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FACTORS AFFECTING KNOWLEDGE TRANSFER: A SYSTEMATIC LITERATURE REVIEW AND THE METHOD TO ASSESS MANUFACTURING COMPANY'S READINESS FOR KNOWLEDGE TRANSFER PROJECTS

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Abstract

In today's business environment, with organizations enhancing performance, maintaining a competitive edge, and fostering innovation, the efficient transfer of knowledge plays an increasingly pivotal role. As industries recognize the importance of and strive for more and more productive knowledge transfer, understanding the factors affecting this process becomes imperative. Manufacturing is considered a strategic sector, and well-performing knowledge transfer is necessary for higher innovation and competitiveness. To increase knowledge transfer performance, companies must have the awareness, ability, and opportunity to identify the main aspects that need operational improvement. Studies based on systematic literature review and mapping impact factors have shown that knowledge transfer is hypothetically affected by a vast variety of factors, which creates challenges for companies in selecting and applying these factors. Therefore, **the two research questions** of this study are – RQ1: What are the relationships between the knowledge transfer-influencing factors identified in the literature analysis and the dependent variables? RQ2: What is the weight of the statistically significant factors identified in the empirical study?

Research purpose. Based on the results of the systematic literature review and the complex quantitative analysis, the study aims to develop a method to assess readiness for knowledge transfer.

Design / Methodology / Approach. To answer the stated research questions, the study compiles diverse research methods: a systematic review of the literature, factors' mapping, the online survey of manufacturing companies, correlation analysis, and experts' evaluation using the analytic hierarchy process (AHP) approach, thus ensuring data triangulation.

Findings. The qualitative study of the literature review through iterative analysis and mapping resulted in 29 factors affecting knowledge transfer. Further, the empirical results led to 14 statistically significant factors in 3 groups ranked sequentially – individual factors (recipient's absorptive capacity, recipient's experience, recipient's confidence in their abilities, and recipient's ability to focus on knowledge transfer), mentoring factors (senior management involvement and support, quick decision-making), and organizational factors (training, finances, internal policy, shared vision, organizational structure, staff turnover, HR quantity, and HR quality). The strongest correlations between the factors affecting knowledge transfer and the defined performance variables to measure knowledge transfer manifested in the group of the recipients' individual factors. The most critical factor is the absorptive capacity of knowledge recipients, which managers should pay attention to.

Originality / Value / Practical implications. As a result of the compound study, including a proposal of a new definition of knowledge transfer, a unified method with equations' calculations to quantifiably assess a company's readiness for knowledge transfer projects was developed, tested and validated. With the help of this study, the hypothetical factors affecting the transfer of knowledge in manufacturing have been identified, and the most important ones have been determined. The study also employed a novel approach of combining statistical analysis and AHP assessments to develop equations' calculations to quantifiably assess the company's readiness for knowledge transfer projects.

Keywords: Knowledge Transfer, Knowledge Sharing, Systematic literature review, Factors mapping, Knowledge Transfer Performance, Absorptive Capacity, Manufacturing, Mechanical Engineering, Metalworking

JEL codes: D80; O31; O32; C38; O14; D24; L61

Introduction

As today's competition among companies becomes fiercer, the creation of more innovative products and services becomes increasingly necessary. Organizations accumulate knowledge to innovate in products and processes, including knowledge acquired outside of the organization; thus knowledge, in general, is becoming an increasingly important factor of production. The systematic literature review, including the search for and analysis of definitions and considerations about the essence of a knowledge transfer, revealed that there is not yet a conventionally accepted and applied terminology and understanding of what the knowledge transfer is – it differs across sectors and by types, skills, information and by many other aspects of work. Generally, the most often used and relevant keywords, such as knowledge transfer, knowledge sharing, and knowledge acquisition, define a process in which knowledge, information, and skills are systematically exchanged between individuals. The condition of systematicity assumes that the knowledge transfer is a process both organized and structured. Furthermore, the circulation, exchange, transfer, or sharing of information or knowledge through the experience of people or industries can affect the individuals, the organizational unit, and even the entire company. Therefore, knowledge transfer is also a management process with the cross-discipline circulation of knowledge. Thus, with the evolving importance of knowledge becoming increasingly crucial for competitive advantage, identifying and exploring the factors affecting how knowledge moves and shifts between people and organizations becomes an essential focus.

The manufacturing sector in the economy is considered a strategic sector with high added value, as it influences the level of technology and performance of other sectors by providing them with the necessary production systems, their components, tools, equipment, and technologies (EESC, 2013; LIAA, 2022,). With today's competition among companies growing fiercer, creating more innovative products and services is necessary (e.g. Zelmenis et al., 2023). To do this, companies accumulate knowledge, including knowledge acquired outside the organization (EC, 2007; OECD, 2022). Based on the Latvian Productivity Report 2020 and clearly emphasized again in 2022, companies should invest in research and development and improve people's knowledge and skills to increase innovation activity in Latvia (Austers et al., 2020; LU PEAK, 2022). As one of the major focuses and case studies of the research is the manufacturing industry, the authors, as well as the scientific and applied debate, stress that a well-performing knowledge transfer is necessary for engineering and metalworking manufacturing companies to achieve higher innovation and competitiveness (Al-Dalaien et al., 2019; MASOC, 2005). Regular knowledge acquisition naturally reduces the risk of lacking knowledge and can prevent the company from the negative consequences deriving from offboarding key specialists, which is a particularly pronounced problem in the mechanical engineering and metalworking industry (Patalas-Maliszewska & Sliwa, 2017).

