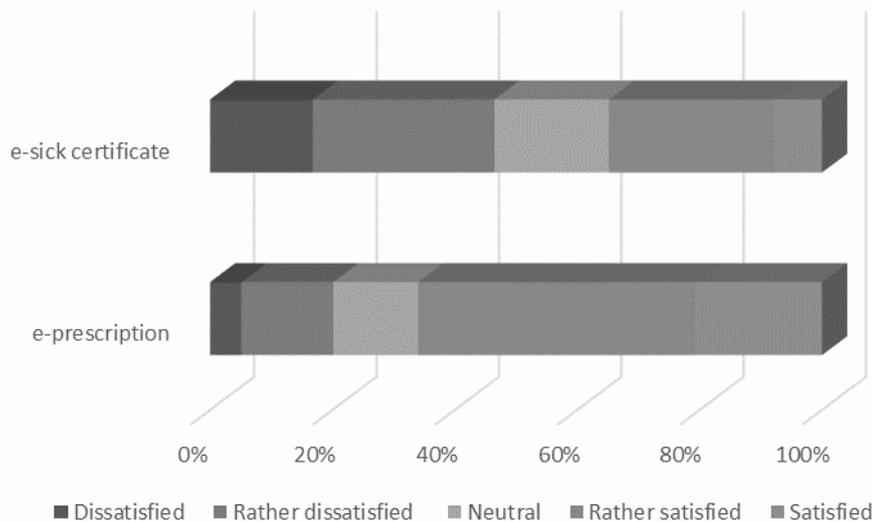
**Table 1: Socio-demographic characteristics of respondents**

Gender			
Male		Female	
168 (52.4 %)		185 (47.6 %)	
Region of praxis			
Jihomoravský	Olomoucký	Zlínský	
145 (41.1 %)	122 (34.6 %)	86 (24.3 %)	
Age			
Under 35	36 to 45	45 to 60	More than 60
53 (15 %)	99 (28 %)	137 (39 %)	64 (18 %)

Source: own research

The next set of questions was oriented on respondents' satisfaction with functions and using of electronic tools e-prescription and e-sick certificate. Most of respondents are rather satisfied with e-prescription but rather dissatisfied with e-sick certificate (see figure 1). The results could be nevertheless biased because of current implementation of e-sick certificate into praxis and practitioners are going through adaptation process. Differences were revealed in case of various age groups of respondents. Thus, younger of them perceive the electronic tools and their using more positively compared to the older colleagues. Comparing men and women, men assess the electronic tools relatively more positively.

**Figure 1: Satisfaction of respondents with functions and using of electronic tools**

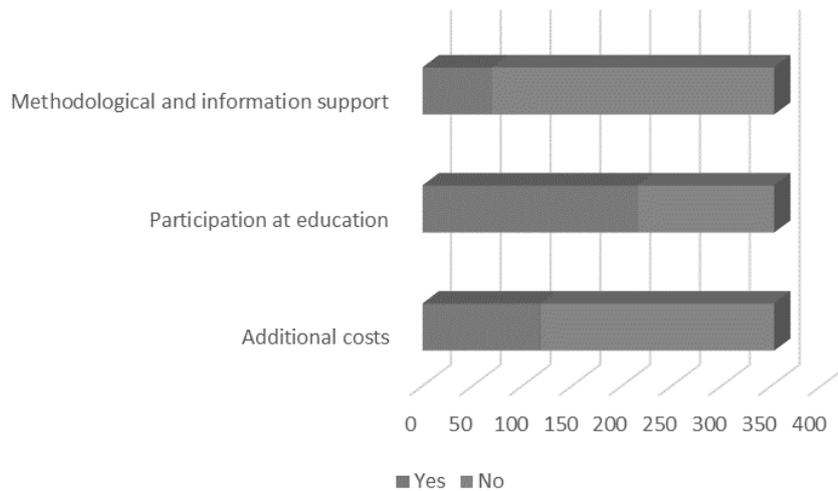


Source: own research

The next set of questions aims on implementation process and its preparation (methodical support, information providing, attendance of respondents on educational actions and emerging of additional economic costs related to electronic tools implementation). Results are summarized in figure 2. Strongly negatively is evaluated especially methodological support during implementing of tools and also information providing. Interest of respondents in obtaining information is obvious in their relatively high participation rate at various educational

actions connected with implementation of electronic tools. Communication and possibility of participation in the process of preparation of electronic tools themselves was evaluated to be poor and insufficient. On the other hand, there was indicated also relatively low participation of respondents in discussion forums or healthcare symposiums or similar actions (not explicitly connected with the issue of electronic tools).

**Figure 2: Implementation and preparation of electronic tools**

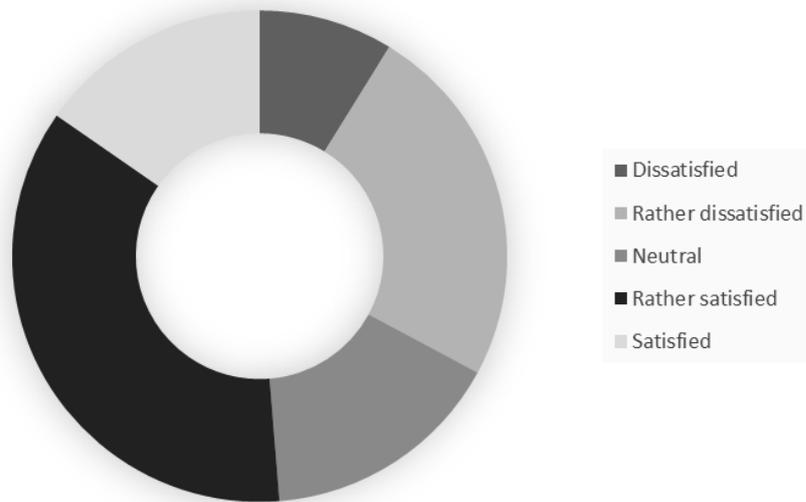


Source: own research

The next question (see figure 3) of the questionnaire was embedded into current evaluation of start of using e-sick certificate (since January 2020). Most of the respondents indicated relatively positive evaluation. Regarding the comments given in final open question, lots of respondents understand this time as adaptation process and believe, that prospective problems are going to be solved in few months. Thus the future of e-sick certificate using is evaluated to be positive and beneficiary. Higher share of negative answer connected with e-sick certificate evaluation is present in case of older respondents and in male group.

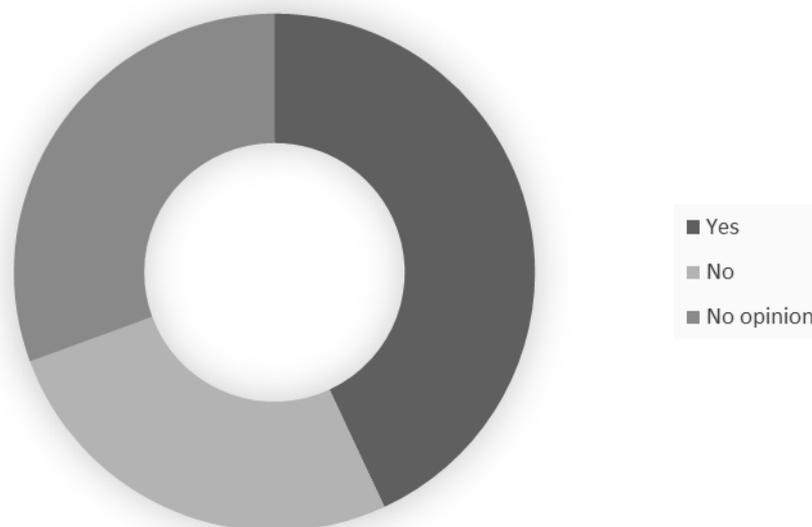
The last, closed, question was oriented on overall assessment of electronization in healthcare (figure 4). Almost half of respondents agree with positive impact of electronization in healthcare, among other on leaning processes, information sharing, more fluent and quicker communication, economic savings etc. Actual implementation is nevertheless usually assessed to be problematic and un-systematic. Nearly 30 % of respondents is sceptic about electronization process. As already mentioned, younger respondents tend to assess the electronization in healthcare more positively compared to older ones.

**Figure 3: Evaluation of using e-sick certificate**



Source: own research

**Figure 4: Evaluation of electronization in healthcare**



Source: own research

#### **4. Conclusions**

Based on the results of questionnaire survey, it is possible to summarize following findings:

- The main weak point of electronization in healthcare is lack of communication. This is true either for electronic tools designing and preparation, either for implementation. Information tend to be insufficient, late and irrelevant in relationship to needs of users.

- Typical feature of implementing new electronic tools is traditionally defending approach of actors. This approach, connected with prejudices and uncertainty, is nevertheless usually overcome during the first months of using of tools.
- Especially for older users of electronic tools it was identified the need of intensification of present educational actions. For all users it would be useful to create more e-learning materials, tutorials, videos and similar support.
- Lots of respondents indicate, that the future of electronization in healthcare is embedded into the issue and development of telemedicine and its specific tools. In this regard, substitution of face-to-face contact with patients by using distance communication and ICT technologies is preferred.
- There should be further enhance information sharing and inter-connectivity of systems, databases and registries, not only in the Czech Republic but also from international viewpoint.
- Commonly agreed is idea about allocation of bigger amount of money in electronization of healthcare. On the other hand, there are preferred savings related to administration and bureaucracy or ineffective and uneconomic healthcare facilities.
- There could be indicated the interest of practitioners in research or pilot projects participation on regional, national and international level.
- Generally, there persist relatively positive opinion about healthcare electronization.

For further research, it is possible to recommend extension of research sample (in the way of number and types of respondents and also in the way of other regions inclusion). The evaluation could be appended by further analytical data exploitation (facing the problem of availability). Inspiration about electronization processes can be found in abroad good, but also bad, praxis examples, in other branches of public and private sector. Especially in commercial sector, the electronization processes and ICT technologies utilization are far ahead of public one. Regardless particular negative findings and opinions about electronization processes in healthcare in the Czech Republic, the future of electronization seems to be positive and challenging.

