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GROWTH OF COMPANIES' COMPETITIVENESS BASED ON THE USE OF FOMO MARKETING STRATEGY ON SOCIAL NETWORKS

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KEY WORDS

commercial communication, social networks, consumer behavior, fear of missing out, FOMO marketing

JEL CODES

M21, M37

1 INTRODUCTION

The presented text deals with the use of the psychological phenomenon FOMO (Fear of Missing Out) in commercial communication on social networks. FOMO is defined as an internal desire to have everything under control. It is a pervasive concern and fear that other people may have enriching experiences that you will miss and therefore you try to be in constant contact with them and not miss anything. Understanding FOMO can influence market segmen-

tation decisions, social media strategies and to help companies in their competitiveness. FOMO strategy is a marketing strategy where businesses use content to capitalize on their target audience's desire to seize an amazing opportunity that only comes along on a rare occasion. The advertising message is constructed in such a way that it can compel the target audience to make an impulse purchase and avoid possible future regrets from non-use of the offer.

2 MATERIAL AND METHODS

The phenomenon FOMO was first identified in 1996 by marketing strategist Dan Herman, who conducted research and published the first academic paper on the topic in 2000 in *The Journal of Brand Management*. Dykman (2012) in his research shows how a person can change his shopping behavior only because he does not want to miss a certain opportunity, i.e., for fear of missing out. Abel et al. (2016) mainly discusses the psychological factor FOMO and describes which groups of people are more susceptible to the fear of missing out. Hodgkinson (2016) presents the exact criteria that marketing strategies should contain like Urgency, Specific time limit, Social proof and It highlights the feeling of a missed opportunity. The experiment was designed according to these criteria. The aim of the eye-tracking research was to find out the center of interest of the respondents

on specific examples and to verify how they perceive the FOMO phenomenon in the context of posts or stories on social networks. This experiment was complemented by a qualitative method, namely a guided in-depth interview. Its aim was to supplement the information found in the first part of the research and to find out the motives, opinions and attitudes towards the given issue. Based on the orientation analysis was determined the age group between 18 and 34 years old, which mainly uses the Instagram social network. Heatmaps and so-called AOI (Area of interest) were used to evaluate the eye-tracking measurement. The most frequently used test for evaluating data from eye-tracking measurement was the parametric test – Student's t-test (Unpaired t-test), which is a test of two mean values.

3 RESULTS

From the results of orientation analysis, eye-tracking measurement and in-depth interviews, it can be said that young people between the ages of 18 and 30 are affected by the psychological phenomenon of FOMO when viewing posts or stories on social networks, where they spend an average of up to 3.6 hours of their day. The majority of respondents connect to social networks via a mobile device and use the computer minimally. Furthermore, recommendations were made for companies that can try to increase their competitiveness level on the market. Companies targeting people under the age of 21 should use click-throughs from Instagram directly to the e-shop or to another part of the website they are promoting. Over the age of 21 years respondents believe that this approach is not safe or they look for products themselves on other websites. The use of the FOMO strategy is best in the third phase of the purchase decision-making process, when evaluating alternatives, or in the first phase of the purchase decision, when recognizing the problem.

Companies should clearly state in their posts until which date, or how many days are left until the end of the discount and avoid deceptive advertising and frequent repetition of time-limited advertisements. Companies should prefer to usage of a time period rather than a limit on the number of pieces covered by the discounted offer. The use of the phrases “Don’t miss” and “Don’t miss out” are no longer a trend in 2022 and should be replaced by less pushy phrases: “You will miss this offer” or “See the bargain before it disappears”. As an alternative for consumers who do not believe in FOMO marketing and are looking for physical evidence, there can be used the Price Waves strategy. The FOMO strategy is especially suitable for companies with clothing and fashion, cosmetics, fitness accessories and products or services connected to leisure activities. A very important part of the FOMO strategy is showing what consumers missed by not taking advantage of the offer after it ended. This will increase the feeling of missing out and consumers will not miss the opportunity next time.

4 CONCLUSIONS

Despite the recommendations mentioned above, a certain part of the participants stated that they are resistant to these marketing tools or find them repulsive. The second group of participants, however, responded to the incentives as expected and stated that their fear of missing out motivates them to find out more about the offers. The advertisement should evoke the fear of missing out, but at the same time not be forced. Companies should take

into account that consumers still want to feel that they were not pressured into the purchase and that the decision was made by them. It is therefore important to find a compromise between the pressure on the consumers and their free will for decision-making. But companies should subconsciously make the target group feel that if they do not take action now, they will regret their decision not to do so.

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FOREIGN DIRECT INVESTMENT (FDI) AND THE CURRENT ACCOUNT BALANCE: A CASE STUDY OF FOUR WEST AFRICAN COUNTRIES

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KEY WORDS

foreign direct investment, west africa, current account, exports, imports

JEL CODES

C23, E00, F21, F32, G11

1 INTRODUCTION

There exists a relationship between FDI, the current account balance and inflow of capital though this relationship is not a straightforward one (Margeirsson, 2015). FDI, notwithstanding its contribution to the growth and development of an economy, is deemed to have serious implications on the balance of payments and foreign exchange reserves of an economy. Overtime, it has been observed that increasing volume of FDI inflows result in high volume of imports and increase profit repatriation along with other effects such as exchange rate appreciation and worsened current account balance especially in developing economies (Sahoo et al, 2016; Jaffri et. al, 2012). This arises because high FDI inflows leads to real appreciation of the currency of the host country which ends up encouraging imports and discouraging exports, thereby worsening the current account balances of the economy (Ali et al, 2019;

Hobza and Zeugner, 2014; Kim et al, 2006). Put another way, FDI inflows strengthens the exchange rate of the host economy and can shift consumption away from domestic products to imported products and this can impact negatively on the current account (Margeirsson, 2015).

Empirically, the impact of FDI on the current account of the host economy has produced varying results ranging from positive to negative and to no effect. The effect of FDI on the current account and the balance of payments accounts in general can be analysed from the perspective of imports, exports and profit repatriation. The objective of this paper is to analyse the effect of FDI on the current account of four West African countries; Nigeria, Ghana, Cote D'Ivoire and Senegal in an attempt to know how increasing inflows affect the current account balance of these economies.

2 MATERIAL AND METHODS

Pooled OLS regression is used to estimate and determine the effect of FDI on the current account of the selected West African countries. Following the model specified by Hossain (2008) and Sahoo et al.

(2016), the current account balance is determined by factors such as FDI inflows, growth rate of GDP, real effective exchange rate, trade openness, inflation, among others. The above determinants are

considered for the purpose of this study. Data is obtained from the World Development Indicators database of the World Bank. The White test for heteroskedasticity and the Variance Inflation Factor

(VIF) test for multicollinearity were conducted to ensure the results from the estimation are unbiased and consistent.

3 RESULTS

After settling on the pooled OLS regression, the results indicate that foreign direct investment and the growth rate of real gross domestic product are statistically significant in explaining the current account balance at 10% level of significance. Trade openness is statistically significant in explaining the

current account balance at 5% level of significance. The real effective exchange rate significantly explains the current account balance at 1% level of significance. However, inflation is statistically insignificant and does not explain changes in the current account balance.

4 CONCLUSIONS

This paper sought to investigate the effect of FDI inflows and other variables on the current account balance in four West African countries. An important consideration from this study is that increasing FDI inflows into an economy regardless of its benefits in the form of technological transfer, increased employment, encouraging efficiency among domestic producers through competition among others, comes with negative implications on the current account

balance of the economy. Therefore, as efforts are made to encourage inflows, policy makers must focus on investments that will be beneficial to the host economy and also identify proper channels where the investments will be directed. For instance, investments that targets the productive rather than the consumption sector of an economy and encourages exports must be prioritised.

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REVEALING THE CONFORMITY EFFECT AT THE ONLINE PUBLIC PLATFORMS FOR PARTICIPATORY BUDGETING AND CROWDFUNDING USING THE EYE-TRACKING METHOD

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KEY WORDS

conformity effect, financing online platforms, participatory budgeting, crowdfunding, eye tracking

JEL CODES

C91, D64, D91

1 INTRODUCTION

In recent years there has been a considerable growth in the use of platforms which harness the social aspects of financing, notably the concepts of participatory budgeting and crowdfunding. Participatory budgeting is based on the idea of the public voting system, where an organization provides the most funds to the projects which acquire the maximum of the public votes (likes). Similarly, in the case of crowdfunding, project exposed at the public online platform receive funding directly from the public. In both systems, the public can see directly the amount of votes (likes) or the amount of awarded resources

(expressed both in monetary unites and percentage). Both approaches might be considered as a form of a social opinion, in a directly quantifiable extent. This brings us to the idea of verifying the effect of social conformity, as originally proposed by Solomon Asch [1], [2]. Objective of this work is to clarify aspects of the conformity effect (influence of the expressed opinions of others on the behavior of an individual) in the frame of the online public platforms (for participatory budgeting and crowdfunding), using the eye-tracking measurement methods and simple experimental design.

2 MATERIAL AND METHODS

We use eye-tracking methods [3], [4], [5] in a frame of a simple experimental desing. Respondents were divided into two groups randomly. Both groups were exposed to the same projects (photo, title of the project, descriptions, etc.), using 2D computer screen equipped with the eye-tracking devise (Tobii x2-30). The only difference between the two groups

of respondents concerned the amounts of likes (participatory budgeting projects) and, analogically, the amount of financial contribution awarded by the public (crowdfunding). The amounts of likes / financial contributions were systematically mutually interchanged between the two groups or respondents. The research design was created and analyzed in the

Tobii Pro Lab software. The stimuli were created on the basis of real projects. As main measures we used the heatmaps and the time of total duration of fixation, in the relative form (in %). As the area

of interest (AOI) we used the table with likes for the stimuli for participatory budgeting projects and the entire area of the project for the crowdfunding platform.

3 RESULTS

In the frame of the pilot research, we analyzed several research settings, and the results can be summarized as follows: 1. Participatory budgets: two projects with significantly different amounts of likes generated significantly different times of fixation duration in the respective AOI (tables with likes), both, when presented subsequently as well as parallelly. On the other hand, projects with similar amounts of likes

generated equally distributed amounts of fixation duration in the respective AOIs. 2. Projects presented at the crowdfunding platforms with significantly higher amount of realized financial contributions generated a significantly higher amount of visual attention, when compared to the project with small level of public contribution (measured by the total fixation duration).

4 CONCLUSIONS

We can conclude that all the findings are fully in accordance with the empirical expectations and in terms of eye behavior pattern clearly confirm the thesis on the conformity effect for both types of platforms (participatory budgeting, crowdfunding). We have found only few papers dealing with the conformity in the frame of crowdfunding [6], [7], [8]. However, none of those employ the eye-tracking methodology. As regards the research of conformity in the frame of participatory budgeting, and the

use of eye-tracking, to our best knowledge, the research is also not numerous. As regards the research limitations, we need to emphasize the pilot character of the hereby presented research and limitations resulting thereof. In terms of practical implications, if the conformity effect will be confirmed, probably the whole industry using the social aspects in financing shall need to reconsider the strategy of project presentations at the online public platforms.

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VIRTUAL ORGANIZATION AND VIRTUAL TEAM

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KEY WORDS

virtual organization, virtual team, communication, communication platform, effectiveness

JEL CODES

A10

1 INTRODUCTION

Technological progress and expanding globalization bring new challenges to the functioning of organizations in the domestic and international space. For this reason, it is necessary to respond flexibly to changing customer requirements, the specifics of local and global markets, the availability of qualified labor, etc. Traditional forms of the structure of organizations and teams with characteristic localization, management, hierarchical arrangement continue to have their application in several spheres of business of organizations, but their functioning is not always efficient enough. There is a relatively large space for the creation of virtual organizations and virtual teams, which bring new elements of communication, reduce the costs of their operation,

make the use of working time more efficient, and increase the flexibility of team members [1]. Both forms of functioning of organizations have strengths and weaknesses, organizations often use them in a combined form. In order to be successful in this, they need to have a deeper knowledge of the above-mentioned issue, for which a thesis can also be helpful. One of the most frequently mentioned reasons for creating a virtual organization is the maximum use of qualified employees, the integration of their professional knowledge, knowledge and skills from different areas, saving time, eliminating the costs of employee travel, sharing identities between workplaces and involved organizations throughout world [2].

2 MATERIAL AND METHODS

The main goal of the thesis is the proposal of measures and recommendations for the effective functioning of the virtual team, as well as the calculation of the costs necessary for its functioning.

The main source of material for the preparation of the thesis was mainly domestic and foreign professional literature, as well as professional articles available on the Internet and research carried out in the form of questionnaires and consultations. The mentioned sources represented the primary source

of data collection on the current state of the issue being addressed. The secondary source of information was own knowledge and experience from completed studies abroad, surveys and case studies available on the Internet. Quantitative data collection the authors of the paper realized through a survey in the questionnaire form. Qualitative data collection was carried out based on the interview with the manager of the virtual organization.

3 RESULTS

Effective communication is a key factor in the success of collaboration between virtual team members. Several obstacles emerge from the conclusions of the questionnaire survey and barriers in virtual communication. Among the most common obstacles the authors can include the following: Technical problems associated with communication tools, Language problems, Incompleteness of information at the required time, Multicultural problems and Low trust,

non-compliance with deadlines, and related failure to meet goals on time and to the required extent.

Further, the authors of the paper make an evaluation of the costs incurred for the functioning of a traditional team and a virtual team, the costs incurred for its transformation from a traditional form of team to a virtual team, their comparison including the calculation of savings for the first and second year.

4 CONCLUSIONS

In order to remove the mentioned barriers, the authors of the paper recommended providing technical equipment of the required level for all members of the virtual team, which would make the communication of the virtual team more effective from a technical point of view. To eliminate language problems, the authors of the paper recommended paying particular attention to active listening, paraphrasing, passing on information in an appropriate and required form, and verifying the manager's understanding of passing on the necessary information.

The authors of the paper recommended removing the multicultural problems that prevent effective communication as follows: get to know the culture of all members of the virtual team, on the basis of which it is possible to better understand the way

of thinking and behavior of the members of the virtual team and adapt the method and form of communication within the virtual team accordingly. An important part is also the preparation of minutes after each working meeting of the virtual team for the purpose of summarizing the most important points and tasks with deadlines for their fulfillment, which will also ensure the fulfillment of goals and tasks in the required time and scope.

The authors of the paper consider the timely identification and understanding of the essence of the problem, its elimination and the adoption of measures to prevent its recurrence to be an important recommendation related to the solution of any problem within the framework of communication in a virtual team.

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THE EFFECTS OF INCREASING MINIMAL WAGE ON THE FINANCIAL INDICATORS OF COMPANIES

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KEY WORDS

corporate finance, firm profitability, nominal minimum wage, regression analysis

JEL CODES

E24, G30, J31

1 INTRODUCTION

Minimum wages are widely used around the world as a tool for redistribution or as a way to achieve higher wages in countries where the bargaining power of employers and employees is rather unbalanced [1]. The economic impact of the minimum wage continues to be debated among policy makers and researchers. Although a rich literature has rigorously documented the positive impact of the minimum wage on the earnings of low-wage workers, existing studies provide ambiguous predictions about the potential effects on performance, including changes in firm profitability, capital, labour productivity and sales. Evidence on how firm profit is affected by increase in the minimum wage has attracted little

attention [2]. There are only a limited number of authors analysing the impacts of the minimum wage at the firm level, for instance, in the UK Draca et al. analysed the empirical relationship between minimum wage legislation and firm profitability, see [3], and in Poland Chorna in [2] studied the empirical evidence that firms more affected by minimum wage increase. The aim of this paper is to empirically verify the possible relation between the increase in the minimum wage and firms' financial indicators in Portugal, which are affected by the so-called 'Economic Adjustment Programme' concerning the Portugal labour market.

2 MATERIAL AND METHODS

Minimum wage data were obtained from the Eurostat database. For the analysis of Portuguese firms, the necessary data were obtained from the Orbis database. Specifically, firms were selected from those sectors where the minimum wage burden is expected to be one of the highest, namely accommodation and food service activities, and office administrative activities (NACE codes 55, 56 and 82). The relationship between increase in minimum wage and the firm indicators was examined with use of regression analysis of panel data. Two strategies were used to

select firms for the purpose of estimating models: strategy A includes firms with complete time series and strategy B includes only those firms with at least 50% of the values in the respective time series. Regression analysis was performed for panel data covering a period of 10 years (2009–2019). Analysis is provided for both original and differentiated data, examined are fixed effects models as well as random effects models. Calculations were provided in MATLAB R2021b computational system and Gretl 2022b software.

Tab. 1: P-values of t-test and signs of estimated parameters for selected differenced financial indicators (CostEmpl means Cost of Employees, ROA is based on Profit/Loss before tax, Liquidity means Liquidity ratio).

Sector	EBIT margin		CostEmpl		ROA		Liquidity	
	p-value	Sign	p-value	Sign	p-value	Sign	p-value	Sign
Accommodation A	<0.001	–	<0.001	+	<0.001	–	0.261	+
Accommodation B	0.015	–	<0.001	+	0.085	–	0.875	–
Administrative A	<0.001	+	<0.001	+	<0.001	+	<0.001	+
Administrative B	<0.001	+	<0.001	+	<0.001	+	0.441	+
Food A	<0.001	–	0.129	+	<0.001	–	0.533	–
Food B	0.071	–	0.016	+	0.058	–	0.196	–

3 RESULTS

Models with fixed effects were preferred in all cases according to results of Hausman test. To avoid spurious regression, we use models based on differences of particular variables. Results for selected financial

indicators are presented in Tab. 1. Beside this, for all sectors we observe significant positive effect of minimum wage increase on number of employees.

4 CONCLUSIONS

Minimum wage increase caused higher number of employees followed by higher costs of employees in all observed sectors. Changes in liquidity ratio were not significant mostly. In accommodation and food sectors this led to significant decrease of both EBIT margin and ROA; we can assume that many employees in these sectors worked for wage very close to minimum wage, and minimum wage increase

raised wage of many of them. In administrative sector we can assume another situation: increase of minimum wage pressured on wage increase of this sector indirectly and administrative sector became attractive to a wider range of workers with better productivity. These assumptions will be verified by further research.

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RELEVANCE OF MARKETING STRATEGIES IN THE GERMAN CLOTHING MARKET

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KEY WORDS

marketing, economics, economic development

JEL CODES

M31, L10

1 INTRODUCTION

Due to many external and internal influences, various developments in terms of structures and orientations can be recognized in the marketing in the German clothing market. Therefore movements of the marketing in the market can be observed, which are becoming more and more recognizable through the formation of different specializations. These focuses are characterised by extremely different and diverse areas in the marketing strategies of the respective acting companies.

The target audience becomes more flexible, more discerning and accordingly partial more complex to reach. Different channels than in the past must be used to achieve the customers through marketing.

It seems that marketing strategies become a more and more important position in the German clothing market.

The question is not only about the intensity of the relevance of marketing strategies in this research field, furthermore also how they work and which aim they are following. In this case it is important which marketing facts should encourage the consumer to

buy the clothes and which are good to accordingly generate sales in this industrial segment. The market in the clothing segment in Germany is very much accelerated in its actions.

There must be chosen different emphases. It should also shown the differences between current examples of such developments in the German clothing market. Next to the “conservative fashion” market also should be researched different business models. The “fast fashion” market the “slow fashion” market are today also clothing markets which are designated by various features. Different market circumstances often make these companies very popular with consumers. Obviously the point of marketing regarding different markets, which could be explored in more detail here, is of great importance for that work.

For companies and their markets it seems possible that marketing strategies, appropriate the literature, becomes a more and more higher significance. This is important to review success factors and generate them in this work.

2 MATERIAL AND METHODS

The research question of the study is: “How important are marketing strategies in the German clothing market?” Different methods are used, in order to

answer the research question of this research work. The focus of the research of the present work is on a survey of companies in the German clothing

market. The aim of this survey is to research how the importance and developments in marketing strategies in companies are as well as how they are working and changing. Afterwards these developments are then researched both in terms of the current status as well as in relation to current handling and additionally also in relation to any future changes.

In order to focus more closely on the marketing and delimit the area of said marketing, research should be done on different individual points. Thus main areas regarding the marketing strategies should be the price, the product, the place and the promotion. The origin of these different areas can be described as “4p’s”. The German clothing market is one of the largest German consumer goods market and the research focuses here mainly on the B2C area. The behaviour regarding the consumer in the marketing strategies stays in this research in the foreground.

3 RESULTS

The research results related to this subject area, should, in addition to very well structured explanations, be presented in various drawings and diagrams. Therefore it is of great importance to have a good structured layout and to proceed with a precise scheme. The results should then be presented broken down according to the different areas of the localized

Marketing is an important factor in the clothing market in general and will likely increase its relevance in the future.

In addition to the survey in the German clothing market, interviews with experts, as well as visits to trade fairs and congresses, where experts can talk about these topics, are planned. Current literature sources that affect said topic are important for research too.

Moreover the research which is made in relation to marketing strategies should also produce a result on how this area deals with the two points consisting of “production conditions” as the first point and “environmental conditions” as the second one. These sectors in this branch of the clothing market are often standing in the foreground and should be examined carefully by marketing strategies. IBM SPSS shall be used to analyze the researched data.

4 CONCLUSIONS

Having shown the results into which marketing strategies has been classified and regarding to its relevance in relation to this work, it is now of importance to show which conclusions can be drawn.

marketing strategies. The main areas that are dealt with in the marketing strategies are the following: price, product, place and promotion.

It is to be assumed that marketing strategies tends to gain more importance and accordingly has to be specialized increasingly, in the market and towards the customer.

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THE ECONOMIC EFFECTS OF JOINT TAX AUDITS EXECUTED ON THE NEW LEGAL FRAMEWORK ACCORDING TO DAC 7

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KEY WORDS

joint tax audits, international taxation, DAC 7

JEL CODES

H25, H26, K34

1 INTRODUCTION

The Council of the European Union passed the so-called DAC 7 directive (Directive on Administrative Cooperation) on March 22nd 2021. In essence, the directive is about cross-border co-operation between EU administrative authorities. In the area that is important for current tax auditing practice, the further development carried out in DAC 7 is what are known as joint audits, which are becoming increasingly important for companies operating across borders in the EU / EEA and require timely audits (Zimmerl, 2021). For this purpose, a new Article 12a with the heading joint tests will be introduced in DAC 7, which must be implemented in the law of the EU member states by January 1st 2024 at the latest. With this new legal framework numbers of

practical issues in the execution of joint tax audits shall be solved (Eisgruber, 2020). The Article 12a of the DAC 7 is the first legally binding provision in the European Union to perform joint tax audits and a big step forward to a common procedural law within the European Union. As a consequence it is still questionable whether the new legal framework achieves the goals to avoid a double taxation and to avoid a non taxation as well as to avoid tax fraud and profit shifting. It has to be examined what economic and legal certainties the new legal regime for taxpayers will have. Moreover it has to be shown what improvements and uncertainties joint tax audits according to the DAC 7 will have for taxpayers.

2 MATERIAL AND METHODS

With the method of quantitative content analysis the existing literature to joint tax audits will be systematically analysed. With the method of legal comparison the current framework and the new legal framework of DAC 7 will be compared.

With a quantitative content analysis the existing literature on the fields of joint tax audits will be sys-

tematically analyzed to find out in a deductive way the reasons for double-taxation and non-taxation, the weak points of the current framework and the economic impact of joint tax audits. In the first step of the quantitative content analysis it will be defined what kind of content (e. g. scientific literature, expert blogs, journals) is used. The content will be

categorized. It will be analysed by frequency analysis how often what kind of words in relation to joint tax audits will be named. According to that the current issues of the legal framework for joint tax audits shall be proven. With the method of legal comparison between the current framework and the new legal framework of DAC 7 the improvements of the new legal framework will be identified. The method of legal comparison is particularly suitable to research

the differences between the current and the new legal framework because there is a comparison within the same legal system in just different time periods. With the legal comparison gaps and improvements can be identified. In a first step the issues will be defined. In a second step the differences between the current and the new legal framework will under a functional aspect be worked out. In the last step the researched result will be interpreted.

3 RESULTS

The practical benefits are to find out the significant improvements of joint tax audits under the new legal framework of DAC 7 by using accepted scientific methods. This helps taxpayers to understand and to accept joint tax audits and the resulting effects. The theoretical benefits are to show whether the new legal

framework is suitable to execute joint tax audits in a legal certainty and to identify weak points. The on the basis of this result in this dissertation developed own models to how weak points and uncertainties can be solved can be used to progress the legal framework for joint tax audits.

4 CONCLUSIONS

About 60 studies and about 50 reports to joint tax audits were reviewed. The most of the publications to joint tax audits are focused on tax fraud and profit-shifting and on the examination of the current legal framework for joint tax audits (Criclivaia. 2020). Some of the publications are real cases discussions and researches on the advantages and the obstacles to an efficient joint tax audit procedure. A few authors have presented an own approach to defining joint tax audits, to providing a final result and an own developed legal bases of the joint tax audits. The literature on joint tax audits mainly focuses on the advantages and obstacles of using the instrument, and the need to amend legislation. Furthermore the

open legal questions which are the information and consultation obligations of the taxpayer is discussed (Haverkamp, 2020); adequate tax data protection despite information exchange across the border; coordination problems due to uncoordinated national procedural rights; multinational tax audit with third countries. There is one publication on how DAC 7 will affect future joint tax audits and how this will result in improvements in the legal framework for carrying out joint tax audits although this is the new legal framework as of January 1st 2024. This one publication is focused on the taxpayer's rights within a joint tax audit under the new legal framework (Cicin-Sain, 2022).

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THE EFFECTS ON DEMAND BEHAVIOR FOR OCCUPATIONAL PENSIONS THROUGH THE OCCUPATIONAL STRENGTHENING PENSIONS ACT (OSPA)

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KEY WORDS

Betriebsrentenstärkungsgesetz (BRSG), company pensions schemes, company pension strengthening law, old age poverty

JEL CODES

G52, J10, K00

1 INTRODUCTION

The German pension system consists of three layers: the statutory pension insurance, the private pension and the occupational pension. Due to the demographic development and the decided pension level reduction the statutory pension alone will be less and less sufficient to secure the standard of living or as a protection against old-age poverty, which is why the future of the German pension system has been intensively discussed for years (German Council of Economic Experts, 2016/17). Considering that occupational pension provision looks back on a history of more than 150 years and was introduced before statutory pension insurance, statutory regulation did not take place until 19 December 1974, 104 years later (Betriebsrentenberatung, 2019). Initially, occupational pension provision consisted of four implementation channels. By the mid-1990s, almost every third employee in the private sector had made provision for old age in the form of

an occupational pension. However, the demand for occupational pension provision stagnated in the course of the 1990s. A good 28 years later, a legal entitlement to occupational pension provision was established by the 2001 pension reform on 1 January 2002. From this point on, every person in an employment relationship was entitled to occupational pension provision. The aim of the mandatory right to occupational pension provision was to counteract the stagnation in occupational pension provision (Leiber, 2005). 16 years later, a milestone was set in the reform of occupational pension provision in Germany with the entry into force of the Betriebsrentenstärkungsgesetz (BRSG) on 01.01.2018. The BRSG pursues the political goal of increasing the dissemination of occupational pensions through greater demand in order to secure the standard of living in old age (Menzel, 2019).

2 MATERIAL AND METHODS

In the theoretical part, according to Mayring the methods of qualitative content analysis will be used for the proposed research and those of quantitative content analysis to review the existing literature in this paper (Mayring, 2015). For the empirical part, questionnaires are first created. As part of the representative sample survey, employees are interviewed. The questionnaires are based on socioeconomic groups such as gender, age, education, industry and company size. Furthermore, expert interviews from middle and senior management who are responsible for the area of occupational pension provision will be interviewed. The extensive literature research for the qualitative content analysis,

the current state of research and the legal and theoretical part were researched with the help of the databases like google scholar, journal of pensions economic and finance and much more. The literature search by google scholar identified 328 sources for the German term “Betriebsrentenstärkungsgesetz”. A further narrowing down to the effects on the demand behavior for occupational pensions due to the OSPA then revealed only 56 sources of which 35 were considered relevant. Only sources that meet the generally applicable scientific requirements and quality were classified as relevant. The methods of qualitative and quantitative content analysis were described by Mayring (Mayring, 2015).

3 RESULTS

Based on the introduction of the OSPA and the resulting legal obligation to promote company pensions plan with at least 15 percent, positive effects on demand behavior and thus the spread of occupational retirement provision are expected. The evaluation

of the employee surveys and expert interviews will then show whether positive effects can already be demonstrated and this hypothesis can thus be proven.