The applied topicality of the research also grounds in the data dynamics on the labour age structure in various professions – for instance, in metalworking, mechanical engineering, and their related sectors in 2022, 38% of the employed are above 50 years of age (Latvian Ministry of Economics, 2022), while those in age decades of 20's, 30's and 40's are respectively 16%, 25% and 23% (Latvian Central Statistical Bureau, 2022). Furthermore, the Labor Market Forecasts until 2040 by the Ministry of Economics in Latvia show that also visibly, in metalworking, mechanical engineering, and their related sectors, the demand for labour (specialists) will not be sufficiently met by the needed supply, but rather opposite – the gap or the labour shortage will increase exponentially – -4% in 2030, and -8,4% in 2040 (EURES, 2023; Latvian Ministry of Economics, 2023). In addition, the Association of Entrepreneurs of Mechanical Engineering and Metalworking Industry (MASOC) in Latvia has repeatedly drawn attention to the fact that with the increase in the efficiency and technological modernization of the companies in the industry, the lack of qualified specialists is still one of the major problems, manifested in approximately 70% of the companies in the industry. In the manufacturing industry, which also includes the mechanical engineering and metalworking sub-sectors, about a quarter of the employees are aged 50-69, which means that the industry will, as a result, need even more new specialists to replace pre-retirement and retirement-age employees, as long-term employees have accumulated industry-specific

technical knowledge and work experience, therefore the transfer of knowledge to companies is becoming more and more relevant (MASOC, 2005, 2022, 2023). As the data shows both the challenges and potential perspective, the research is necessary to contribute to efficient – considered, precise, and smooth – knowledge transfer, purposefully addressing the factors actually and justifiably affecting the knowledge transfer.

Knowledge transfer is affected by various factors, hence, the systematic review of the scientific literature results in the mapping of identified impact factors, which are further explored via research questions determining to what extent the impact factors affect knowledge transfer, particularly within manufacturing companies in the mechanical engineering and metalworking sector. Further, to increase the performance of knowledge transfer, companies need to find the opportunity to identify the aspects that need to be improved in their operation. Therefore, the study develops a method for assessing the readiness for knowledge transfer. Based on the outcomes of the systematic review of the scientific literature and the mapping of factors affecting knowledge transfer, the framework of 4 factors groups – 1) Individual, 2) Mentoring, 3) Organizational, 4) Technological – is used for companies' survey and factors' correlation analysis.

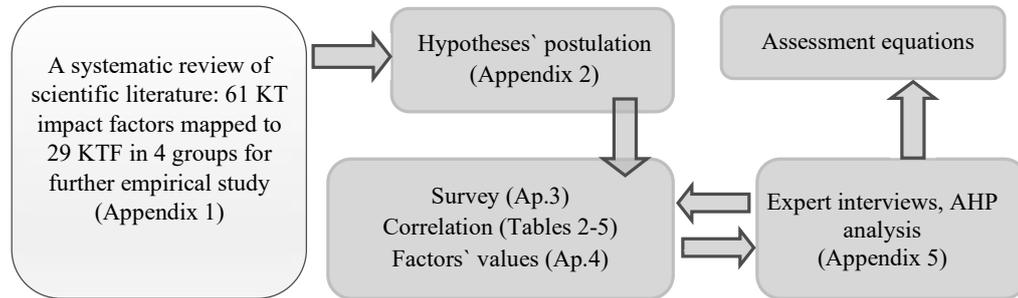
Research Methodology

The research is divided into several stages, including qualitative and quantitative research methods. The systematic literature review and the mapping of identified impact factors (Balaid et al., 2016; Booth et al., 2021, Pedersen et al., 2020) identified and extensively examined what factors generally might affect the transfer of knowledge. Further, quantitative research methods – an online survey of manufacturing companies and expert assessment using the analytic hierarchy process (AHP) approach (Ramanathan, 2006; Saaty, 1994) - are applied in the study providing factual data that were coded and measured. Qualitative and quantitative results are used for correlation and impact significance analysis, using data across research stages, thus overall ensuring data triangulation.