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# **Risk factors of the current crisis management of the euro area and their impact on the economic development of the European Union**

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## **Abstract**

The article deals with the contemporary development of the European Monetary Union (euro area) with a focus on its key problems and ways of their solution. Its aim is to assess the meaningfulness of the 'Eurozone' project, including the gradual introduction of the single European currency into other countries and the consequences it causes. The first part of the paper describes the emergence and initial development of the European Union and the adoption of the European common currency, including the initial consequences that caused it. Subsequently, the methods and effectiveness of macroeconomic regulation of the European Central Bank in the following stages of crisis and so-called "post-crisis" development are analyzed, focusing on specifically used ECB monetary policy instruments and achieved results. And then the current economic situation in which the euro area and the European Union are currently being situated is analyzed. The penultimate part then evaluates the primary and secondary impacts of the use of the single European currency on economic development in the euro area, as well as the impacts of the current monetary management method of the European Central Bank. The very conclusion of the paper deals with the evaluation of benefits, respectively the results of the use of the single European currency, both in the euro area and throughout the European Union.

*Keywords: eurozone; monetary regulation; European central bank; crises factors; euro*

## **1. Introduction**

The spring of 2019 witnessed the celebration of the twentieth anniversary of the existence of the European Monetary Union (euro area), which marks the twenty years of the use of the single European currency "the euro". Although the European Commission President Jean-Claude Juncker said in his speech that "the single European currency has brought prosperity, has become a symbol of unity, sovereignty and stability and has provided protection for citizens", he has not convinced anyone. His speech only reminded the parties that twenty years ago the Maastricht Treaty had brought a structural transition from cooperation of the then sovereign European nation states to the creation of a separate, transnational political entity with its own powers transferred from the national level. The European Community has become a

European Union, and adopted the common currency, and thus a common transnational monetary policy has become a practical tool for the realization of a transnational European superstate which - irrespective of its final formal form and name - had (and has) historically the function to replace the sovereign states. This is where conflicts between supporters and critics of the functioning of the euro area comes from. While we find countless economic arguments and data damning the euro for huge costs and systemic defects, its proponents are deaf to them. For them, it is not an economic project, but a political project (Skopeček 2019).

The current problems of the European Union (and of the euro area in particular) have not arisen by themselves, but are the result of a number of causes which arose by people's misconduct (or purely purposeful acting). Therefore, in order to identify and properly evaluate these causes, it is necessary to analyze the issue in the most complex and systemic context. This implies that it is not only the financing or the economy that needs to be addressed, but also other, in particular political, factors that are also significantly related to the current problems of the European Union

## **2. Origin and future development of the European Union and Europe**

The European Union was formally established by the signing of the Maastricht Treaty in February 1992. It set out the principles for moving towards the common currency and agreed a timetable to set 1 January 1999 as the latest date for the creation of a monetary union. Convergence criteria were also formulated, in other words the fulfillment which was supposed to be binding for participation in the monetary union, and the institutional design of the euro area, headed by the newly established European Central Bank (ECB), whose primary mission was to maintain price stability. The ECB took up its responsibilities in June 1998 and presented its monetary strategy in October 1998. Subsequently, on the 1st January 1999, a cashless euro was introduced in the first 11 countries, with banknotes and coins introduced three years later on the 1st January 2002.

As the Governor of the Czech National Bank Miroslav Singer (2012) stated, the first decade of the euro seemed to be a functional and successful project. Monetary integration progressed at a fast pace, loans flowed across borders in rising volumes, interest rates converged, the euro stimulated growth in trade, and the southern wing countries grew rapidly.

Since it was clear that the changeover to the single currency will lead the individual states to lose, respectively their central banks to lose the possibility of pursuing their own monetary policy, there was a concern that economically weaker countries would not generate large public budget deficits. Therefore, in 1997 the EU member states adopted a common coordination mechanism "Stability and growth pact" (SGP) to avoid fiscal undisciplined action. It specified how the budgetary policies of the member states of the European Union would be coordinated, and made a binding commitment that the medium-term budgetary objective (MTO) was to be balanced and an Excessive deficit procedure (EDP) could be implemented with countries that violated it. On the other hand, however, it did not deal with ways of dealing with financial crises, respectively procedures to assist governments in default and not even address any exit from the euro area.

However, the belief that euro-area membership would lead individual member states to greater discipline in their economic policies proved to be an illusion, and as early as 2002, when the European Commission proposed to penalize France and Germany for excessive deficits, these strongest states pushed for no sanctions to be imposed on them and, moreover, since 2005 the originally agreed rules were softened.

From the findings of Singer (2012), Zahradník (2005), Prušvice (2010) and Rejnuš (2015), it can be concluded that the main shortcomings of the initial development of the euro area were as follows:

- The euro area was not an optimal currency area at the time of its inception or later due to differences in competitiveness between member states.
- Weaker economies that offered higher interest yields were raising capital, but only at the cost of higher risk, which creditors' banks have long ignored, assuming that EU leadership will resolve the situation. This implies that the euro area did not bring about an improvement in capital allocation, rather the contrary.
- Easy access to low-cost credit encouraged rapid growth in private and public spending, creating current account deficits.
- Capital inflows and low real interest rates in countries with higher inflation have caused their economies to overheat.
- Most euro area countries did not use the initial economic growth to consolidate public finances, ie. to reduce structural deficits and debt.
- Eurozone rules were not respected.
- The EU political elites (including the ECB) have long downplayed the problems and, instead of real solutions, only adopted operational measures, suitable only for the so-called "time buying".

As a result, in the European Union, the economically strongest Germany was gaining increasingly their price competitiveness thanks to the single European currency (which could not weaken against the currencies of the weaker countries), and the current account deficits of southern European countries were increasingly offset by Germany's current account surpluses. However, this further weakened the weaker economies, obscuring structural differences between countries, insufficient fiscal discipline, as well as weaknesses in the institutional framework. Worst of all, it turned out that, unlike small states that are obliged to comply with the rules in force, large states can violate them with impunity.

### **3. Analysis of the single monetary management of the euro area**

The existence of the euro must be stressed when analyzing the ways of managing the European Union. This is because the European Union is not a unified whole, but an economic community of many states that are gradually creating a monetary union. And the functionality, or vice versa, of the majority of the system using the European single currency has a decisive impact on the development of the European Community as a whole.

#### ***3.1 Analysis of euro area management at the height of the financial crisis (2009-2010)***

The first significant examination of the functioning of the euro area was the beginning (peak phase) of the global financial crisis, which originated in 2008. Although its emergence can be seen as a result of the development of the US economy in particular, its effects were global. Nor did they avoid the European Union, with each Member State affected differently. As the former Governor of the Czech National Bank (Singer 2012) states, the problems of individual EU member states were the result of their past management. Some countries "lived above their

circumstances” (especially Greece) before the crisis. Others (eg. Spain or Ireland) managed relatively well, but the economic downturn and the rescue of banks significantly worsened their fiscal situation. Approximately two months after the outbreak of the financial crisis, investors began to differentiate between the solvency of government debt of individual member states, making public debt financing expensive or even impossible for many states.

This has caused fiscal policy, instead of dampening financial shocks, to become an additional source in most euro area countries, leading to a massive shifting of debt into public finances, contributing to the recession. In connection with this, however, the question arises of what the European Central Bank did all the time, respectively how responded to this situation? After the outbreak of the financial crisis in 2008, it quite rightly began to provide banks with virtually unlimited amounts of money for 1% interest, but this gradually turned into a very unsystematic and chaotic management of the European banking system.

Sulík (2012) mentions concrete examples of this ECB behaving, for example: the gradual reduction of the required guarantees for the purchases of bonds from commercial banks to unrated bonds, so called “printing of money by the euro area national banks under the adopted Emergency Liquidity Assistance (ELA) program, noting that the central banks of the two largest and most indebted euro area countries, France and Italy, belong to private banks. In addition, it involves legally unauthorized purchases of euro area government bonds, allowing banks to create Asset Backed Securities (ABS) and subsequently accept them as guarantees and then even buy them from them. Last but not least, is not paying attention to illegal operations of commercial banks (eg. providing bank loans by banks to themselves, issuing bonds with a maturity of several thousand years, etc.). It follows that, although in 2009 it was publicly declared by European politicians and euro-supporters that “Monetary Union and the euro are a huge success and the euro has become a pillar of stability and the world economy (Karpiš, 2015), it was not so. Indeed, it turned out that those European countries that had previously given up their own currency are unable to defend themselves. By renouncing their own currencies, they also gave up the possibility of using their own monetary policy and became totally dependent on the measures of the European Central Bank. And since it had to manage the entire euro area monetarily, it could not individually address the specific problems of individual states.

Moreover, lost the tool of possible targeted weakening of their own national currencies, which forced their governments to deal with the situation fiscally, or by getting into the extreme debt. It follows from the above mentioned that the global financial crisis peaking in 2009 and 2010 has shown that the main problem of the euro area lies not only in non-compliance with the adopted rules, but in particular in its inconsistency. At the same time, it has shown that the single monetary policy has led to a significant widening of the disparities between the southern wing countries and the EU core, so that the euro zone's continued dependence is on ECB crisis measures, namely non-standard loans, fiscal transfers and "political solidarity" between European states. This means that the EU's largest project, with the ambition to significantly accelerate economic growth to a level that ensures global competitiveness, has not yielded anything positive for more than a decade, and has also threatened to collapse with disastrous consequences (Singer 2012).

### 3.2. Analysis of monetary management of the euro area in 2011-2018

After overcoming the most critical years of 2009 and 2010, it was widely believed that the euro area economy was gradually stabilizing and that the crisis had been successfully resolved. It was not so. A further decline in GDP has already started in the euro area in 2012 and discussions on the meaningfulness of the euro have begun to reoccur. The new ECB Governor Mario Draghi then responded to this with his historically renowned statement: “The European Central Bank is ready to do anything to save the euro. Believe me, it will be enough”. As a result, the ECB started to slacken its monetary policy considerably. In addition to interest rate cuts and money printing, in March 2015, due to a sudden decline in GDP and the impossibility of further interest rate cuts, a new non-standard monetary regulation tool called "Quantitative Easing" (QE) which means banks to supply additional liquidity to the banking sector. Under this program, bonds worth 2.6 trillion were purchased by the European Central Bank by the end of 2018. €, which is 7 ths. € per euro area citizen. As it was subsequently reflected in the ECB's balance sheet, which caused the ECB's balance sheet to exceed 4.5 trillion in 2018. €. (Tradingeconomics.com, 2019).