4 CONCLUSIONS

From the literature research, the conclusion can be drawn that there are only a few publications to date that systematically deal with the influence on the demand for company pension plans due to the OSPA. As a result of this finding, our article seems

to address a research gap. It can be assumed that demand for company pension plans has increased as a result of the German OSPA. The analyses of the employee surveys and expert interviews are intended to substantiate this hypothesis.

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SUSTAINABLE ACTIVITY OF FOOD BANKS IN THE CZECH REPUBLIC IN RELATION TO THE PLANNED STRATEGIC CHANGES OF THE EU AGRI-FOOD SECTOR IN THE PERIOD 2021+

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KEY WORDS

food bank, food waste, sustainability

JEL CODES

O13, Q18

1 INTRODUCTION

The problematic framework of the activity of food banks in the European area can be identified primarily in a wide range of areas for managerial solutions, which include, on the one hand, the financing of this type of activity with regard to the necessity of compliance with hygiene regulations, food donation standards (e.g. [1], [2], [3]). Although food is provided to these banks free of charge, their operation depends on subsidies from the state budget. Specifically, these

are operating and investment subsidies, especially from the budget chapter of the Ministry of Agriculture of the Czech Republic [4].

The EU strategy for the period 2021+ targets the need to transform the agri-food complex with an emphasis on fair market conditions, quality, safety and environmental friendliness of production systems. [5]

2 MATERIAL AND METHODS

A review part of article is based on the revision of the current state of art in the field of effective service provision of food banks in the context of new strategic goals of EU Common Agricultural

Policy. The empirical part is based on comparison of accessible financial data, which provide an outlook into the status and financial position of that specific type of entities.

3 RESULTS

There is a positive effect of the relevant subsidies on the volume of distributed aid due to support for the reconstruction and construction of storage areas

for food storage, including technological equipment within domestic food banks and other entities with a humanitarian focus.

The current situation of the energy crisis, influenced by the war conflict in Ukraine, causes an increase in the number of clients in material need. These people then turn to food banks again. The

stated facts affect the need for additional funding sources for food banks, but also the growing need for volunteer work.

4 CONCLUSIONS

Current situation in financial support for ensuring the activities of food banks from the government authorities is overall stabilized, but there exist a growing effort to change the funding scheme for food banks in the Czech Republic.

The mentioned aspects are then conceivably reflected in the sustainable activity of food banks

in the Czech Republic, respectively basic attributes in connection with ensuring the sustainability of this type of public services. In particular, these are technical limitations in the area of the volume of distribution of food aid to people in material need, respecting nutritional, or health restrictions of the final recipients of the given type of food aid.

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VARIATIONAL AUTOENCODER FOR DIMENSIONALITY REDUCTION

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KEY WORDS

machine learning, autoencoders, neural networks, dimensionality reduction

JEL CODES

L86, G14

1 INTRODUCTION

Implementation of machine learning algorithms is computationally demanding and thus it is very important to keep data mining procedures as cheap as possible (Meng, Catchpoole, Skillicom, Kennedy, 2017). Therefore, feature extraction is a crucial part of data preprocessing and its goal is to compress data while the level of information included in dataset stay unchanged. Moreover it is often that the features in dataset are highly correlated among them

and so no additional information can be obtained by machine learning algorithms. The analysis uses variational autoencoder for dimensionality reduction of financial and corporate data. The study brings hands-on methodology how to compress dataset to have highly informative medium and simultaneously probe autoencoders in the environment with low signal-to-noise ratio.

2 MATERIAL AND METHODS

Autoencoders are neural networks mimicking (generating) output with an objective to be close as possible to input values. The set of such algorithms is called an unsupervised learning and it is used for clustering task and feature extraction as aforementioned. The algorithm starts with data compression (encoding) the original data into feature tensor z which is significantly smaller than original tensor x (Langr, Bok, 2019). The encoding process is retrieved from passing input data x through neural network layers l which are fully connected to the previous one $l - 1$ or convolutional layers which compress the input to a lower-dimension (smaller) representation (Bengio et al., 2015). This hidden layer with the lowest number of nodes (the lowest-dimension representation) is

called bottleneck and since that the autoencoder reconstructs the encoded signal to its original representation (Vincent, Larochelle, 2010). Basically autoencoders pass the input data or generally tensor and fit code dictionary that encode-decode the raw input from one representation to another. The basic idea behind a variational autoencoder is that instead of mapping an input to fixed vector, input is mapped to a specific distribution. This approach is more general and robust and covers the original set up, since it is a specific limit case where the distribution function collapses to the one point (analogously like Dirac delta function). The loss function is constructed from two parts. The first one is the reconstruction loss and the latter is Kullback-

Leibler divergence between the distribution $q\theta$ and $p(z)$. The divergence measures how much information got lost while decoding (reconstructing) process.

The study use a basic variational autoencoder (Welling, Kingma, 2019) architecture where the input vector has got a length 100, representing close price of the 100 companies listed on New York Stock Exchange and the list records approximately¹ the largest companies by the market capitalization. The

neural network architecture has got 3 layers and the intermediate layer has got 50 units with a rectified linear unit activation function and decoded vector of length 100 with a sigmoid activation function. The final evaluation will be obtained via the predictions which should in the ideal scenario mimick market movements (exchange traded fund for SP100 in our case).

3 RESULTS

This work tested a stock dataset against a exchange traded fund data. After 10 runs and collecting 50 closest points (for each run) a set of testing was collected. The representation of each company was set up as equall. The constructed index copied the benchmark exchange treaded data only the first quarter of 2020. The results suggest the ability of the variational autoencoder to extract the significant information and reconstruct input with lower volume of data a thus it is efficient for machine learning task

in environment with such a low signal-to-noise ratio as the financial data is. The divergence in the first quarter in 2020 is caused with absence of the largest technological companies in the involved companies. Because the sample of 100 stocks is not large enough, this divergence should not be evaluated as a inability to mimick the input data or on the other hand the ability to keep companies with higher growth potential.

4 CONCLUSIONS

The variational autoencoder can be useful part of a machine learning workflow even in the environment with a low signal-to-noise ratio. The results show its ability to decrease number of analysed features while the information value of dataset stays unchanged. The opposite conclusion is the autoencoder can be used to reliably predict values. Despite the fact the

results could be interpreted that the autoencoder is a useful predictor, the inadequate robustness of input data force me to conclude in opposite way. The future research could probe the autoencoder via using a synthetic dataset generated by stochastic simulations.

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¹The term approximately is due to the fact that the market capitalization is dynamically changing every day but surely I can considered the represantives as giant corporations. While to keep strictly 100 largest companies is not important for the study I find that definiton sufficient enough.

PEST ANALYSIS OF THE INTRODUCTION OF VIDEO CONSULTATION IN PSYCHOTHERAPY IN GERMANY AT THE TIME OF THE SARS-COV-2 PANDEMIC

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KEY WORDS

PEST analysis, video consultation, outpatient psychotherapy

JEL CODES

I18, O33

1 INTRODUCTION

One of the many significant impacts of the SARS-CoV-2 pandemic was what has been called “social distancing.” Many processes that had previously taken place in direct, face-to-face contact in commercial enterprises, schools, service companies and the like were now carried out via Internet-based solutions wherever possible. This eventually also affected the field of outpatient psychotherapy in Germany, an area of the healthcare system in which work without direct, personal contact with the patient had previ-

ously been unthinkable and also not permitted. Thus, the possibility of video consultation has caught both patients on the demand side and psychotherapists on the supply side unprepared. With the help of the PEST analysis it should be evaluated retrospectively whether the very fast introduction of the video consultation due to regulatory measures on the part of the health system should also have been taken from an economic, entrepreneurial point of view or perhaps rather not.

2 MATERIAL AND METHODS

The examination is carried out with the help of PEST analysis. The aim is to analyze external political, economic, socio-demographic and technological influences that have a positive, neutral or negative impact on the introduction of video consultation in outpatient psychotherapy in Germany. With the help of a structured literature review, research results are sorted according to these four categories of

influences that arise in the rapid introduction of video consultation for outpatient video consultation in Germany. The first step is a literature search via databases using search strings (vom Brocke et al. 2009). These are based on the four categories of the PEST analysis. In a second step, the results are analysed, summarised, and evaluated using a structuring content analysis (Mayring 2007).

3 RESULTS

Due to the long periods of government and chancellorship (Presse- und Informationsamt der

Bundesregierung (Bundesregierung) 2022), the self-administration of the health system and the

Political influences	Economic influences	Socio-demographic influences	Technological influences
Political stability	Demand for outpatient psychotherapy	Age structure	Coverage of fast internet
Legal framework	Strenght of health system	Income distribution	Hard- and software
Pandemic laws	Economic loss due to sick leave	Disadvantaged groups	Equipment of patients
Subsidies	Saving time	Region and access to outpatient psychotherapy	Training on new technologies

stable legal certainty, political fluctuations can be considered low risk factors for the introduction of video consultation. There is a great need for outpatient psychotherapy, also in the future, in order to absorb the high economic damage caused by psychologically induced absenteeism (Statista Research Department 2022), (Statistisches Bundesamt 2020). However, with an ageing society and a multiple burden of mentally ill people as well as an increase in financially weak patients, it is to be expected that only a small proportion of

patients will be able to use video consultation hours at all. Neither hardware nor software is subsidised for patients or psychotherapists, nor is there training for the use of the new technology. A serious factor is that coverage with fast internet is mainly limited to urban areas and cities, while rural areas are rather poorly equipped. In addition, the provision of outpatient psychotherapy is worse in rural areas than in urban areas. I.e. especially in rural areas, video consultation could save travel time and the risk of infection.

4 CONCLUSIONS

There is a great need for outpatient psychotherapy in Germany at a constantly high level. Due to the SARS-CoV-2 pandemic, it is even assumed that there will be a significant increase in demand. Mental illnesses lead to many days of absence due to illness, which in turn causes great economic damage. Video consultation could be a possibility to continue the necessary therapy even in pandemic times during lockdowns or quarantine. Video consultation could also help to save time due to long journeys, reduce the spread of diseases by avoiding direct contact and prevent the isolation of people in danger by continuing the therapy via video. However, the access requirements for the use of video consultation are unequal. These depend on regionality and the

expansion of fast internet, but also on age and the severity of the mental illness as well as social status and financial means. Video consultation replaces outpatient psychotherapy in direct contact and does not lead to a higher number of treatments. At best, it absorbs shortfalls due to quarantine or lockdowns. Since there are neither subsidies for hardware or software nor training in the use of the media, nor is fast internet available nationwide, according to the PEST analysis the introduction would only make sense from an economic point of view for psychotherapeutic practices if the financial burden outweighs the risk of work loss due to infection, quarantine, lockdown or patient anxiety.

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THE IMPACT OF SARS-COV-2 PANDEMIC ON SUPPLY AND DEMAND FOR OUTPATIENT PSYCHOTHERAPY IN GERMANY

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KEY WORDS

SARS-CoV-2, pandemic, outpatient psychotherapy, supply and demand

JEL CODES

I15, I11

1 INTRODUCTION

Due to the very rapid and unforeseen SARS-CoV-2 pandemic, there were enormous changes and restrictions worldwide. These changes affected not only private lifestyles through restrictions on social contacts, quarantine measures, illnesses or deaths, but also many other areas, such as the economy and the healthcare system. As part of the healthcare system, outpatient psychotherapy was also greatly affected by the rapid changes. From the patient's perspective, inpatient interventions have been significantly squeezed by freeing up capacity for intensive care units, closing inpatient clinics due to SARS-CoV-2 outbreaks, or converting patient rooms to fewer patients per room. On the other hand, the

uncertainty of the unknown pandemic, the permanent media presence, own experiences with SARS-CoV-2, illness or deaths in the environment resulted in a significant increase in demand for outpatient psychotherapy. On the supply side, psychotherapists were affected by the same consequences of the pandemic, with similar fears of illness and death, quarantine measures, their own illness, hygiene measures and remodeling of practice rooms and the like, which often led to a reduction in treatment capacity. This paper aims to show the different dynamics of supply and demand for outpatient psychotherapy in sudden crisis situations with the goal of being able to respond more quickly and efficiently to future crises.

2 MATERIAL AND METHODS

First, the changes in supply and demand for outpatient psychotherapy before the outbreak of the SARS-CoV-2 pandemic and afterwards are considered. For this purpose, statistical data are considered and evaluated. With the help of a qualitative content analysis according to Mayring et al. (Mayring und Fenzl 2019), a 4-field scheme will be used to analyse

which factors favour an increase in demand and supply, and which factors cause a decrease in demand and supply. To do this, a literature search is first carried out in databases using search terms (vom Brocke et al. 2009). The results obtained are then analysed, summarised and evaluated by means of a structuring content analysis (Mayring 2007).

3 RESULTS

According to the Federal Statistical Office, there was a 19% increase in the number of psychotherapists from 2015 to 2019 (Statistisches Bundesamt 2021). According to the Federal Association of Statutory Health Insurance (Kassenärztliche Bundesvereinigung (KBV) 2022), the number of non-physician psychotherapists in statutory health care has risen

from 28,116 (as of 31 December 2019) to 31,308 (as of 31 December 2022), an increase of 11.35%, which was only slightly higher than in previous years. This contrasts with an estimated 40% increase in patient demand from 2020 to 2021 alone (DPtV 2021).

The results of the literature review are not yet available.

4 CONCLUSIONS

There is much to suggest that there has been a shift in the demand and supply of outpatient psychotherapy. The slight increase in psychotherapists (compared to previous years) contrasts with a significant increase in demand, especially since the outbreak of the SARS-CoV-2 pandemic. On the one hand, it is assumed that demand effects have arisen through a redistribution from inpatient to outpatient treatment. On the other hand, however, it is also due to

aggravation of already existing mental illnesses and new illnesses as a result of the pandemic. A long-term increase in demand due to post-covidity and long-covidity still needs to be investigated. The study could provide an impulse to increase the number of outpatient therapy services and thus help to reduce the enormous economic damage caused by sick leave and absenteeism from work due to mental illness.

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DOCUMENT VERIFICATION USING BLOCKCHAIN

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KEY WORDS

blockchain, Bloxberg, data verification

JEL CODES

C88, L86

1 INTRODUCTION

It is common practice to store documents in a shared, cloud-based repository provided by a third party. Cloud storage has become a modern standard, but in its basic form, it also carries many disadvantages. One of the disadvantages is the lack of trust in a third party or a central authority (company, institute or state) that we use for our services.

Central authority can be a problem for several reasons. It may fail technically, economically or personally. Although the data are usually secured, there is always a risk, that they will be stolen. Due to centralisation, the entity can be easily attacked. Servers and data are located in one place. Companies and institutions are also vulnerable to man-in-the-middle attacks [1]. The company may go bankrupt, which may lead to further problems and prevent users from accessing their data. And certainly, there can

be a personal failure of an employee. The company has usually access to the stored data, hence an employee can deliberately or accidentally tamper them. Uncontrolled access by the company is an especially complicated issue in case of sensitive data like health information etc.

Blockchain could function as a supplement to such a classical solution, or even replace it. In the first case, the user will save his data on regular storage and use the blockchain to store the digital fingerprint of the data. This will help him verify the integrity of the data. In the case of sensitive data, the user can store the data locally and use the blockchain as well.

In the second case, the data can be stored directly on the blockchain. However, it should be taken into account that this data will be publicly available on the public blockchain.

2 MATERIAL AND METHODS

We are using the Bloxberg blockchain and network [2]. The core client is forked from Ethereum and the consensus algorithm is proof of authority. For storing data and hashes we use smart contracts written in the Solidity programming language [3].

One of the primary use cases is hashing documents. An author of a document hashes his document and stores the hash on the blockchain with some basic

identification of the document or the author. The documents itself is not stored on the blockchain. When another user receives mentioned document from the author, he hashes the document again and compares the new hash with the original hash stored on the blockchain. This verifies the originality of the shared document.

3 RESULTS

We created our smart contracts for specific purposes and successfully deployed them on the blockchain. On the Bloxberg network creating, deploying and executing smart contracts is free. Nevertheless, we had to create an account with a wallet and request some berg tokens to the account from Bloxberg faucet. The purpose of this is the prevention of attacks, so the request was completely free.

Then we created the user interface for the insertion of documents and hashing them. We connected the frontend to the user's wallet account, which served as a bridge between the user and the blockchain. We used a metamask wallet. Different types of data have been successfully added to the new block and attached to the blockchain.

4 CONCLUSIONS

The Bloxberg network has proven to be a reliable platform for storing and verifying data. A clear advantage is that it is free of charge and its performance is more than adequate. In our further research, we will focus on creating a service that will

simplify the entire process of storing data on the blockchain without the necessity of creating a wallet, which can be a substantial obstacle for many users. At the same time, we will add additional functions to the document verification process.

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OPTIMIZATION OF PLANT AND ANIMAL PRODUCTION IN AGRICULTURAL FIRM

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KEY WORDS

operational research, linear programming, stochastic programming, agriculture

JEL CODES

C15, C61, Q12

1 INTRODUCTION

The efficiency of economic activity determines whether a given enterprise can be competitive on the European agricultural market. Institutional income of agricultural enterprises, coming from national and European sources, which provide differential annuities as a significant share of the enterprise's income, is lower in Slovakia than in the Western countries of the European Union. This creates a fundamental

requirement for achieving high efficiency in order to maximise income from the sale of farm output.

The aim of this paper is to find the optimal production structure of crop and livestock production. The objective will be fulfilled through the construction of optimization models and in particular linear and stochastic programming, where such models aim to maximize the profit of the enterprise or minimize the costs.

2 MATERIAL AND METHODS

Huttman (2011) [1] summarized the functions of agriculture into several points, namely that it: provides the necessary raw materials for human life as well as for other production, influences foreign trade and contributes to the cultivation of the country.

Csabay et al (2011) [2] state that the agricultural sector enables a country to increase the supply of food for domestic consumption, increases domestic savings, provides for the transfer of labour to the industrial sector and contributes to foreign exchange earnings through the export of surpluses. It is the provision of affordable food and labour to other economic sectors that the authors consider to be the most important role of agriculture.

The input data will be obtained from the given enterprise for the years 2013–2020. These data will include detailed data on crop and livestock production, crop yields, hectares, hectare yields, revenues, costs, etc., which will be necessary for the optimisation models. The optimization models will be solved with the objective of profit maximization, cost minimization and also optimization models that will contain random parameters in the objective function will be constructed. Such optimisation model of the mathematical programming problem looks and can be written in the following form (Jablonsky, 2007) [3]:

Maximize or minimize

$$z = f(x_1, x_2, \dots, x_n)$$

with constraints:

$$g_1(x_1, x_2, \dots, x_n) \geq 0$$

$$\vdots$$

$$g_m(x_1, x_2, \dots, x_n) \geq 0$$

$$x_m \geq 0, \quad m = 1, 2, \dots, n$$

Hřebíček and Škrdla (2006) [4] argue that mathematical models provide a clear and comprehensible description of the factors that are relevant to a given situation and allow to uncover the relationships between the elements of a given system under study.

In the framework of this paper, production planning task, which is focused on the goal of determining the structure of the production program that generates maximum profit or minimizes costs will be used (Kubišová, 2014) [5].

3 RESULTS

Total of 7 optimization models were calculated in order to find out the optimal production structure of crop and livestock production. All optimization models were subject to constraints that had to be respected and included in the optimization process. However, the different models had different objectives, which were achieved by different mathematical

apparatuses. Model number 3 was selected as the most appropriate model which can be practically used in given company. Total profit from crops was 316 024 EUR and profit from livestock 41 052 EUR. The total profit that could be obtained with a production split based on the results of given model would be 357 076 EUR.

4 CONCLUSIONS

The result of this paper is recommendations for the management of given company in making decisions to focus production practices to maximize the desired

economic outcome, and these recommendations could replace decision making that is often based on habits and conservative managerial decisions.

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AUTOMATION OF HUMAN WORK AND THE LABOR MARKETS OF THE V4 COUNTRIES

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KEY WORDS

labour markets in V4, automation of human work, V4

JEL CODES

F66, J08

1 INTRODUCTION

The company Koyo Bearings ČR modernized the line for the production of bearing rings by using technologies that are characteristic of Industry 4.0. After this modernization, the company only needs two workers to operate the line (previously it was four workers). The remaining workers were trained in other work skills - turning and grinding. With this step, their qualifications were expanded and their multifunctionality increased (SP ČR 2021). This is a positive example of changes in labor markets related to the automation of human work. However, the question is whether, in general, the labor markets in the Czech Republic and in the other V4 countries

are ready for a greater occurrence of new technologies in the workplace - in connection with the experience and professional orientation of employees.

In the Czech Republic, Confederation of Industry of the Czech Republic requests changes in connection with the preparation (education) of the potential workforce and the current workforce. For example, in connection with the current workforce, it requires a well-thought-out system of retraining and reskilling. This system should enable workers to move better on the labor market in connection with increasing digitization (SP ČR 2021).

2 MATERIAL AND METHODS

First of all, it is necessary to realize that technological progress will affect almost all fields of work (Carr 2015). In any case, findings from the literature point to the fact that occupational fields where there is a higher incidence of routine work will be particularly affected: Chmelař, Volčík, Nechuta and Holub (2015) Autor (2013), Acemoglu and Autor (2011) or Makó, Illéssy and Borbély (2018).

The author's goal is to use cluster analysis to characterize the similarities between the structures of labor markets across European countries and then, with the help of time series and descriptive

statistics, to identify differences between individual clusters, but especially to identify specific differences that are related to the automation of human work. The intention is to find out how the V4 countries are prepared for the gradually ongoing automation process in comparison to other countries, according to their labor market structures.

Data from ILOSTAT and EUROSTAT will be used to analyze the data. Specifically, it will be data related to substitutability in individual fields of work or data related to the willingness of employees to participate in their self-education.

3 RESULTS

The results found can prove whether the V4 countries have greater or lesser substitutability in the occupational fields that, according to the literature, are potentially the most prone to automation. At the same time, the results of the work can be impulses for national economic politicians to make reforms in labor markets or for politicians dedicated to the education sector to make reforms in educational

systems. At the same time, the work can point out how important it is to invest in the education of employees (and in specific fields of work) on the part of employers.

On the contrary, the work may also prove that the automation of human labor may not be as much of a threat to the V4 states as it is to other European states.

4 CONCLUSIONS

In addition to focusing on the changes in the labor markets in the V4 countries in connection with the automation of human work, the work also has another meaning - It can, for example, draw attention to the risk of technological unemployment, which can also result in the following: insufficient functionality of the social system, the breakdown of marriages and families or increased crime in that state. In other words, work can also serve as an impetus for

discussions regarding the prevention of technological unemployment. This is also a sociological overlap of this work

The work can also motivate a greater transfer of innovations to the business sphere or a more efficient use of the workforce in the given enterprises - following the increase in competitiveness and current global trends (the use of new technologies that are connected to Industry 4.0).

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THE IMPACT OF RETENTION FACTORS IN THE CRAFT SECTOR

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KEY WORDS

employee retention, human resource management, craft, job satisfaction

JEL CODES

M54, J28

1 INTRODUCTION

The labour markets have undergone a significant transformation in recent years. Whereas companies used to be able to choose from many applicants, today, the issue of the “shortage of skilled workers”, especially in the craft sector, is very present. Young skilled workers, in particular, are highly sought after, which means new retention measures are needed [1]. Therefore, craft companies must be aware that they need instruments to keep their workforce skilled and secure the qualifications and competences of the younger generation [2,3].

The work “The craftsmen” by Senett [4] sheds light on this craft field but more from a theoretical perspective. The purpose of this paper is to find out the main reasons for employees leaving the company and what motivates people to stay in the firm. Therefore, various researchers review research on employee retention that may help HR managers design strategies to retain or improve the duration of young employees in a craft organization.

2 MATERIAL AND METHODS

A systematic literature analysis examines the factors that make people stay in firms. Since little or no research has been done on employee retention in the skilled trades, the search was extended to other sectors to identify possible factors that could also be relevant for the skilled trades in the next step. Based on an intense literature review, the research intends to answer the following research question: “What are the leading factors for employees to stay in a firm and to what extent are these transferable to the craft sector?”

The analysis includes publications from 2002–2022 and consists of German- and English-language pa-

pers. Publications before 2002 were only considered if essential definitions and foundations were relevant for the review. For this purpose, the following databases and library catalogues were used for the literature search SCOPUS, JSTOR, ProQuest, Google Scholar, Google Search, Web of Science and Springer Link.

The search terms used were for example, retention | employee retention | craft sector | employee retention factors | Mitarbeiterbindung im Handwerk and others. The boolean operators AND/UND | NOT/NICHT | OR/ODER were used to connect the search terms. Selection of the literature based on the following order:

First, review of the title, second, screening of the abstract, third, complete reading of the text and fourth, the inclusion of the analysis. Finally, the collected data material was examined specifically regarding the research question. The literature review identified a total of 2338 potential sources, of which 340 proved to be relevant to the stated research question. All references were sorted and structured

according to scientific requirements and quality. For this purpose, ten principal codes and 28 subcategories were developed inductively and deductively.

The literature was coded with MAXQDA software, following an inductive, data-driven approach. Literature was analyzed and systematized according to structured content analysis [5].

3 RESULTS

Employee retention is one of the most critical parameters for measuring the health of a company. Wise employers never underestimate the importance of retaining the best talents. Employees take knowledge capital, relationships, and investments with them when they leave a company. The results of the systematic literature analysis show that the publications focus primarily on the question of why people leave the firms but less on the query about what makes people stay. Two overarching motives why people stay are job embeddedness and job satisfaction. Not

a single factor leads to a retention of a combination of managerial aspects, a feeling of belonging and the compensation aspect etc., is relevant for this.

One of the main problems in the craft industry is that there are often no regular meetings with the employees, which could identify possible dissatisfaction at an early stage. The boss of the craft company not only carries out the craft activities but also has to take care of the personnel issues, accounting, wages and so on. Further reasons that motivate people to stay are analyzed in the paper.

4 CONCLUSIONS

The literature review shows that the need to retain employees can be a crucial factor for a successful human resource (HR) policy. However, it also needs further research to keep young people in skilled trades

companies long-term, especially in the craft sector. Furthermore, for those craft enterprises that deal with personnel retention measures, the shortage of skilled workers can be prevented in the future.

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RETAINING YOUNG EMPLOYEES IN CRAFT SECTOR

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KEY WORDS

employee retention, human resource management, craft, job satisfaction

JEL CODES

M54, J28

1 INTRODUCTION

Craft companies are faced with numerous challenges. In particular, the issue of skilled workers and the changing conditions for recruiting and retaining them is a significant problem. Young people, in particular, are an essential source of a sufficient supply of skilled workers in the long term. Forecasts for the future show that demographic change and an increasing tendency toward academization will not improve the situation. The first effects are already noticeable

[1]. Therefore, craft companies must be aware that they need instruments to keep their workforce skilled and secure the qualifications and competences of the younger generation [2,3].

The study aims to identify the relevant factors for apprentices to stay in the craft sector after their apprenticeship and give recommendations for craft sector managers to retain qualified young employees successfully.

2 MATERIAL AND METHODS

The research consists of qualitative and quantitative data. The first part, qualitative research, consists of 12 semi-structured expert interviews with managers of craft firms. All of them train apprentices actively and have fewer or no problems with retention. The interviews are coded through MAXQDA software, following structured qualitative content analysis by Mayring [4].

The second part, a quantitative study, consists of 200 datasets. An online survey was designed with closed and open questions answered by apprentices in the craft sector in Germany in the third year of apprenticeship. To ensure that the trainees all reliably complete the questions, this is done in the vocational schools under the supervision of

the teachers during class time. The questionnaire was designed from open and closed questions with the findings of the previous literature review and qualitative analysis.

The survey was conducted at vocational schools in the federal state of Baden-Württemberg. This is where Germany's most significant shortage of skilled workers in the skilled crafts sector. Over 300 vocational schools in Baden Württemberg teach trainees in skilled crafts. The largest sector is the building and finishing trades, including professions such as bricklaying, carpentry, floor-laying, etc. This is also where the most considerable shortage of skilled workers lies. The schools in Baden Württemberg that teach these trades were sorted, and the link was

sent to the school management so that the students could fill it out. It is expected that 15 classes from 50 selected schools will participate, and 200 valid questionnaires can be evaluated.

Based on the described situation, the research intends to answer the following research questions:

- What are the leading causes for craft apprentices to remain in the craft sector after completing the

apprenticeship, and how can they be strengthened?

- To what extent are “stay-factors” during and after the apprenticeship a successful part of the retention strategy, and what are the requirements from an apprentice’s point of view?

The software SPSS is used to evaluate the data, and correlation analysis, regression analysis and interaction analysis of the available data are performed.

3 RESULTS

To retain young people in the craft sector and especially to the company in the long term, it is necessary to look at and examine various factors. It is not one factor that determines whether young people stay in the company after their training, but often one factor that is the reason for leaving. Numerous factors were derived from qualitative research and supported by quantitative results. Factors such as leadership style, loyalty, salary, satisfaction, autonomy and others can be named for this.