The overall structure of the research methodology design consists of 5 consecutively constructed and implemented stages with the respective research and analysis methods, and with every next stage built up relevantly to the resulted contents of the previous stages (see also Figure 1 below):

- 1) A systematic review of scientific literature resulted in 47 selected sources producing 61 hypothetically valid impact factors from 15 sectors further grouped into 8 groups of 36 aggregated factors that could hypothetically affect the transfer of knowledge (**Error! Reference source not found.**). Iterative mapping of factors resulted in 29 justifiably selected factors in 4 groups to be further analysed empirically (**Appendix 2.** Results of the systematic literature review: factors' map of 29 factors across 4 major groups.).
- 2) Setting 58 **hypotheses** of 29 factors within 4 groups against the two dependent variables – the achieved stage of knowledge transfer and – the frequency of using the acquired knowledge (see Appendix 3. Knowledge transfer factors' hypotheses). The hypotheses formulated for the empirical part of the study are based on factors influencing knowledge transfer, which were identified through the analysis of scientific literature. Considering the research questions and the literature review results, 58 hypotheses were put forward for empirical research on how different factors in 4 groups affect the achieved stage in knowledge transfer and the frequency of using the acquired knowledge.
- 3) Companies' **survey** (see Appendix 4. Companies survey questionnaire) based on **correlation analysis** narrowing to 14 statistically significant factors. The survey also includes **factors' values** to be set for statistically significant factors used further in research (see Appendix 5. Factors' statement values.).
- 4) **Expert interviews in the AHP approach** (see Appendix 6. AHP questionnaire for comparing factors affecting knowledge transfer.) to identify the relative weights of the 14 statistically significant factors.
- 5) Creation of equation as well as calculation and testing of the method to assess the a) knowledge

transfer performance via two variables (the achieved stage of knowledge transfer and the frequency of knowledge usage) and b) company's overall readiness for knowledge transfer projects.



* KTF – knowledge transfer factors

Fig. 1. Research methodology design scheme (Source: made by the authors)

The factors identified as a result of the literature review were iteratively grouped based on considerations and peculiarities also discussed in the literature, and thus further evaluated for inclusion in the empirical study. The literature review and the factors identified also led to the discussion about the definition of knowledge transfer. As a result, the authors offer a more contemporary, complete definition of knowledge transfer; see further in the analysis. Furthermore, the results of the systematic literature review provided also valuable discussion and outcomes on characteristics and parameters which were further used for structured classification and mapping of the factors affecting the knowledge transfer, for instance, the types of knowledge, the levels, and structures (e.g. hierarchical, scope, external, internal) of knowledge exchange, their usability, expediency, and other. The parametrical characteristics resulted from the systematic literature review also provided the two dependent variables – the achieved stage of knowledge transfer and the frequency of using the acquired knowledge – that are further fundamentally used in the empirical part of the research to design a method for assessing manufacturing company's readiness for knowledge transfer projects.

The online survey of the production companies in the database of MASOC (the Association of Entrepreneurs of Mechanical Engineering and Metalworking Industry) members was used to study which influencing factors are significant in the manufacturing companies of the mechanical engineering and metalworking industry (see **Appendix 4. Companies survey questionnaire**). The survey was conducted using Google Forms from April 25 to May 9, 2022. The online questionnaire was sent to 122 respondents, of which 42 respondents took part in the survey. As a result, 27 questionnaires were used to process the results. The following limits were set for collecting the survey data: the survey was conducted only in Latvian manufacturing companies; only companies in the engineering and metalworking industry participated.

The survey uses the concept of *knowledge transfer*, defined in this study as *the process of acquiring tacit and explicit knowledge or using existing knowledge within a company, which is then adapted to the needs of a particular company and shared or disseminated from one organizational structure to another*. Tacit knowledge is based on the individual's experience and skills, which is difficult to express in words but can mainly be acquired through practice. Explicit knowledge means any knowledge that can be obtained and transferred in a coded form, such as a document, database, or image (e.g., Dubickis & Gaile-Sarkane, 2017). The survey first asks a qualification question: Has a new knowledge transfer (knowledge acquisition, transformation, and distribution) project been implemented in the company in the last three years and has been concluded at the given moment? In the framework of this survey, the concept of new knowledge and technologies following Dubickis and Gaile-Sarkane (2021) is perceived as knowledge and technologies that may have already been used in other companies but are new to the particular company. If several knowledge transfer projects were implemented in the company, then the

survey participants were invited to answer only about one of the most critical knowledge transfer projects in the company's opinion. The survey also used concepts such as white and blue-collar, where white-collar refers to employees who perform managerial or administrative work in an office or other administrative environment, and blue-collar employees, in turn, perform physical, skilled, or unskilled labour.

To achieve the purpose of the survey, for each studied factor affecting knowledge transfer, a statement was created, which was associated with two performance indicators:

1) **the extent** to which the knowledge has been acquired by concluding a new knowledge transfer (knowledge acquisition, transformation, and distribution) project. The following **stages of knowledge transfer** were set in the questionnaire, characterizing the extent of knowledge transfer implementation:

- 1) Knowledge was acquired (obtained).
- 2) Knowledge was acquired and adapted to the company's needs.
- 3) Knowledge was acquired, transformed for the company's needs, and distributed among the company's structural units.
- 4) Knowledge was acquired, transformed for the company's needs, distributed among the company's structural units, and is still being used.

2) **the usage frequency** of the acquired knowledge, i.e., how frequently it continued to be used after concluding a new knowledge transfer (knowledge acquisition, transformation, and distribution) project. The following frequency scale was set in the questionnaire, characterizing the usage frequency of the acquired knowledge: 1) Never; 2) Rare; 3) Sometimes; 4) Often; 5) Always.

The significant factor correlations in manufacturing companies were discovered based on the survey data processed and analysed using *Microsoft Excel* and *PSPP* software.