In a very aggressively conducted QE, the ECB bought € 60 billion of bonds from commercial banks per month and afterwards even worth € 80 billion of bonds, which it further supported by lowering its main interest rate to zero and the refinancing rate (which remunerates commercial bank deposits recorded in the accounts of the central bank) even down to -0.4% pa. As a result, GDP growth in the euro area has recovered, starting to increase since 2016 (Tradingeconomics.com, 2019).

This has led to the subsequent general optimism that the problem of insufficient euro area growth has been successfully resolved and, as a result, the current QE program was officially terminated at the end of 2018. At the same time, the ECB declared that it will gradually normalize (increase) interest rates in the summer of 2019. However by Tradingeconomics.com (2019), as it turned out, at the end of 2018, the annual percentage increases in GDP (calculated as the ratio of GDP in the current quarter to the same quarter of the previous year) began to decline.

### 3.3. Analysis of current economic development in the euro area (resp. European Union)

Currently (in 2019), a total of 28 countries belong to the European Union, of which 19 use the euro. These are Belgium, Estonia, Finland, France, Ireland, Italy, Cyprus, Luxembourg, Latvia, Lithuania, Malta, Germany, the Netherlands, Portugal, Austria, Greece, Slovenia, Slovakia and Spain. This means that, as the following table shows, the European Union currently has around 513 million people, but the euro area, which does not include the UK, Poland, Romania, Czech Republic, Sweden, Hungary, Bulgaria, Denmark and Croatia, has only 322 million.

**Table 1: Population of the European Union as of January 1, 2019**

European Union		513 481 691	
<b>Germany</b>	83 019 214	<b>Austria</b>	8 858 775
<b>France</b>	67 028 048	<b>Bulgaria</b>	7 000 039
<b>United Kingdom</b>	66 647 112	<b>Denmark</b>	5 806 081
<b>Italy</b>	60 359 546	<b>Finland</b>	5 517 919
<b>Spain</b>	46 934 632	<b>Slovakia</b>	5 450 421
<b>Poland</b>	37 972 812	<b>Ireland</b>	4 904 226
<b>Romania</b>	19 401 658	<b>Croatia</b>	4 076 246

<b>Netherlands</b>	17 282 163	<b>Lithuania</b>	2 794 184
<b>Belgium</b>	11 467 923	<b>Slovenia</b>	2 080 908
<b>Greece</b>	10 722 287	<b>Latvia</b>	1 919 968
<b>Czech Republic</b>	10 649 800	<b>Estonia</b>	1 324 820
<b>Portugal</b>	10 276 617	<b>Cyprus</b>	875 898
<b>Sweden</b>	10 230 185	<b>Luxembourg</b>	613 894
<b>Hungary</b>	9 772 756	<b>Malta</b>	493 559

Source: Eurostat

The above overview shows that Germany, France, Italy and Spain have the most important positions in the euro area, with a total population of 257 million, accounting for about 80% of the total euro area population and accounting for about 75% of its GDP. This clearly determines who has the greatest influence on developments in the euro area, not only economic but also political. When assessing the current economic situation of the euro area, a number of sub-factors need to be analyzed, as it is necessary to ascertain whether the use of non-standard monetary regulation instruments has actually solved existing problems in the euro area's economic development or not. However, this would mean that they could return in the future and act even more intensively than in the past. At the same time, it is also important to pay the greatest attention to the four most important countries mentioned above, especially to Germany, and then to France, Italy and Spain. As they are the most important economies of the euro area, it is clear that their impact on the euro area's economic performance will also be greatest and that (together with the United Kingdom) they also have the greatest impact on developments throughout the European Union.

### **3.3.1. Analysis of the current economic development in the euro area**

When analyzing the current economic developments in the euro area, it is not enough to only analyze its overall GDP, but it is also necessary to pay close attention to the economic development of Germany, in particular France, Italy and Spain. Mainly dynamically, or following the predictions of their percentage economic growth.

The following table 1 shows quarter-on-quarter GDP development since the 4th quarter of 2017. This is also important because the possible occurrence of two subsequent declines is statistically considered to be a "technical" recession. The table below shows, among other things, that GDP growth has slowed considerably in the euro area and that Germany is starting to run into economic growth problems in addition to Italy.

**Table 2: Euro Area GDP Growth Rate [%]**

	IV/2017	I/2018	II/2018	III/2018	IV/2018	I/2019	II/2019	III/2019
<b>Eurozone</b>	<b>0,8</b>	<b>0,3</b>	<b>0,4</b>	<b>0,2</b>	<b>0,3</b>	<b>0,4</b>	<b>0,2</b>	<b>0,2</b>
Germany	0,7	0,1	0,4	-0,1	0,2	0,5	-0,2	0,1
France	0,7	0,2	0,2	0,3	0,4	0,3	0,3	0,3
Italy	0,5	0,1	-0,1	-0,1	0,1	0,1	0,1	0,1
Spain	0,7	0,5	0,5	0,5	0,6	0,5	0,4	0,4

Source: Trading economics

Table 3 further demonstrates a significant slowdown in annual GDP growth both in the euro area as a whole and in all other large states, including Germany. This is particularly a warning factor, as the problems of the most important euro area economy and the largest European exporter can destabilize the economy of the whole euro area (and thus of the whole European Union).

**Table 3: Euro Area GDP Annual Growth Rate [%]**

	IV/2017	I/2018	II/2018	III/2018	IV/2018	I/2019	II/2019	III/2019
<b>Eurozone</b>	<b>3,0</b>	<b>2,6</b>	<b>2,3</b>	<b>1,7</b>	<b>1,2</b>	<b>1,3</b>	<b>1,2</b>	<b>1,1</b>
Germany	3,4	2,3	2,1	1,1	0,6	0,9	0,4	0,5
France	3,0	2,4	1,9	1,5	1,2	1,3	1,4	1,3
Italy	1,9	1,4	0,9	0,4	-0,1	0,0	0,1	0,3
Spain	3,0	2,8	2,3	2,2	2,1	2,2	2,0	2,0

Source: Trading economics

The following table 4 is also very important. "Manufacturing production" is a very important indicator of industrialized countries and, in addition to being broadly taken, it is also published monthly. This means that it is an important indicator of GDP growth in the next quarter. Statistically, it is a comparison of the current month with the same month of the previous year, which in this case indicates a significant slowdown not only in the economy of the entire euro area, but also in the economies of most major European states. Moreover, in the mentioned cases, it is clear that the most critical situation is probably in Germany and Italy, while France has not prevented the decline of this indicator. As for the other smaller euro area countries, their situation is mostly similar.

**Table 3: Euro area production [%]**

	12/18	1/19	2/19	3/19	4/19	5/19	6/19	7/19	8/19	9/19	10/19
<b>Eurozone</b>	<b>-3,9</b>	<b>-1,5</b>	<b>0,7</b>	<b>0,2</b>	<b>-0,9</b>	<b>-0,9</b>	<b>-2,6</b>	<b>-2,2</b>	<b>-2,8</b>	<b>-1,8</b>	<b>-2,3</b>
Germany	-3,1	-3,7	-1,7	-2,4	-4,3	-5,1	-5,8	-4,8	-4,1	-5,2	-6,1
France	-2,1	1,3	2,8	0,5	0,4	3,4	-0,5	0,0	-1,4	0,5	0,1
Italy	-5,8	-2,5	1,3	-1,3	-2,2	-0,7	-1,8	-1,4	-2,8	-2,2	-2,7
Spain	-2,3	1,0	1,4	0,6	1,5	1,0	1,0	0,1	0,5	0,1	-0,2

Source: Trading economics

The evolution of all three indicators above concludes that even the extremely strong and relatively long-term deployment of the ECB's non-standard monetary regulation instruments (introduced during Governor Mario Draghi's work) has not been able to eliminate the economic problems of the European Monetary Union. And both the euro area and the European Union as a whole will probably have to face further crisis developments soon.

### **3.3.2. Recent developments in ECB interest rates**

The analysis of ECB interest rates is also very important. Nowadays, various expressions of their "insignificance" (eg. in the context of the so-called "Modern Monetary Theory" (MMT)) are becoming more and more common, the opposite is true (Rejnuš, 2019).

Interest rates are of extreme economic importance, and violations of the principles of economic governance associated with them can be very dangerous (Ezrati, 2019).

The European Central Bank declares a total of three interest rates, the main rate being the “main refinancing operations rate” at which commercial banks borrow money from the ECB for one week (which they must, however, provide with collateral). Furthermore, the “rate on the deposit facility” is also extremely important. It determines the interest received by banks - or, if it is negative, pays on deposits deposited with the ECB for a day,

The evolution of the ECB's key interest rate since 2008, when it was around 4% p.a., The ECB has significantly reduced this rate during the peaking crisis to save the euro area, so it has never been able to normalize. It is also extremely important that it has been zero since 2016 (European Central Bank, 2019).

However, an even worse situation can be observed in the development of the deposit facility rate, this rate is equal to zero from the 11<sup>th</sup> of June 2004 and therefore commercial banks has to pay for their money deposited with ECB. Since then, this negative rate has been gradually decreasing, while at present (in 2019) it is already at -0.5% p.a. (European Central Bank, 2019).

The conclusion is unequivocal: the European Central Bank has already exhausted the standard monetary regulation of the euro area banking system and has no choice but to use very drastic and practically unverified non-standard instruments. And, as will be shown below, there are a number of consequential negative consequences.