It is essential to plan and communicate with the trainees early on about whether they want to stay in the company and what needs to be done to make this happen. Unfortunately, many craft enterprises do not conduct personnel interviews and usually react very situationally.

In addition, for those skilled crafts enterprises that engage in personnel retention measures, the shortage of skilled workers can be prevented in the future, especially for our young professionals.

4 CONCLUSIONS

Whether young people stay in the craft sector has a lot to do with a combination of different stay factors. Leadership style, work environment and the opportunity to learn something new (f.e. gain professional experience on the job) are essential factors why young people decide to stay. Unfortunately, craft businesses are often limited regarding professional

development within the company or do not have an early conversation with young professionals about whether and how they can imagine their future in the company.

There is still a need for more research in the training and retention of skilled workers.

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VAT GAP IN THE CZECH REPUBLIC

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KEY WORDS

VAT gap, tax gap, VAT revenue, tax revenue, tax policy

JEL CODES

H21, H26

1 INTRODUCTION

Tax revenues represent almost 50% of public revenues [7], and these revenues are an indispensable resource for the functioning of the state and the provision of public goods, but this kind of revenue is reduced by tax evasion. In response to the decline of these resources, tax obligations may be increased and additional controls introduced. However, increasing tax rates may also increase the incentive for entities to continue tax evasion, which will not increase public revenue anyway, leaving only an additional administrative burden. The VAT gap could be used to measure the impact of legislative changes on VAT revenues. This tax represents a significant source of tax revenue, but it is also one of the most vulnerable taxes to tax evasion and tax fraud [3]. The VAT gap represents the difference between the amount that should have been collected in value added tax

and the amount that was actually collected [1], [4], [8]. However, there may be several reasons for the discrepancy between these two amounts, such as taxpayers going bankrupt or tax arrears; this part of the VAT gap is the policy gap. The other part, the compliance gap, represents the tax fraud itself [2]. A top-down or bottom-up approach can be used to quantify the VAT gap. The top-down approach processes aggregated statistical data, while the bottom-up approach involves direct interviews with taxpayers as well as tax audits. This paper will use the top-down approach, specifically the GDP clean-up method. This method is relatively simple and requires data that are available over long time periods. This allows the VAT gap to be quantified over several years and thus to assess its evolution over a longer period of time.

2 MATERIAL AND METHODS

For the calculation of the VAT gap, the GDP cleaning method was chosen. This method was used by the consulting company Reckon [6] and further developed by Zídková [9]. In this method, the theoretical VAT revenue needs to be determined, and subsequently it is compared with the actual tax collection. In order to find the theoretical VAT revenue, the value of GDP per year is treated as the value of consumption in the national economy including VAT. The overall procedure is shown in formula 1.

$$\begin{aligned} \text{CNE} = & \text{GDP} - \text{export} + \text{import} - \text{GCF} \\ & - \text{C}_{\text{COLL}} + (\text{GCF} + \text{IC})_{\text{NPISH}} \\ & + (\text{GCF} + \text{IC})_{\text{GOV}} + (\text{GCF} + \text{IC})_{\text{FIN}} \\ & - \text{C}_{\text{RES}} + \text{C}_{\text{NON-RES}} + \text{GCF}_{\text{HOUSE}} \\ & + \text{GCF}_{\text{NON-TAXPAYER}} \\ & - \text{production for own final consumption,} \end{aligned}$$

where CNE – consumption in the national economy, GDP – gross domestic product, GCF – gross capital formation, IC – interconsumption, C_{COLL} – collectiv consumption, C_{RES}, C_{NON-RES} – consumption by

residents and non-residents, NPISH – non-profit institution serving households, GOV – government, FIN – financial institution, HOUSE – households, NON-TAXPAYER – non-taxpayer.

First, GDP is adjusted for exports and imports. Particular attention should be paid to adjustments relating to the sectors of NIPSH, financial institutions and government. Their gross capital formation and intermediate consumption need to be included. Special attention needs to be paid to the household sector. The gross capital formation of non-payers should be included. I have assumed gross capital formation of households less expenditure on housing. Only that part attributable to non-taxpayers was added. I found the share of non-taxpayers very simply

by the ratio of VAT payers to personal income tax payers. The expenditures of residents abroad need to be subtracted, and conversely, the expenditures of non-residents in the country need to be added. Furthermore, production for own final use has to be taken into account.

Since the Czech legislation stipulates three rates: the standard one, the first and the second reduced rate, the weighted average VAT rate needs to be chosen for the calculation. To calculate it, data on the final use of commodities sorted according to two-digit CPA codes are needed. VAT rates are assigned to each item according to the legislation validated in the year in question. The final use expenditure represents the weights for calculating the weighted average rate.

3 RESULTS

If these data are available and the procedure described above is followed, it is possible to determine the value of the VAT gap over a longer time series.

Subsequently, it is possible to assess the impact of individual legislative changes on tax revenues.

4 CONCLUSIONS

When interpreting the results, the fact that the VAT gap is not equal to VAT evasion have to be taken into account. It represents the discrepancy between the tax revenue that should have been collected

and that was actually collected. The reasons for the discrepancy include tax arrears, but also inaccuracies in national accounting [1],[6],[8].

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G-QUADRUPLEX BULK MUTATIONS

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KEY WORDS

G4, quadruplex, DNA, DNA mutation, bioinformatics

JEL CODES

C63, C88

1 INTRODUCTION

G-quadruplexes (G4) are gaining more and more functional relevance at the DNA level with therapeutic potential of the structure presence. The need for a tool with bulk processing capabilities increased especially after introducing the gapless human genome [1]. This brings the possibility to gain more insight about human genome and newly

discovered structures in the DNA. G-quadruplex formation is dependent on G-rich nucleic acid sequences and the structure itself plays vital role in transcription, translation, genomic stability, and telomere maintenance [2]. The result of this paper is a publicly available tool for bulk analysis of multiple sequences at once.

2 MATERIAL AND METHODS

G-quadruplexes are DNA structures defined by high occurrence of guanine clusters between nucleic acids. The quadruplex detection algorithm is defined by G-richness and G-skewness previously introduced by G4 Hunter algorithm [3].

Each position in sequence has a score evaluation in the range of -4 to 4 . Adenine and thymine nucleotides have the score of 0 , guanine has positive score and cytosine (as the complementary part of guanine) has negative score according to the size of the cluster of nucleotides. The final score is divided by the length of a window of the analysed sequence. According to the threshold of a desired score, we can continue with a mutation of the sequence resulting

in increasing or decreasing of the score (according to the strand which is part of the analysis).

Web interface for analysing direct sequence of given length does exist in the form of G4Killer [4], but it has limited capabilities in the form of the length of the sequence and the possibility to mutate only the sequence which was obtained through the input. Through this paper I am presenting a improved publicly available tool for bulk analysis of given files containing sequences. For the purpose of the analysis of the whole human gapless genome, the tool loads a single *xlsx* file full of sequences and mutates every sequence split into overlapping windows with no limits. There is a possibility to define greater window of score calculation if needed as well.

3 RESULTS

The tool was tested on a dataset of around 1800 sequences of the average length of ~ 210 base pairs. The algorithm is capable of mutating around 280 sequences per second while each sequence is also split into smaller sliding windows of the size of 25 base pairs. Because of the sliding window, it is hard to hit the memory limit, because score calculation is made in the window area and the mutation is done in place

of the sequence. The limitation is the maximum row count in the xlsx file, which results in analysing the maximum of 1 million sequences. While the speed and possibility to mutate longer sequences are the key factors of improvement, the possibility of enlarging the score window (in order to obtain G-clusters near the ends and calculate the score properly) is also a plus.

4 CONCLUSIONS

The created publicly available tool is a command line implementation of the G-quadruplex score evaluation. The existing solution (G4Killer) has its limitations in the form of calculating the score of single sequence of a fixed length and the analysis one by one via web interface or API. The presented tool is memory effective, variable and capable of

bulk analysis of multiple sequences at once while putting the result back in a provided file. Because of these new features, the vast parts of human genome can be analysed at once if needed. The tool is publicly available at <https://github.com/jan-havlik/g4-bulk-sequence-killer>.

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INFLUENCE OF THE DEPTH OF INFORMATION OF SUSTAINABILITY LABELS ON THE PRODUCT AUTHENTICITY PERCEIVED BY THE CONSUMER: CORRELATION OF INFORMATION DEPTH AND IMPLICIT PERCEPTIONS OF CONSUMERS BY THE IMPLICIT ASSOCIATION TEST

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KEY WORDS

sustainability, labelling, communication

JEL CODES

M14

1 INTRODUCTION

In terms of confidence in a product proposition, the literature names two major factors. Functionality implies if the product meets the needs of the customer, whereas authenticity describes whether the offer corresponds to the advertised product or not (Vega-Zamora, Torres-Ruiz, & Parras-Rosa, 2018).

A lack of perceived authenticity of a product's sustainability is due to consumers' emerging sensitivity to greenwashing. This refers to the declaration of sustainability factors in a product that are not fulfilled to achieve a higher sales price. (Schmuck,

Matthes, & Naderer, 2018) (Arouri, El Ghoul, & Gomes, 2021)

Previous studies have shown that consumer understanding of a sustainability label positively impacts the perception of a product's sustainability. (Van Loo, Caputo, Nayga, & Verbeke, 2014) (Gutierrez, 2020) (Schoenheit, 2014) (Marette, Messéan, & Millet, 2012) This paper will examine how a higher depth of information, in addition to a label, impacts the perceived authenticity of a sustainability proposition.

2 MATERIAL AND METHODS

There is a lack of quantified differentiation in literature between the depth of information and perceived trust. (Carmela Aprile & Punzo, 2022) From this, the following hypothesis is formed.

H₁: There is a positive correlation between information depth on a label and perceived authenticity.

To investigate these factors, an Implicit Association test (IAT) is undertaken to measure the

implicit attitude of the potential consumers. For this, participants must combine the initial target concept with associative attributes. Thereby, in the initial target concept labels with and without concrete examples are shown. The associative attributes here are synonyms for authentic and inauthentic. Both target concepts are combined once with one and

once with the other attribute group to measure the reaction time in the IAT, which indicates the implicit attitude. The test results are evaluated using Greenwald's improved d-score, which gives a quantification of which combination of factors had a faster response time and therefore describes the implicit attitude. (Greenwald A. G., 2003)

3 RESULTS

In the survey, 94 interviews were completed. According to the measurement of the d-score, it can be observed that generated labels with concrete examples were perceived as more authentic than labels without concrete examples. In the described test setup, a d-score of 0,73 was achieved. This corresponds to a faster assignment of the more concrete examples to

the authentic objects than the other way around. In the context of this study, it can be concluded that, as assumed in H_1 , there is a positive correlation between depth of information and perceived authenticity, as shown by the determined association above the mean of the rating scale.

4 CONCLUSIONS

In general, a higher depth of information positively affects the perceived authenticity that a label or information has on the consumer. The additional information gives the consumer a feeling of trust. This is in line with previous studies on the factor of

understanding the label's content. It can be assumed that the additional information given in text form helps the consumer understand the effects of his or her actions and, by this, increases the perceived authenticity.

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THE UKRAINE CONFLICT: NOT ONLY A CRISIS FOR THE HUMAN FOOD SITUATION

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KEY WORDS

Ukraine war, agriculture, agribusiness, pet food market, pet farming, agricultural supply chains, Five Forces Model

JEL CODES

Q110

1 INTRODUCTION

The pet food industry in Europe has been affected by the past and present Corona epidemic, supply chain disruptions and the current war in Ukraine, as have other related food industries. Energy shortages due to Russian supply restrictions and deliberate stoppages as well as raw material shortages of cereals are the main factors here. They are accompanied by shortages in the area of food-related oils and fertilizers generally necessary for agriculture. In general,

in the pet food sector an increased accumulation of suppliers took place until the beginning of the Corona pandemic. In order to present the industry in a data-based manner, the statistical overviews of the European Pet Food Industry (FEDIAF) are included, which cover the market for whole Europe. With the pandemic, the industry has been pushed by households acquiring more pets in 2020 and 2021.

2 MATERIAL AND METHODS

Methodologically, the analysis of the industry based on Porter's Five Forces Model. The industry is analyzed based on the influence mechanisms of the entry and exit barriers. Current statistical evaluations by EU bodies, the OECD and experts are used as the data basis for the current situation and placed in the context of pet food industry. The data basis makes it possible to depict factors of raw material

shortage, supply and energy problems and presents an overall picture of risks of the industry participants. Using the data obtained and evaluating it as factors influencing the pet food industry, Porter's industry analysis is explicitly applied to this. The five forces that Porter has defined as influencing determinants for the industry are summarized here in a separate model structure and analyzed in terms of content.

3 RESULTS

The results show that the pet food industry will have to look for an alternative supply chain due to the shortage of agricultural raw materials and gas supplies. The risks are primarily in the short term, which may lead to renewed dependencies with new suppliers, which will be reflected primarily in rising prices. Given the mixture of problem areas that affect them personally, such as inflation, rising energy costs in conjunction with already existing high-cost factors

in the areas of mobility and housing, customers will turn to cheaper products or prefer the new industry participants that can generate cost advantages. Many of the identified problem areas also depend much on government intervention in their management, either in the form of certain protective mechanisms for the industry or by putting even more pressure on industry participants through energy nationalization and distribution ranking.

4 CONCLUSIONS

Solutions can only be found in form of finding alternative supply chains and suppliers to compensate for the shortfalls. In addition, producers will have to find ways to make their production more energy efficient or to switch to alternatives that will make them less dependent on Russian imports. One possibility in the area of dry feed production is used as a benchmark

by the producer Josera TM in the form of steam drying, where the energy sources gas or oil can be completely replaced by sustainable and alternative energy sources. An imitation effect here would be an adequate partial solution to the existing problem portfolio.

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HOW DOES BEING PRIVATE EQUITY-BACKED EFFECT THE POST-IPO PERFORMANCE OF COMPANIES IN THE DACH-REGION?

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KEY WORDS

private equity, post-IPO performance

JEL CODES

G19, G24, G29

1 INTRODUCTION

In the underlying research, the after-market performance of Private-Equity backed IPOs in the DACH-region between the beginning of 2012 and the end of 2019 will be analyzed and compared to non-PE backed IPOs. Literature review showed that there is little recent evidence about the influence of being PE-backed on the post-IPO performance in the DACH-region, which motivated the researchers to conduct the present study. The already existing, mostly not very recent publications achieved partly

contradictory research results: While Mian and Rosefeld (1993) [1] detected a significant outperformance of PE-backed companies that went public over non-PE-backed ones within three years, Brau et al. (2004) [2] research showed that there were no performance differences between VC-backed and non-VC-backed IPOs. In contrast to that, Vivani et al. (2009) [3] detected a negative impact of PE involvement on the companys' long-run performance.

2 MATERIAL AND METHODS

By using the Bureau van Dijk's database a sample of PE-backed and non-PE backed companies that were listed between 2012 and 2019 on the DACH-market was used. Later IPOs will not be observed since the aim of the study was to observe the midterm performance and not the short-term one. Furthermore, the data was only retrieved for companies that were listed on the stock exchange for the whole period under review. In total, 125 companies were observed – 85 of them were not PE-backed and 40 were PE-backed. As the companies were listed within different years, the three-year and five-year post-IPO performance

could not be determined for every company, as the companies are simply not listed long enough. When it comes to non-PE-backed companies, the three-year performance of 73 companies and the five-year performance of 35 companies could be observed, while the three-year performance of 36 and the five-year performance of 19 PE-backed companies was observed. Since the aim of the study was to find out if there is a performance difference between the one, three- and five-years post-IPO performance of PE-backed and non PE-backed companies, t-tests were conducted. The t-tests allows to compare the groups'

mean values (pairwise comparison). To find out, if there is a relation between earnings per share (EPS) and being PE-backed, the Pearson Correlation was used since it measures if there is a linear relationship between two variables. If the value is positive, it can be expected that the variables increase / decrease

together, while a negative value means that one value decreases when the other one increases. A correlation coefficient that is close to 0 indicates that there is only a low association between the variables (Kirch 2008).

3 RESULTS

To find out if there is a significant difference between the post-IPO performance of PE-backed companies compared to non-PE backed ones, a T-Test was conducted. For this study, the significance level was set at 5%. This means that if the T-Value is higher than 5% or 0.05, the hypothesis is rejected. It turned out that there was not statistically significant difference between the performance of stock prices one year after the IPO between PE-backed and non-PE-backed companies, $t(123) = 1.234$, $p = 0.219$. Looking at the stock price performance after three years, again no significant difference between the

groups can be determined, $t(107) = -1.355$, $p = 0.178$. When it comes to the post-IPO performance five years after the IPO, there was again no significant difference detected $t(52) = -1.975$, $p = 0.54$.

When it comes to the average EPS according to our sample, investors on average benefited from higher EPS between 2018 and 2021 when they invested in NPBC. Nevertheless, one cannot ignore the fact that the observed groups were not equal size, since the number of NBPC was partly twice as high as the number of NPBC which makes generally valid statements not possible.

4 CONCLUSIONS

In the study, the differences in stock price performance between PE-and non-PE backed companies on the DACH-market within one to five years after the IPO were observed and t-tests were conducted.

Surprisingly, no significant differences could be detected. Instead, it was found out that the duration a company is listed is positive related with the earnings per share.

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THE SUSTAINABILITY BALANCED SCORECARD, A TOOL TO MEASURE CORPORATE SUSTAINABILITY: LITERATURE REVIEW

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KEY WORDS

sustainability balanced scorecard, sustainability measurement, literature review

JEL CODES

M12, M14

1 INTRODUCTION

Sustainability management is becoming one of the most trending topics nowadays because the importance and focus on sustainability are crucial for companies and their perception by the general public. Companies' sustainability is related to their values and strategies, and their activities should have the most negligible impact on the environment and society. Therefore, companies are encouraged to engage in sustainable development to achieve a competitive advantage actively. Critical issues tend to focus on integrating sustainability into decision-making and finding measurement tools to measure sustainability in companies. Companies should not limit themselves to measuring their performance only in financial terms but should be able to measure their social and environmental impact. One of the tools introduced in recent history is the

Balanced Scorecard (BSC), created by Kaplan & Norton in 1992. These authors brought a tool that measures the performance of companies not only from a financial point of view but also from a non-financial perspective. The BSC integrates four elements – financial, customer, business processes and learning and growth into corporate strategy and values (Kaplan & Norton, 1996). The original BSC does not explicitly focus on measuring sustainability (Johnson, 1998; Epstein & Wisner, 2001; Figge et al., 2002; Schaltegger & Wagner, 2006; etc.), so researchers came up with a new approach to the BSC and brought the Sustainability Balanced Scorecard (SBSC). The SBSC explicitly shows the measurement of the sustainability of companies. This literature review aims to introduce the SBSC as a measuring sustainable performance tool.

2 MATERIAL AND METHODS

Relevant literature was searched to conduct a literature review and find out the key researchers' thoughts on using the SBSC. Firstly, publicly available databases such as Google Scholar were searched and then the Scopus and Web of Science databases freely available for Prague University of Economics

and Business students. In this regard, the search terms “sustainability measurement”, “sustainability balanced scorecard”, and “sustainability management” were used. For the review, 35 scientific articles in English were identified as relevant and were further analysed.

3 RESULTS

In general, the analysis of research papers shows that incorporating sustainable development elements into the Kaplan & Norton (1996) BSC is an essential issue for managers focusing on measuring sustainability performance to follow and meet companies' strategic objectives. The SBSC can be used as an initial support structure for implementing sustainability into practice. It can be presented as a comprehensive, valuable concept and tool that considers and measures all aspects of sustainability through corporate social responsibility and sustainable corporate development. The papers show that the SBSC integration promotes improved sustainability performance, and the implementation of sustainable strategies enables companies to manage their sustainable development

providing a high potential for corporate sustainability management. Its implementation into corporate management systems leads to fundamental changes in corporate governance and translates sustainability strategies into operations. No approach is best suited for integrating sustainability into the BSC. Approaches to embedding sustainability into the traditional four-pillar BSC vary, and in some cases, a fifth additional pillar is even added to the BSC, creating a separate pillar specifically focused on sustainability. It is argued that the creation of the SBSC explicitly increases sustainability accountability. Finally, because the SBSC is based on the traditional BSC, a well-known measurement tool among managers, it is easy to understand. On the other hand, the SBSC is challenging to construct well.

4 CONCLUSIONS

The SBSC is a comprehensive sustainability management and performance measurement tool that helps companies achieve their sustainability goals and strategies. Since the first introduction of the BSC, several research papers have been conducted on its use and development, as well as the implementation of sustainability into the tool. The optimal architecture of the tool has not yet been confirmed as to how it could be used to measure sustainability, but

to users' satisfaction, there are several approaches that can add value to their management. It is clear from the research that sustainability management and measurement will receive even more attention in the future. Addressing sustainability and its implementation in the companies' management has proven to be very important for their functioning and natural development.

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OUT OF THE BOX – A RISK MANAGEMENT EMBEDDED VIEW ON THE PROCUREMENT OF SUPPOSEDLY NON-LETHAL POLICE RESOURCES

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KEY WORDS

police, risk management, police resources, baton

JEL CODES

D62, H23, H41

1 INTRODUCTION

In Germany and Austria, the police perform numerous sovereign tasks which, for constitutional reasons, are their sole responsibility and cannot be transferred to private security companies. In particular, the police act as a monopolist in the exercise of state power. The intricacy and volatility of such extraordinary police situations present the police with enormous practical as well as formal obstacles. This is due to the fact that the police officers involved occasionally employ measures whose outcomes are difficult to predict. The investigation is centred on how the police are currently managing these threats. The

study is less concerned with the neglected acquisition costs and more with the potential impact of the use of police equipment, both for the users and for others who are directly or indirectly affected. However, the focus is on the extent to which these specific risks are covered by police risk management and whether such risk management is already anchored in the organisational structure of the police. Finally, there is also the question of the extent to which the resulting reputational damage to the police service is taken into account.

2 MATERIAL AND METHODS

Among the police resources, only the baton is examined, which has already been available to the police forces of both countries in a specified and modified form for some time. The example of the Austrian police illustrates that sufficient experience has been gained on the baton and its use to bring about a strategic decision by the Austrian parliament to introduce a special model. This is intended to close the existing gap between the use of pepper spray and

firearms. In this context, the baton model was tested in various (special) units of the Austrian police. Furthermore, the German police officer Metzner and his Austrian colleague Zwanzinger also independently deal with the management of special risks in the acquisition and use of batons. In addition, federal and state parliamentary printed matter also represent valuable sources of information that are already available as qualitative empirical data in text form.

Another text form that can be used to assess the management of specific risks are transcripts generated by interviews in a first step. For this purpose, semi-standardised, semi-narrative, guideline-based interviews are conducted with Metzner & Zwanzinger. Here, the interview conducted in person and recorded with a digital recorder is to be understood as a structured procedure with the aim of prompting the two experts to give verbal answers through openly posed questions [1]. The audio files represent the raw data which, after transcription (2nd step), serve as a basis for further analysis and

interpretation [2]. In this context, a guideline is developed as a survey instrument, which is oriented towards the underlying research questions and is applied equally to both interviews. The qualitative content analysis of the cumulated data will attempt to get even closer to the strategic core of the police. Particular emphasis is placed on this aspect of the process. In particular, the corresponding scientific theories that have emerged within the framework of the analytical method offered by Mayring & Fenzl [3].

3 RESULTS

Metzner & Zwanzinger have a wealth of training expertise in addition to actual experience using various baton models. Both experts concur that having such a tool on one's person might defuse the situation. Dangers arise in particular from the use of the baton in the absence of training and advanced training. At this point, it must be made clear that the risks associated with the use of the baton (physical injuries and reputational damage to the police service) can only be established using

assessments made by the Austrian police. In view of the data protection stipulated in the German Data protection Regulation (DSGVO), a key finding of the study is that such surveys are not even conducted in Germany. In this respect, it can be correlatively stated that in the German police forces there is a lack of essential subtasks of a generally valid risk management, which relate in particular to the analysis, monitoring, management and evaluation of corresponding risks.

4 CONCLUSIONS

Police batons and their use are inherently dangerous, regardless of the model. One advantage is another disadvantage. Extensive training in particular is suitable for minimising these dangers for the police counterpart as well as for the police themselves. The starting point is a mature risk management system

that takes the dangers into account and handles them professionally. A limitation of the article is the elaboration on the need for improvement, which could possibly be eliminated by a consistent reporting system.

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AN ANALYSIS ON THE AVAILABILITY OF ESG RATINGS OF STOCK EXCHANGE LISTED COMPANIES WORLDWIDE

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KEY WORDS

ESG, ESG rating, emerging markets, developed markets

JEL CODES

M14, Q56

1 INTRODUCTION

The subject of ESG (environmental, social, governance) and sustainability in general is becoming increasingly important and popular in the media and in politics [1]. Companies are facing pressure from investors, the public, and peers to implement ESG principles in corporate decisions and strategies [2], and are thus undergoing a shift from purely maximizing self-interest to maximizing social interest [1]. Also through political regulations, e.g. the EU sustainable finance action plan as part of the Euro-

pean Green Deal, ESG issues are directly promoted and can have a explicit influence on the future direction of companies and the capital markets [1]. The aim of such regulations is, for example, to promote sustainable investments and transparency in economic activity [3]. The objective of this work is to provide an overview of the current availability of ESG ratings at the capital markets worldwide, taking into account regional levels.

2 MATERIAL AND METHODS

This study is based on company data from 43,061 companies listed on the stock exchange from a total of 49 countries worldwide (excluding financial companies according to GICS classification). The data was collected yearly for a period of 11 years from 2011-2021 by Refinitiv Datastream and includes the ESG score from Refinitiv Eikon. The score comprises a scale from 0-100. According to the MSCI market classification 2022, the countries were categorized as developed markets (22 countries), emerging markets (14 countries), frontier markets (5 countries) and

stand alone markets (5 countries). Three further countries could not be assigned. For further analysis, a group of companies from the developed markets is formed and a group from the emerging markets+, which contains the companies from the emerging markets, frontier markets, stand alone markets and others. There are 23,076 companies in the developed markets group and 19,985 companies in the emerging markets+ group. Data cleaning and analysis was performed using STATA.

Tab. 1: Descriptive statistics esgscore by group

Variable	group: developed markets						group: emerging markets+					
	n	Mean	SD	Min	Mdn	Max	n	Mean	SD	Min	Mdn	Max
esgscore 2011	2184	42.05	21.38	0.76	39.59	95.15	540	37.45	21.41	2.21	33.68	88.96
esgscore 2012	2263	42.62	21.35	1.38	40.90	94.52	616	38.26	21.57	2.85	34.58	88.16
esgscore 2013	2335	42.86	21.34	1.47	41.76	94.49	652	39.82	21.99	1.56	36.63	92.32
esgscore 2014	2418	42.83	21.19	0.63	41.14	92.77	688	39.88	21.84	1.51	37.31	91.12
esgscore 2015	2778	42.29	21.15	0.87	40.41	93.57	724	41.48	21.42	1.31	39.75	92.28
esgscore 2016	3405	41.16	20.95	0.45	38.03	92.22	759	43.70	21.41	1.31	43.29	92.44
esgscore 2017	4035	40.83	20.89	0.94	37.86	93.92	955	41.53	21.24	1.00	42.30	91.29
esgscore 2018	4595	41.34	21.00	0.31	38.65	94.28	1073	42.27	21.64	0.67	42.97	92.80
esgscore 2019	5176	42.55	20.93	0.43	39.99	93.62	1447	41.41	20.83	0.72	40.37	92.40
esgscore 2020	5941	43.67	20.96	0.43	41.95	95.08	1777	41.92	20.61	1.09	40.86	94.30
esgscore 2021	6287	45.42	20.95	0.95	44.25	95.60	2090	44.11	20.34	1.38	43.47	93.75
total		42.72	21.09	0.31	40.61	95.6		41.69	21.16	0.67	40.68	94.3

3 RESULTS

Overall, 8.377 of the companies in the total sample had an ESG rating in the last year of the observation period. This means a total share of 19.45%. In the developed markets group, 27.14% of the companies studied had an ESG rating with a mean score of 45.42

in 2021, representing an increase of 8.01% compared to the score 2011. In the emerging markets+ group, 10.46% of companies had an ESG rating with a mean score of 44.11 in 2021, an increase of 17.78% relative to 2011.