Further, based on correlation analysis results, the **Analytical Hierarchy Process (AHP) questionnaire** was created containing factors that have been found to correlate (statistically significant) with knowledge transfer. The AHP is a structured method that helps make complex decisions based on mutually comparing factors. This method is often used to rank alternatives from best to worst. This article compares the influencing factors of knowledge transfer in pairs by determining each factor's importance (relative weight) (Ramanathan, R., 2006). To obtain evaluation data using the AHP approach, experts who have conducted scientific research in knowledge transfer or have practically encountered knowledge acquisition and transfer within a company were invited. A total of 29 experts were approached, of which 24 were researchers, and 5 were representatives of production companies. Considering the experts' time availability, 10 experts filled out the AHP questionnaires from the experts approached.

During the AHP, the experts were asked to compare the factors in pairs using the importance intensity scale (Saaty, 1994.) shown below in Table 1.

Table 1. AHP scale for pairwise comparisons (Source: Saaty, 1994)

| Importance intensity | Explanation |
|----------------------|--|
| 1 | Two activities contribute equally to the objective |
| 3 | Experience and judgement slightly favour one activity over another |
| 5 | Experience and judgement strongly favour one activity over another |
| 7 | An activity is favoured very strongly over another; its dominance is demonstrated in practice |
| 9 | The evidence favouring one activity over another is of the highest possible order of affirmation |

A simplified AHP approach is used throughout the questionnaire, where factors within one group are compared in pairs, streamlining the comparison process for the experts and reducing the number of compared pairs (Saaty, 1994). Each factor is additionally defined so that experts can better understand the meaning of the factor (see Appendix 6. AHP questionnaire for comparing factors affecting knowledge transfer.).

Research Results

The systematic review of scientific literature

The systematic review of scientific literature explored and summarized the factors from scientific studies published and available in the *Google Scholar* database. An automated search using the keywords “*factors knowledge transfer*” in March 2022 yielded 4,630,000 search records. Advanced search options were selected to limit search results where keywords are in the article title, resulting in 566 search records. A time period restriction was set in the advanced search options using the “since 2016” search filter to narrow the search results further. This resulted in 132 search records – 2 unrelated to keywords, 15 were citations, 12 were in a language other than English, and 10 were master or doctoral dissertations. Therefore, the 39 results were not included in the further screening, leaving the search with 93 records. Of the retrieved search results, 46 were only abstracts or no full text, leaving the remaining 47 search records used in the subsequent literature review. Overall, the 2016-2021 search period returned a total of 132 records, 47 of which were eligible for the systematic review of the results in the scientific literature. The 47 articles selected provided 61 knowledge transfer factors from 15 different sectors:

1. Entrepreneurship (Ebrahimejad, 2017; Ghazinoori et al., 2019; Marjani et al., 2019; Sondari & Akbar, 2016; Szondi & Gergely, 2020; Tuan & Thang, 2021),
2. Education (Djefflat & Maaref, 2021; Es-Sadki & Arundel, 2021; Habtoor et al., 2020; Hu, 2016; Kurniawan & Asari, 2019; Mohidin et al., 2019; Sharma & Garg, 2020; Yancey et al., 2018; Yin, 2017),
3. Medicine (Al-Dalaïen et al., 2019; Chelagat et al., 2019; Gerbin & Drnovsek, 2020; Ghodsian et al., 2017; ; Hassan et al., 2016; Vasli et al., 2018; Wang et al., 2017; Xia et al., 2016),
4. Human resources (Enane, 2016; Ismail, 2015; Mokhtarzadeh & Faghei, 2017 Zulkifly et al., 2017),
5. Information technology (Madhu & Reddy, 2019; Sahu & Dwivedi, 2020; Siu & Chu, 2017; Wang et al., 2021),
6. Public institutions (Azizan et al., 2017; Azizan et al., 2018),
7. Catering (Moon et al., 2021),
8. Hotels (Powell & da Sousa, 2016),
9. Construction (Khamaksorn et al., 2017; Osabutey & Jin, 2016),
10. Energy (Uttaphut, 2018),
11. Project management (Shoeleh et al., 2019; Srisuksa et al., 2021),
12. Sports (Quer & Pedro, 2021),
13. Transport (Geresu, 2020),
14. Product development (Gurcan et al., 2018; Hu, 2016),
15. Manufacturing (Albers et al., 2018; Davoudi & Fartash, 2012; Frank et al., 2018).