### ***3.3.3. Recent developments in the debt of the euro area and individual European states***

As illustrated in previous Figures 3 and 4, although the European Central Bank has been able to boost moderate economic growth in the euro area since 2014, the question arises: at what price? According to economic theory, there exists the rule that expansionary monetary policy brings the risk of indebtedness for all types of economic entities, and so this will be the subject to following analysis. This will be done in two steps, first focusing on the development of public debt and then on the volume of loans to the private sector.

As follows from European Central Bank (2019), the evolution of euro area public debt corresponds to standard theoretical assumptions. Despite the fact that its growth slowed somewhat compared to the peak of the crisis, in absolute terms it continues to grow gradually and its value is close to 10 trillion. EUR. First, this means that the theoretical postulate that GDP growth is to be financed by savings and not by debt financing is still partially violated. Secondly, it also suggests that the current strong expansionary monetary policy of the ECB, using non-traditional regulatory instruments, tends to keep the euro area economy running and postpone the solution to the growing problems for later.

In practice, however, the ratio of public debt to GDP ratios is more often used. If we preferred this data, we could be mistaken to believe that the size of euro area public debt is gradually decreasing. This is not true. At the same time, as the euro area's GDP is currently rising somewhat, the denominator of this indicator is also increasing - if, however, another crisis wave occurs and GDP declines, the euro area's public debt referring to its GDP would increase sharply.

However, to get real picture of the current situation it is not sufficient to assess the euro area or the European Union as a whole, but it is also necessary to assess national indebtedness of all European states. Their situation is shown in Table 4 below, which lists all the countries of the European Union (including the United Kingdom) for the sake of completeness, while those outside the euro area are shown in italics only.

**Table 4: Indebtedness of individual states of the European Union since 2008 [in% of GDP]**

State /Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Belgium</b>	<b>93.2</b>	<b>100.2</b>	<b>100.3</b>	<b>103.5</b>	<b>104.8</b>	<b>105.5</b>	<b>107.0</b>	<b>105.2</b>	<b>104.9</b>	<b>101.8</b>	<b>100.0</b>
<i>Bulgaria</i>	<i>13.0</i>	<i>13.7</i>	<i>15.4</i>	<i>15.2</i>	<i>16.7</i>	<i>17.1</i>	<i>27.1</i>	<i>26.0</i>	<i>29.3</i>	<i>25.3</i>	<i>22.3</i>
<i>Czech republic</i>	<i>28.3</i>	<i>33.6</i>	<i>37.4</i>	<i>39.8</i>	<i>44.5</i>	<i>44.9</i>	<i>42.2</i>	<i>40.0</i>	<i>36.8</i>	<i>34.7</i>	<i>32.6</i>
<i>Denmark</i>	<i>33.3</i>	<i>40.2</i>	<i>42.6</i>	<i>46.1</i>	<i>44.9</i>	<i>44.0</i>	<i>44.3</i>	<i>39.8</i>	<i>37.2</i>	<i>35.5</i>	<i>34.2</i>
<b>Germany</b>	<b>65.5</b>	<b>73.0</b>	<b>82.4</b>	<b>79.8</b>	<b>81.1</b>	<b>78.7</b>	<b>75.7</b>	<b>72.1</b>	<b>69.2</b>	<b>65.3</b>	<b>61.9</b>
<b>Estonia</b>	<b>4.5</b>	<b>7.2</b>	<b>6.6</b>	<b>6.1</b>	<b>9.8</b>	<b>10.2</b>	<b>10.6</b>	<b>10.0</b>	<b>10.2</b>	<b>9.3</b>	<b>8.4</b>
<b>Ireland</b>	<b>42.4</b>	<b>61.5</b>	<b>86.0</b>	<b>111.1</b>	<b>119.9</b>	<b>119.9</b>	<b>104.4</b>	<b>76.7</b>	<b>73.9</b>	<b>67.8</b>	<b>63.6</b>
<b>Greece</b>	<b>109.4</b>	<b>126.7</b>	<b>146.2</b>	<b>172.1</b>	<b>159.6</b>	<b>177.4</b>	<b>178.9</b>	<b>175.9</b>	<b>178.5</b>	<b>176.2</b>	<b>181.2</b>
<b>Spain</b>	<b>39.7</b>	<b>53.3</b>	<b>60.5</b>	<b>69.9</b>	<b>86.3</b>	<b>95.8</b>	<b>100.7</b>	<b>99.3</b>	<b>99.2</b>	<b>98.6</b>	<b>97.6</b>
<b>France</b>	<b>68.8</b>	<b>83.0</b>	<b>85.3</b>	<b>87.8</b>	<b>90.6</b>	<b>93.4</b>	<b>94.9</b>	<b>95.6</b>	<b>98.0</b>	<b>98.4</b>	<b>98.4</b>
<i>Croatia</i>	<i>39.3</i>	<i>48.7</i>	<i>57.8</i>	<i>64.4</i>	<i>70.1</i>	<i>81.2</i>	<i>84.7</i>	<i>84.4</i>	<i>81.0</i>	<i>78.0</i>	<i>74.8</i>
<b>Italy</b>	<b>106.1</b>	<b>116.6</b>	<b>119.2</b>	<b>119.7</b>	<b>126.5</b>	<b>132.4</b>	<b>135.4</b>	<b>135.3</b>	<b>134.8</b>	<b>134.1</b>	<b>134.8</b>
<b>Cyprus</b>	<b>45.6</b>	<b>54.3</b>	<b>56.4</b>	<b>65.9</b>	<b>80.3</b>	<b>104.0</b>	<b>109.2</b>	<b>107.5</b>	<b>103.4</b>	<b>93.9</b>	<b>100.6</b>
<b>Latvia</b>	<b>18.1</b>	<b>36.2</b>	<b>47.3</b>	<b>43.1</b>	<b>41.6</b>	<b>39.4</b>	<b>40.9</b>	<b>36.7</b>	<b>40.2</b>	<b>38.6</b>	<b>36.4</b>
<b>Lithuania</b>	<b>14.6</b>	<b>28.0</b>	<b>36.3</b>	<b>37.2</b>	<b>39.8</b>	<b>38.7</b>	<b>40.6</b>	<b>42.7</b>	<b>39.9</b>	<b>39.3</b>	<b>34.1</b>
<b>Luxembourg</b>	<b>14.9</b>	<b>15.7</b>	<b>19.8</b>	<b>18.7</b>	<b>22.0</b>	<b>23.7</b>	<b>22.7</b>	<b>22.0</b>	<b>20.1</b>	<b>22.3</b>	<b>21.0</b>
<i>Hungary</i>	<i>71.8</i>	<i>78.2</i>	<i>80.6</i>	<i>80.8</i>	<i>78.5</i>	<i>77.3</i>	<i>76.8</i>	<i>76.1</i>	<i>75.5</i>	<i>72.9</i>	<i>70.2</i>
<b>Malta</b>	<b>62.6</b>	<b>67.6</b>	<b>67.5</b>	<b>70.2</b>	<b>67.7</b>	<b>68.4</b>	<b>63.4</b>	<b>57.8</b>	<b>55.5</b>	<b>50.3</b>	<b>45.8</b>
<b>Netherlands</b>	<b>54.7</b>	<b>56.8</b>	<b>59.2</b>	<b>61.7</b>	<b>66.2</b>	<b>67.7</b>	<b>67.8</b>	<b>64.6</b>	<b>61.9</b>	<b>56.9</b>	<b>52.4</b>
<b>Austria</b>	<b>68.7</b>	<b>79.9</b>	<b>82.7</b>	<b>82.4</b>	<b>81.9</b>	<b>81.3</b>	<b>84.0</b>	<b>84.9</b>	<b>82.9</b>	<b>78.3</b>	<b>74.0</b>
<i>Poland</i>	<i>46.3</i>	<i>49.4</i>	<i>53.1</i>	<i>54.1</i>	<i>53.7</i>	<i>55.7</i>	<i>50.4</i>	<i>51.3</i>	<i>54.2</i>	<i>50.6</i>	<i>48.9</i>
<b>Portugal</b>	<b>75.6</b>	<b>87.8</b>	<b>100.2</b>	<b>114.4</b>	<b>129.0</b>	<b>131.4</b>	<b>132.9</b>	<b>131.2</b>	<b>131.5</b>	<b>126.0</b>	<b>122.2</b>
<i>Romania</i>	<i>12.3</i>	<i>21.8</i>	<i>29.6</i>	<i>34.0</i>	<i>37.0</i>	<i>37.6</i>	<i>39.2</i>	<i>37.8</i>	<i>37.3</i>	<i>35.1</i>	<i>35.0</i>
<b>Slovenia</b>	<b>21.8</b>	<b>34.5</b>	<b>38.3</b>	<b>46.5</b>	<b>53.6</b>	<b>70.0</b>	<b>80.3</b>	<b>82.6</b>	<b>78.7</b>	<b>74.1</b>	<b>70.4</b>
<b>Slovakia</b>	<b>28.6</b>	<b>36.4</b>	<b>41.0</b>	<b>43.5</b>	<b>51.8</b>	<b>54.7</b>	<b>53.5</b>	<b>51.9</b>	<b>52.0</b>	<b>51.3</b>	<b>49.4</b>
<b>Finland</b>	<b>32.6</b>	<b>41.5</b>	<b>46.9</b>	<b>48.3</b>	<b>53.6</b>	<b>56.2</b>	<b>59.8</b>	<b>63.0</b>	<b>62.6</b>	<b>60.9</b>	<b>59.0</b>
<i>Sweden</i>	<i>37.7</i>	<i>40.9</i>	<i>38.2</i>	<i>37.3</i>	<i>37.7</i>	<i>40.5</i>	<i>45.2</i>	<i>43.9</i>	<i>42.3</i>	<i>40.7</i>	<i>38.8</i>
<i>Great Britain</i>	<i>49.4</i>	<i>63.3</i>	<i>74.6</i>	<i>80.1</i>	<i>83.2</i>	<i>84.2</i>	<i>86.2</i>	<i>86.9</i>	<i>86.8</i>	<i>86.2</i>	<i>85.9</i>

Source: Eurostat

The table 4 shows the very sad fact that while small states, with the exception of Belgium, Cyprus, Greece and Portugal, are not too indebted, large states such as France, Italy and Spain (and the UK) are blatantly extremely indebted regardless of the Maastricht criteria adopted, aware that no sanctions would be imposed on them.