4 CONCLUSIONS

The evaluation clearly shows that companies in developed markets are more likely to have an ESG rating than companies in emerging markets, frontier markets, stand alone markets and others. Even though the proportion of rated companies in the developed markets group is more than twice as high as in the emerging makets+, there is however a clear trend in the increase of rated companies and in the development of the level of ESG scores over the measurement period for both groups. Nevertheless, the average level of ratings in the emerging markets+, as well as the increase in rated companies and their absolute number, lag behind the values in the developed markets. This difference in development can be attributed, among other things, to different framework conditions. While, for example, in the European legal area, companies are being driven towards ESG commitment by new regulations [3], companies in emerging markets have different pre-conditions and influencing factors to invest in ESG

and thus obtain an ESG rating. Martins summarizes in 2022 that there is less willingness to invest in ESG practices in emerging markets because of low levels of investor protection, weaker rules and laws for environmental and social investments, low transparency about corporate practices, and less efficient markets. As a result, there is little pressure or incentive for companies in emerging markets to invest in ESG strategies because there is minimal or no benefit to them [2]. However, as a significant increase in ESG engagement can also be observed in the emerging markets of the sample studied, the question arises whether ESG investments also make sense for companies for other reasons, such as profitability enhancement. In further studies, the relationship or the influence of ESG scores and the associated ESG commitment on key figures of the companies in the regions must be shown in order to identify possible effects of the increasing prioritization of ESG issues in politics and business.

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IMPACT OF DARK DATA ON THE VALUE DRIVEN DATA MANAGEMENT STRATEGY OF MANUFACTURERS – A LITERATURE REVIEW

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KEY WORDS

dark data, data management, manufacturing reporting

JEL CODES

M10

1 INTRODUCTION

In today's businesses more and more data is created. Current estimates are forecasting a total amount of data created, consumed and stored in 2025 of 181 zeta bytes. [1]

An important driver for this fast increasing data growth is the digitization in manufacturing processes. Nevertheless surveys came to the result that the industrial manufacturing sector has the lowest rate of data driven decision making processes. [2] One way to explain this discrepancy is that manufacturers

miss to utilize the data they are collecting. This data which is not used by companies actively is called dark data. This data only generates costs but no value. [3] This paper conducts a literature review to get deeper insights on the relevance of dark data on different companies within a concern structure. The focal point is set on impacts of dark data on the data consumption processes and the data management strategy within manufacturers.

2 MATERIAL AND METHODS

The articles researched for this review were collected via Scopus¹ and Web of Science². These two databases have been selected because they are seen as the most reliable source for research evaluations. They are seen as the main databases as they are not as exposed to manipulations as other databases like Google Scholar³. [4] In both databases the advanced search function has been used to get most suitable results using combinations of search

terms and the boolean expression "AND" to only search for occurrences of both exact search terms. The result set of the relevant search terms "dark data" AND "value" and "dark data" AND "strategy" includes 52 non-unique results. After filtering non-relevant research fields and document types, 39 non-unique results are left. The complete result set is afterwards checked for duplicates and non-relevant contents after reviewing the abstract. After this last

¹<https://www.scopus.com>

²<https://www.webofscience.com>

³<https://scholar.google.com/>

filtering eleven unique documents are left. These eleven papers are subjected, both a content review

and a text mining based check on significant numbers of occurrences of specific word stems.

3 RESULTS

All articles selected for this review were released between the years 2019 and 2022, showing the actuality of the main topic dark data. The current literature can mainly be grouped into two categories. The first category includes the papers which interpret dark data starting based on the definition in [3] and research the use of this data in the context of big data. The second category focuses setting the

term dark data in the data management context. Only [5] sets the term dark data into the context of companies in the manufacturing industry. The textmining processing of all papers shows that they have in common that they interpret the term dark data as an unstructured, unprocessed, unused or unknown datatype.

4 CONCLUSIONS

Dark data is coming more and more into focus. The increasing number of publications is showing this phenomenon. The existing articles agree on the importance of dark data and the aim for companies to enhance their data management strategies to cover dark data. Nevertheless the articles are presenting results either on an abstract level or try to create algorithms to decode dark data. What is missing in these contemplations is the questioning regarding why specific data is unused in a certain

company. Therefore it is not possible to answer the question regarding the impact of dark data to a data management strategy of manufactureres as the reasons for the existence of dark data are still unknown. Further research activity should focus on investigating the reason of existence of dark data in a group of companies where data is available and processed but parts of the group are failing to utilize it.

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EUROPEAN UNION AND ITS APPROACH TO THE DIGITALISATION PROCESS AMID THE COVID-19: AN ANALYSIS AND EVALUATION OF THE DESI

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KEY WORDS

Covid-19, DESI, digitalisation, European Union

JEL CODES

F66, O33, O38

1 INTRODUCTION

Digitalisation can be defined as a process of converting information into a digital format – i.e., data processing, storage, and its transmission. The first mention of the term digital economy was by Nicholas Negroponte in 1995, (Stavytskyy, 2019). Many observers believe that digitalisation is part of the Industry 4.0, a new industrial revolution and result of the globalisation and technological advance. Yet the industrial sector has remained the key trigger of growth and employment in the long-term perspective, (Verhoef, 2019).

In the European Union, the process does not only concern individual business companies, but especially the member states and the European Union as a whole (European Commission, 2021). The Covid-19 pandemic has demonstrated how crucial the level of digitalisation of individual states may be for delivering effective public policy strategies and further management of the digital transition. In this regard,

Covid-19 could be seen as a significant accelerator of fast-tracking within the existing global trend leaning towards modern emerging technologies (Amankwah-Amoah, 2021). Accordingly, the rapid advances in technologies, communication, and information have affected all the member states of the European Union.

Bánhidi, Dobos, and Nemslaki (2020) believe that the measurement of digitalisation is essential for effective public policy strategies to govern any transition. The same opinion is shared by the European Commission (2021) that created the Digital Economy and Society Index (DESI) while using a series of multivariate statistics. This index helps us demonstrate different levels of individual dimensions of digitalisation within the EU member states, and it summarises the relevant indicators contributing to Europe's digital performance (Russo, 2020).

2 MATERIAL AND METHODS

Literature review has been conducted to gather knowledge about the process of digitalisation and digital transformation among the member states

of the European Union. According to the existing literature, the concepts of digitalisation and digital transformation have been evolving in the form of

the European Commission's measure index (DESI) that has functioned as a official universal scoring system. This review then combines the information from scholarly journals as well as other respective reports.

To address the research questions, the data of the DESI were collected and measured. In the context of the obtained data, the EU 27 countries were ranked

and classified into clusters. Afterwards, results of each dimension were analysed and compared to the previous years. During our research, we even considered the latest index calculation model which had involved a different type of data compared to the previous models and with use of specific statistical methods to express the dependence between the variables.

3 RESULTS

As utilised by the European Commission since 2014, the Digital Economy and Society Index has been evolving in its methodology. The results of our correlation tests, principal component analysis, and partial correlation also showed that the DESI could be used as a reference point and the main variable for the EU member states whilst comparing the performance and policymaking.

Second, it exposed a strong correlation between the five dimensions of the DESI. The results from

the 2021 data showed moderate to strong correlation between the dimensions of Human Capital and Integration of the Digital Technologies, and Human Capital and the Use of Internet and Human Capital and Connectivity. In this context, results of the principal component analysis show the moderate correlation between the five DESI dimensions. These correlations stress the importance of digital public services and the relations with business as a principal component.

4 CONCLUSIONS

This research study confirms that the DESI requires a further investigation. Former research had been based on a different type of data and, at the same time, used distinct methods of data collection and its involvement in the index. The Covid-19 pandemic, economic and energy crises, and the labour market in the EU member states have accentuated the importance of digitalisation. Therefore, we argue that having this index improved to be more accurate will

be imperative. Yet this study confirms the importance of the DESI as the best method to determine the level of digitalisation and performance of the digital economy across the EU 27. The outcomes are one of the crucial indicators for competitiveness of the member states of the European Union, and it also reveals the causality between the variables which could be of some help to policymakers.

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LEGAL PROTECTION AND LEGAL COSTS – STATUS OF THE RESEARCH PROCESS (SURVEY)

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KEY WORDS

legal protection, income, assets, dependence

JEL CODES

K39, K40

1 INTRODUCTION

The democratic constitutional state ensures the so-called rule of law through an independently and impartially functioning judiciary. Everyone has a right to justice from the state system, which is derived from the principle of the rule of law and the guarantee of legal protection and legal process. However, the de jure guarantee of access to justice is not de facto unrestricted. Access is associated with costs and depends on the financial possibil-

ities. The subject of the research project is how the legal prosecution and enforcement depends on the economic circumstances of the individual. In particular, whether there are financially induced inhibitions on the part of those seeking justice and what significance financial safeguards have, primarily taking the institution of legal expenses insurance as an example.

2 MATERIAL AND METHODS

In addition to collecting and analysing secondary data from the legal protection insurance sector, the research project will collect data in two steps via surveys and expert interviews. The data collected will be analysed both qualitatively and, if possible, quantitatively. The analyses are based on the standards of Mayring and Kuckartz. The analysis will be carried out using a software program. It is planned to carry out the analysis with the help of the QDA software MaxQDA according to the specified criteria of a QDA analysis (Kuckartz, 2016).

Within the scope of the survey, about 200 respondents will be asked about their experiences with the topic under investigation. The collected data

will be evaluated by means of statistical analysis. A correlation and a regression analysis will be carried out. The aim is to show a correlation or regression relationship between the obligation to advance costs, the financial strength of the legal seeker and the probability of filing a lawsuit.

The survey research method will be applied to two of four research questions. Firstly: To what extent is legal action conditional on the obligation to advance costs and/or to bear costs? And secondly: To what extent is the cost burden and cost amount of an out-of-court claim and court action correctly assessed by the legal layman? Theses and hypotheses are formed on both research questions and then a questionnaire

is prepared. In addition to a demographic issues complex, the questionnaire contains four question

topics with 5 questions each, which have a scale with 5 possible answers.

3 RESULTS

The importance of income and wealth for the guarantee of justice and legal recourse is *prima facie* obvious. The quantitative evaluation of the responses to the survey makes an initial data analysis possible and a guide for the interviews can be developed

in order to create an overview of the percentage weightings of the responses and to qualitatively evaluate the explanations of the interview partners. What contributes to the further answering of the research question.

4 CONCLUSIONS

In order to implement the research project, initial data must be collected and analysed via surveys; for example, to what extent the legal layperson correctly assesses the cost burden and the amount of costs, or to what extent there is a relationship between

the commencement of legal proceedings and income or wealth. Furthermore, these questions should be placed in a microeconomic or macroeconomic context via the relationship to existing legal protection insurance.

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INNOVATION OF WORK PROCEDURES USING OPEN-SOURCE TECHNOLOGIES

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KEY WORDS

workflow, AFPA, open-source technologies, Camunda, business process management

JEL CODES

O32, Q55

1 INTRODUCTION

Process modeling is a supporting element for business process management (BPM), which includes activities associated with the optimization of business processes and their maximum adaptation to the needs of the business. The core of business process management is the solution of changes, development and introduction of new business processes in connection with the established business architecture, which represents a complex of tasks (projects) of process reengineering (BPR). These projects include formal-

ized expression, or modeling of business processes and implementation of other optimization steps. [1], [2]

The use of process modeling is a question of specific conditions, corporate culture, level of management and other important factors. However, the common denominator of both approaches is the necessity of applying a certain solution methodology and effective documentation of business processes, whether original for the purposes of their analysis, or the expression of newly designed or modified processes. [1], [2], [3]

2 MATERIAL AND METHODS

The business process management (BPM) methodology was chosen to determine the research implementation methodology. [2] The methodology is composed of five steps: Design, Modeling, Implementation, Monitoring, Simulation.

In order to fulfill the research goal, the expected problems and limitations of the implementation, including the method of optimization and minimization of the impact on the overall result of the research, are determined [2], [3]:

- Process reengineering is primarily a matter of improving the quality of company management.

- Process reengineering are relatively time-consuming projects, where the risk of their successful completion can be associated with a long duration and, in connection with that, with an inadequate level of solution detail.
- The results of process reengineering should not end only with the processing of process documentation. If the proposed processes are not reflected in the organization and internal regulations of the potential customer as well as in the used software application, which is the new AFPA framework, then the resulting effects of these results will be significantly minimized.

- To solve the project, it is necessary to choose adequate tools for specialists, i.e. specialized modeling tools, but then it is necessary to ensure

the availability of the results to a wide range of users.

3 RESULTS

The following benefits resulting from the methodology were evaluated from the selected main process:

- Alignment of business processes with the goals and strategic intentions of its management,
- achieving economic and business effects,
- creation of documents for the implementation of organizational changes,
- creation of documentation for the evaluation of the quality of education,
- changes in the course of the process associated with the reduction of points of interruption of the optimal course of the process,
- reducing the number and scope of documents,
- creation of prerequisites for the implementation of applications and workflow tools,
- faster introduction of new employees into the organizational structure and corporate architecture of the potential customer,
- unification of documentation,
- anchoring technologies in relation to the capabilities of the company and the AFPA framework.

4 CONCLUSIONS

The verification of the achieved results of the conducted research is mapped to the defined expected benefits:

- The business process simulation identified the process steps and process participants that are important for fulfilling the workflow process,
- to shorten the response time, a simulation of the THP Employee Definition process was carried out, where a key bottleneck in the solution decision-making method and response options was identified,
- part of the research was the creation of three process maps in the Camunda modeler, in which the AFPA microservice framework extension was implemented,
- the implementation of the physical process in the environment of the Camunda tool is suitable for increasing and planning the education of potential employees,
- research results and written documentation will be used as basic documentation for the product sheet of the AFPA framework,
- as part of the research, the possibility of implementing the Camunda modeler and the TAPAAL tool was verified,
- it is assumed that the created process maps and their documentation will serve as input material for new employees of the HR field.

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FACTORS OF GASTRONOMY BUSINESS SITUATION IN BRNO: CUSTOMERS' EVALUATION

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KEY WORDS

gastronomy industry, COVID-19, IPA, destination development

JEL CODES

L83, Z32, M30

1 INTRODUCTION

Gastronomy is no longer only about the physical need, but more about the experience, the emotions and can be a source of regional and destination propagation [1]. Unfortunately, during the COVID-19 pandemic, many foodservice businesses were forced to close and only use window sales or various delivery systems. This led to new trends such as mobile delivery services. Consequently, it is essential to understand these trends as this could lead to a better understanding of consumer needs and thus increase their satisfaction and loyalty [2].

However, there is still no guarantee that the changes in the gastronomy industry caused by the

COVID-19 pandemic will be sustained in the longer term. This will be the case at least to some extent [3], as the higher volume of food orders via mobile apps is also caused by technological developments and not only by the pandemic [4].

Considering the current situation, food service is one of the most important factors in the attractiveness of a destination [5] and even one of the most important factors in the choice of a particular destination [6]. Therefore, it is inevitable to analyze the current situation on the gastronomy market. Since Brno (the second largest city in the Czech Republic) is considered one of the best Czech cities in the field of gastronomy [7], the case study was conducted exclusively in the city of Brno.

2 MATERIAL AND METHODS

Primary data were collected from January 20 to March 3, 2022. A total of 198 respondents who visited gastronomy businesses in Brno participated in the study. In addition, the gender of the respondents was determined as the basis for the quota sample.

Therefore, 113 of the respondents were women and 85 were men [8]. In order to evaluate the current situation in the gastronomy market, IPA analysis was used, which evaluates the importance and performance of various factors [9]. These 12 factors were retrieved from previous studies [10, 11, 12].

3 RESULTS

Of the 12 factors studied, the taste of the food was the most important, followed closely by the ability to pay by card and cleanliness. The quality of the food,

on the other hand, was the least important factor for respondents.

According to the IPA analysis, most of the factors (6 out of 12) belong to the second quadrant, indicating high satisfaction and importance of the studied factors. Even if the respondents are satisfied with these factors (cleanliness, atmosphere, parking, arrangement of food, taste of food and possibility of card payment), it is inevitable to ensure at least the current level of satisfaction. On the other hand, the

price and the quality of the personnel are between the first and third quadrant. This indicates high importance but low satisfaction with the respective factors. Consequently, it is important to pay more attention to the quality of the staff, as this is the factor that can be easily influenced by the gastronomy business.

4 CONCLUSIONS

To ensure better quality of staff, regular staff training and team building activities would be highly recommended, as this is one of the most important quality factors in the gastronomy industry [10]. Furthermore, quality is an essential element

that influences customer satisfaction [6]. This study focused exclusively on the Brno area. Therefore, further research should focus on other parts of the Czech Republic to ensure the representativeness of the data.

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OLIGOPOLIES AND ON-LINE SHOPPING DURING CORONA PANDEMIC

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KEY WORDS

inflation, online price index, Amazon, retail price, online trade, buy box

JEL CODES

E31, E39, O12

1 INTRODUCTION

The aim of this paper is to find out whether Amazon exploited its market power to raise prices during the government-imposed lockdowns in Germany in the wake of the pandemic in 2020 and 2021. With brick-and-mortar retailers shut down and VAT rates temporarily reduced to activate consumption, online retail experienced a real shock in demand, growing by a staggering 43% since 2019 (Online Monitor, 2021). Above all, however, the tech and online giant Amazon, which is responsible for more than half of online sales in Germany, benefited from this. Amazon is both an online shop and a marketplace where customers can buy almost anything in various

product categories. In the form of the online shop, Amazon mostly buys the goods directly from the manufacturer and determines the selling price for these items itself with the help of its own scraping software system in order to offer the customer the best possible deal in online retail (Cavallo, 2018). On the Amazon marketplace, other sellers also have the opportunity to sell the same products. The best offer for the consumer wins the Buy Box, a synonym for the best offer behind the buy button. With the competition for the Buy Box, the best possible offer from price and shipping costs for the consumer is determined.

2 MATERIAL AND METHODS

This study has the following data on a daily basis from 9,977 items from 17 different brands in the office and stationery sector in the period 01.01.2019 to 31.12.2021, recorded using advanced web scraping software: Amazon Purchase Price, Amazon Retail Price, Amazon Net Profit Margin and Amazon Buy Box Quote per month. With the metrics, this research aims to provide evidence that Amazon increased prices and thus its own profit during the 2020 and 2021 pandemic, taking advantage of its dominant market position. The calculation and

validation of the data was guided by a published study by Hansen (2020), who has already undertaken a study of online prices to investigate the dynamic pricing of online shops. For the calculations of the online price indices, the Laspeyres index formula is applied, which is also used in the calculation of the consumer price index in Germany (Camba-Mendez et al., 2002). The average monthly price of the current month is compared with the same month of the previous year. The monthly Buy Box quota per item is calculated from the number of days on which

Amazon itself was in the Buy Box (ADB) in relation to the number of days in a month. The total Buy Box quota per month is calculated from the average of all Buy Box quotas per article and month. The change

in Amazon's net profit margin is calculated with a simple subtraction of the net PPM from the current year and the net PPM from the previous year.

3 RESULTS

It was found that the demand shock during the first lockdown in 2020 led to an Amazon Buy Box crash to as low as 56.73%, which is otherwise constant at around 75%. Amazon recovers the lost Buy Box shares through pricing aggressiveness in the following months to reach an average annual value of 75% again at the end of the year. The diagnosed price reduction from June to December 2020 correlates with Amazon's increased Buy Box share. While Amazon still lowered prices significantly in 2020, seemingly foregoing margins, prices were raised significantly in the second half of 2021, averaging 14.4%. In addition to increased Amazon purchase prices (+9.05%), the

end of the government-imposed VAT cut to activate consumption had an additional effect on Amazon's price. The VAT effect comes in at 2.52%. This means that Amazon's prices increased by 2.83% without the influence of VAT and the purchase price increase. The record of the change in net PPM compared to the previous year, which is around the zero line with the exception of April 2021, confirms the finding that Amazon must have foregone margins in the previous year in an attempt to restore the buy box ratio. It thus refutes the hypothesis that Amazon exploited its market position at pandemic times to maximise profits to the detriment of consumers.

4 CONCLUSIONS

Amazon has not exploited its dominant market position. Contrary to our assumption, Amazon lowered prices in the first pandemic year more than the official inflation rates of the German Federal Statistical Office. Amazon came under pressure on its own marketplace due to an increased sell-out situation

and had to win back shares via low Buy Box prices. In the second pandemic year, a price increase adjusted for the VAT effect and the increase in purchase prices could be measured, but this did not lead to a significant increase in Amazon's profits.

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IMPACT OF COVID-19 PANDEMIC ON TOURIST CONSUMER BEHAVIOUR: A CASE STUDY ON SOUTH MORAVIA

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KEY WORDS

Covid-19, tourist consumer behaviour, South Moravia

JEL CODES

M39

1 INTRODUCTION

The Covid-19 pandemic has undoubtedly influenced the tourism and has led to a change in the consumer behavior of tourists. The purpose of this research was to find out how the profile of the visitor of the rural area South Moravia in Czech Republic has changed in the context of the Covid-19 pandemic. It also brought a new area that tourists consider when choosing rural areas, and that is security and safety. Rural areas are perceived by tourists much more positively in terms of security and health risks compared to overcrowded

urban areas, in which there is a greater risk of disease spreading (Porutiu et al., 2021, Rosalina et al., 2021). [1,2]

Our research can help to understand how the Covid-19 pandemic has changed the preferences of visitors to South Moravia and can be a basis both for organizations, companies and accommodation facilities that operate in this rural area, as well as for the marketing of municipalities.

2 MATERIAL AND METHODS

Quantitative research was conducted for the purposes of this study research. A questionnaire survey was carried out, in which 1026 respondents took part, who chose the region of South Moravia to spend their vacation. The questionnaire survey took place from June to September 2021 and was conducted face to face with responders. 89,57% of the respondents came from the Czech Republic, the rest of the respondents were from abroad.

In this study research, we decided to focus on three segments – groups with children, couples and others (without children). The choice of group size as a

segmentation criterion is based on the fact that rural areas are visited by tourists in smaller groups, and mainly families (Porutiu et al., 2021). [1]

The questionnaire survey was focused on examining three selected segments within seven areas – previous visit, visit decision moment, reason for the visit, days spent in the area, accommodation type, source of information about the area and satisfaction.

As part of the research, we also focused on visitor satisfaction with the quality of services in South Moravia. We determined 21 quality factors among them we chose 11 quality factors for which

it is possible to observe differences in satisfaction among the three investigated segments. Respondents

expressed their satisfaction with quality factors using a five-point Likert scale.

3 RESULTS

The results of our research show that, due to the Covid-19 pandemic, the demand in tourism is shifting from urban areas to rural areas. The rural area of South Moravia is popular and visited repeatedly by all three segments. The rural areas are great opportunity for domestic tourism and for visitors seeking visitors seeking a shorter trip option. The research showed the possibilities for improvement. The segment “groups with children” needs more security, plans the trip more in advance and stays longer at the destination. The “couples” and “others

without children” segments perceive South Moravia as an easily accessible last minute option for their trip. The results also showed that the “groups with children” segment was the one most satisfied with their visit of South Moravia. We also observed the possibilities for improvement in quality of services in region. The quality factors accommodation and tourist signage were not sufficient for the segment “groups with children” and quality factors museums and additional services (sports equipment rentals, bike paths) for the segment “couples”.

4 CONCLUSIONS

Visitors to rural areas are mostly smaller groups, families or couples. However, visiting rural areas is generally a shorter-term option for all visitors, which does not require long-term planning. Rural areas are especially suitable for domestic tourism. Tourists do visit the rural areas of South Moravia, spend their free time here, visit the destination to relax, or even an active vacation and exploring tourist attractions, but at the same time, the data show that they choose accommodation mainly in urban areas.

The segment “groups with children”, due to the fact that they travel with children, needs more security, plans the trip more in advance and stays longer at the destination. In contrast, the “couples”

and “others without children” segments perceive South Moravia as an easily accessible last minute option for their trip, for example during a long weekend.

The segment “groups with children” was significantly less satisfied with accommodation and tourist signage than the other two segments. The “couples” segment, on the other hand, was not very satisfied with the offer and quality of museums in the area and additional services, such as sports equipment rentals, bike paths. Satisfaction with quality differed greatly within the factors we focused, especially in the factors related to transportation, where the “groups with children” segment was the most satisfied with it.

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THE IMPACT OF CHANGES TO THE TAXATION OF EMPLOYMENT INCOMES

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KEY WORDS

personal income tax, tax base, employment, advance tax, social insurance, health insurance

JEL CODES

D63, E24, H24

1 INTRODUCTION

The paper deals with the evaluation of the impact of changes to the taxation of employment incomes on taxpayers, employers and the state. Emphasis is placed on the calculation and subsequent comparison of different methods of taxation. At the same time, differences are identified within selected groups of taxpayers with regard to the different amounts of their gross salary. Recently, the taxation methods of employment incomes have changed even several times. The first significant change came in 2008

when progressive taxation was abolished and the so-called super-gross salary, the concept still unique in the world, was introduced. The next change took place in 2020. The approved proposal was selected from a number of alternative proposals for taxation of employment incomes. The main purpose of the change in 2020 was to encourage people to spend more money and help the economy get out of the ever-deepening crisis caused by the COVID-19 disease.

2 MATERIAL AND METHODS

The paper evaluates the taxation methods connected with the change. During the research, a total of six proposals were assessed and graphically compared (the original taxation method from 2008, the proposal by the ANO political party, the proposal by the ČSSD political party, the proposal by the Czech Pirate Party, the proposal approved by the House of Deputies but rejected by the Senate, and

the approved proposal). In addition to these, two alternative methods of taxation were proposed. For the comparison of the taxation methods, the following were used: net salary, its absolute and relative increments, tax, and effective tax rate calculated for a taxpayer who only applies income tax personal allowance.

3 RESULTS

The abolition of the super-gross salary has a positive impact on all taxpayer groups. After this change, net salaries of all taxpayers increased, but in different ways. Low-income earners are seriously disadvantaged compared to high-income earners. There were no direct impacts on employers identified. The change to the method of taxation deepened the public budget deficit by 90.2 billion CZK. It was found that of the originally proposed taxation methods, the most

appropriate method with regard to the goal set would be the one proposed by the Czech Pirate Party. It offers a significant degree of progression and favours low-income taxpayers over high-income groups. The two alternative proposals put forward by the authors favour even more the low-income groups and have some degree of progression. The approved proposal and the other original proposals rather favour high-income groups.

4 CONCLUSIONS

The results showed that of the proposals concerning the taxation method the most appropriate proposal, with one of the smallest impacts on the state budget, appears to be the proposal by the Czech Pirate Party. The other proposals impose a significant burden on the state budget and favour high-income taxpayers. It was revealed that the approved method of taxation gave a few hundred Czech crowns to low-income taxpayers, a few hundred Czech crowns to the middle class, and thousands of Czech crowns to high-income

groups and has a significant negative impact on the public budget. The abolition of the super-gross salary was a logical step, but it was ill-timed, and above all, it was an unfortunately chosen proposal. The alternative taxation methods proposed by the authors would bring more justice for the monitored groups of taxpayers, would offer a significant degree of progression and suggest a certain way of raising money for the state budget.

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THE INFLUENCE OF SELECTED FACTORS DETERMINING THE STANDARD OF LIVING OF PEOPLE IN THE POST-PRODUCTIVE AGE

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KEY WORDS

factors (income/retirement, savings, education, provision, family, material security, etc.), standard of living of people, post-productive age, productive age of people, security for old age, savings, lifestyle, retirement timing

JEL CODES

G18, G21, G28, G32, G38

1 INTRODUCTION

The paper deals with the influence of selected factors that determine the standard of living of people in the post-productive age, i.e. how certain factors influence people's retirement options and, in particular, what impact they have subsequently in the retirement age for the productive group of people in the Czech Republic within the framework of old-age security.

As part of the creation of the thesis, the selected sub-goals will be fulfilled, e.g. determination of the influence that specific factors have in accordance with the standard of living of people after their retirement age. Or their thinking about retirement (earlier

retirement x later retirement), which is related to, among other things, the very thinking of these people about saving for their old age, which would represent one of the selected factors of security for old age. Furthermore, the dissertation will deal with the formulation of recommendations and measures both at the level of people in working age (how best to prepare for the post-productive period) and at the level of employers (what forms of support in preparation for retirement can an employer provide to its employees).

2 MATERIAL AND METHODS

The work deals with how certain factors influence people's retirement options and, in particular, what impact they have subsequently in the retirement age for the productive group of people in the Czech Republic within the framework of old-age security. The influence of selected factors (pension/income, type of household, family, people's thinking about the time of retirement, creation of savings, pension funds, lifestyle, assets, etc.) determining the standard of living of people in the post-productive age is therefore examined.

In the paper, both qualitative and especially quantitative investigations will be used as part of the convergence of data. Primary data would be taken from the SHARE database, where data from a representative sample of a questionnaire survey on a given issue is regularly recorded. Furthermore, the data would be taken from various world databases and associations of specific EU countries, such as the database of the European Union Statistical Office (Eurostat), the database of the European

Central Bank or the database of the Organization for Economic Cooperation and Development (OECD).