The most shared factors are internal communication, mutual trust, organization culture, company management aspects (engagement and support), absorptive capacity, and training of the knowledge

recipient. The overall relatively scattered results across factors and articles evidence a diverse and often dissimilar understanding and various broad interpretations of the factors affecting knowledge transfer factors, thus yet again indicating the necessity for more in-depth research on this topic. Within the analysis, the obtained knowledge transfer factors were aggregated and grouped by similarity in order to facilitate their feasibility in relation to the research purpose, as well as by the type or area of their influence considering both cause and effect and impact directions. As a result, 36 aggregated factors that could hypothetically affect the transfer of knowledge were divided into 8 groups 1) technological, 2) human resources, 3) individual, 4) organizational, 5) academic environment, 6) external, and 7) communication, (see **Error! Reference source not found.**). The greatest factors' variation is seen in the organizational and individual factors, allowing us to conclude that in most cases, knowledge transfer is influenced by either the individual or the organization factors such as the recipient's absorptive capacity, motivation, mutual trust, and management, particularly its level of engagement and support. Further, considering which potential factors might have different effects for different companies and which could be measured, the factors affecting knowledge transfer were 2nd-fold iteratively regrouped. For example, factors from the group "readiness of the academic environment" could have the same impact on companies of the same industry, so this group is excluded from further research. By a similar analogy, factors such as *environment, guidelines, government policy, culture, time zone, and language* are also discarded because companies within one country have the same external factors that could affect knowledge transfer. Nevertheless, given the principally similar strive for innovation via knowledge accumulation in both private and public sectors, the latter searching for more efficient, productive and co-productive provisions and implementation of public policies and services (see, e.g. Putans & Zeibote, 2021), the identified factors shall be relevant for both sectors. Additionally, the 2nd iteration of factors' grouping was largely based also on the scientific findings related to structures and classification of knowledge motion in an organization – its exchange and transfer aspects – revealing that knowledge exchange can take place at three levels: individual, organizational, and technological with each of the levels having different barriers (factors) to knowledge sharing – e.g., at the individual level, the main problem is related to the lack of time and communication and employee's distrust of other employees; at the organizational level, the exchange of knowledge is hindered due to the lack of suitable premises and contacts of cooperation partners; and at the level of technology, the lack of competence and the desire to use technologies are mentioned as the main obstacles (Patalas-Maliszewska, 2014). Furthermore, the group of mentoring factors was formed based on scientific discoveries on the importance of knowledge motion, particularly on the various and indefinable forms of how knowledge is shared and exchanged. It is considered the most important process in the field of knowledge management (Ibrahim et al., 2018), in which interpersonal cooperation takes place (Ryu et al., 2003) both inside and outside the organization (Charterina & Landet, 2013). Knowledge sharing is defined as a two-way process where employees communicate by sharing knowledge (Patalas-Maliszewska & Klos, 2019). Interestingly, also vice versa – knowledge sharing is a way of organizational structures and how participants communicate and learn from each other (Yoon et al., 2021). In particular, the intangible or tacit knowledge exchange takes place via communication between management and employees (Crhova et al., 2015). Thus, the mentoring factors largely derive from individual and organizational factors and their synergy, for instance, the availability of knowledge within an organization and willingness to transfer communication between the knowledge provider and the recipient, as well as organization management's involvement, including support and organization of for knowledge transfer. As a result of the extensive in-depth analysis and various aspect exploration of considerations, the knowledge transfer factors' grouping was settled into a map of 29 factors in 4 general groups: 1) 8 individual factors, 2) 7 mentoring factors, 3) 10 organizational factors, 4) 4 technological factors (see **Appendix 2**. Results of the systematic literature review: factors' map of 29 factors across 4 major groups.). These factors shall be used further in the empirical part of the research according to the methodological design.

Finally, to fully establish the groundwork for further research, the systematic review of the scientific literature has also led to the determination of performance indicators or dependent variables crucial in the subsequent empirical study for assessing the effectiveness of knowledge transfer by evaluating the identified factors. Based particularly on the author's augmented definition of knowledge transfer – a *process in which internal or external tacit and explicit knowledge is acquired and is further adapted to*

the needs of a company and shared or distributed from one organizational structure to another – two dependent variables as performance indicators for characterizing knowledge transfer success were developed:

- 1) the extent to which the knowledge is acquired or the achieved stage in knowledge transfer by concluding a new knowledge transfer (knowledge acquisition, transformation, and distribution) project – such an indicator should allow us to determine whether the acquired knowledge has been transformed for the company's needs and shared between different structural units of the company;
- 2) the usage frequency of the acquired knowledge after concluding a new knowledge transfer (knowledge acquisition, its transformation, and distribution) project – such an indicator shall determine whether the transferred knowledge has been useful at all and whether the company has used it after the conclusion of the knowledge transfer project.

The authors consider knowledge transfer to be successful if the acquired knowledge is transformed and shared and used in the company as a valuable resource.

The results of the correlation analysis showed that the proposed hypotheses had obtained a correlation on the influence of various factors on knowledge transfer performance variables: P1 – the achieved stage of knowledge transfer, and P2 – the frequency of using the acquired knowledge. Table 2 below shows the correlation of individual factors of recipients with the efficiency indicators of knowledge transfer.

Table 2. Correlation of the individual factors of recipients with the achieved stage of knowledge transfer and the frequency of using the acquired knowledge (Source: Made by the authors based on survey results)

| Individual factors | Statistically significant correlations with performance variables | |
|---|---|--------|
| | P1 | P2 |
| Recipient's ability to focus on the knowledge acquisition process | 0.640* | |
| Recipient's motivation | | |
| Recipient's intellectual level, including emotional intelligence | | |
| Recipient's absorptive capacity | 0.445* | 0.547* |
| Recipient's confidence in their abilities | | 0.491* |
| Recipient's work experience | | 0.546* |
| Recipient's education level for white-collar workers | | |
| Recipient's education level for blue-collar workers | | |

P1 – the achieved stage of knowledge transfer; P2 – the frequency of using the acquired knowledge.