The issue of the development of private debt was significantly different from the development of public debt. In a period of peak crisis, its volume declined, which was due to a significant reduction in household consumption and also due to a reduction in business investment. However, since the ECB's extremely strong monetary expansion began, it has also started to increase as a result of a significant easing. It went to the extent that from 2015 to 2018 the private debt increased by about 1 trillion. EUR, so it is currently about 11.4 trillion. EUR

(about EUR 1.5 trillion more than the total public debt of the euro area). This is also a significant risk factor in the event of another crisis wave. (European Central Bank, 2019)

### 3.3.4. Analysis of other important indicators of economic health of the eurozone

Clearly, only three economic indicators cannot comprehensively characterize the development of a broad economic community such as the euro area or the European Union as a whole. Therefore, Table 5 below shows the latest known data on unemployment, inflation, rating and the yield of ten-year government bonds, both in the euro area as a whole and in Germany, France, Italy and Spain.

**Table 5: Other macroeconomic indicators for the euro area and its major states**

COUNTRIES	Jobless rate	Inflation	Government bond 10Y yield	Rating S&P
	[10/2019]	[10/2019]	12/ 2019]	[11/2019]
<b>Eurozone</b>	<b>7,50 %</b>	<b>0,70 %</b>	<b>+0,37 % p.a.</b>	<b>AA</b>
Germany	3,10 %	1,10 %	-0,29 % p.a.	AAA
France	8,60 %	0,70 %	+0,02 % p.a.	AA
Italy	9,70 %	0,30 %	+1,35 % p.a.	BBB
<b>Spain</b>	<b>13,90 %</b>	<b>0,10 %</b>	<b>+0,40 % p.a.</b>	<b>A</b>

Source: Eurostat

The first indicator, which is unemployment, shows that although economic growth in recent years has reduced unemployment in the euro area somewhat, it is still too high. This also applies to France and, above all, Italy and Spain, where unemployment levels seem to be absolutely critical. It should be added that some of the smaller European states are also in this bad situation namely Greece.

As far as the current inflation rate is concerned, all reported values can be considered to be very low, confirming relatively weak economic growth.

As far as the current yield of 10Y government bonds is concerned, the reported values do not appear to be realistic from an economic point of view. They appear to be significantly decreased due to the exceptionally strong monetary expansion of the ECB. However, the ECB's end to its monetary policy would endanger the functioning of the entire euro area banking system.

With regard to Standard & Poor's rating and looking at the overall situation in the euro area its rating seems to be somewhat overvalued. Both the euro area rating and the ratings of all its major states.

### 3.4. Conclusions of the analysis on the economic development of the euro area

The results of the analysis of the "economic health of the euro area" show that the euro area, and hence the EU as a whole, are in fact in a pre-crisis situation, which could even threaten an overall economic collapse in the event of another world crisis. GDP growth is practically stagnating, indebtedness has already reached extreme and irrecoverable values. And the European Central Bank is no longer able to address the growing problems of the euro area banking system with standard monetary instruments. And the use of non-standard tools can help the economy in the short term, but in the long run their use is very dangerous.

#### **4. Is the euro responsible for the current critical situation of the European Union?**

In this case, the basic question arises. Is the European Union's single currency responsible for the long term crisis development in the European Union, resp. what would be the situation if individual euro area or European Union countries retain their own currencies?

The assessment of the impact of the euro on the current economic situation of the euro area will be carried out in two steps. Firstly, the individual negative impacts of the single European currency itself will be evaluated. And then whether the current euro area problems can be solved successfully if the single currency exists.

##### ***4.1. The primary negative consequences of the introduction of the single European currency***

The primary reasons for the harmfulness of the euro are those crisis phenomena caused by the very introduction of the single European currency - the euro.

##### ***4.1.1. Deepening the differences in economic maturity between EU countries***

It is now sufficiently demonstrated that the main problem of the euro area lies in its inconsistency, respectively in the violent union of economically weak countries with strong countries. And these differences are even greater by the use of the single European currency.

This is because the single currency requires a central (single) monetary policy that cannot distinguish too much between economically developed and lagging states. And since individual states cannot regulate the strength of their currencies according to their needs, they increasingly depend on the ECB. And it has gone so far that the persistence of the euro area today de facto depends solely on the ECB's "crisis" measures; especially on non-standard loans, fiscal transfers and "political solidarity" between European countries. The common Schengen area also collapses. According to Janáček and Janáčková, these two pillars were supposed to herald the direction from economic and monetary union to political union, while by being undercut they are now "a catalyst for the disintegration of the European Union" (Janáček & Janáčková 2017).

##### ***4.1.2. Increasing export dominance of economically strongest countries***

As a result of the single European currency, Germany is also gaining ever greater price competitiveness. As a result, current account deficits, in particular in southern European countries, are increasingly offset by its current account surpluses (Singer 2012). George Friedman even claims that Germany has already eliminated competition in other euro area countries and has become the export superpower with the highest surplus since its unification (April 2016). German export policy has created an imbalance across the euro area. Due to the euro, Germany managed to gain markets in economically risky countries such as Portugal, Ireland, Italy, Greece, Spain, etc. But it is necessary to pay for products and services, and if the

economy is in crisis, it leads to debt and debt carousel. This creates a simple cycle: Germany produces a machine that Italy wants to buy, but it lacks money and therefore borrows for it. Thus, while Germany would obtain money by exporting the machine, it had to give Italy credit before doing so. But the economies of neighboring states cannot be vacuumed forever. And if Germany does not have enough export earnings, it will have nothing to borrow from other states, which will not be able to buy its goods.

This implies that in Europe, a significant problem arises, which is increasingly being borne by, for example, Italy, which is already starting to collapse in the banking system due to its indebtedness and bad debt (but this also applies to other euro area countries). And Germany will necessarily have to hold Italy back because its bankruptcy would cause the entire euro area to collapse.

#### ***4.1.3. Deepening the extreme indebtedness of many EU countries, especially euro area members***

As the euro area countries adopted the common currency, they lost the opportunity to pursue their own monetary policy. And since they cannot use monetary instruments of macroeconomic regulation, their governments must replace monetary management with fiscal management, which inevitably leads to budget deficits in less developed economies and thus further debt.

It is also important that the Stability and Growth Pact (SGP) mechanism, which was designed to prevent fiscal restlessness, did not address the issue of financial crisis management, nor how to help states in default.

#### ***4.1.4. Threats to the functioning of the European banking system***

Nowadays, following the extreme indebtedness of most European countries, questions about the possible collapse of the euro area banking system, in particular the banking systems of Italy and Greece, are increasingly being discussed. It also includes a problems occurring in many other countries (the strongest euro area countries), including Germany where, for example, the so-called "restructuring" of Deutsche Bank is now under way. This largest German bank is currently in the highest loss since the financial crisis and will lay off 18,000 employees (Financial Times, 2019).

If the member states of the Union stayed with their national currencies, the problems of individual countries were continuously solved by standard methods and the current, practically unsolvable problem of saving the European banking system of nineteen European states would not exist. Indeed, this common banking system already operates only on the basis of strong monetary support from the ECB through extreme monetary regulation instruments, and would probably collapse if the ECB were to withdraw this support.

According to a recent survey by McKinsey, banks in the euro area are under pressure from very low or even negative interest rates, reducing their income. It goes to the extent that a possible withdrawal of the conjuncture could be fatal to them and so it could happen that ten years after the financial crisis, almost every third bank could close its doors (Lacroix 2019).

Therefore, in September 2019 it was again decided to launch a new round of QE and to introduce other ways of supporting European commercial banks.

#### **4.2. Secondary consequences of using the single European currency**

The secondary reasons for the harmfulness of the euro can be understood as those factors that appear only secondary. That is to say, in the implementation of remedial measures, to fix crisis problems that have been caused by the introduction of the single currency and which make it impossible to be solved successfully.

##### **4.2.1. Consequences of zero or negative interest rates**

The use of zero and even negative interest rates destabilizes virtually the entire banking sector as well as the performance of virtually all types of financial institutions.

First, they cause negative impacts on commercial bank's performance. As a general rule, banking assets are long-term but are financed by short-term liabilities. This implies that banks are getting a "net interest margin" from the difference between short-term and long-term interest rates, which does not work at zero or negative rates.

Second, there are negative impacts on the management of pension companies, respectively pension funds. They are obliged to comply with strict security rules regarding the composition of their portfolios, so they are not allowed to buy risky assets. And if government bonds show negative returns, pension fund management is increasingly leading to risky trades and sometimes even to technical insolvency.

Another disadvantage is that the correct valuation of investment instruments is impossible. Extremely low or even negative interest rates exclude from the use of a number of standard analytical methods traditionally used in the valuation of financial (but also real) investment instruments, while the predicative ability of many indicators or models of financial analysis is considerably weakened. All this increases the nervousness not only of investors but practically of all financial market participants and consequently is reflected in the high volatility of both securities and the volatility of market prices in all segments of the financial market.

And unprecedentedly the most dangerous situation for the further development seems to be the situation on the markets of derivative instruments, whose exposure within the European banks is very significant. This is due to the existence of financial leverage, and to the fact that the valuation of financial derivatives tends to be complex and often dependent on a number of predefined input assumptions that may not apply under current non-standard market conditions. Many derivative instruments (including structured products) are interest rate, currency or credit based, which may lead to unexpected price developments or, in the case of credit derivatives, they may so called "activate" in the event of conversion or valuations or interest rate changes of their underlying assets.

Last but not least, it is necessary to emphasize that it is also support for further indebtedness of all types of economic entities. Extremely low or even negative interest rates lead to further indebtedness of states, firms and households, often spending unnecessarily on anything (since low interest rates do not lead to "allocation efficiency").