As for the designated target group of people, it is a productive group of people aged 18–60, for whom it would be analysed what factors influence this target group of people in the context of the issue

of security for their old age. It would therefore be examined specifically how selected factors affect the target group of people in their working age, why and what effects and consequences they then have on their standard of living in their retirement age.

3 RESULTS

In the case of the issue of this dissertation, it is a relatively modern and not well-described theory, which has so far only been dealt with by a few research articles (Sievänen et al., 2013; Earles, 2013; Perotti and Schwiembacher, 2009) or professional publications, such as e.g. (Léime et al., 2020 or Hinz et al., 2013). This work can thus serve to deepen knowledge dealing with the issue of factors affecting the standard of living of people in a certain age category, which is mainly the productive group of people aged 18–60, or possibly also older people thinking about the right timing of retirement.

The contribution of the dissertation to the development of the theory would definitely be the

deepening of the researched issue, since the work will analyse individual selected factors that influence the pension possibilities of the target group of people in some way. In particular, attention will be focused on factors such as: household income, material security, pension, family, savings, the COVID-19 pandemic, health status, etc. The results of a sociological analysis conducted through a questionnaire survey on a certain number of respondents would show what people prefer more and, conversely, less, what are the reasons for using funds, etc. The conclusion of the dissertation is thus a comparison of the obtained conclusions of this work with existing literature and scientific studies.

4 CONCLUSIONS

On the basis of the information obtained, the results obtained from the analyses would be discussed in the work, which will then be compared with other researched works on the given and similar topic, research articles, etc. Some selected factors will certainly influence the standard of living of people in the post-productive age positively and some, on the contrary, negatively. As part of the

output of the work, possible economic and political recommendations for the social and pension system will be proposed in connection with the results of the analyses resulting from the methodology of the work, the chosen procedure for creating the dissertation and the overall information obtained during the creation of this work.

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SPATIAL DATA VISUALISATION IN METAVERSE

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KEY WORDS

computer vision, spatial data, virtual reality, WebXR, metaverse, 3D Tiles

JEL CODES

C88, L86

1 INTRODUCTION

Augmented and virtual reality are more and more often contemplated to be used for urban planning and smart city management [1].

The third dimension gives maps the opportunity to provide a better understanding of frequently complex spatial issues. Spatial data are usually three-dimensional by nature. Hence, 3D visualisation is more natural and precise than any projection in a 2D map. It is useful to create, visualize, store, analyze and share 3D data for better decision-making, planning or solving problems. The processing of 3D data has already become important part of geospatial

community and several industries (e.g., real estate or smart cities) take advantage of using the third dimension [2].

However, there is lack of standardized web services that allow users accessing 3D spatial data. Additionally, 3D models can become very large, such that it is not feasible to stream and render them without some compromise, otherwise the browser will not respond until all objects are loaded. With 3D city models becoming more and more popular, providing responsive real-time interaction has undeniable benefits [3].

2 MATERIAL AND METHODS

We explore possibilities of visualization of 3D spatial data in virtual reality devices and bring our solution to the so-called Metaverse. Visualization and interaction with 3D spatial data in virtual reality is already a well-known issue supported by many commercial and open-source solutions. However, our solution also needs to be compliant with the Metaverse principles: interoperable, open, hardware-agnostic, etc. [4]. In other words, not to create another “silo” application, but create a solution based on open standards that can be interconnected with other projects.

To be hardware agnostic, we decided to build a web application. We explored various 3D formats for

streaming and storing 3D spatial data that could help satisfy the Metaverse principles (glTF, USD, i3s). The most suitable turned out to be the 3D Tiles format. The 3D Tiles standard allows streaming of massive, heterogeneous 3D spatial data (3D buildings, BIM, photogrammetry, instanced features, point clouds). It is open and interoperable, allows balancing performance and can contain semantic data that can be interacted with [5]. 3D tiles standard has been approved by OGC [6]. Using WebXR Device API [7], we gained independence on any particular VR headset. To render the 3D scene and 3D tiles we used libraries Three.js [8] and 3DTilesRendererJS [9].

3 RESULTS

Our application let users to interact with 3D tiles datasets in virtual reality. User can move around the scene using VR controllers. If user selects an object that has additional data associated with it, the data will be displayed. To demonstrate it, our application was connected to data about buildings

from OpenStreetMaps. The application is accessible also without VR headset on both desktop and mobile platforms. We have tested the application to effectively display dataset of all buildings in Lyon (ca 50km²) with multiple levels of detail.

4 CONCLUSIONS

The Metaverse standards, although relatively new, are already well supported by the GIS community. They can be easily used for standardised spatial data processing. A challenging issue is an interconnection

with other GIS sources like Open Street Maps data, and different web mapping services and certainly, providing a user-friendly interface for interaction in VR.

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FINANCING OF PRIMARY SCHOOLS COMPARING THE CZECH REPUBLIC AND SELECTED EU COUNTRIES AT THE TOP OF THE PISA INTERNATIONAL COMPARISON OF LEARNING OUTCOMES

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KEY WORDS

importance of education, primary education, primary education funding system, comparison of primary education funding systems

JEL CODES

H52, H72, I22

1 INTRODUCTION

Basic education is the cornerstone of countries' education systems and human capital building (Becker, 1993) (Peková, Jetman, & Toth, 2019). In this article, basic education refers to education at ISCED 1 and ISCED 2 levels. Its form varies from country to country. It differs in its structure, length and even in the financing system of it. Different basic education systems show different results. Their diversity can be seen, for example, in the PISA international

comparison of the learning achievement of 15-year-olds, organised by OECD (ČŠI, 2022).

This article takes the task to compare the systems of financing basic education in the Czech Republic with selected EU countries that are at the top of PISA learning outcomes. The selected countries are Estonia, the EU's premiant country, Finland, whose education system tends to be highlighted in public debate, and Poland, which has improved greatly in PISA results in recent years (ČTK, 2019).

2 MATERIAL AND METHODS

The paper is based on a description and research of the theoretical foundations of education and an analysis of the importance of basic education in society (Peková, Jetman, & Toth, 2019) and in building human capital (Becker, 1993).

An important source of information for the authors is the most recent international comparison of PISA learning outcomes, which they use to select countries for comparing funding systems (ČTK, 2019). In addition, PISA country reports are used in the

analysis of individual country results (OECD (a), 2019) (OECD (b), 2019) (OECD (c), 2019).

The next part of the paper is an analysis of the education systems, especially basic education, of the selected countries and their financing. Finally, these systems are compared. The paper attempts to bring the systhesis of the reasons for the different outcomes of the basic education systems by comparing the financing of them.

3 RESULTS

Education systems based on the principle of equal access and of relatively strong autonomy of individual basic schools are the strongest. Ensuring that all pupils receive the same quality of education is also proving important.

The Estonian system guarantees strong autonomy of individual schools and coverage of all financial costs related to education (including lunches, textbooks and school transport, also other support services when needed). The Finnish education system guarantees strong autonomy for individual schools, coverage of all financial costs associated with education and uniformity of the system up to the

end of ISCED 2. The Polish system has undergone significant reforms in recent years. Eight-years basic education is completed by a single examination. The municipal level plays an important role in the financing of all basic education systems in all three selected countries. However, there are differences in the share of municipalities in the funding and also in what is funded. The Czech system takes nine years. From ISCED 2 onwards, unlike others systems pupils are segregated (eight-years gymnasium or conservatory). Education spending is publicly funded, but there is not as much support for spending that promotes equal access (e.g. lunches).

4 CONCLUSIONS

The paper considers different forms of financing of basic education as a prerequisite for different outcomes of this level of education. Based on the comparisons made, it appears to be important that basic education is funded and administered by municipalities. However, it is clear that other factors also play a significant role, e.g. autonomy of individual schools/municipalities, uniformity of the

education system up to the end of ISCED 2, coverage of education-related costs, etc.

The fact that individual schools and teachers have a greater degree of autonomy also appears to be beneficial. However, this can only work if there are good quality curriculum frameworks at national level. Pupils from countries where basic education is uniform also perform better in the international PISA comparison of learning outcomes. This could be seen on results of Estonia, Finland and Poland.

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THE RELATIONSHIP BETWEEN AGRICULTURE AND ECONOMIC GROWTH IN THE SADC REGION (1990–2019)

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KEY WORDS

FGLS, economic growth, agriculture, SADC

JEL CODES

Q18, Q10

1 INTRODUCTION

The contribution that agriculture makes to economic growth is a theme of crucial importance for developing countries. In SADC economies, 8 percent of the GDP is attributed to Agriculture. Southern Africa, 75 percent of the poor rely on agriculture for their livelihoods or basic needs. The sector is the primary source of subsistence employment and earnings for

about 61 percent of SADCs population. These assertions suggest that agricultural development has the potential to decrease poverty and accelerate monetary or economic growth. It's quite unfortunate however, that many growing countries have not fully harnessed the agriculture sector for its more than one functions.

2 MATERIAL AND METHODS

To investigate the relationship between agriculture and economic growth, a panel dataset of annual observations is utilized. The natural logarithm of the dependent variable GDP and the independent variables was however utilized to reduce on the variance between the variables and to make the distribution well behaved. A cross section of 14 SADC countries namely Angola, Botswana, Comoros, Congo DR, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Tanzania, Zambia and Zimbabwe with data captured over a period of 30 years from 1990 to 2019 has been employed. The choice of the countries and the period was solely dictated by data availability. The data

used in this study for the dependent variable GDP (as proxy for economic growth) was collected from World Development Indicators and the data for the explanatory variables was collected from the USDA Economic Research and analysed using STATA 16. The following econometrics model was specified.

$$\begin{aligned} \Delta GDP_{it} = & \beta_0 + \beta_1 \Delta AgrProd_{it-1} \\ & + \beta_2 \Delta AgrOutput_{it-1} \\ & + \beta_3 \Delta AgrLabor_{it-1} \\ & + \beta_4 \Delta AgrLand_{it} + \epsilon_t \end{aligned}$$

Tab. 1: FE, LR and SR FGLS Regression Results

Variables	Coef	Std. Err	t	P> t	LR. Coef	SR Coef.
logAgricPr~y	.3208992	.0586828	5.47	0.000	.4703431	.903722
logAgricOu~t	.4837751	.0166905	28.99	0.000	.478168	.078075
logAgricLa~r	-.1142286	.013808	-8.27	0.000	.1712759	.0267504
logAgricLand	5.295105	.0190081	27.86	0.000	.2347734	.287352
Cons	3.076961	.3260226	9.44	0.000	2.643127	.0156456

Where ΔGDP shows the change in GDP, characteristic of the changes in agricultural productiveness, output in the preceding period. In order to determine whether the push of labor out of the agricultural region contributes to economic growth or monetary growth, lagged agriculture labor in one period is covered. The other variable is the typical Agricultural land of a country which was taken into consideration. The unique price for GDP is transferred in its respective logarithm so as to minimize the disturbing effect of outliers.

The estimation techniques implemented in this study uses a three-step procedure. A panel unit root test is first applied to determine the order of integration between the dependent variable and the explanatory variables. Panel cointegration techniques proposed by Westerlund are then applied to determine the long run relationship between the variables. Finally, the fixed effect panel model as supported by the Hausman specification test results was applied to our model.

3 RESULTS

Results clearly show that all the variables were significant and other than agricultural labour, all the variables had a positive impact on GDP. For instance any unit change in agricultural productivity, ceteris paribas led to a 0.48% increase in GDP. All variables had a positive impact on GDP in both short and long run periods. There was also no serial

correlation in the FE model. The Normality Test showed that residuals were not normally distributed, hence the use of logged variables. There was no heteroscedasticity in the model) and the Hausman Test showed that the FE estimation was the best fit for the data.

4 CONCLUSIONS

The study concluded that there was a clear evidence of the presence of a co-integrating relation between the logged independent variables and the logged explanatory variables, implying the existence of a

stable long-run relation between the two. Being significant variables, we can reliably make necessary recommendations to SADC countries.

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SIMPLE ENTROPY RULE FOR SYSTEMIC RISK REDUCTION IN PORTFOLIO SELECTION FRAMEWORK

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KEY WORDS

alarm, double optimization, entropy, portfolio selection, systemic risk

JEL CODES

C38, G11, G15

1 INTRODUCTION

Systemic risk and related systemic crises are caused by a common fluctuation that affects the entire economy. Otherwise, the interconnectedness of single institutions contributes to an undesirable domino effect in an unstable economy. Billio et al. (2016) defined systemic risk as a set of circumstances that threaten the stability (public confidence) of the financial system.

In this work, the aim is to analyse the proposed simple entropy alarm rules included in the portfolio selection strategy using a double optimization approach and multifactor model. In particular, simple

entropy-based alarm rules are mainly considered for systemic risk prediction. Generally, the inclusion of the multifactor model is considered for the estimation of returns used in the optimization procedure. The application of alarm is primarily motivated by the work of Kouaissah and Hocine (2021), in which technical analysis indicators and their rules are examined for the detection of systemic risk on the market. In contrast to this approach, we replace technical analysis with the entropy technique. In particular, we consider the prediction of systemic risk based on two selected entropy measures.

2 MATERIAL AND METHODS

In general, we can distinguish several entropy indicators. In this work, Shannon and Tsallis entropy measures are used, where the probability distribution of the return vector is employed (Shannon, 1948; Tsallis, 1998). Compared to the general Shannon entropy, the Tsallis one involves the extension index α , which helps us to better identify the rate of relevance for the crisis prediction of the distribution tails. To define the alarm, we set the rule based on empirical evidence of h-day changes of the particular indicator.

To determine the portfolio composition, we consider the double optimization approach and approximated return series, where we use ordinary least squares (OLS) regression for factors obtained employing the principal component analysis (PCA). In this portfolio strategy, the first optimization is based on the reward-risk portfolio model, where various performance measures (Sharpe, Rachev, STARR, and Ruttiens ratios) are used. The second optimization consists of the risk minimization model, where Value at Risk (VaR) or Conditional Value at Risk (CoVaR) are considered.

3 RESULTS

First, if we compare individual portfolio strategies without alarm, double optimization with VaR minimization provides the best performance. The SR-CoVaR strategy has profitability similar to that of simple optimization, but surprisingly higher risk. Considering alarm strategies, the benefit consists of reducing the level of risk undertaken and increasing profitability and performance. In particular, the marginal expected shortfall (MES) decreases significantly, which confirms the success of limiting exposure to systemic risk. It is also evident that the Shannon entropy alarm generates better results compared to the Tsallis alarm.

Generally, it is obvious that the profitability of portfolio strategies with an alarm rule and simple

optimization is basically comparable with the simple optimization strategy, but we are able to reduce the risk of portfolios. Otherwise, the effect of double optimization is mainly reflected in the higher mean portfolio return and the corresponding final wealth. Note that we can also slightly reduce the classical risk measures undertaken of these strategies, as well as the systemic risk measure (MES), due to the involvement of the alarm. Obviously, the highest profitability is achieved by maximizing the Rutt ratio. Finally, it is evident that all strategies with or without alarm outperform the benchmark index S&P 100 in the case of final wealth.

4 CONCLUSIONS

In this paper, we mainly analyse the Shannon and Tsallis entropy used for the alarm rules included in the various portfolio optimization strategies. In particular, the alarm is applied in order to detect the threat of systemic risk in the market.

The empirical section analyses the portfolio statistics and wealth paths for different portfolio strategies with and without alarm. By comparing obtained results based on the data of the US market, we confirm the advantage of alarm strategies with double optimization provided even the transaction costs are taken into account in wealth computation.

Overall, we can conclude that the double optimization approach leads to significantly higher portfolio performance compared to the simple optimization strategy, while the impact of the alarm is visible in allowing us to reduce the risk indicators of generated portfolios.

In further research, more sophisticated rules will be examined using entropy measures based on market prediction. Moreover, it is important to consider the sensitivity analysis of the entropy parameters and to evaluate the impact of the return approximation techniques.

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DETERMINANTS OF WELL-BEING IN AFRICA: A LITERATURE REVIEW

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KEY WORDS

subjective well-being, income, quality of life

JEL CODES

F63, I39, I31

1 INTRODUCTION

The concept of well-being is increasingly gaining recognition across the economic space with economists and scientists viewing it as very essential in gauging the pulse of an economy. Over the years, the Gross Domestic Product (GDP) has been the most widely recognized indicator for assessing the strength of an economy. However, renowned Economists like Joseph Stiglitz have continuously stressed the need to go beyond measures of market activity and towards measures of well-being as an indicator of the “health” of an economy and individuals. Studies have identified the factors influencing well-being and the associated impacts. Kingdon and Knight (2007) identified the influence of household

income on subjective well-being. Cramm et al. (2011) stressed the effect of social capital, marital status, health and income on subjective well-being.

Bearing all these in mind, well-being can be defined as a measure of the substance of what is actually good and valuable for an individual (or group) and what is in their best interest. Well-being can be further strengthened and boosted when someone is capable of achieving both personal and social goals as well as accomplishing a sense of purpose in the community. Following this thought, the current study is well-placed as it focuses on examining the determinants of well-being in Africa.

2 MATERIAL AND METHODS

In a view to achieve the overall aim of the study, we adopted a literature review methodology to examine extant discourses on subjective well-being from renowned academic databases: Elsevier and ScienceDirect repositories. These academic databases were selected because they contained peer-reviewed journal articles. The google search term “Subjective well-being in Africa” was the search combination employed. Thereafter articles were evaluated on the

criteria that their purpose fit the overall aim of the review. In order to carry out the screening, the abstracts were first read and those articles found to be ideal for the review were adopted and the full papers downloaded and read. Articles that did not pass this screening test were excluded. Following these, a critical review was conducted probing the nature and state-of-the-art of the debate on subjective well-being in the African context.

3 RESULTS

Extant discourses have reiterated that well-being is a multifaceted concept. Nanor et al. (2021) opined that happiness or subjective well-being depends on the household characteristics of the residents. Also, from majority of the literatures reviewed, the study showed that the word subjective well-being is indeed a misnomer for the concept of subjective well-being. This implies that what constitutes well-being is

universal and is not subjective as the term suggests. Although regional differences are prevalent in the delivery of certain essential services or infrastructure as in the case of Africa where indicators such as religion and ethnicity determine well-being. However, in an ideal setting what constitutes well-being should be the same globally.

4 CONCLUSIONS

We have found subjective well-being to be a germane concept in the African setting as it is the very brick that determines the true state of development in the region. As such, policy makers should look to incorporate the ideals of what constitutes subjective well-being in tandem with the Sustainable Development Goals and other components from developed or advanced economies in extending or developing an improved composite framework in the delivery mechanism of their fiduciary duties. It is our belief

that the notion of subjective well-being should be universal and void of regional difference. As such, this research endeavor is a step towards sparking a renaissance on the importance of well-being if true development is to be attained. To sum up, in the agenda setting of well-being infrastructures within the context, the European framework and that of advanced economies can be set as a target in the development trajectory of the African continent.

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SYSTEMATIC LEADERSHIP: THE PRINCIPLES OF LEADING – LITERATURE REVIEW

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KEY WORDS

leadership, leadership styles, leadership principles, employee engagement

JEL CODES

M12, J28, M54

1 INTRODUCTION

Leadership is one of the most important topic in all areas of life. In today's fast-paced world of work it must be considered to have a chance to achieve the operative and strategy goals of the company with the highest efficiency, effectiveness, and employee engagement (Shobaki et al, 2017).

When talking about leadership in general, one is often expected to share a very straightforward approach to leadership. But the reality of what makes a good leadership isn't as simple as that. There needs to be balanced, to good leadership. You can't be too strict or too easygoing, too talkative or too quiet, too much of a disciplinarian or too much of a pushover. The list goes on and on. Successful leadership is about creating strong relationships based on mutual trust and respect.

Only by doing this, you can lead the company to success. Especially in a medium-sized enterprise, the challenge is to find a leadership style that fits the size of the company, the flexibility of the agile environment, and the requirements and expectations of the employees so that they are willing to go the extra mile so that the company can differentiate itself from the competition.

The topic of leadership is not new and the problem is not, that companies don't recognize the importance of leadership, but rather on how to do it effectively and successfully. The main point of this paper is to figure out how a systematical leading looks like considering the variables leading principals and employee engagement.

2 MATERIAL AND METHODS

Based on the described points the following questions shall be answered through the literature review:

1. What is the base of systematic leadership focused on medium-sized enterprise in Germany?
2. How does leadership style & -principal influence the employee engagement? A deep review of the existing literature in the field of leadership, leadership styles & -principles focused on medium-

sized enterprises and employee engagement was carried out.

The study begins by examining the need for and importance of leadership in medium-sized enterprises in Germany. The research is always carried out with a deeper look at a possible relationship between leadership and employee engagement. For this purpose, databases / library catalogues were used such as

Scopus, SpringerLink, Google Scholar. The following keywords were used as part of a targeted literature search:

1. “Leadership” AND “medium-sized enterprise” AND “Germany”
2. “Leadership *” AND “employee engagement”

3 RESULTS

The literature review gave first findings about the practical implementation of leadership -styles and -principals in medium-sized enterprises in Germany. But the results combined with the keywords “Lead-

Titles and abstracts were reviewed for inclusion criteria such as exclusion criteria. A lot of papers didn’t match the topic at, although the keywords were found in the search query. The review included papers and articles both in German and English. To identify the relevant answers, a structural content analysis according to Mayring (Mayring, 2015) was carried out.

ership” AND “medium-sized enterprise” AND “Germany” showed a very weak data situation.

Regarding the second research question, the results showed that there is a high depend between leadership and employee engagement.

4 CONCLUSIONS

Based on the literature review the topic leadership is high prioritized. For the medium-sized enterprises regarding in Germany, it is still however a challenge

introducing a systematic leadership that takes employee engagement into account.

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CONSPICUOUS CONSUMPTION OF SPORTSWEAR: WHAT INFLUENCES CONSUMER BEHAVIOR OF PEOPLE ACTIVE IN SPORTS?

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KEY WORDS

conspicuous consumption, sportswear, influencer, consumer behavior

JEL CODES

M31, M37

1 INTRODUCTION

Generation Z, born between 1995 and 2010, is the generation associated with massive social media use (Kardes et al., 2015). It is social networks that are closely associated with the rapid development of conspicuous consumption. This is because they allow an easy presentation of oneself, one's values, and personality (Bronner & de Hoog, 2018).

The consumption of sportswear is significantly influenced by its functionality (Ağaç & Sakarya, 2014; Cao, 2014). Yet, sportswear brands can also symbolize the values of their consumers (Cao, 2014) and, thus, can be a suitable product for conspicuous consumption.

2 MATERIAL AND METHODS

This research aimed to define the relationship between conspicuous consumption and consumption behaviour of sports active people in conjunction with influencer marketing on the social network Instagram. For this purpose, qualitative and quantitative research was conducted focusing on Generation Z. The research was partly focused on the topic of conspicuous consumption. The questions (mostly in form of statements) were partly based on previously conducted studies by Riquelme et al. (2011), Mai & Tambyah (2011), and Assimos et al. (2019), focusing on conspicuous or status consumption. The second section focused on consumer behaviour on the social network Instagram and the influencability of respondents by influencers.

The qualitative research was conducted through in-depth interviews ($n = 10$) with respondents involved

in sports on a regular basis. The interviews aimed to delve into the topic of sportswear purchasing behaviour and integrate these findings into the quantitative research.

The quantitative research was conducted via a questionnaire survey ($n = 240$). It consisted of open and closed-ended questions based on a Likert scale (with 1 indicating absolute disagreement with a statement and 7 indicating absolute agreement with a statement). The questionnaire contained a battery of 25 statements focusing on the previously mentioned topics of conspicuous consumption and influencer marketing, followed up with sociodemographic questions. Regression analyses in the Gretl program were used to analyze collected data.

3 RESULTS

Results of the quantitative research showed that consumers buying sportswear tend to deny their tendency to conspicuous consumption (the mean of the factor focused on conspicuous consumption was 2.55). However, the qualitative research suggests that, after deeper reflection on the topic, they do acknowledge conspicuous motives in their behaviour. The regression analysis of the data suggests that the factors most influencing conspicuous consumption among sports active people are the desire to make a good impression on those around them; gaining prestige and importance through purchases of branded clothing; sharing purchases of branded clothing on

Instagram; purchasing the same brand of clothing as those around a consumer (trying to fit in with a certain social group); and demonstrating one's social status through purchases of branded clothing.

The research also shows that sports active people from Generation Z are active on Instagram (up to 71% of respondents use Instagram daily). They use Instagram for entertainment, inspiration, and also as a source of information. More than 80% of respondents also follow sports-themed influencers, with professional athletes more likely to be identified as trusted influencers.

4 CONCLUSIONS

Although the quantitative research did not demonstrate a tendency for sports active people to conspicuous consumption, the qualitative research does show certain relationship with conspicuous purchase behaviour. Conspicuous behaviour is then most influenced by the desire to make a good impression on

one's social circles and to gain social prestige through purchases of branded sportswear.

Research has shown the suitability of using influencer marketing as a tool for promoting sporting goods, with professional athletes being the most suitable influencers.

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NEURAL NETWORKS ON CONSTRAINED DEVICES

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KEY WORDS

neural networks, constrained devices, MCU, machine learning

JEL CODES

C45

1 INTRODUCTION

The application of Artificial Intelligence to the industrial world and its appliances has recently grown in popularity. Indeed, AI techniques are now becoming the de-facto technology for the resolution of complex tasks concerning computer vision, natural language processing and many other areas. In the last years, most of the the research community efforts have focused on increasing the performance of most common AI techniques (NN), at the expenses of their complexity. [1] Simultaneously, many algorithmic optimizations such as pruning and quantization have been adopted to lower the algorithmic burden. [3]

Indeed, many works in the AI field identify and propose hyper-efficient techniques, targeting high-

end devices. However, the application of such AI techniques to devices and appliances which are characterised by limited computational capabilities, remains an open research issue. In the industrial world, this problem heavily targets low-end appliances, which are developed focusing on saving costs and relying on computationally constrained components. [1]

Using a constrained devices for simple tasks is therefore a possible solution in many industrial applications. Like use artificial in electric vehicle's battery management systems. [2]

2 MATERIAL AND METHODS

While some efforts have been made in this area through the proposal of AI-simplification and AI-compression techniques, it is still necessarily to study which available AI techniques can be used in modern constrained devices. The search of NN solutions that can be embedded successfully into constrained industrial devices. [1]

The constrained devices can be used as local simple AI, offline devices, devices with limited conectivity, resource-fendly, costs-saving solution. Simple microcontroller is characterised by very poor computational performances like MIPS and FLOPS.

To fulfill the research goal, with the expected problems and limitations of the implementation:

- Find the optimal fields of implementation.
- To solve the problem, we need to find best SW tools and optimal HW requirments.
- The training of NN consumes a lot of time, find the optimal size of NN.
- Use of optimalsing methods like pruning, ka-vantization, etc.
- On board tests (MCU)

3 RESULTS

The following benefits from research can be obtained:

- Finding a suitable optimization problem
- Finding a methodology to train the NN.
- Finding a suitable endpoint HW.
- Reducing the energy consumption of the application
- Possible reduction of the endpoint HW price
- Use of AI in new areas

4 CONCLUSIONS

The result is the applicability of NN in constrained devices. And identify relevant task, which is usable in industry or real world application, where AI is required. Or find an NN or small model to use on a microcontroller. The chosen hardware is to be constrained as possible. A research effort is required

in the field of NNs simplification in order to deploy of AI solutions on constrained devices.

The broad selection of AI accelerators, it is not obvious which approach benefits from which optimization most. The design space includes a large number of deployment settings (batch sizes, power modes, etc.) and unclear measurement methods.

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INTERACTION WITH IOT DEVICES USING COMPUTER VISION

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KEY WORDS

internet of things, user experience, computer vision, mobile devices

JEL CODES

L63, L86

1 INTRODUCTION

Nowadays, IoT devices are becoming more widely known and it is no longer a problem to equip your home or office with them or use them in hotels or other shared spaces. There is a huge number of smart bulbs from various manufacturers, smart thermostatic heads, window sensors or adjustable blinds on the market. Each manufacturer usually offers a more or less comprehensive mobile app that allows the user to control the IoT devices. However, the problem is that most manufacturers focus on a specific segment of devices and they can use various communication protocols like ZigBee or Wi-Fi. Sooner or later, a situation where it will be necessary to use products from different manufacturers will arise. This will

involve either installing more and more applications or using integration platforms, for example, Apple's HomeKit or Google Home platforms. But this only solves a part of the problem. Both of these solutions are platform-centric. The second and more important problem is that the IoT devices are only available to a specific user. He/She can share some features, but he/she has to do this explicitly for each user, and even such manual sharing has a number of limitations. The goal of our research was how to effectively interact with IoT devices in shared spaces such as hotels, co-working centers, etc. So how to offer the user a complete user interface to the device the moment they enter the room?