According to the data in Table 2, it can be seen that the achieved stage of knowledge transfer (P1) has two while the frequency of using the acquired knowledge (P2) has three statistically significant positive correlations with the individual factors of recipients. *The recipient's ability to focus on the knowledge acquisition process* has relatively the highest correlation with *the achieved knowledge transfer stage*. *The recipient's absorptive capacity* is the only factor from this group that significantly correlates with both performance indicators. Such correlation allows the conclusion that the higher the *recipient's ability to focus* and the higher the *absorptive capacity*, the better the recipient has mastered the knowledge. Thus, the recipients are more able to adapt the knowledge to the company's needs and use it in daily operations. In addition, this factor also stood out in the scientific literature review, showing that the *recipient's absorptive capacity* is one of the factors affecting transnational knowledge transfer projects particularly (Shoeleh et al., 2019). Also, there is a relatively high positive correlation between the

recipient's work experience and *the frequency of use of the acquired knowledge*. The obtained correlation could be explained by the fact that often the most experienced employees of the company have acquired both explicit and tacit knowledge, which is directly based on their previous experience. Based on theory analysis within the literature review, tacit knowledge is highly valued because it is the most difficult to transfer. Therefore, if there are more experienced employees in the company, the more they can recommend how the company should act or not based on the knowledge already acquired in practice. As a result, companies can better focus on knowledge transfer and avoid the most typical mistakes that make knowledge transfer less successful, such as, e.g., overestimation of employees' eagerness, readiness, and ability to participate in the knowledge transfer process efficiently or underestimation of indirect impact aspects such as company's strategic and tactical culture or organization structure. Although the level of education as an individual factor did not reveal statistically significant correlations with any of the knowledge transfer performance indicators in the empirical case study, still based on the literature review as well as taking into account recent trends in industrial development (Greco, 2023), including the role of knowledge in the knowledge economy, the authors envisage the potential relevance of education as individual factors.

Further, Table 3 shows a comparatively smaller volume of correlation between the identified **mentoring factors** and the achieved stage of knowledge transfer and the frequency of use of acquired knowledge.

Table 3. Correlation of mentoring factors with the achieved stage of knowledge transfer and the frequency of use of acquired knowledge (Source: Made by the authors based on survey results)

| Mentoring factors | Statistically significant correlations with performance variables | |
|--|---|--------|
| | P1 | P2 |
| Availability of knowledge | | |
| Content and quality of knowledge | | |
| Communication with the recipient | | |
| Skills to transfer knowledge | | |
| Willingness to transfer knowledge | | |
| Top management involvement and support | | 0.490* |
| Quick decision-making | | 0.444* |

P1 – the achieved stage of knowledge transfer; P2 – the frequency of using the acquired knowledge.

Only two factors considered for mentoring – top management involvement and support and decision-making – have a statistically significant positive correlation, with only one of the performance variables being how often the acquired knowledge is used after the conclusion of the knowledge transfer project. The results confirm that the employees appreciate top management's involvement in the knowledge transfer process. The participation of the management can inspire and motivate the employee.

In turn, the **organizational factors**, as shown in Table 4, show a broad correlation with both performance variables of knowledge transfer.

Table 4. Correlation of organizational factors with the achieved stage of knowledge transfer and the frequency of use of acquired knowledge (Source: Made by the authors based on survey results)

| Organizational factors | Statistically significant correlations with performance variables | |
|-----------------------------------|---|----|
| | P1 | P2 |
| Communication among the employees | | |

| | | |
|----------------------------------|---------------|---------------|
| Staff turnover | | 0.412* |
| Human resource quantity | | 0.471* |
| Human resource quality | 0.505* | |
| Training | | 0.559* |
| Financial resources | | 0.531* |
| Organizational culture | | |
| Company's internal policy | 0.613* | 0.434* |
| A shared vision | | <u>0.518*</u> |
| Organizational structure | | 0.438* |

P1 – the achieved stage of knowledge transfer; P2 – the frequency of using the acquired knowledge.

The organizational factors group has the most statistically significant correlations in terms of an amount compared to other groups of factors. Furthermore, the correlations reveal both of the performance variables. In terms of correlations' significance within the organizational factors group, the strongest correlation is established between the achieved stage of knowledge transfer and the factor such as the *Company's internal policy* followed by the frequency of using the acquired knowledge with the highest correlation to the factor *training*, which is a process in which an employee is taught the skills needed to upgrade their qualifications. Therefore, it can be concluded that training to raise qualifications positively affects the frequency of using the acquired knowledge. Accordingly, there is a higher probability that by regularly holding employee training, knowledge transfer can be more successfully implemented (employees can accumulate knowledge even more and use it to transform and share knowledge). Interestingly, the second most correlated factor with the frequency of using the acquired knowledge is the shared vision, which proves that if the company's employees have a clear picture of the company and understand it, then the transferred knowledge can be used longer because the employees have learned the knowledge, transformed and shared in such a way that they correspond as much as possible to the company's vision, which describes the company's desired achievable goal in the long term. This also aligns clearly with the finding of a systematic review of scientific literature – shared vision fosters mutual understanding and provides an essential mechanism among employees to integrate, share, and transfer knowledge within the organization (Zulkifly et al., 2017). It can be said that knowledge transfer also helps employees understand what the company wants to achieve through knowledge transfer if they understand the company's long-term goals. Such observation is also justified by the abovementioned company's internal policy's impact on the achieved knowledge transfer stage. Overall, there will be 8 organization factors extracted for further grouping and AHP analysis based on correlation results.