And since it can be considered a proven statement that "stimulation leads to further stimulation", it is clear that the longer this monetary policy period is, the more difficult it will

be to change it. This gradually creates conditions for future surge or hyperinflation and, in connection with this, for announcing currency reforms.

And what is the specific significance of the single European currency in all this, except that it has greatly contributed to the emergence of this disastrous situation across the euro area? The harmfulness of the euro is primarily that negative interest rates are imposed by the European Central Bank on all nineteen countries, whether or not their economy needs it. This means that all those who save honestly and those who are blatantly in debt are treated in a uniform way. And this affects not only about 320 million citizens, but also companies or governments and local governments of all nineteen euro area countries.

#### **4.2.2. Impacts of 'Quantitative easing'**

Obviously, the use of the QE method implies hidden financing of governments (or other entities) by the European Central Bank. As shown in Figure 2 above, the buy-backs of bonds from commercial banks are subsequently reflected in the ECB's balance sheet, which is rising significantly.

Sovereign states with their own central banks and their own currencies use different options to amortize sovereign debt; but who in the future will equalize the ECB's euro-denominated balance sheet, which does not belong to any state and belongs to all 19 euro area countries?

#### **4.2.3. Extreme "printing" of money**

As far as "money printing" is concerned, this is obviously not about cash money printing, but about the emergence of deposit money, which, "with the approval of the ECB", creates the central, respectively commercial banks of individual euro area countries. This means that this is not a monetary regulation in the strict sense, as it would be in the case of national currencies, but an administrative decision of the ECB. And the ECB's intensive use of this instrument is evidenced by the "Euro Area Money Supply M1", where its development since 2008 its extreme growth of 4 trillion. € in 2018 to the current state of almost 9 trillion. €. (European Central Bank, 2019)

#### **4.2.4. EU rescue system**

If the euro area countries had their own currencies, the European Union would not have suffered a critical downturn at present and would not have to take desperate political and de facto unusable measures such as the European Monetary Union Rescue System.

These are the two "EU rescue programs", the European Stability Mechanism (ESM) and the Banking Union (Rejnuš 2016). The ESM is an institution which acts as a rescue fund for financial assistance to euro-paying countries, to which euro area member states are obliged to pay for any capital requirement it imposes on them. And with regard to the Banking Union, its mission is to "jointly and with solidarity" address the major financial problems of the euro area in applying the principles of uniform banking regulation, uniform banking supervision, uniform resolution of banking problems and a unified deposit guarantee system. First and foremost, it aims to promote the principle of bail-in for the only necessary involvement of public resources

in the restructuring of banks, with the cost of their recovery being primarily borne by their shareholders and creditors. Secondly, it is to transfer the responsibility for the results of banking supervision to the Union level, to which sufficient financial capacities are to be put together to redevelopment of banks.

Obviously, this system negates a fair solution of the financial problems of individual euro area countries, forcing economically responsible countries to subsidize or even rescue poorly-managed countries. In the end it would not even save the euro area if eg. Italy would bankrupt. Indeed, it can be assumed that the population of those European countries affected by the redistribution of money will surely protest massively, which may lead to the end of the euro area.

## 5 Conclusions

The above mentioned analysis shows that the euro is a disaster for today's Europeans. According to Joseph E. Stiglitz, holder of Nobel Prize in Economics (2016), a European structure that was defective at its inception was proposed. Its structure of rules, regulations and the institutions can be blamed for the poor performance of the European regions but also for an emerging crisis. Europe's main and most important strength was its diversity. But it is very difficult for the single currency to work "above regions" which show extremely high economic and political diversity. The single currency contains the fixed exchange rate between the member states and the common interest rate. Those should be in accordance with specific economic conditions existing in the individual member states and there may exist a European institutions who help these states who do not meet those conditions. But Europe did not create these institutions and instead introduced a single currency - the "euro".

Thus, while there are many factors contributing to European problems, the single currency operates in the euro area without the necessary set of institutions to enable European diversity to function effectively. The euro has not achieved either of its two main objectives of prosperity and political integration: these objectives are now much more distant than they were before the creation of the euro area. Instead of peace and harmony, the individual European countries are now confronting each other with anger. Old stereotypes are reviving because Northern Europe declares the South lazy and unreliable and, on the contrary, the South recalls Germany's behavior in World Wars.

And the founder of the euro and former ECB chief economist Otmar Issing says: "The euro is a ticking time bomb that will blow up and destroy the entire EU project. One day the euro collapses like a house of cards, because the "euro project" is no longer working. Brussels' dream of a European super-state will be buried under the rubble of the collapsing single currency. Eurocrats have betrayed the principles of the euro and are demonstrating scandalous incompetence in their actions (Gutteridge 2016).

Last but not least, it must also be taken into account that, as each EU Member State has different priorities and interests, the effort to tie them all together through a single common currency makes joint decision making very cumbersome. The Community of cooperating states has thus reached a crossroads with the introduction of the euro. Either it will continue to pursue a self-destructive policy and will see its collapse soon, or the Member State's leaders will understand the situation and return to the original idea of not having a planned "super state" (Polanecký, 2015). Czech former President Vaclav Klaus (2012) also warns against the emergence of the "United States of Europe" with his statement that the end of democracy and the national state is approaching.

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# Implementing non-motorised transport in urban space within strategic planning

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## Abstract

Actual lifestyle and society organization consider optimization and restructuralization of system approach and need reliable support for further planning and decision-making. Branches supporting development within economic issues and public administration use well-known procedures and techniques of decision-making. Speaking about strategical planning, proposing new cycle paths is based on both quantitative evaluating and qualitative respecting strategic intent of the city. The main goal of the paper is to extend currently accepted approaches in modelling of non-morised transport and highlight key issues of implementing these findings into strategic concepts. The issue of spatial decision making implementation into information management depends mainly on the suitably chosen purpose of use and the nature of information system in the organization. In connection with the above mentioned, we offer the use of both web-based applications and the implementation of stand-alone program solutions or the use of both in the form of on-line services.

*Keywords: transportation; decision making; strategies*

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## 1. Introduction

### 1.1. Non-motorised transport

In the past, vehicular movement used to be concerned only as a subject in urban transportation planning, which nowadays is evolving into a discipline that deals with multimodal systems, where transit and non-motorised means of transport such as cycling and walking are getting more and more attention. This so called active transportation has become an essential component of many cities' transportation systems being used both as the only mode and in combination with other modes, providing access to or from the transit network. Modal share of pedestrians and bicyclists has been growing in many parts of the world taking its part in sustainable urban transport systems (e. g. Strauss et al., 2015; Griswold et al., 2011;

Rybarczyk and Wu, 2009; Lerman et al. 2014). There are numerous benefits of non-motorised transport. It has positive effect upon urban life quality - emissions and noise reducing, safety increase, higher social group independence (children and senior) (Zampieri and Rigatti, 2007). Alleviating automobile congestions is also an important factor as this has become a critical problem in cities worldwide. Traffic related problems such as growing climate change as well as energy and health concerns are causing a shift away towards greener and healthier modes which also help reducing the dependency on fossil fuels (Lerman et al, 2014; Nordström and Manum, 2015). Regarding to the negative externalities of vehicular movement, sustainable transport has become an important goal in transportation planning (Rybarczyk and Wu, 2010). Distribution of pedestrians or bicyclist movement volumes within the area present key information affecting transportation engineering, planning and design of transportation projects, as well as decision making and allocation of financial resources and policy evaluation. Several techniques have been used for measuring bicycle and pedestrians traffic such as manual and automated counts taken either long- or short term, GPS tracking devices and mobile phones data or various survey techniques (Ruda, Flokova, 2017). There is an urge not only to know the current numbers of pedestrians and bicyclists but also to be able to predict and estimate their movement so many researches focus on modelling these flows.

## 1.2 Strategic planning

Strategic planning and management is considered as a crucial activity, which determinates a success of a given organization in the future. When talking about strategic planning and management, it is mostly regarding commercial organizations. Unlike this, public or non-profit sector do not aim primarily for profit maximization, nevertheless these subjects can use these kind of strategies similarly to private sector. The goal of strategic management in these cases is to make an effort to upraise work efficiency and keep or possibly improve services with lowering costs. Of course certain specifics can be found especially in the field of property rights, controlling, outbound influences etc. Decision making is also often influenced more by political conditions than factual state of the environment.

One of the basic instruments used for strategic planning and management are strategic documents. Their purpose is to set a complex system of implementation, coordination and sustainability of strategic planning and management in an organization, using a wide range of tools, such as consultation, impact assessment of regulations, using alternatives for traditional ordering and controlling directives etc.

Generally, the process of the strategic document creation can be divided into several consecutive phases: (i) identification of the need for a new strategy, (ii) project settings, (iii) analytical and prognostic phase, (iv) setting of the basic strategic direction, (v) plan development, (vi) setting the strategic plan interpretation, (vii) strategic plan adoption (MRD CR, 2013a). In the process of the strategy plan creation, decision making has to be employed several times. In the beginning, it is a decision about initiation of a strategy creation, and a decision about work-flow, which is necessary for project settings. Then, setting of the basic strategic direction is done based on the decisions about vision and strategic goals variants. This is followed by decisions about objects variants. Various methods with different level of subjectivity or objectivity and involvement of expert and/or public opinion can be used in all stages of the strategic planning creation.