2 MATERIAL AND METHODS

Since smart device manufacturers do not provide an API for their devices, there is no simple way to communicate with them. Fortunately, several open-source projects address this issue. First of them is Home assistant [1] which is focused more on home automatization of IoT devices. But for our project, we chose the second option, Homebridge [2], which can find connected IoT devices from different manufacturers, but mainly offers better API through which you can directly interact with the devices.

Our project consists of several parts. The first part is a cloud service that communicates with the Homebridge software running on a computer in the

LAN network. The service obtains a list of active IoT devices, their current status, and properties that can be set on the given device. After that, it is possible to set, for example on a smart light bulb, the brightness level, color spectrum or to turn it off/on. The second part is a web application for a cloud service that allows performing these actions from a web browser and allows generating a QR code for a smart device with a unique ID. The last part is a native iOS application providing a universal graphical user interface for controlling a specific IoT device. The application is implemented on the principle of using Computer Vision as the

QR code reader that represents the given device. After reading the QR code, the application is able to identify the device by sending the scanned ID to a cloud service, which will return a list of available parameters needed to control this device. As a result, the GUI of the application adapts to the given IoT device and displays only control elements for this device. There are other projects working on a very similar principle. [3]

3 RESULTS

In our case, we used a Philips bulb as a test case, which was connected to a cloud service via a bridge. After reading the given QR code of the iOS application, we were able to receive information from the Homebridge about the connected devices and also information about the given bulb. Thus, after reading the QR code that represented the light bulb, control elements such as on/off, brightness or color temperature appear in the iOS application. Similarly, the application would also work with other IoT devices, such as an air conditioner.

4 CONCLUSIONS

According to our experiments, computer vision presents an interesting possibility for the identification of IoT devices that should be controlled. Certainly, there are more technologically interesting

Nowadays, it became possible to use the detection of natural objects in space [4]. This option appears to be very practical, but in a way difficult to implement. So for testing purposes, this option would not be very efficient. Basically, the user would use a mobile device to recognize an object in the scene, which in our case could be a light bulb or an entire lamp, based on how the model for object recognition would be trained. Unfortunately, it is too complicated to distinguish several identical lamps and identify the right one.

As a result, we noticed some problems regarding the communication availability with the device, which would be appropriate for further extension. Considering that for a functional implementation, it is necessary to have a constantly running local server with a cloud service, which is paired with the network in which the IoT devices are located, so that communication is enabled between the service and the devices. The solution is, for example, deploying the service on a Raspberry PI microcomputer, which means that we move out of the local network and the device can be controlled remotely, but here again, it is necessary to know the specific ID of this device.

approaches: usage of Bluetooth beacons, RFID chips etc. However, the key advantage of computer vision is its wide proliferation. It is available on all platforms, versions of iOS and even on low-end devices.

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CHANGES IN AUDIT CRITERIA – IS THE CASE OF SLOVAKIA A MODEL FOR THE CZECH REPUBLIC?

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KEY WORDS

audit, statutory audit criteria, Czech Republic, Slovak Republic

JEL CODES

M42, M41

1 INTRODUCTION

This paper deals with the setting of criteria for statutory audit in the Czech and Slovak Republics. The aim of this paper is to examine the development of changes in this area, compare the current situation between countries and then outline the possibilities of changing the criteria for the Czech Republic, taking into account possible impacts.

The Czech and Slovak Republics initially had identical criteria for mandatory audits in both countries, as they were merged into the Czechoslovak Republic until 1993. The amount of the set criteria was defined by §20 of Act No. 563/1991 Coll., on accounting. In

the version of 31.12.1991, the obligation to have its financial statements audited was established if the company exceeded the following criteria: the amount of its turnover exceeded Kčs 40 million (Czechoslovak crowns) or if the amount of net assets was more than Kčs 20 million. After the split, each country continued to develop independently. In Slovakia, the criteria for mandatory audits have changed over the last three years, but in the Czech Republic they have remained unchanged for 19 years. So, the question is whether the representatives of the legislative power in the Czech Republic should also consider changing the criteria for mandatory audit?

2 MATERIAL AND METHODS

The primary source is the accounting laws of the countries concerned and their amendments. In the Czech Republic this is Act No. 563/1991 Coll., on accounting, in the Slovak Republic Act No. 431/2002 Coll., on accounting. As both countries are member states of the European Union, Directive 2013/34/EU

also had to be taken into account. Accountancy Europe's research was also relevant to this paper, which in 2016 started monitoring the setting of thresholds for statutory audit criteria across Europe. Using the analysis of these relevant sources, the legislative provisions were then compared, followed by draft recommendations and conclusions.

3 RESULTS

The first increase in the mandatory audit criteria in the Slovak Republic took place in 2009 in Act No. 431/2002 Coll. on Accounting, to the following values: total assets EUR 1,000,000, net turnover

EUR 2,000,000, average number of employees 30. In this form, the mandatory audit criteria lasted for 10 years. A further increase in the limits of the mandatory audit criteria was subsequently made

in 2020 by Amendment No. 363/2019 Coll., after which the setting of the limits in Section 19 of the Accounting Act changed every year. The changes for 2021 and 2022 were included in the amendment to the Accounting Act No. 198/2020 Coll. For 2022, the criteria for the statutory audit are as follows: total assets of EUR 4,000,000, net turnover of EUR 8,000,000 and average number of employees 50. Companies are required to have their financial statements audited if they exceed at least two of these criteria. Converted to Czech crowns at the exchange rate of 1 EUR = 25 CZK, the criteria have the following value: total assets of CZK 100 million, net turnover CZK 200 million.

In the Czech Republic, since the first setting of the criteria, there have also been several changes in Act No. 563/1991 Coll., on accounting, but these were rather changes in the interpretation of certain terms. The increase in the limits of the statutory audit criteria occurred only in 2003. Since then,

limited liability companies have been subject to audit obligations if they exceed at least two of the following criteria: total assets of CZK 40 million, annual aggregate net turnover of CZK 80 million, average number of employees 50. Needless to say, the real financial value of these limits is not the same after so many years as it was when they were introduced in 2003. With such a low setting of criteria for statutory audit, many entities easily exceed the limits or balance on the edge of them over the years [3]. For such companies, the audit may represent a certain financial burden and increasing the values of the statutory audit criteria could help them from the cost and administrative burden. However, increasing the limits may also cause some negative effects, such as an increase in the risk of accounting errors, tax evasion or even the risk of economic crime [1]. However, there is also a need to focus on the fact that audit firms will lose their contracts and may be under pressure to provide non-audit services.

4 CONCLUSIONS

According to Directive 2013/34/EU, the European Union allows its Member States to set their own thresholds for statutory audit criteria. With the changes in the setting of the criteria in recent years, the Slovak Republic has moved closer to European countries with higher real GDP than Slovakia. Time will tell if it has been hasty in its move to increase the mandatory audit criteria. In deciding whether to follow the Slovak Republic, the Czech Republic should take into account many factors that

are important in its decision-making process. For example, it should take into account the development of the country's economic situation, as well as legal or tax aspects. [2] It is also important to take into account the possible consequences, both positive and negative, that may occur when the criteria are changed. The change to the statutory audit criteria will affect many more entities than just the audit profession, as it might seem at first glance.

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REGULATORY PRESSURE ON GERMAN COMPANIES BETWEEN 2000 AND 2022

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KEY WORDS

legal framework, regulatory environment, amount of regulations

JEL CODES

K20, L20

1 INTRODUCTION

The regulatory environment has meanwhile become of significant importance for companies, mainly when business activities are conducted internationally. Legal requirements in Germany are based on different norms on different hierarchical levels: municipal law and other regulations below state law, state law itself, federal law, European law, and binding requirements of third countries that extend the scope of their national regulations extraterritorial. These requirements represent essential and mandatory framework conditions for companies, in particular, due to the developments of the last twenty years in corporate liability and compliance. Therefore, the sheer quantity and frequency of innovations and changes are essential for companies.

Every year, a company based in the state of Bavaria in Germany is potentially affected by around 4,500 new legal acts in the areas of state, federal, and European law alone. In order to be able to recognize and evaluate the effects of the (amount of) regulation on corporate actions, such as a phase of exceptionally high regulatory pressure, knowledge of the exact status and development is essential.

Despite freedom of information and rights to information, there is a lack of sufficiently differentiated official information on this, at least at federal and state levels. Such statistics are also not available at european level.

2 MATERIAL AND METHODS

In order to determine a quantifiable stock of legal requirements for the period 2000 to 2022, the official legal databases of the competent authorities at federal and state levels, as well as the European Union, were searched, selected and sorted, and supplemented with official information.

The number of new legal acts from 2000 to 2022 at the level of state, federal, and European law was recorded by evaluating the promulgations in the

respective publication since the act of promulgation brings about effectiveness.

The focus was on those legal acts that can have a direct regulatory effect on companies. In state and federal law, there are laws and regulations. The EU level has the following types: Regulation, Decisions, Corrections Implementing Regulation, Implementing Decision, Delegated Regulation, and Regulation of bodies set up under international agreements. Direc-

tives, Delegated Directives, Implementing Directives and Guidelines were considered indirectly relevant to federal law.

In order to be able to compare the significantly different values at state, federal and european levels and thus be able to visualize the extreme

points of regulatory pressure on companies for the period 2010 to 2022, the determined values (X) were adjusted using a correction factor: $Y = (X - \text{Min}[X:2010 \text{ to } 2022]) * (100 / (\text{Max}[X:2010 \text{ to } 2022] - \text{Min}[X:2010 \text{ to } 2022]))$.

3 RESULTS

From 2010 to 2022, an average of 4448 (min. 3605, max. 5116) new legal acts came into force at state, federal, and EU levels each year. Legal acts of the EU make up the most significant proportion of the new regulations: from 2010 to 2022, an average of 93.49% (min. 90.83, max. 96.03%). Federal law accounts for an average of 3.82% (min. 1.53%, max. 5.51%), state law for an average of 2.68% (min. 1.88, max. 3.66%).

Accordingly, EU regulation peaks in 2004, 2009, 2014, 2021 and the lows in 2008, 2010, 2018 are also the extreme values for the total number of regulations across the levels. There was a common peak at state and federal levels in 2012. In state law, two more peaks can be visible in 2018 and 2020.

There was a peak in 2014 in the indirect requirements of the EU, which require implementation by

the member states. Two years later, in 2016, there was a high point in federal law. This pattern is also visible for 2019 at EU level and 2021 at federal level. Incidentally, the relative peaks between the EU and the federal level coincide. There is no apparent correlation with state law.

The total number of legal acts at federal level fell from 5,328 to 4,323 between 2002 and 2010. However, the number of regulations in the ratio has not fallen significantly from 85,974 to 79,935. The average number of regulations per legal act has increased from 16.14 to 18.49. As of 2022, the total number of legal acts has remained almost unchanged at 4,300, but total regulations have increased to 93,328. That means an average of 21.70 regulations per legal act.

4 CONCLUSIONS

Internationally active companies are significantly influenced by EU law. Clear peaks are visible where the regulatory pressure is exceptionally high. This data can now be used to compare other developments in subsequent steps.

The apparent delay of two years between the peak of indirect EU law and then federal law is plausible since the implementation period for the member states through the creation of national law is usually two years.

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STAKEHOLDERS CLASSIFICATION IN THE FIELD OF HEALTHCARE SERVICES: MANAGERIAL ASPECT

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KEY WORDS

stakeholder, healthcare services, managerial aspect

JEL CODES

I15, P36

1 INTRODUCTION

The theory of stakeholders today includes many directions and scientific works, however, certain practical aspects of its implementation still remain relevant and not sufficiently deeply studied. Such aspects include the study of the branch specifics of the application of the developed provisions of this theory. One of the key industries in any national and even global economy is the healthcare industry. Enterprises in this industry are objects of critical infrastructure. At the same time, the relations between enterprises and stakeholders in this industry have significant features. These features depend on many factors, but the main one is the types of stakeholders. In the scientific literature, there is a significant number of classifications of stakeholders, each of which was developed for specific theoretical provisions [1–3]. One of the broadest is the classification that divide the existing definitions into two groups: a broad and a narrow approach

to understanding the essence of stakeholders [4]. However, the problem of practical implementation of most of the classifications given in the scientific literature is still relevant. The currently known classifications of stakeholders, firstly, do not fully take into account the specifics of the healthcare industry, and secondly, do not create a basis for the formation of specific practical recommendations for improving management at enterprises in this industry. This study proposes a classification of stakeholders taking into account: the possibility of exercising managerial influence on them from the side of the enterprise; their affiliation to a group of traditional or new or actualized stakeholders; their belonging to the micro-, meso- or macroeconomic level. This approach to the classification of stakeholders in healthcare will contribute to the formation of practical measures for effective interaction with them.

2 MATERIAL AND METHODS

To determine the shortcomings of the existing classifications of stakeholders, the method of content analysis was used, which made it possible to identify

the most frequently used classification criteria when determining the types of stakeholders. Methods of logical generalization and synthesis were used to

substantiate the proposed approach to the definition of stakeholder types in three dimensions (possibility of managerial influence, age of origin and belonging to the economic level). The works of scientists representing various stages of the development of

the stakeholder theory, starting from its formation, and ending with the modern stage of expanding the spheres of its influence, were chosen as the research base.

3 RESULTS

The study systematized approaches to the classification of the company's stakeholders. Each of the above classifications was developed by its authors for certain scientific tasks, but many of them cannot act as a clear basis for the development of specific management measures and strategies. Therefore, the analyzed approaches to the classification of stakeholders were divided into two groups: those that take into account the management aspect, and those that do not take it into account when determining the types of stakeholders. According to the results of the analysis of the existing classifications of stakeholders in the field of health care, the following was determined: firstly, most works, although they consider stakeholders of different economic levels, do not clearly distinguish these levels and do not provide a generalized scheme of stakeholder interaction on macro-, meso- and microeconomic levels; secondly, some extremely important stakeholders in many works either remain outside the scope of the attention of scientists, or they are given insufficient attention; thirdly, scientific works mainly consider the list

and structure of stakeholders for stable operating conditions of enterprises in the field of medical services. Currently, the management of relations with stakeholders of Ukrainian medical institutions requires a non-standard approach, taking into account the complex crisis conditions due to hostilities and the coronavirus pandemic.

In order to solve the mentioned problems, the work substantiates the classification of stakeholders in the field of healthcare according to three characteristics: belonging to the micro-, meso-, or macroeconomic level; belonging to a group of traditional stakeholders, or a group that includes stakeholders of a new generation (these include recently created enterprises or organizations, as well as those that were updated in response to the challenges of the coronavirus pandemic first, and then military actions); the possibility of exerting managerial influence on stakeholders (direct managerial influence is possible; indirect influence is possible based on agreements and legal documents; the enterprise cannot influence the stakeholder by managerial methods).

4 CONCLUSIONS

The proposed classification has a practical orientation and creates a basis for improving the process of managerial decision-making regarding the interaction

of healthcare enterprises with stakeholders at the macro, meso, and microeconomic levels.

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CRISES MANAGEMENT AND ORGANIZATIONAL BURNOUT CHANCES AND OPPORTUNITIES FOR SMES IN GERMANY

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KEY WORDS

strategy, crisis management, SMEs, organizational burnout

JEL CODES

G32, H12, L21

1 INTRODUCTION

Fast changing economies, easily accessible markets and volatile business cycles are posing challenges for almost any business. Besides these frequent economic effects many companies facing even more challenges resulting out of Covid pandemic crisis, Ukraine war as well as further ongoing international political tensions, an ongoing energy crisis, inflation and an announced recession [1]. In addition, there are still

other major difficulties such as the demographic issue of shortage of skilled labour which is said to be a frightening challenge for many companies nowadays [2]. All these factors as well as other omnipresent circumstances might lead to crisis situations within companies directly or indirectly by guiding an organizational potential to an organizational burnout through external effects [3].

2 MATERIAL AND METHODS

This paper is focusing on the research question of how can German SMEs face existing or upcoming crisis situations due to different factors caused by macro and micro environment? Generally, there are not only external factors such as the ones mentioned earlier but also internal issues such as organizational burnouts that might threaten a company's current situation and lead into crisis situation. The present study examines crisis situations that might come across organizations self-imposed or by external factors. To be able to focus on a certain peer group and because crises management covers a wide range of topics, different influences and ways of acting this paper has configured a core segment of SMEs in Germany. These often family held companies mostly have other critical situations and different

capabilities of facing crisis situations than large corporations have.

Systematic analysis for issuing this paper is based on strategic literature research focusing on professional peer reviewed literature from Springer Link, EBSCO, Research Gate & Google Scholar complemented through statistics provided by STATISTA as well as Chamber of Commerce. Coming from a general overview and relevant definitions of rudimentary factors the paper reveals interdependence strategic management and crisis management by applying tools such as SWOT, PEST(LE) and Porter's five forces to recognise alarm signals and finding ways of counteracting on a short, medium and long-time range before concluding the paper.

3 RESULTS

Even though Crisis Management is treated as an own economic discipline with plenty of literature and sources, it is still strongly connected to Strategic Management considering that many crisis situations might be avoidable with proper Strategic Management and Business Analysis. However, there are crisis situations that have not been able to be anticipated earlier. The reasons are often immeasurable changes facing an organization. By focusing on fast changing external factors companies often lose track of their

internal situation that might make the company less effective and productive.

Besides checking external and internal situations with well-known models such as PEST(LE) and SWOT-Analysis it is important not to lose sight on other factors such as HR and a companies' overall strategy. Instead, it might be helpful rethinking an organization as a whole based on the company vision for instance by following an Entrepreneurship tool such as Business Model Canvas where even employees can be incorporated as essential key partners [4].

4 CONCLUSIONS

Even though there are certain descriptions for different kind of crisis there is no such thing as a clear definition of crisis situation. Each crisis is different and needs to be handled individually. However, each organisation needs to scrutinise its own current status to check if it still matches with the companies' Strategy and Strategic Management. Recognizing a

crisis by checking a companies' numbers might be too late as reasons for a crisis usually appear far earlier. Instead, it is important to reinforce strategic management to avoid respective crisis situations by keeping an eye on external as well as internal factors and being able to react promptly to indications.

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DEPENDENCE OF REGIONAL POLITICAL POLARIZATION ON ECONOMIC WELL-BEING OF CZECH REPUBLIC

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KEY WORDS

disposable income, OLS, Czech republic, regional analysis, political polarization, economic well-being, gross domestic product, unemployment, political economy

JEL CODES

D72, E61, I31, P16

1 INTRODUCTION

The economic boom of the 1990s and the newly acquired freedom and democracy were the foundation stones of the development of the modern political situation of Czech Republic. The aim of this paper is to evaluate to what degree, in conditions of higher economic prosperity (represented by economic well-

being), political representation and therefore society is less polarized and vice versa – whether regions showing lower economic prosperity are more prone more extremist, more polarized choice of political representatives in given time period (from 1992 to 2021) and space (NUTS 2 regions of the Czech Republic).

2 MATERIAL AND METHODS

The reason why this paper focuses on political polarization and problems it can cause, is addressed in the work of Duell and Valasek (2019). The research has shown that political representation under the influence of polarization does not decide according to the social optimum, and voters prefer candidates with lower qualification and with more extreme opinions. The work of Jones (2001) leads to similar conclusion that the polarization undermines trust in the state's political system and can block the legislative process.

According to Han (2015), polarization strongly correlates with income inequality and overall voter's trust. Greater income inequality increases polarization. The correlation of these indicators is stronger in democratic countries, where voters have more direct influence on election results. Regarding the definition of economic well-being, according to Večerník (2015), its indicators can be considered, for example, GDP per capita, unemployment or disposable household

income. Xiao (2015) proposes gross domestic product as the primary indicator of economic well-being. Xiao also includes income, expenses, debt and other owned assets in his consumption indicators.

This work uses data from the ParlGov project (Döring and Manow, 2022), which deals with the division of individual political parties on various ideological spectra, and data from the Czech Statistical Office (2022), providing both the results of elections to the Chamber of Deputies of the Czech Parliament same as the necessary economic indicators and control variables at the regional level. This work uses its own index for evaluation of the extent of political polarization, based on the left-right political spectrum. The hypothesis states the dependence of political polarization on the economic well-being can be proven. The economic indicators used in this work are GDP per capita in CZK, net disposable household income per capita in CZK and

unemployment in % of the region, all from the year previous to the year of elections. The paper further uses 5 control socio-demographic variables of the year of elections. Namely, these consist of the voter turnout in %, the average state of population, the

share of university-educated people in the average state of the population in %, population density in persons per km² and the share of population of outer age groups in the average state of population (voters aged 20 to 29 and 65 years and older) in %. All 5 control variables are also used in this context for example by Finseraas and Vernby (2014).

3 RESULTS

Regarding the results, it is possible to confirm the dependence of political polarization on the economic well-being of the region if the economic well-being is defined only by the disposable income of households. Chosen model has 69% of explained polarization values, which is satisfactory for given economic and sociographic data. The results of economic well-being defined by gross domestic product are also convincing, but with a lower degree of explained polarization values. Unemployment values are not significant and cannot be included in the given definition of economic well-being. Thus, the polarization is affected by disposable income, in a negative direction (increase of disposable income leads to decrease of

polarization), which corresponds to the given literature. As for the control variables, the polarization is affected by the average state of population, share of outer-age groups and share of university-educated population in a negative direction and by population density in a positive direction. The direction of the influence of the variables density and outer-age is in opposition to the economic theory, but both can be explained in the same way for Czech conditions. The older population (predominant in the outer-age variable), which predominates in regions with a lower population density (smaller municipalities), tends to vote for populist, catch-all parties, which are located in the center of the left-right spectrum, therefore this group seems to vote more moderately.

4 CONCLUSIONS

The tested hypothesis of the confirmation of the dependence of political polarization on economic well-being defined as disposable income of Czech

Republic cannot be rejected. As relevant socio-demographic variables were identified: the average state of population, share of outer-age groups and university educated population and the density of population in region.

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6 ACKNOWLEDGEMENT

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THE IMPACT OF THREAT OF POVERTY OF LOWER INCOME CLASS ON POLITICAL POLARIZATION IN EUROPEAN UNION

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KEY WORDS

poverty, income inequality, OLS, political polarization, political economy

JEL CODES

D72, E61, I32, P16, P46

1 INTRODUCTION

The aim of the paper is to prove the dependence of political polarization on selected variables indicating the occurrence of income inequality and worsened living conditions of lower income class in the European Union. The paper is based on the research of Polacko (2021), which identifies the current trend of

mainstream political parties, which are ideologically approaching higher income class. As a result, income inequality is increasing the same as the number of disaffected voters from lower income class that vote for extreme parties, especially the radical right, populists, and authoritarian parties.

2 MATERIAL AND METHODS

The link between income inequality and political polarization is confirmed by Duca and Saving (2016). Main current factor that has an influence on its increased values is the technological development, which threatens especially the lower income class (less qualified workforce). Progressing globalization and demographic development are identified as other factors. According to Gu and Wang (2022), the threat of poverty to the lower income class increases income inequality of society and leads to higher values of political polarization. As the threat of poverty increases, the affected part of the population begins to adopt risk-averse strategies. This is exploited by extremist and populist parties that adapt ideologically. Ellis and Ura (2008) emphasize the influence of education. If the poorer class has access to education, it reacts to economic issues more strongly, almost strongest across all income classes. On the contrary, without

access to education, it is inclined to vote according to cultural and moral values and not to react to changes in the attitude of the political garniture.

The unique contribution of this work is the polarization index constructed with data from the ParlGov project. The polarization index is constructed from the left-right, liberal-interventionist, liberal-authoritarian spectrum and from the attitude towards European integration. The general election dates are used for the entire European Union from 1990 to the present. The main explanatory variables are: the poverty line rate that expresses the share of the population living in poverty at 20 \$ and 5.5 \$ per day and capita, Human development index of United Nations Development Programme, GINI index, gross national income per capita, gross domestic product, adjusted gross disposable income of households, unemployment and trade openness.

Used sociodemographic control variables are: voters' turnout, the density of population per km² of the

state, the share of population older than 65 years and the share of population with tertiary education. The data are analysed using the OLS method.

3 RESULTS

The hypothesis about the link between the threat of poverty of lower income class and political polarization cannot be rejected. The resulting model confirms the positive dependence of polarization on the poverty line rate (20 \$), i.e., as the number of people in poverty increases, the degree of polarization rises. Moreover, polarization depends to a lesser extent on the openness of the economy, where more open states move towards less polarization. The positive dependence of polarization on disposable income is interesting, i.e., with higher values of income, polarization increases. This phenomenon is in contradiction with the broad literature dedicated to polarization, but as this work is devoted almost only to economically developed states, a phenomenon known as loss aversion may be the cause (Kahneman and Tversky,

1979). The population is so sensitive to their income level that when higher values occur, the voters are so afraid of losing it that they vote for more extreme parties that promise to protect them. As for the socio-demographic variables, polarization depends on population density, where states with a higher population density (where is denser urban development, usually of population with higher incomes) vote less polarized. The influence of population over the age of 65 is also significant, where larger share leads to higher values of polarization, as these voters are typically more easily influenced by extreme opinions. The influence of these socio-demographic changes is consistent with the research of e.g., Stanig (2013). Chosen model explains 50.54% of polarization variability values, which is satisfactory for given dataset.

4 CONCLUSIONS

The aim of the paper, i.e., identification of variables that have an influence on political polarization within the context of poverty at risk of lower class, was fulfilled. For the European Union, the indicator of the share of population living in poverty at 20 \$ per day and capita, is relevant. Major influence on individual

income classes and their decision-making represents the development of disposable income. The openness of the economy also effects the overall wealth of the state. Per the results of socio-demographic variables, the density of population, and the age composition of population, especially the share of the over 65 years age group, proved to be of importance.

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THE ENERGY ACT 458/2000 COLLECTION CONCERNING CUSTOMERS WITH HEALTH DISADVANTAGES

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KEY WORDS

Energy Act, experiment, outside the legal framework, termination solution, people with disabilities

JEL CODES

K32, K38, K49

1 INTRODUCTION

Recent years have been marked by the popularised topic of ‘energy scumbags’. If we look at the list of the latest most searched topics on the world search engine Google starting with the word energy, we will find terms such as energy vampires, scumbags, energy scumbags list, protection against scumbags, vampires, energy consultants, and similar terms. The

goal of this research is to find a way to address the withdrawal of gas consumption outside the reach of the Energy Act, effectively and immediately. The main research method will be an experiment where the proposed solution to the problem will be applied in practice and retrospectively evaluated.

2 MATERIAL AND METHODS

The primary sources of data were obtained from the experiment and in-depth interview that was conducted, from January to April 2022, where the expectations of the customer to resolve the situation were identified, after the methodology was developed, the possibility of the solution and the possibilities of the outcome were outlined. The subscriber was made aware of and then applied the methodology. Secondary data was obtained from the full text of Energy Act 458/Collection 2000. Other sources of

information are mentioned in the list of references used and in the appendix. The experiment was chosen as the research method for this investigation. An experiment in the sense that it was conducted based on the identified problems that cannot be solved in the standard way by using the energy law regulation 458 of the collection 2000, which treats the rights and obligations of the energy provider and, the consumer of energy and gas supply (I energy supply intermediaries, etc.).

3 RESULTS

Due to missing the statutory period for withdrawal from the subscription contract based on a change in the terms and conditions of the subscription, a change in the package of the product subscribed, a change in the mandatory monthly advance payments (which within six months changed to more than 250% of the original monthly advance payment amount, and more than 1.5 times the income of the disabled

pensioner's subscriber). This was dealt with in legal negotiations, but outside the scope of the Energy Act with respect to the company's GTC (general terms and conditions). The negotiation was anti-contractor but legally correct. According to the company's GTCs, a customer can withdraw within 14 days. Therefore, it was dealt with as a new contract for a new customer and user of the point of consumption.

4 CONCLUSIONS

Based on the application of the solution methodology, the question arises whether the mentioned application of legal aid to people with disabilities was not an appropriate method of assistance in the Czech Republic as well, as stated by Rosmalinda et al. [2]. This fact needs to be verified in practice. However, as stated in the regulation of Law 458/2000 [3] of the Collection, it would be sufficient to follow the terms and regulations given by the law and make the customers well aware of the general contractual

conditions of the company and regulate more and prevent the unfair commercial practices mentioned in the chapter introduction and literature review. Zelenka [1] discusses the possibility of the unilateral price change of energies. This is one of the most serious options that big energy companies possess – in B2C business, the customer has a weaker negotiating position, however, is, at the same time, more protected, or at least should be. As explained earlier by Zelenka [1].