Finally, Table 5 shows the correlation coefficients of the **technological factors** to the achieved stage of knowledge transfer and the frequency of use of acquired knowledge.

Table 5. Correlation of technological factors with the achieved stage of knowledge transfer and the frequency of use of acquired knowledge (Source: Made by the authors based on survey results)

| Technological factors | Statistically significant correlations with performance variables | |
|--|---|---------|
| | P1 | P2 |
| The average age of computers | | |
| The average age of software updates | | 0.417* |
| Frequency of database updates | | -0.445* |
| Frequency of applied technology, knowledge, and methods revision | | |

P1 – the achieved stage of knowledge transfer; P2 – the frequency of using the acquired knowledge.

According to the data in Table 5, it can be seen that the only two factors showing a significant correlation with the frequency of using the acquired knowledge are – the *average age of software updates*, which correlates positively with the frequency of using the acquired knowledge, and the *frequency of database updates* correlating negatively with the frequency of using the acquired knowledge. According to the survey data, no statistically significant correlations were obtained for *the average age of computers and the frequency of updates of technology, knowledge, and methods used to implement the activity*. However, the literature review strongly emphasized that technology significantly impacts knowledge transfer. Since the obtained results are contrary to what was hypothesized, **the group of technological factors was excluded** from further research and was not presented in the expert evaluation.

As a result of the correlation analysis on the factors identified in the survey findings and the knowledge transfer performance variables, the study has identified 14 factors (see below Figure 2) with empirically justified significance (found statistically significant correlation) in the context of knowledge transfer performance. As a result, the initially identified 61 factors based on their empirically justified significance in correlation to their impact performance variables are now re-grouped into the mentioned 14 factors of 3 groups:

- 4 individual factors of recipients (recipient’s ability to focus on the knowledge acquisition process, recipient’s absorptive capacity, recipient’s confidence in their abilities, and the existing work experience of the recipient).
- 2 mentoring factors (involvement and support of senior management, the ability of senior management to make decisions quickly). The selected mentoring factors showed correlations with only the second performance variable – the frequency of using the acquired knowledge.
- 8 organizational factors (staff turnover, sufficiency of human resources, qualification (quality) of human resources, training for employees, resources for employee training, compliance with company policy, shared vision, organizational structure facilitating information exchange).

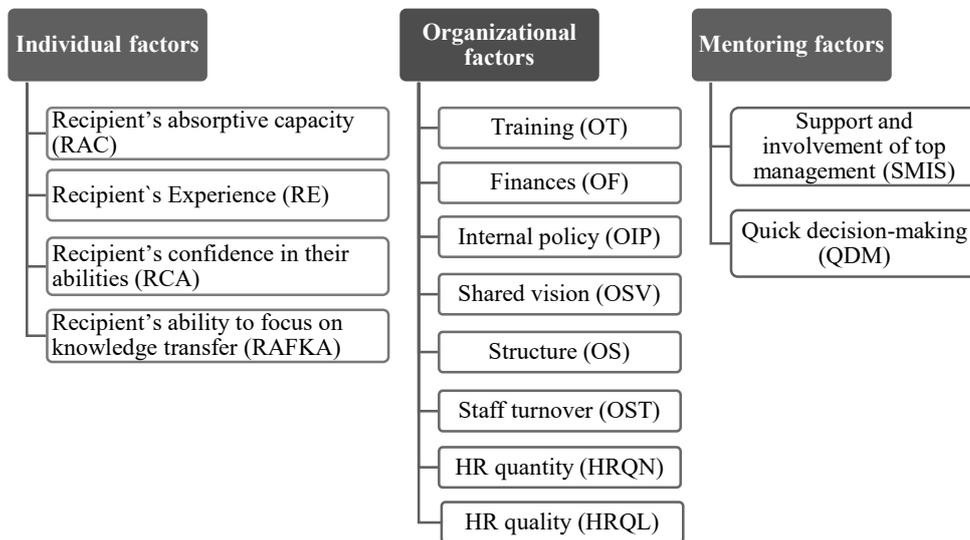


Fig. 2. Post-correlation re-grouped knowledge transfer factors. (Source: Made by the authors based on correlation analysis results)

Abbreviations’ acronym codes are used further with quantitative values in calculation equations (see Equation 1. The knowledge transfer performance equation.).

The experts' assessment

The experts were offered 14 factors in 3 groups for evaluation, which were found to have a statistically significant correlation with the two dependent variables – the achieved stage of knowledge transfer and – the frequency of using the acquired knowledge. The weights of individual recipient factors are shown in Table 6.