In the past, strategic documents even on the highest level were often created completely without using a specific methodology, it usually came out from previous experiences and proposals from workers. Documents such as Security strategy of the Czech Republic (MoD,

2003), National Strategic Framework 2001 – 2013 (MRD, 2006), Economic Growth Strategy (Government Office Czech Republic, 2005) or Strategic Framework for Sustainable Development (ME CR, 2010) were created this way. Individual strategic documents are created in the basis of different principles and are aiming different purposes. Another problem, besides not keeping a united methodology, is inconsistent terminology. A search of Ernst & Young company shows, that out of 22 examined documents only 3 have a drawn-up methodology for creating of strategy documents (MRD CR, 2011). The governments became aware of the problems and the necessity of taking an action. For example, since May 2013 the Methodology for Public Strategies Creation has come into effect in the Czech Republic (MRD CR, 2013a), which set a basis for actualization of previous documents, e. g. Strategy for Regional Development 2014 – 2020 (MRD, CR, 2013b) and Strategic Framework Czech Republic 2030 (ME CR, 2016). This methodology is created in the cooperation of representatives of all ministries, Government Office of the Czech Republic, Association of Regions of the Czech Republic, Union of Towns and Municipalities Czech Republic and Czech Statistical Office. It states recommended procedures for creating strategic documents and a proposal of specific methods that should be used. The SMART method is suggested for initial goal definition. This method is recommended also in other countries, e. g. Moldova (RDA, 2010). On the other hand, impact assessment, cost benefit analysis, mind maps, PESTLE analysis, tree diagram, feasibility analysis and SWOT analysis are suggested for analytical and prognostic phase. Brainstorming and other team work methods are recommended for identification of solution variants. Assessment and measurement selection is recommended to be realized using multiple-criteria decision methods, when different weights can be set for individual criteria. However, the process is not described in detail and so can vary dramatically case to case.

## **2. Heading Modelling non-motorised flows in urban space**

Creating predictive models of bicycle and/or pedestrian volumes in urban areas is challenging as it is considered extremely complex issue. But they are widely used for safety analysis and calculation of crash risks, identifying priority locations for facility improvements or estimating changes in volumes following up infrastructure changes and new projects (Griswold et al, 2011).

Used methodologies can be divided into two groups, first of them traditional transport models which use aspatial regression techniques. The most prominent example of traditional transport models is the travel-demand based Four-Step-Model which usually follows these four steps - trip generation, trip distribution, transport mode choice, route choice.

In the first step various socio-demographic, economical and structural data are considered employing statistical routines, which require independent samples, and are fed into a model. Then travel demand based on trip production and trip attraction is calculated. This is usually done for spatial entities - traffic analysis zones which are characterised independently from each other and spatial association or dependency is largely neglected (Loidl et al., 2016). The trip distribution is done in the next step. Origin-destination matrices are created and according to them the generated trips are distributed over the whole study area using for example gravity models. At this stage spatial characteristics and relations are highly abstracted (Loidl et al., 2016). However this four step model was used by Milakis and Athanasopoulos (2014) for cycle network planning in Athens where participative multicriteria processes were implied to help plan bicycle routes in the city. 11 criteria which describe infrastructure

properties such as comfort, travel safety, directness, surrounding environment and functionality were chosen. Weighting process essential for multicriteria analysis was done comprising participative evaluation of prospective users and suggested scenarios were tested by them.

Also various forms of regression analysis for traffic modelling can be found in the literature.

Linear and logistic regression to estimate traffic volumes on low volume roads in Wyoming was applied in the study of Apronti et al. (2016). 14 potential predictors were defined reflecting land use, road surface, population, number of households, access to highway, income per capita and housing units. Different subsets of variables were tested and the best subset of predictors was then utilized. To overcome issue of non-constancy of error variance the response variable was log transformed. Models were verified against observed counts. The linear regression model is recommended in applications where precious estimates of average daily traffic are desired, the logistics regression model for applications where level of traffic is desired as it enables predicting the probability of a road belonging to one of traffic volume thresholds. In spite of the fact that non-motorised traffic is influenced by many other factors than motorised there is a matter of correcting generally used methods for non-motorised count. Figliozi et al. (2014) defined regression-based correcting function to improve accuracy of annual average daily traffic estimation methods used for motorised counts so that they can be used for non-motorised, in their case bicycle, traffic estimation. The correcting function accounts for weather (regarding temperature or precipitation) and activity (holiday, weekday, weekend) factors which influence bicycle volumes observed and cause error in bicycle annual daily traffic estimation.

Lowry and Dixon (2012) presented own GIS tool to estimate average annual daily traffic based on ordinary least square regression employing functional classification, number of lanes and connectivity importance index as explanatory variables which were found significant for the case study of Moscow, Idaho presented by them. The connectivity importance index was also developed by Lowry and Dixon (2012) and is based on the space syntax technique which is getting more attention in transport planning nowadays.

Loglinear least square regression was used in the study of the Alameda County, California (Griswold et al., 2011). Dependent variables were transformed using natural logarithm before creating the model. Comparing to negative binomial form of regression model which was also tested in this study similar model coefficient was obtained but loglinear form is easier to apply and interpret. Besides bicycle counts there were variables referring to intersection site characteristic (average slope, bicycle lanes and markings), surrounding land use (number and network distance to certain points of interests) and surrounding transportation system (intersection density, connectivity) included in the modelling process. The models showed that bicycle activity tends to be higher at intersections which are in a flat terrain, surrounded by more commercial properties, closer to major university, are marked as a bicycle facility and well connected to the roadway network.

Multiple regression analysis was used for example by Mohamad et al. (1998) to estimate AADT on county roads in Indiana. The linear model used four explanatory variables: county population, total arterial mileage of the county, whether the road is urban or rural, and whether the road is close to a state highway or not. They examined also six other variables but no enhancement of the model was achieved. Similarly Xia et al. (1999) specified a model with functional classification, number of lanes, area type, auto ownership, whether the road is close to a state highway or not, and nearby employment.

Straus et al. (2015) considered regression models for the purpose of estimating average annual daily bicycle (AADB) in the city of Montreal combining long- and short-term bicycle

counts and GPS data. Linear model for predicting AADB was chosen because it provides a better fit than alternative Poisson model. Variables were generated combining the number of cyclists and facility type so that the effect of bicycle facility (no facility, bicycle path or cycle track) can be captured. When comparing estimated parameters from manual count and GPS data the results show that they are very similar. Also a distance to downtown was taken in account in the model.

Zhao and Chung (2001) applied and compared four different regression models in the study of Florida. They set four groups of variables regarding to roadway characteristics, socioeconomics characteristics, accessibility to expressways and regional accessibility to employment. Based on previous analysis they included six variables, which seemed to be suitable, for the model building – function classification, number of lanes, direct access to expressway, accessibility to regional employment centre, employment in a variable-sized buffer and population in variable-sized buffer. Combining these six variables, four models were generated. Validation of the models proved that the more variables they used, the better result was obtained and the most significant variables class and number of lanes.

Many authors realise the necessity of reflecting spatial patterns and focus on comparison of spatial and aspatial approaches. Cardoso et al. (2012) proposes a direct forecasting model that uses geographically weighted regression (GWR) and compares the results with ordinary least square (OLS) multiple regression model. Nine variables were considered as possible predictors but only four – employment, workers, number of lines and suburban bus lines- were included. The weights of the model were generated from kernel function. They proved that incorporating spatial autocorrelation measures and GWR in the modelling process gives better results than the use of traditional statistical methods which do not take into account spatial variations in the relationship between variables.

Sarlas and Axhusen (2016) examined AADT predictive accuracy of several models such as traditional four-step model, spatial lag model, negative binomial regression, three variations of OLS models, GWR model which is able to provide also localized estimates and interpolation technique using ordinary kriging method where three semivariogram functions were evaluated (exponential, Gaussian and spherical). Variables related to the road type and population density were considered. They also introduced a new variable called accessibility-weighted centrality which enables the inclusion of network-based theory in the model formulation. The results show that GWR has the highest predictive accuracy and using network theory can also lead to significant enhancement on the predictive accuracy. But still the traditional four-step model can constitute a trustworthy alternative to this more advanced models, which are much more computationally burdensome and data demanding.

Some more studies are trying to employ the network-constrained function. The study of Yu and Ai (2014) proposes the method to discover functional patterns of points of interests (POI) in the urban area using network distances rather than Euclidean ones. They propose a computational method of Kernel density estimation on a network. Combining the effect of the street network structure and land-use patterns is the aim of the study of Omer and Kaplan (2017), who suggested the agent-based model for predicting pedestrian movements. When using space syntax and agent-based approach for modelling, they claim better prediction results comparing to multiple regression analysis models especially in local scale environments. Spatial interpolation of traffic counts using Kriging-based (in this case Ordinary Kriging) methods on network instead of Euclidean distances is discussed in the paper of Wang and Kockelman (2009). They found reliance on network distances helpful particularly for small datasets.

To investigate existing correlations or patterns Bagheri et al., (2012) used several tools such as Moran's I index, Hot-Spot analysis, Average Nearest Neighbor and Kriging methods to demonstrate how traffic growths are distributed in the area. The correlation analysis revealed the space patterns and clustering tendencies which need to be taken in account in AADT estimation. Appropriateness of various interpolation techniques to estimate bicycle volumes was studied by Ruda and Flokova (2017). In this case, the best fit of examined techniques was proved for Empirical Bayesian Kriging.

The aforementioned studies emphasise the role of spatial aspects which lead in general to better results and that fully accords the "First law of geography" formulated by Tobler (1970) which says that "everything is related to everything else, but near things are more related than distant things". This approach helped develop concepts for spatial analysis such as spatial dependence, spatial autocorrelation, inverse distance weighting, spatial interpolation or kriging. As the relevance of the geographical space has become acknowledged there is a shift from "traditional" to "alternative" traffic models which implement spatial statistics and analysis (Loidl et al., 2016). Lopez et al. (2014) used Moran's I Index which indicates the similarity of each area to its neighbour instead of regression equations in the initial stages of the four step model. Enhancement to regression models was presented by Straus and Miranda-Moreno (2013) in the study of Montreal using spatial lag regression. The main factors they considered were land use mix, cycle track presence and employment density and they conclude that models that account for spatial lag have lower standard error values than those which ignore spatial effects. The overall comparison of spatial and aspatial methods is proposed also by Selby and Kockelman (2012). They used universal kriging and GWR taking account both Euclidean and network distance. The input data included traffic counts and variables such as speed limit, number of lanes, functional class and accessibility. The results show that spatial methods definitely outperformed the aspatial ones. The best result was obtained when using kriging model with exponential semivariogram. Euclidean-distance methods perform nearly same results as network-distance based methods but they are much easier to use in practice. Another way to involve the network distance into the analysis was proposed by She et al. (2015). They used weighted network Voronoi diagrams in the study of Jiangnan district, China, where two types of spatial analysis methods were used – network-constrained kernel density estimation and the local Moran's I method. Unspecified generators (origins) and events (destinations) were used to produce weights to the street segments and in the constructed weighted Voronoi network the characteristics of how the structure of a street network affects the distribution was considered.