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SWISSNESS AS A COUNTRY-OF-ORIGIN EFFECT: MANAGEMENT PERSPECTIVE THROUGH EXPLORATORY INTERVIEWS

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KEY WORDS

swissness, co-branding, country-of-origin, service marketing

JEL CODES

M10

1 INTRODUCTION

Swissness as an Anglicism for goods and services made in Switzerland has proven to be a valuable country-of-origin factor (Feige et al. 2016, Fischer & Reinecke 2016). This has led the Swiss government to create a geographical trade mark underlying strict rules within the Trade Mark Protection Act also called Swissness legislation (IGE 2017). The need for the latter was supported by research publications

revolving around key attributes of Swiss products and services associated with them by consumers worldwide.

Now, almost exactly five years after the coming into force of the Swissness legislation, this paper focuses on a management reality centered recap of its intentions and pre-legislation assumptions.

2 MATERIAL AND METHODS

Based on the review of literature mostly pre-dating the Swissness legislation and the cited research work within the draft law proposal, a questionnaire for exploratory management & executive interviews was created.

The interviews took place between June and August 2022 within the Swiss MEM (Machine-Electro-Metal) industry (see table 1).

3 RESULTS

Swissness in marketing is part of the Country-of-Origin research. Feige et al. (2016) state that the brand “Switzerland” represents a value that increases the willingness to pay through attributes such as “reliability, quality and confidence”. Schwarz & Blatt (2015) list “high performance quality, exclusivity, traditionalism, naturalness and environmental

friendliness” as product & service relevant attributes and “high quality of life, reliability, hospitality, beautiful landscape and sympathy” on country image level. Swissness from marketing perspective is a “reason to believe” that, through Co-branding of Swissness and the company brand, can be used depending on the competitive situation of the Swiss

Tab. 1: Exploratory interviewees overview

Number of interviewees	Duration Avg	Place	Titles / Number companies	Age Avg	Professional Seniority*	Education
15 12x male / 3x female	approx. 100 min	video conference & physical on site	CEOs, General Managers, VPs / 10x different companies	48,6 years	Avg 20,9 years	Academic degrees (University & University of Applied Sciences), Other diplomas
						* professional activity within MEM industry

firms (mainly SMEs). In summary the decision-making process based on the Swissness associations is put on an emotional level that leaves the rational factors in the background and make the Swiss products and services less comparable in the international competitive environment. This results in a potential for differentiation and price premiums (hedonic pricing effect). They differ based on the industry, product category & product ethnicity, geographical target market and company brand strategy & size. Fischer & Reinecke (2016) published a study illustrating e.g. an average 30% price premium for steel watches depending highly on consumer nationality.

The exploratory interviews showed a high match with the Swissness attributes listed above especially on product level. Supposedly due to the MEM industry, “precision” was a supplementary attribute predominately mentioned. This is also the case for “easy to use”. All interviewees stated that Swissness is important for their corresponding market success and price positioning, whereas the responses rather indicated that the Swissness price premium is a pre-

requisite for profitability based on the rather high labor costs in Switzerland. Only three global players don’t use co-branding since they established a brand that is associated with the very Swissness attributes (indirect Swissness). The latter confirms the literature findings that mainly SMEs use and profit from Swissness. Interestingly, 14 of 15 interviewees confirmed that their tangible product range possesses a relative comparability of their properties and specifications on international level. Swissness in general however and in particular associated services provide the means for co-value creation on customer side and means for differentiation. Attributes mentioned in this context were “solution oriented, value-creating, trustworthy, walk-the-talk, polite, customer focused, reliable, accessible/at eye level, transparent”. Several participants described services as a leverage and amplifier for the Swissness aspects within the products because fulfilling the latter is seen as a pre-requisite. It is also considered to be the crucial factor to sustain Swissness in the long run since communication and marketing is not deemed to be self-sustaining.

4 CONCLUSIONS

The interviews confirmed many aspects regarding the Country-of-Origin theory related to Swissness. The results indicate however that the importance of Swissness as a complementary service to tangible products represents an area that seems to be of great importance from a management point of view. In addition to that the reviewed Swissness literature rather focuses on other aspects that might not

provide enough guidance for Swiss firms to fully exploit this Country-of-Origin asset. Further research into the service domain, e.g. service marketing as well as a customer focused survey, in order to refine the Swissness service attributes, are recommended. This could provide the baseline for a Swissness service offering around tangible products as part of a management recommendation.

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TECHNOLOGY AND EMPLOYEES NOW AND THEN – A COMPARISON OF SURVEY RESULTS FROM 2011 AND 2021

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KEY WORDS

information technology, workplace, human resources, new work

JEL CODES

L86, O14, O33

1 INTRODUCTION

This paper aims to compare the results of two surveys regarding ICT usage. The goal of the original survey, which was part of the author's thesis in 2011, was to establish a better understanding of how far modern ICT technology has reached the work environment and how these ICT technologies influence the work

environment – e.g. work from home, flexible working time. A decade later, the same survey was carried out in 2021. It included the same set of questions but was slightly extended to allow coverage of the recent developments driven by the worldwide Covid-19 pandemic.

2 MATERIAL AND METHODS

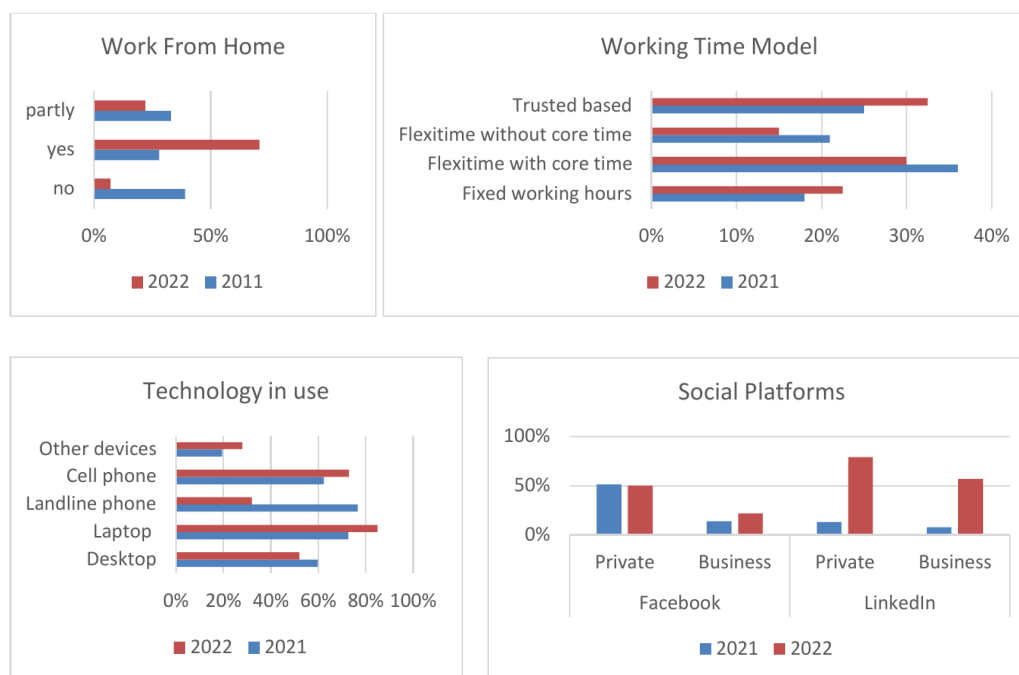
The initial survey was analysed in 2011, and the results have been included in the thesis "Anforderungen und Auswirkungen moderner Informations und Kommunikationstechnologien auf Mitarbeiter" (English: Requirements and Implications of modern information and communication technology on employees) [1]. The survey has been carried out as a quantitative online survey. To allow for easier comparison, the questions have not been altered, although it needs

to be mentioned that some questions did not exactly apply to the current state of technology anymore and had to be slightly amended to reflect the technological development of the last years. The structure of the survey covered the parts 1) characteristics of the participants, 2) questions towards working time and place of work, and 3) questions towards the general use of ITC in daily work life.

3 RESULTS

In both surveys the captured the main group of participants was of working age between 26 and 50 years, with 71% of the respondents in 2021 and 70% of the respondents in 2011. The age distribution shifted from 59% male and 41% female participants

in 2011 to 79% male and 22% female participants in 2021. The question regarding work time and place of work (work from home, in 2011, it was still more common in the literature to refer to telecommuting).



A massive change between 2011 to 2021 is visible, but it also needs to be mentioned that 40% of the 2021 participants answered the question if a change was due to Covid-19 with “yes”. Similar results are also visible in Barrero et al. [2]. Therefore, it can be assumed that not only technological advances but also the pandemic was a crucial driver for this transformation. Regarding work time models, the results show a shift away from fixed and core times towards more flexible and even trust-based working

times. The technology in use by the participants clearly indicates more flexibility in this area. Whilst mobile or portable devices such as cell phones and laptops gained, stationary technology such as desktop computers and landline phones are not that common anymore. Looking at the usage of social platforms, there is not too much of a change visible in the 2011 and 2021 results for the private use of Facebook, but a massive increase for the private use of LinkedIn, where private use is higher than business use.

4 CONCLUSIONS

It needs to be considered that asking questions on technological developments via technical tools, such as an online survey, poses an inherent bias which should be considered in the analysis. Nevertheless, the results clearly indicate that work and technology became more flexible and time and place-

independent. Additionally, it seems social networks such as LinkedIn are used as business and career tools e.g, for learning and development [2]. Further research should address the psychological influence of these developments on employees.

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USING NEUROMARKETING TOOLS TO REVEAL AUTHENTIC MOTIVATION

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KEY WORDS

neuromarketing, workplace motivation, electrodermal activity, EDA

JEL CODES

M39, M59

1 INTRODUCTION

The role of an appropriate motivation is crucial for the job performance. Understanding the aspects of authentic and genuine motivation might be of a significant importance for organizations and businesses. People who harness their genuine intrinsic motivation achieve higher level of self-efficacy which directly relates to the work performance.[1]

Consequently, a question arises how to reveal this authentic job motivation. Research shows that electrodermal activity (EDA), as a classical tool of

the neuromarketing research, can be a good indicator of the intra-personal processes as the EDA relates closely to the autonomic nervous system activation [2] and is also strongly connected with the human intellectual performance [3] and corresponds well to the respondents' self-reports [4].

Objective of this research is to reveal the possibility to analyze authentic human workplace motivation by means of the EDA signal.

2 MATERIAL AND METHODS

Respondents were exposed to the audio recording (in duration of 20 to 25 seconds); each depicting some typical aspects of workplace motivation, stemming from the theories of Holland's Riasec model [5] (creativity vs. pro-social orientation), MBTI model [6] (extraversion vs. introversion) and specific motivational drivers (financial reward vs. influence vs. popularity). During the audition, the electrodermal

activity was measured (in microsiemens, sample: 5 times per second). Then a difference between the raw signal and its linear trend was calculated (in MS Excel, function lintrend); and the difference between the respective groups of motivations was analyzed (using Kruskal-Wallis and Mann Whitney U test). Subsequently, we compared the results with the questionnaire-based outcomes and interviews.

3 RESULTS

Results were very favorable, where the above-mentioned methodology showed a clear distinction between the levels of electrodermal activation for the respective motivational factors (creativity vs. pro-social orientation, introversion vs. extroversion,

financial reward vs. influence vs. popularity). Furthermore, this difference in electrodermal activation fully corresponded to the results as measured by the questionnaires and the data collected in the individual interviews concerning the respective motivation.

4 CONCLUSIONS

Methods of analyzing job motivation, using the electrodermal activity, while the respondents were listening to the audio recording depicting the main aspects of the motivational factor has proved as valid. Furthermore, EDA results fully corresponded to the data acquired by the questionnaire and interview (triangulation). Main limitations of the hereby presented research stem from its pilot character. Practical

implications are straightforward: application of the EDA measure in the frame of appropriate research settings paves the road toward the measurement of the authentic human motivation (which relates directly with activation of the autonomous nervous system). This methodology might find a vast application, in marketing as well as in human resources, both in research and in day-to-day business practice.

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CHANGE IN EFFICIENCY OF EU COUNTRIES WITHIN THE ACCOMMODATION, FOOD, AND HOSPITALITY SECTOR IN 2020

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KEY WORDS

efficiency, EU countries, data envelopment analysis, Covid-19

JEL CODES

C44, D24

1 INTRODUCTION

Like other economic sectors, the Accommodation, food and hospitality sector was also affected by the Covid-19 pandemic and many businesses suffer the consequences till today. But for some, there was also room for innovation and the need to rethink the use of limited resources. The main aim of this article is

to evaluate the efficiency level of EU companies in this sector before and during the pandemic. The main goal of this article could be divided into two sub-goals – calculation of individual efficiency; and determining the change in efficiency due to the emergence of the Covid-19 pandemic in 2020.

2 MATERIAL AND METHODS

Similar to [1] we use annual data available from the EU KLEMS database, with the difference that we focus on the period of arise of the Covid-19 pandemic. The models will therefore be estimated for the period of 2019 and 2020. A total of four variables were used. The labor factor was captured through the number of hours worked by employees. The capital factor is represented by the variable nominal gross fixed capital formation. The remaining two variables (output variables) are gross value added and gross output. Except for hours worked, all other variables are reported in national currencies. So these variables were converted to Euros at the average exchange rate in that year. Due to the unavailability of data in some

EU countries, it was possible to include 15 countries in the analysis.

The non-parametric data envelopment analysis (DEA) method was used to calculate efficiency. Similar to [2] we used input oriented DEA models, as it is assumed that individual enterprises are able to influence mainly the input side of the transformation processes. Due to the nature of the data (i.e. aggregated annual data), the CCR DEA model was chosen, which assumes constant returns to scale. The Malmquist index was chosen for the analysis of the change in efficiency due to the onset of the pandemic, like in [3]. The efficiency score is calculated via DEA SolverPro.

Tab. 1: Efficiency change coefficient from 2019 to 2020

Country	Coefficient	Country	Coefficient	Country	Coefficient
Austria	1.00	Estonia	0.45	Hungary	0.38
Belgium	1.00	Finland	0.79	Malta	0.94
Bulgaria	0.66	France	0.98	Slovakia	0.71
Czech Republic	0.57	Germany	0.80	Slovenia	0.94
Denmark	1.00	Greece	0.39	Spain	0.74

3 RESULTS

In terms of efficiency scores achieved in 2019 and 2020, companies from Austria, Belgium and Denmark performed the best (they were fully efficient in both years). The high efficiency of companies from these countries is probably because of their advanced economies and relatively high quality of life in comparison to other countries. Spain and Finland were among the fully efficient countries in 2019, but not in 2020. In terms of efficiency, countries such as Bulgaria, Slovakia, the Czech republic and Hungary were ranked in the worst positions. In 2019, the median efficiency was 82% (average 76%). In 2020, businesses in general fared worse in the sector, as the median efficiency was only 51% (average 59%). More detailed changes in the efficiency score are recorded in Tab. 1.

It can be stated that only in the three above-mentioned countries, which were fully efficient in

both sectors, there was no decline in efficiency with the onset of the pandemic. With the exception of Austria, Belgium and Denmark, all other monitored countries show a decrease in efficiency in 2020 compared to the previous period. The median value of the efficiency change coefficient according to Tab. 1 is 0.76 (ie 76%), the average value is 0.79 (ie 79%). Uncertainty and state restrictions were certainly one of the main reasons for this decline. In addition, although the EU economy was at the peak of the business cycle at the beginning of 2018, slight declines were expected in the future, as 2019 was already negatively marked by the Brexit and trade war between the US and China. These events had a significant impact on stock market crashes and economic slowdowns. News of the pandemic spreading from China at the end of 2019 only added to the wave of uncertainty.

4 CONCLUSIONS

This article focused on calculating efficiency score in 2019 and 2020 along with deriving the change in efficiency in these two years. The results show that with the onset of the Covid-19 pandemic, there was a

visible decrease in efficiency in most of the monitored countries. Only three countries retained their status as fully efficient countries in 2020.

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SECONDARY EDUCATION EFFICIENCY IN SELECTED COUNTRIES

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KEY WORDS

data envelopment analysis, efficiency, linear programming, secondary education

JEL CODES

C44, H52, I21

1 INTRODUCTION

In the context of the Industry 4.0 technological revolution, education is gaining greater and greater prominence. As a result, the education sector is under pressure to improve quality. Education also brings with it profits in the form of growth in labour productivity and thus in economic growth [9]. In many countries, education is at least partially publicly funded. This significant share of public spending is one of the reasons why it makes sense to address the efficiency of education. The number of private schools is also gradually increasing in secondary education [10]. Although these schools do not draw as large an amount from the public budget as state schools,

this is not a significant expense for the state budget. At this time, it is a significant advantage to have a university degree, but there are still many professions for which a secondary education on its own is sufficient. Graduate unemployment has fallen in many countries in the last few years. This decreasing trend is due not only to the ageing of the population but also due to the fact that younger generations have more and more technical knowledge [8].

The main aim of this article is to evaluate the efficiency of secondary education in selected countries in 2018 and 2019. The efficiency of education can be viewed from different perspectives. In this article, we address the efficiency of education in terms of the applicability of graduates in connection with the financing of education.

2 MATERIAL AND METHODS

In this article, the data envelopment analysis (DEA) method was used to evaluate the efficiency. The method is very popular for measuring efficiency in many areas. The efficiency of education was measured by DEA method for example in [4] and [3].

Five variables were selected for the efficiency analysis. The data were drawn from the OECD database. The average wages of teachers employed in secondary education (in EUR), the number of teachers in secondary education (in thousands) and education spending (in

millions of EUR) were chosen as input variables. The output for the model was selected indicators the number of employed young people (in thousands) and the number of secondary education students (in thousands). The analysis was performed on a sample of 21 countries for which we had complete information for both the years being analysed. The input orientation of the model was chosen during modelling and variable returns to scale (i.e. the BCC model) were assumed, similar to [5], [6] and [7].

Technical details about the DEA method can be found in [1]. The results are from the DEA Solver Pro program.

3 RESULTS

In 2018, the average efficiency in secondary education was 81.5% for selected countries. The median also reaches similar values (81.6%). We can therefore say that half of the countries had efficiency above 81%. In the V4

countries the average efficiency was around 98%. In the European Union overall, the average efficiency in 2018 is lower, around 75%. In that year, Israel, Luxembourg, Slovenia, Poland, the Slovak Republic, Turkey, the United

Kingdom, and the United States of America all achieved full efficiency. By contrast, Austria (50.3%) and Germany (50.4%) had the lowest efficiency in secondary education.

In 2019, the same countries extended by Finland and Greece, are achieving full efficiency in this year. The average efficiency in the countries being studied increased slightly to 81.7%. In the V4 countries it is 98% and in the EU countries the value is again lower, namely 75%. The lowest efficiency is to be found again in Austria (54.9%) and Germany (50.9%). These two countries and Belgium had efficiency less than 60%.

Overall, in the V4 countries the average efficiency is higher than the average efficiency of all selected countries in both years. The V4 countries apply a non-standard mixed model of secondary education ([2]). These countries have a common post-war history, which was also reflected in education, and these countries in Europe are among those with the highest percentage of people with a secondary education.

4 CONCLUSIONS

The results of this article show that even economically developed countries such as Germany or Austria, when compared with other selected countries, do not perform well in terms of the efficiency of secondary education. This is due to the alternatively differentiated model of secondary education. Even the V4 countries, which are influenced by a common history, have better average results than these developed countries. Overall efficiency

In countries such as Belgium and the USA, there are no significant changes from 2018 to 2019 both in terms of technical efficiency and production capacity limits. A more interesting trend is represented by the countries in the second category, such as France, Germany, Italy, Poland, Spain, Turkey, and the United Kingdom. In these countries, there were no significant changes in the value of their individual efficiency during the period under review, but the overall situation worsened. The same situation can be observed in France, Germany, Italy, Mexico, Spain, Turkey and the UK. The last category consists of countries where efficiency has improved, production opportunities have improved, and the overall situation has improved. These are Austria, Denmark, Finland, Greece, Hungary and Slovakia. Here we also observe a large effect on overall efficiency from the decline in education spending. In these countries, there has been a decrease in education spending per student, leading to lower inputs and improving overall efficiency in secondary education.

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PUBLIC FINANCES IN GERMANY SINCE 2010 – ANALYSIS OF THE DEBT RATIO

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KEY WORDS

public finances, unemployment, short-time work, financial sustainability

JEL CODES

J64, H12, G28

1 INTRODUCTION

Many industrialised countries, including the European Union member states (EU), have high public debt levels. According to Kronberger Kreis, the risk of insolvency has risen sharply in countries such as Greece, Portugal and Spain (Kronberger

Kreis, 2010). The development of public finances in Germany has been the focus of policy since 2010. Germany has been facing challenges such as economic and banking crises and the reduction of unemployment for years. The analysis aims to determine the influence of the development of unemployment on the debt ratio.

2 MATERIAL AND METHODS

The state sets the framework for the democratic coexistence of citizens and provides services that secure their existence. Fiscal statistics reflect the general government budget's revenue, expenditure and debt and provide a detailed picture of the entire public finance sector (European Commission, 2021).

The author uses linear regression analysis to analyse the development of public finances in Germany from 2010 to 2021 to explain the gross public debt. The indicator is defined (in the Maastricht Treaty) as

the consolidated gross debt of the general government at nominal value (face value).

The author examines the influence of the favourable labour market situation and the unemployment rate on the debt ratio (gross debt). The unemployment rate is the share of unemployed persons in the labour force. The labour force is the sum of employed and unemployed persons. Unemployed persons include all persons aged 15 to 74 (a) who were unemployed, (b) who were available to the labour market, (c) who were actively seeking work. The Statistical Office of the European Union (Eurostat) and the European Commission provide the data used.

3 RESULTS

The positive economic development of recent years has been the starting point for the positive development of public finances in Germany since 2010. The corona pandemic has stopped this positive development abruptly. The same picture is shown

by the development of the unemployment rate in Germany.

The model makes an explanatory contribution. It can be proven that the development of unemployment explains the government debt of the state of Germany.

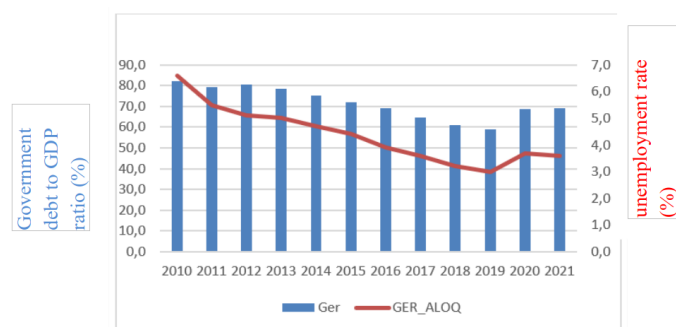


Fig. 1: Development of gross public debt/per cent of gross domestic product (GDP) and unemployment rate in Germany as of 2010



Fig. 2: Explanation of the dependent variable “government debt/per cent of gross domestic product (GDP)” by the “Unemployment rate in Germany” as of 2010

When unemployment increases, the level of debt increases. Thus, the fight against unemployment is and remains one of the highest goals to ensure the stability of public finances. Public finances support the economy considerably (Deutsche Bundesbank, 2021). During the Pandemic, the Federal Government’s approach was to support the economy through high-stability programmes. The high investment in the program/funding of the Federal Employment Agency called Short-Time Working Allowance has avoided

unemployment. With the beginning of the lockdown in March 2020, short-time work rose to an all-time high. The peak in April includes almost 6 million short-time workers, corresponding to 18% of all employees subject to social security contributions. With an average loss of work of about 38%, short-time work has mathematically secured jobs for almost one million employees; their (temporary) unemployment, despite the costs of short-time work, prevents a worse increase in the debt ratio (Bauer & Weber, 2020).

4 CONCLUSIONS

Significant further efforts are still needed to ensure the sustainability of public finances. Compliance with the debt brake after overcoming the crises is necessary, while at the same time, the composition of German government spending must be tested (Werd-

ing et al., 2020). During the crisis, unemployment was avoided through support (short-time work). After the crisis, reducing unemployment through integration into the labour market is a successful approach to contributing to the stability of finances.

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DISTRIBUTED COMPUTER VISION

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KEY WORDS

computer vision, TensorFlow, mobile devices, object detection

JEL CODES

L63, L86

1 INTRODUCTION

In this constantly evolving modern era, distributed image processing brings many benefits and opportunities to various industries. The most well-known solution is the recognition of objects in an image and pairing the object with available information using different visualization techniques. The recognition mentioned above can most often be addressed in two ways [2].

If the device is powerful enough, the first way uses the hardware available on the device and the object detection is done locally. Local detection can bring

better application performance and faster response since there is no need for communication between the device and the server [3].

As already hinted the second way is object detection on the server. This method is mainly designed for devices with weaker computing power. The device can send several images per second to the server, the server processes the image and performs object detection. This method requires a constant internet connection and there may be performance drops in the application based on its quality.

2 MATERIAL AND METHODS

On the Internet, we can find many similar projects and various solutions for this issue mentioned in the introduction such as Google starter apps or TensorFlow quickstart applications [1]. The proposed solution is based on the Python programming language in which the whole server is written. The communication between the server and the devices is done using web sockets. The Socket.IO library allows us to implement it more easily. We used web sockets mainly for their speed in communication [5]. Since we need to send several images per second, web sockets will give us a communication speed that we would not achieve with a classic REST API.

The TensorFlow library takes care of object detection on the server. For detection, a trained model

on custom objects in a file format is needed. The detection method receives the image, then modifies it according to its requirement, and returns a list of detected objects (label, confidence, bounding box position).

The application provides the user with an overview of the detected objects using labels added to the image with Augmented reality technology. This is taken care of by the SceneForm library, which is not only in charge of visualization and keeping the detected objects in the image, but maintains the entire scene and allows to manage individual camera frames [4].

3 RESULTS

We have created the proposed server that can detect objects using the TensorFlow library with models. Before training, we need to prepare a dataset in the correct format and augment each photo with information about the object's location and label. When training larger datasets, this work is very time-consuming and must be done manually. We plan to automate this part in the future. While training our models, we encountered several problems that we plan to address in the future. Time is a key element for real-time detection and we have not been able to reduce the detection time below two seconds.

Two seconds is too long and in that time the device may move to a completely different location and the object label may not match the correct location in the image.

The application offers users the possibility to choose from a menu of trained models. The user is then presented with the camera image and labels start appearing in the space after receiving the detected objects. After tapping on a label, additional information about the specific object is sent from the server and then displayed in the prepared bottom sheet dialogue.

4 CONCLUSIONS

Our research with the first version of the application and server turned out very promising. However, we have many directions where we can take our development. Next, we need to focus on optimizing and simplifying the training of our models, as this

is the part of the project that is very crucial. Furthermore, the server has only been running locally so it is appropriate to move this server to the cloud to make it accessible to all users, not just those connected to the same network.

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EDUCATION QUALITY AS FACILITATOR OF BRAIN DRAIN FROM WESTERN BALKAN COUNTRIES

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KEY WORDS

brain drain, cluster analysis, education level, migration, Western Balkans

JEL CODES

C10, J50

1 INTRODUCTION

Economic and political conditions, the war environment, and the transition from a centralized to an open economy caused a wave of emigration from Western Balkan (WB) countries in the 90s [1]. According to [2], the change that occurred at the end of the last century is that the emigration of unskilled workers has mostly turned into the emigration of highly skilled workers. Countries of the WB region perform relatively well compared to the EU in

primary education, but also in higher education and training [3]. Therefore the actual challenge for traditional EU countries is attracting and retaining talents from abroad. The goal of this paper is to illustrate the education level in WB countries and to compare these countries with the EU Member States, which are the main destination countries for WB emigrants.

2 MATERIAL AND METHODS

Hierarchical cluster analysis was employed to classify countries based on indicators of the quality of the education system (PISA test results), government expenditures on education as a percentage of GDP

and public investments in research and development as a percentage of GDP. Using means for created clusters, we will get insight into positions of WB countries in relation to EU countries.

3 RESULTS

The results of this hierarchical cluster analysis show that all WB countries belong to the same cluster together with their neighbouring EU Member States – Romania, Bulgaria, and Greece, and also with Slovakia (Cluster 1). Cluster 2 is formed by the most developed EU countries – the Scandinavian countries, Germany, Austria, and Belgium. The last

cluster, Cluster 3 includes all other EU countries. A comparison of the means of all indicators used in the analysis for all clusters separately with the means of the indicators for all clusters together is shown in Fig. 1.