### **3. Planning and decision making in the public administration**

A regional development sets a complex framework of processes, which are applied inside defined regions, and which are connected with a positive growth of economic, social and environmental aspects. Regarding this fact, it is spoken about sustainable development of a region. The vision of sustainable development is based on a long-term process, during which it is necessary to accept an array of decisions. They depend mostly on the accessibility of data, information and knowledge and their appropriate coordination on the local, regional and global level. Generally, the development is defined as a process of positive changes which usually aim to improve quantitative (extensive development), but also qualitative (intensive development) characteristics of a given region. A decision can be simply defined as a process of choice between two or more variants. For each decision making, it is important to specify system, its boundaries and surroundings, in which the decision is to be made. For each system,

it is also important to define inputs, outputs, processes and a “human factor”, which becomes an active component of the system.

Considering the system of decision making process in the field of public administration and self-government activity, input data and information are gained in the form of agenda carried out by many institutions. Ways of communication and data transferring is set among them. Nevertheless, it cannot be alleged, that all necessary data for regional development planning are available at this management level. Many of them, e. g. data about tourist movement, are missing and are often deducted for example based on economic results. The processual part of the system is represented both by legislative and/or financial tools of regional policy, and certificated methodology and procedures, which are implemented in many assessment processes (e. g. SEA). Their outputs are basis for partial decision making in the form of assessment reports, map outputs and table spreadsheets, or a number of processed strategies and marketing studies for regional development. Besides a professional management, an important role is also played by public, which is, on various level of importance, involved into the discussion about important issues.

Inhomogeneity in methodology for strategic planning can be found in all states both in Europe and worldwide in national and also supranational strategic documents. Documents are often created “ad hoc” using project approach, so that fast and flexible solution can be found and a political will can be implemented. Hence, political decisions are directly transposed to regulations without evidence-based instruments (Koprić, 2018). However, such solutions not always fit into wider framework – regional, national or supranational (Salet and Faudi, 2000). There are attempts of application unified methodological instructions for strategic document developers within the European Union. Methods suitable for strategic planning are proposed, so that efficient strategic planning can be reached.

Looking into strategic documents of European countries, the most often used method in all levels is SWOT analysis, e.g. Hungary National Smart Specialisation Strategy, (NIO, 2014), Croatia, Croatian smart specialisation strategy 2016 – 2020 (MRDEUF, 2016), Finnish national and regional strategies - Lapland’s Arctic Specialisation Programme (RCL, 2014) etc. Among other often used methods belong PESTLE, benchmarking, internal capabilities profile analysis, impact analysis, cost benefit analysis, mind maps, comparative analysis or multi-criteria analysis. Also methods such as brainstorming, expert panel and other participative methods or future state index are widely used.

According to Potůček (2006) aforementioned methods are especially suitable for prognostic work. To depict development dynamics, he recommends trend extrapolation, megatrend analysis, Delphi, road maps for science and technologies, decision modelling, scenarios and other. These methods are called processual and require quantitative approach. On the other hand, qualitative methods are suitable for structure identification, here belong for example tree of significance, morphological analyses, future wheels, cross interaction, critical technology etc. Some other authors dealt with the problematics of strategic documents on the scientific level, Rentkova (2017) focuses on regional development support in Slovakia, Oprițescu and Blediman (2017) studied elimination or lowering of significant economic, social and regional disparities, which can be found inside Romania or between Romania and other EU states, Fellenhofer (2017) dealt with individual qualitative and quantitative methods used for strategy creation.

An example of methodology which deals with decision making methods, in the EU context is Guide to Research and Innovation Strategies for Smart Specializations (S3) (EC, 2012). This Guide provides methodology for creation National RIS3 documents (Research and Innovation Strategy for Smart Specialization) in six basic steps. At the initial part, there always

is analysis of regional context and potential, which is used for priority areas determination. No specific unified methodology is declared for this purpose. It is possible to use a lot of methods ranging from purely quantitative to qualitative, combination of both approaches is also often used. Recommended methods are divided into four following areas, but their implication varies in different countries.

Analysis of scientific and technological specialisation is a composite indicator representing quantitative approach. A representative of such composite indicator is used in. It is a composite indicator, which expresses comparative advantage of a region in a given field. It is set on the basis of research and development investment, publication activity and citations and patent application. An advantage of this indicator is, that it enables comparing with other regions, a disadvantage is, that it shows mostly scientific and technological potential than innovation potential for economic benefits.

Another quantitative analysis is used for analysis of regional economic specialisation. A degree of specialization of regional economies is calculated on the basis of employment data. It shows weather a significantly larger number of people are employed in a certain field comparing to other regions or states. However, critical masses of activity can be indicated rather than innovation-driven linkages.

It is important to put these indicators in a relation with other performance indicators such and monitor their time changeability. In the document Croatian smart specialisation strategy 2016 – 2020 (MRDEUF, 2016) and National Sustainable Development Strategy of Romania 2013-2020-2030 (MESD, 2008), the criteria are compared to European average values.

'Cluster' in-depth case studies and peer reviews represents more qualitative method, which carries out relative specializations. This approach was used for the document Lithuanian Regional Policy, White paper for harmonious and sustainable development 2017- 2030. Value chain analysis, context conditions for the operation of the cluster or labour market situation and analysis of the linkages between the clusters are involved. Also Revealed Skill Relatedness (RSR) according to methodology can be used. It is based on a network analysis and job changes data and measures the degree of proximity between industries in terms of skill requirements. Involving mixed regional and international expert panels enable gaining a better overview in international competitiveness, whilst employing stakeholders from other clusters brings the added value of peer review.

Foresight uses prognostic methods and enables systematic consideration of possible future variants and make them accessible to decision makers. The aim is to enlighten possible future trends and open a discussion about development paths. Among the most often used methods belong expert panel discussion and Delphi method, but a number of other methods either quantitative, qualitative or semi-quantitative can be found in literature.

Quantitative methods are according to Popper (2008) defined as the ones, which use measurable variables. Statistical analysis is employed and previous development is taken into account. Especially, benchmarking, bibliometric, composite indicators, time series analysis, modelling and simulation belong here. The use of quantitative methods such as trend extrapolation and impact assessment are recommended in Moldavian document "Methodology for preparation of strategic development programmes of central public administration authorities" (RDA, 2010). Fellnhofer (2018) places among them also a research study, survey, descriptive analysis, structural equations modelling, factor and cluster analysis, regression and correlation analysis, but also Delphi method. Quantitative approach was also employed for assessing the level of region development in the National Regional Development Strategy of

Republic of Bulgaria for the period 2012 – 2022 (MRDEUF, 2012), or National Sustainable Development Strategy of Romania 2013-2020-2030 (MESD, 2008).

Qualitative methods are generally used more often in strategic document elaboration, although they are considered to be less precise, as they are based on subjectivity and creativity, which are difficult to determine objectively. According to Popper (2008) methods such as backcasting, brainstorming, citizen panel, conferences/workshops, scenarios, expert panels, genius forecasting, interview, literature review, morphological analysis, relevance tree, role-play, environmental scanning, Science Fiction Scenario, survey, SWOT analysis, Wild Cards & Weak Signals. Other methods placed here are case studies, classification, theoretical models, road maps, framework analyses etc. (Fellnhöfer, 2018). Among the qualitative methods a special attention to the participative methods has to be paid, as they are the most often used ones (Petrusel, 2013). They are namely citizen panel, conference/workshop or expert panel. Their application can be found in elaboration of National Smart Specialization Strategy in Hungary (NIO, 2014), Croatian Smart Specialization Strategy 2016 – 2020 (MRDEUF, 2016). Participative approach is also used on lower levels of government for example in Romania (Haruta and Radu, 2010), or Shannon region, Ireland (CCC, 2013) and higher, superregional, levels, e. g. the document Mediterranean Strategy for Sustainable Development 2016-2025 (UNEP/MAP 2016) was created via iterative dealing of several workgroups, which resulted in suggestions for the strategic document. Panels discussion and expert analysis, which was verified by national surveys of various stakeholders, was used in the case of Lithuanian S3 strategy (Mosta, 2016). The Brainstorming method is recommended in the process of creating the Sustainable Development Strategy of Latvia until 2030 (CM, 2002). Expert panel proposed main goals using the brainstorming method and created possible scenarios for each. After, a wide public discussion was made about proposed scenarios.

Sometimes, the difference between qualitative and quantitative methods is rather fuzzy. In some cases, mathematical principles for subjectivity, rational assessment and point of view quantification are employed in the decision making process. Hence a third group of methods, so called semi-quantitative, is set aside. Among these methods belong, according to Popper (2008), for example Delphi, key/critical technologies, multi-criteria analysis, road maps, quantitative scenarios, stakeholder analysis. Practical use of them have been already mentioned above, an example of application of multi-criteria analysis can be found in Regional Development Strategy of the Czech Republic, period 2014 – 2020 (MRD, 2013).

#### **4. Summary**

Qualitative and quantitative decision-making methods offer a wide range of decision-making apparatus, which find their main use mainly in economic and managerial fields. Their applicability in spatially oriented sciences (geosciences) is very well known in connection with multicriteria analysis, less is used game theory, linear programming and others. Both the general global mathematical apparatus and their local variants are described in detail in the literature. Despite constantly improving information technologies and our own methodological procedures, rational decision-making is still difficult and obtaining a uniform result is thus unrealistic. The decision-making process itself, supported by information technologies, must therefore properly process both objective information from the external environment (existing data necessary for decision-making) and the subjective approaches (preferences) of decision-makers. While the subjective attitudes of decision-makers cannot be directly influenced, the

processing of existing data into the required form suitable for decision-making can be set and objectified to some extent.

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