This output allows for a graphical comparison of the average values achieved by all clusters in the

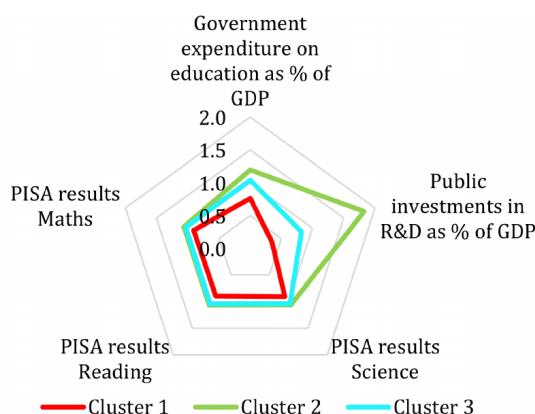


Fig. 1: Ratio of the mean characteristics of individual clusters to the overall mean characteristics

selected indicators. Based on the graph, it can be concluded that although the differences in investment are significant, the differences in achievement are not that large. This is particularly evident when

comparing Cluster 2 and Cluster 3, between which the differences in R&D investment are significant, while the differences in achievements between the two clusters are negligible.

4 CONCLUSIONS

Performed analysis confirms that although the WB countries do not invest as much in education as some more developed countries, they still do not lag as much in terms of educational outcomes. Although WB countries invest below the EU average in R&D and cannot be expected to be leaders in innovation, their potential lies in their technologically advanced firms learning from others. Another positive in this respect is the diverse economy, which allows for

the development of human capital in many different directions.

It can therefore be concluded that it is indeed worthwhile for the more developed countries to import students or young educated people from these countries, as they do not lag in terms of the knowledge acquired compared to native pupils. Countries that import highly educated workers also save on their education, the cost of which is borne by the country of origin.

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COMPETITIVENESS OF NATIONS AND GEOGRAPHY OF MULTINATIONAL ENTERPRISES

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KEY WORDS

MNEs' distribution, competitive advantages, competitiveness of nations, competitiveness index

JEL CODES

F23, O57

1 INTRODUCTION

The question of why some countries have more successful multinational enterprises (MNEs) was opened by Porter [1, 2] when he asked “why does a nation become the home base for successful international competitors in an industry?” in the introduction of his seminal work.

The distribution of headquarters (HQs) of large MNEs in the global economy is seen as “an important yet insufficiently understood phenomenon on the agenda of global strategy research” [3]. HQs are unevenly distributed in the global economy, with significant aggregation in a small number of countries [2, 4]. Being a home country for a large number of MNEs can be significant, for example, due to the creation of a link between the political and corporate spheres [1, 4]. Additionally, it can be interpreted as

a sign of a “nation’s well-functioning economy and institutions” [2]. For those reasons, this topic is a frequent economic interest of national governments. Many authors [2, 3, 6] call for an examination of the global distribution of MNEs HQs. Such a study should combine the influence of both economic and institutional factors. To do this, Meyer and Benito [3] recommend “focus on the forces that drive the relative growth or decline of firms”.

The purpose of this study is to describe the influence of national competitiveness indicators on the distribution of large MNEs' HQs. Therefore, we aim to answer Porter’s question reinterpreted by Coeurderoy and Verbeke [2]: “Why do we observe some nations having a concentration of firms that rank among the largest in the world?”

2 MATERIAL AND METHODS

Regression analysis was used to determine which indicators of NGCI have an impact on the significance of MNEs' HQs in the economy. The regressors used are divided into three levels (categories, components, and sub-components). For a dependent variable, several measures of the significance of MNEs' HQs were used: simple aggregated number of HQs, aggregated number of HQs normalised by the country’s GDP

and GDP-normalised aggregated sales and market value of those MNEs for each economy.

Two main sources of data were chosen for investigation. The Forbes Global 2000 ranking of the largest corporations was chosen to express the significance of MNEs, and structured indicators of the New Global Competitiveness Index [7]. Forbes data examines the list of the 2000 largest corporations for individual

years and provides information on sales, assets, value, profit, and country of origin. The reason for choosing NGCI is that it includes both microeconomic and

macroeconomic phenomena and combines both economic and institutional factors of competitiveness.

3 RESULTS

Based on the literature, a positive and statistically significant influence of indicators of competitiveness on the significance of large MNEs in the economy was expected. The results of our models confirm that the micro and macro environments influence the distribution of HQs of large companies in the global economy. Individual components are positive, but only Company operations and strategy and

Social infrastructure and political institutions are significant. The National business environment factor (represents Porter's Diamond) as a whole seems to be insignificant, only one of its sub-components—Factor conditions are significant with a positive influence. Of the other three factors, only Demand conditions and Supporting and related industries are significant.

4 CONCLUSIONS

The results of this study support the expectation that the number of large domestic MNEs in an economy is influenced by the competitiveness factors of the given economy. The results for the factors of the so-called Porter's diamond are striking findings. Specifically, the negative impact of domestic demand and the quality of competition and clusters of companies. This may be due to the use of a limited sample of only the 2000 largest MNEs in the world economy.

We perceive the limited sample of investigated companies and the lack of individual indicators of the New Global Competitiveness Index as the strongest limitation of this work. Future research could thus build on our paper and undertake a deeper examination of the importance of competitiveness factors on the distribution of large MNEs across economies.

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HOW DIFFERENT METHODS TELL DIFFERENT STORIES: A COMPARISON OF METHODS MEASURING MULTINATIONALITY

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KEY WORDS

MNE, firm-level multinationality, classification of multinationality, internationalisation index, degree of internationalization, empirical comparison

JEL CODES

F23, L25

1 INTRODUCTION

The internationalization of multinational enterprises (MNEs) is a topic that touches three of the five main areas addressed in the current international business (IB) literature [1]. Those topics are namely internationalization and firm performance, the regionalization versus globalization debate, and internationalization by emerging market firms. Inconsistent methods of measuring firm-level multinationality (FLM) generate contradictory conclusions [2, 3, 4] and therefore, might be the reason for ongoing debates concerning the above-mentioned areas of IB literature. Vanek [5] specified the aspects of measuring the internationality of companies. Those aspects include aggregation, complexity, indicators, and flexibility. In this paper, we add two more key aspects – dimensionality and founding theory.

In the literature, a limited sample of papers evaluating methods of measuring FLM exists. The-

oretical and empirical comparisons of two or three methods prevail. To our best knowledge, empirical comparisons of multiple methods do not exist in the literature as methods request various data which are not publicly available.

Two issues can arise when using methods of measuring FLM, namely (1) various methods might evaluate the same firm differently, and (2) the same method may evaluate diverse firms as ones having similar characteristics. The purpose of this paper is to clarify the extent to which methods suffer from these two issues. The paper aims to answer the question of whether the two above-defined issues cause the regionality/globality debate and the debate on the influence of internationality on the performance of MNEs.

2 MATERIAL AND METHODS

For comparison, a set of 128 fictitious companies was created with a manually generated geographical distribution of company activities, reflecting seven

main dimensions defined in this paper (expansion level, number of countries, GDP balance, means of internalisation, main market location, balance

of activities, and Triad focus). The created set of companies covers possible combinations of these dimensions. A unique sample of MNEs' was created due to the absence of suitable empirical data to provide various data for every method in comparison.

3 RESULTS

The results are expected to clarify to what extent individual methods suffer from the issues of the first and second categories. Additionally, based on the key aspects of FLM each method will be evaluated and similar methods will be grouped together. Using

Individual methods will be briefly introduced and the purpose of their creation stated. For the comparison, the key aspects of measuring FLM in Vanek [5] will be chosen. Subsequently, the methods will be applied to a sample of 128 companies.

4 CONCLUSIONS

By comparing the methods of measuring internationality on a unique sample of companies, we proved that many inconsistencies in IB are caused by the methodology used in the studies. Therefore, the globalization-regionalization debate cannot be resolved without the authors agreeing on the principles for the creation and use of methods for examining the internationality of firms. These principles for choosing and creating methods for future studies can be taken from Vanek [5]. How to use these key aspects for comparison has been demonstrated in this article.

the unique sample of MNEs, conclusions. Finally, it will be clarified to what extent these differences can influence the evaluation of samples of empirical data and therefore drive the ambiguity of the research.

A limitation of this article is the absence of empirical data. Based on this article, it is therefore not possible to draw conclusions about the degree of internationalization of large companies. However, the dataset is sufficient to demonstrate the ambiguity of individual methods. Geographical data on the distribution of MNEs' activities are getting more available and detailed in time. Therefore, future studies could obtain needed empirical data and revisit our study to verify our conclusions.

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INFLUENCE OF MINIMUM WAGE SETTINGS ON CONSUMPTION IN EU

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KEY WORDS

cluster analysis, consumption, EU countries, minimum wage, regression analysis

JEL CODES

C23, E21, E24

1 INTRODUCTION

The influence of the minimum wage on employment was discussed many times in scientific papers and economic theories. Nevertheless, opinions on the topic differ. Some argue that the effect of the minimum wage on employment is just muted, another studies say that the loss of employment is significant. Economic theory claims that a rise in unemployment will be accompanied by a reduction in the income of the population, and this will change spending behaviour as mentioned in [1]; however, this effect may vary for different time horizons and different

groups of workers. The hypothesis can be stated that with an increase in the minimum wage, consumption expenditures are going to increase as well. The paper [2] deals with this issue through the case of Chinese households, while in the paper [3] the topic is treated by comparing the situation in high and low income provinces in Canada. In this study, the aim is to verify the possible relationship between minimum wages and consumption behaviour in the EU countries.

2 MATERIAL AND METHODS

Since minimum wage data are available from the year 1999, the time series from 1999 to 2021 were considered. The relationship between the increase in the minimum wage and the increase in consumption expenditures was examined by using regression analysis of time series and panel data. For countries that did not introduce a minimum wage or introduced it during the period under study, two approaches were taken, either adding zeros in the blind spots or using the lowest minimum wage of all countries in the given period. As explanatory variables, national minimum wage, gross domestic product and gross domestic product per capita were used. The dependent variables were either consumption expenditures or consumption expenditures per capita. Additionally, a

dummy variable was added to the model to identify whether a country did or did not have a minimum wage. In different variants of models, lagged variables for consumption expenditures and minimum wage were also included. As national minimum wage data are published biannually, they were converted to annual data by applying an arithmetic average. Final consumption expenditures and gross domestic product are reported annually in millions of euros at current prices. To obtain per capita variables, the aggregated annual values were divided by the population of the individual countries. Random and fixed effects of panel data as well as first differences were used in the model fitting. To find more accurate models for a wide range of countries,

Cluster 1	Cluster 2	Cluster 3
Austria	Cyprus	Bulgaria
Belgium	Greece	Croatia
Denmark	Malta	Czech Republic
Finland	Portugal	Estonia
France	Slovenia	Hungary
Germany	Spain	Latvia
Ireland		Lithuania
Italy		Poland
Netherlands		Romania
Sweden		Slovakia

cluster analysis with standardized Euclidean metric and Ward's distance was employed (this choice was found to be the best based on the evaluation of cluster analyses with many different settings). All

data were acquired from the Eurostat database, and calculations were provided by MATLAB R2021b computational system and Gretl 2022a software.

3 RESULTS

Cluster analysis resulted in four clusters, where one cluster contains Luxembourg only and is therefore not discussed further.

For Cluster 1, we estimated models with a significant minimum wage variable in various forms with a negative parameter, accompanied by a minimum wage dummy also with a negative sign. Although an attempt was made to omit Ireland as a possible

outlier, the results remained almost the same. For Cluster 2, no model with a significant minimum wage effect could be found, despite the fact that some of them looked promising. For Cluster 3, one suitable model was estimated for each type of minimum wage with a positive effect of minimum wage increase. All estimated models seemed to be accurate and were not at risk of false regression.

4 CONCLUSIONS

It can be concluded that effect of national minimum wage increase is significant in most EU countries. The direction of the effect differs between the North-Western countries, where consumption is lower for

countries without a minimum wage but also decreases with increasing minimum wages, and for post-socialist countries, where consumption increase with increasing minimum wage.

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THE IMPACT OF DIGITAL TRANSFORMATION ON THE BUSINESS PERFORMANCE IN THE MANUFACTURING INDUSTRY

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KEY WORDS

digitalisation, digital transformation, digital maturity model, maturity assessment

JEL CODES

M11, M15, O33

1 INTRODUCTION

The global business world has changed significantly over the past decades. Ongoing economic globalisation, the continuous rise of new technologies, market volatility, increasing risk and supply shortages represent only some examples for challenges enterprises have to face in present times [1]. The global developments force companies to rethink. Maintaining and improving competitiveness on the market requires a targeted optimisation of business processes along the supply chain. To achieve an improvement of process effectiveness and efficiency within a company, digitalisation is taking a decisive role. Digital transformation and the use of new technologies along the supply chain can help enterprises to design their processes more efficiently, promote sustainable organisational development and thus strengthen their competitive position on a long-term basis. Hence, the importance of digitalisation has grown more and more throughout all business sectors and types of organisations over the past years and will also be a critical factor when it comes to succeeding on the global market in future years [2].

For many years Germany has been representing a key economic power in Europe [3]. Known for its high competi-

tiveness and strong industrial sector, even in times of crisis the country has managed to maintain a strong economic position [4]. However, with regards to digitalisation the picture is completely different. In this area Germany is not taking the lead, but rather an average position compared to other highly developed European countries [5, 6]. Also the German manufacturing industry, contributing significantly to the country's economic success, still has to admit a digital backlog demand compared to other German industrial sectors [7]. Considering the steadily increasing relevance of digitalisation in today's business world in combination with the digital catch-up demand of Germany and its manufacturing industry, this research paper aims at understanding if and how the level of digitalisation of a manufacturing enterprise affects its business performance. Based on this, the objective is to provide managers and decision-makers of manufacturing companies with recommendations on how to proceed on their digital path and thus drive the digitalisation of business processes within their companies.

2 MATERIAL AND METHODS

The methodical approach of the present study is divided into six main steps (I – VI). Initially, the current state of development in the field of digital transformation was analysed (I). This literature review involved the analysis of existing research on digital transformation in general, the

assessment of digital maturity and its impact on business performance. Furthermore, an evaluation and comparison of existing digital maturity models, covering the needs of manufacturing companies, was conducted. This formed the basis for the subsequent identification of methods

for measuring a company's digital maturity level (II), involving an in-depth analysis of the dimensions addressed by the selected digital maturity models. After examining similarities and differences between the model dimensions, a set of superordinate, cross-model dimensions was defined. These key dimensions in turn were compared to the processes covered by Porter's value chain model to identify similarities and gaps. Based on this, the final dimensions applied within the digital maturity assessment in the course of this study were identified. By combining the selected digital maturity models with Porter's model,

an enhanced approach for measuring digital maturity is proposed in the form of a questionnaire. Subsequently, a set of key performance indicators for measuring business performance in the manufacturing industry was defined and integrated into the questionnaire (III). The questionnaire thus represents the proposal of a methodology for assessing the impact of digital transformation on the business performance of a manufacturing enterprise (IV). The proposed methodology is then validated in the form of a case study (V) and finally applied within the quantitative research (VI).

3 RESULTS

By conducting the previously described steps, ten final dimensions were defined for measuring the digital maturity level in the course of the present study. In addition, a set of eight key performance indicators for measuring business performance was selected. After collecting the data required for the quantitative research from companies via an online survey, valuable data bases are used to

complement and check the collected data. Subsequently, the data is analysed to verify the correlation between a manufacturing company's digital maturity level and its business performance. Regression analysis is used for data evaluation to test the impact of the independent variable digital maturity level on the dependent variables for business performance.

4 CONCLUSIONS

Through investigating how to measure digital maturity and enhancing existing models by an emphasized involvement of business processes into the assessment, the present study aims at gaining more understanding on the effective deployment of digital transformation in the manufacturing industry. Managers and decision-makers in the sector are thus provided with a practicable tool to measure their organisational level of digitalisation. This in turn enables them to identify opportunities for improvement and critical success factors for digital transformation within their

companies. In addition, recommendations for action to support in deciding on how to proceed with digitalisation are formulated. Further, greater comparability to other enterprises in the sector is enabled by establishing a benchmark. Finally, the results of the study are meant to assist manufacturing enterprises in building up or developing further their digitalisation strategy in order to remain competitive on the global market in the years to come.

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THE NEXUS BETWEEN STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH: EVIDENCE FROM THE BRICS COUNTRIES

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KEY WORDS

BRICS, causality, correlation analysis, economic growth, GDP, Granger test causality, stock index, stock market, VAR model

JEL CODES

C32, E44, F43

1 INTRODUCTION

The interdependence in the evolution of stock indices and economic growth can be defined by several types of causality. The first type is the one-way causality of the “supply-leading hypothesis”. According to Karimo and Ogbonna (2017), the “supply-leading hypothesis” is based on the proposition that financial development has a positive effect on economic growth. The second theoretical framework of the relationship between financial development and economic growth is the one-way causality of the “demand-following hypothesis”, which assumes that economic growth leads to financial development. This theory has been supported by Demetriades and Hussein (1996). Evidence of a bidirectional causal relationship between deepening financial markets and economic activity, referred to as the “feedback hypothesis”, was

tested by Apergis (2007). The null causal relationship between financial depth and economic growth is referred to as the “neutral hypothesis”. The decay of the relationship between stock returns and future actual economic activity is discussed, for example, by Binswanger (2000). Several authors have produced models giving space for conflicting views on the relationship between the stock market and growth, and the relationship is thus described as the “negative hypothesis” (Naceur, Ghazouni, 2007). The role of stock indices can be an economic growth volatility predictor and thus become an important indicator for economic policy makers in the BRICS countries. Therefore, the aim of this paper is to examine the correlation between stock market performance and actual economic activity in the BRICS countries.

2 MATERIAL AND METHODS

Time series analysis capturing economic and stock market activity was required to test the property of stock indices as leading indicators in the BRICS countries. In order to capture the economic growth of the BRICS countries, the gross domestic products of these countries were used. The GDP time series were obtained from the OECD database, at a quarterly

frequency from the first quarter of 2004 to the third quarter of 2020. Stock market developments were approximated by stock indices that are typically representative of the BRICS countries. The strength of the statistical dependence between the variables was first determined using correlation analysis. In case a certain dependence of the variables GDP

and stock market was found through correlation analysis, the possibility of a real existence of causality can be assumed. The Granger causality test was used to decide the correlation between economic development and stock market activity. Multivariate

time series built in the form of VAR models allow us to investigate Granger causality by testing for nullity of individual blocks in the parameters of the VAR model.

3 RESULTS

The results that emerges from the individual time series distribution is the high degree of divergence between the results of the correlation analysis and the Granger causality test. Only Granger causality results are presented, and this is because the assumption of univariate and bivariate normality was not met for the correlation analysis for the vast majority

of the data. The type of causality can be identified for Brazil, where the predominant type is “demand-following causality”. In South Africa, the “neutral hypothesis” dominates. In the other countries, the identification of the hypothesis is more complicated as no causality typically prevails.

4 CONCLUSIONS

The main hypothesis of the paper, that stock indices have the ability to predict future economic developments, should be rejected. It cannot be said that stock indices and economic performance are unrelated, but “supply-leading” causality cannot be conclusively confirmed because it has not been demonstrated for any of the BRICS countries at

a level that would prevail. It has been found in some sub-periods in Russia, India and South Africa, suggesting that stock indices carry information about future economic performance, but other causalities have been found to occur more frequently in these countries.

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MEASURING UNEMPLOYMENT RATE UNDER LABOUR MARKET CHANGES AND CURRENT ECONOMIC DEVELOPMENT

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KEY WORDS

Google Trends, labour market, measuring unemployment, unemployment

JEL CODES

E24, J01, J21

1 INTRODUCTION

Unemployment determines the state of the country's economic equilibrium, but it is also an obstacle to social development. In this regard, it is an important macroeconomic variable, as its consequences have an impact not only on the economy as a whole, but also on economic agents in a social and personal context [2]. Before the Covid-19 pandemic, it was estimated that the overall unemployment rate in the European Union would stabilise at values corresponding to 2008 by 2030 [1]. Despite these predictions, the Covid-19 pandemic disrupted the economy to such an extent that it triggered the world's second largest global crisis, the consequences of which were felt in the labour market and its indicators [4]. The recession

has thus resulted in both persistently and unevenly high unemployment, meaning that unemployment rates currently vary dramatically across economies around the world [3]. However, the labour market has also been changing in the last few years due to the impact of recent technological developments, extraordinary dynamic socio-economic changes [5, 6]. Thus, the question remains whether traditional unemployment rate indicators can reflect the state of the unemployed part of the population realistically. The aim of this research is to enlighten Google Trends as an alternative approach to measuring the unemployment rate, which could be a more accurate representation of the unemployment rate.

2 MATERIAL AND METHODS

The aim of this paper is to provide a literature review covering the most significant changes in the labour market, which will serve as a baseline for further research in the field of measuring unemployment rates by tracking user activity on the Internet. To accomplish this aim, four research questions were selected. RQ1: What are the current indicators for measuring unemployment rates with emphasis on their limiting characteristics? RQ2: What major changes have taken place in the labour market in general in the 21st century? RQ3: What specific changes have

occurred in the labour market in the V4 countries? RQ4: What is the possibility of using Google Trends for the purpose of measuring the unemployment rate? The following bibliographic databases were searched as part of the systematic literature research – Scopus, Springer, JSTOR, Research Gate, EBSCO, Journal Citation Report, Google Scholar, Repec, Sciendo. The paper is structured into several sections that correspond to the RQs. The first section is devoted to an enumeration of current indicators for measuring the unemployment rate, focusing on the

construction of these indicators and their limiting elements. The second section provides an overview of the 21st century changes affecting the functioning of the labour market. The third section highlights the recent labour market changes in the V4 countries. The fourth section analyses the correlation between

unemployment and online activity of internet users. The last section summarises the most important conclusions and assesses the labour market changes. According to these conclusions, the ability of Google Trends to carry information about the unemployment rate is finally evaluated.

3 RESULTS

Traditional indicators for measuring the unemployment rate have not been designed to respond to the multiple dynamic changes occurring in the current labour market. Despite the introduction of legislative changes, there are persistent divergences between the indicators. In addition, unemployment indicators do not provide information that can be used to

predict short-term fluctuations or changes in trends. Another shortcoming is that the unemployment forecasts of most national statistical offices do not use information from external sources. The aforesaid gives scope for unemployment nowcasts based on Google Trends.

4 CONCLUSIONS

The main contribution of this paper is to provide a review that justifies the relevance of Google Trends in the role of nowcasting unemployment in terms of economic evaluation of labor market changes, which has not been addressed in the existing

literature. In this context, the paper will be used as a starting theoretical framework for the purpose of constructing an alternative indicator to measure the unemployment rate just by tracking users' internet activity.

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CONFIGURATION OF NEURAL NETWORKS IN VIRTUAL REALITY

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KEY WORDS

virtual reality, neural networks, user experience

JEL CODES

C88, L86

1 INTRODUCTION

Artificial Neural Networks (ANN) play a key role in plenty of applications. Only traditional approaches has been used to create and configure ANN so far such as building ANN using programming languages or other 2D environments [0]. ANN can be effectively visualised using directed graphs, therefore we decided to focus on development of 3D environment for their creation, training, and evaluation. This kind of environment accessible through VR headset has number of advantages, e.g., Alger [1] describes following:

- User's workspace is significantly larger than in 2D.
- User can be more efficient at work because the 3D environment tends to be more immersive.
- Z-depth gives a new perspective.

Additionally, since metaverse is becoming more than a buzzword these days, we wanted our application to be compatible with other metaverse services. In a practical sense we mean that our application would be accessible also from smartphones or desktop computers so that it “merges physical reality with digital virtuality” as Mystakidis [2] states.

2 MATERIAL AND METHODS

In order to satisfy metaverse requirements we decided to create a web application using traditional client-server architecture. This architecture is suitable for training ANN because servers usually have more computational power, meaning it would be very suitable to use them for training ANN models, on top of that client device can be focused purely on rendering a 3D scene.

For the client part of the application, we used framework A-Frame [3], an abstraction of Three.js library [4], that allows creation of such 3D environment for VR. This library uses WebXR Device API [5] to communicate the VR requests. Also, control of the scene was adjusted according to the accessing device.

Metaverse requirements imply that user has to be allowed to start their work in 2D environment and finish is in 3D. This the reason why we used widely used framework Keras [6] for Python in order to make our application capable of generating Keras scripts according to configuration visualised in 3D environment. Naturally, the application is also able to parse Keras scripts (in a limited sense) thanks to PEG – parsing expression grammar [7].

Our application is not only focused on construction, training and evaluation of ANN models, which can process simple numerical input data, but it supports textual data processing as well, this was accomplished by adding proper recurrent ANN layers like LSTM or GRU.

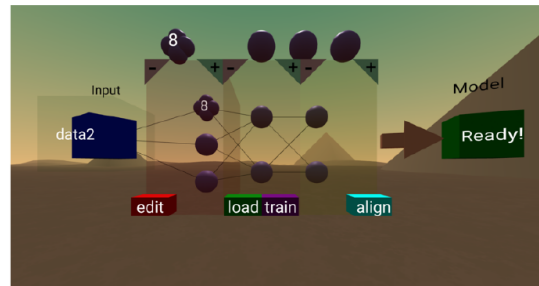


Fig. 1: A demonstration of ANN design using our application

3 RESULTS

User testing of the application prototype was done by both people who had experience with ANN and also people who did not. The first group was able to easily go through an advanced scenario of training and testing a ANN model. Surprisingly the group with almost no knowledge of ANN was also able to complete training and testing of the model without any significant help. A few users

mentioned that the environment reminds them of a game. Most considerable problems with orientation and controlling were reported by smartphone users because of the size of the display. The application is limited by the use of the browser since WebXR standart is not fully supported by, e.g., Firefox or Safari [5]. On the other hand, all the unsupported browsers were used only by 30% of the users [8].

4 CONCLUSIONS

Mentioned results of the user testing confirmed the user friendliness and convenience of the 3D workspace. It turned out that the application has great potential for usage in education. Besides,

other projects of our research group focuses on data visualisation in 3D so we expect to connect these projects in near future.

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MOBILE AUGMENTED REALITY USER INTERFACE STANDARDIZATION

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KEY WORDS

augmented reality, user interface, user experience, mobile devices

JEL CODES

C88

1 INTRODUCTION

Since 2016, when the Pokemon Go mobile application popularized augmented reality (AR) to the general public, mobile devices such as smartphones and tablets have been the most widely used devices for augmented reality [1]. There are a large number of these apps on both major platforms, Android and iOS. The applications comprise games, entertainment applications, teaching and training applications, e-commerce and product visualization, smart tools such as room measurement and photogrammetry of the surroundings, social networks, and more. Even though augmented reality is not a young technology at all and the expansion of AR applications has been going on for over half a decade, there is still

virtually no user interface standardization similar to the Material Design and Human Interface Guidelines for non-AR mobile and web applications, which make the user interface of mobile devices have today's form [2]. The situation is similar to the state of mobile user interfaces before the proliferation of the mentioned standards. Each AR app's user interface elements have various designs, are placed in different places, and, generally, the whole control mechanism is frequently different. An inconsistent experience across mobile AR applications makes it difficult for users to use them or switch from one application to another. For such a purpose, we aim at creating AR user interface guidelines.

2 MATERIAL AND METHODS

Based on the survey of user interfaces of AR applications, we defined the problems of user interfaces of mobile augmented reality. Furthermore, we created a set of approaches that can be used to solve these problems. For each case, we prepared a non-functional prototype in the form of design proposals of a part of the application pointing out the problem and its possible solutions. Similarly, Material Design visualizes problems and their solutions on its website. An example of prototyping and iterative development of an AR mobile user interface is the project in which the application where citizens can collaboratively

create designs for urban environments was created [3]. During development, we followed the general approaches from our past works, which describes the basic general rules that should apply to all AR platforms such as smart glasses, mobile AR, and projectors. The approaches have been evaluated by users who have advanced knowledge of augmented reality as well as potential users without this knowledge. There is no standard AR user interface evaluation method, however, general approaches that work for evaluating classic user interfaces can be used [4].

3 RESULTS

We created a set of non-functional prototypes in the form of design proposals. These were mainly approaches such as possibilities of placement and behaviour of a user interface element containing virtual information in the AR scene, placement of virtual information depending on the screen size (placed directly in the scene vs. placed outside the scene), a transformation of the scene, objects, and information depending on the context of the user, scene, and environment (movement of the user, the

direction of the user's gaze, the position of the user, time, light intensity, temperature, etc.), use of phone accessories (smartwatches, headphones) for AR applications and approaches for creating their user interface, etc.

We conducted a set of extensive user evaluations, in which twelve evaluators provided us with the necessary feedback to modify and select prospective approaches.

4 CONCLUSIONS

We created a set of design proposals serving as a basis for creating user interface guidelines for mobile AR applications. A set of proposals was evaluated for further development. Standardization development is a process that requires user testing and iterative improvement by incorporating their

results. We will continue to iteratively develop rules and recommendations by comparing the user experience of individual approaches. The implementation of a functional prototype based on feedback from user evaluations will be the next step to verify the correctness of our approaches.

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