Table 6. Individual factors' weights. (Source: Made by the authors based on experts' survey via AHP.)

| Experts | Factor weights | | | |
|----------------|---|---------------------------------|---|---|
| | Recipient's ability to focus on the knowledge acquisition process | Recipient's absorptive capacity | Recipient's confidence in their abilities | The existing work experience of the recipient |
| 1 | 0.15 | 0.33 | 0.09 | 0.43 |
| 2 | 0.06 | 0.66 | 0.21 | 0.07 |
| 3 | 0.04 | 0.62 | 0.09 | 0.25 |
| 4 | 0.27 | 0.54 | 0.08 | 0.11 |
| 5 | 0.09 | 0.19 | 0.61 | 0.11 |
| 6 | 0.11 | 0.29 | 0.06 | 0.54 |
| 7 | 0.20 | 0.57 | 0.10 | 0.13 |
| 8 | 0.12 | 0.43 | 0.05 | 0.4 |
| 9 | 0.05 | 0.39 | 0.26 | 0.3 |
| 10 | 0.13 | 0.61 | 0.05 | 0.21 |
| Average | 0.12 | 0.46 | 0.16 | 0.26 |

The results show that the experts considered the most crucial factor to be *recipients' absorptive capacity*, but relatively less critical – *recipients' ability to focus on the knowledge acquisition process* and *the recipient's confidence in their abilities*. Also, in the correlation analysis from the company survey data, it can be found that in the group of recipients' individual factors, *the recipients' absorptive capacity* has the highest correlation with the frequency of using the knowledge acquired in the transfer of knowledge. Further, the weights of mentoring factors are shown in Table 7.

Table 7. Mentoring factors' weights (Source: Made by the authors based on experts' survey via AHP)

| Experts | Factors' weight | |
|---------|--|--|
| | Involvement and support of senior management | The ability of senior management to make decisions quickly |
| 1 | 0.75 | 0.25 |
| 2 | 0.5 | 0.5 |
| 3 | 0.9 | 0.1 |
| 4 | 0.75 | 0.25 |
| 5 | 0.5 | 0.5 |
| 6 | 0.75 | 0.25 |
| 7 | 0.5 | 0.5 |
| 8 | 0.83 | 0.17 |

| | | |
|----------------|-------------|-------------|
| 9 | 0.75 | 0.25 |
| 10 | 0.75 | 0.25 |
| Average | 0.70 | 0.30 |

Within the correlation analysis of the mentoring factors, only two factors showed statistically significant correlations with one of the performance variables and thus were further evaluated in this group. It can be seen from the table above that the experts have recognized that the *involvement and support of senior management* has more than twice the weight of *the ability of senior management to make quick decisions*. This could be explained by the fact that the most essential thing in the mentoring process is that the top management participates. If the top management does not get involved in the mentoring process, quick decision-making becomes less critical. Also, the correlation analysis showed a higher correlation for the *involvement and support of senior management*. Thus confirming the reliability of the research results.

And lastly, the weights of organizational factors are shown in Table 8.

Table 8. Organizational factors' weights (Source: Made by the authors based on experts' survey via AHP)

| Experts | Factors' weight | | | | | | | |
|----------------|-----------------|--------------------------------|----------------------------|------------------------|---|---------------|--|----------------------------------|
| | Staff turnover | Sufficiency of human resources | Quality of human resources | Training for employees | Financial resources for employee training | Shared vision | Organizational structure facilitating information exchange | Compliance with company's policy |
| 1 | 0.04 | 0.04 | 0.26 | 0.07 | 0.07 | 0.36 | 0.08 | 0.08 |
| 2 | 0.07 | 0.04 | 0.26 | 0.04 | 0.10 | 0.37 | 0.09 | 0.03 |
| 3 | 0.02 | 0.05 | 0.20 | 0.25 | 0.20 | 0.19 | 0.03 | 0.06 |
| 4 | 0.02 | 0.05 | 0.30 | 0.11 | 0.09 | 0.14 | 0.09 | 0.20 |
| 5 | 0.10 | 0.08 | 0.26 | 0.17 | 0.06 | 0.13 | 0.16 | 0.04 |
| 6 | 0.03 | 0.02 | 0.24 | 0.12 | 0.09 | 0.40 | 0.05 | 0.05 |
| 7 | 0.05 | 0.04 | 0.20 | 0.18 | 0.12 | 0.16 | 0.11 | 0.14 |
| 8 | 0.08 | 0.02 | 0.23 | 0.06 | 0.13 | 0.12 | 0.14 | 0.22 |
| 9 | 0.05 | 0.11 | 0.21 | 0.18 | 0.19 | 0.16 | 0.06 | 0.04 |
| 10 | 0.02 | 0.10 | 0.33 | 0.06 | 0.08 | 0.25 | 0.10 | 0.06 |
| Average | 0.05 | 0.06 | 0.25 | 0.12 | 0.11 | 0.23 | 0.09 | 0.09 |

Experts' evaluations of the knowledge transfer organizational factors' weights show that 2 out of 8 factors of this group are evaluated substantially higher than others. According to experts' considerations, the most important organizational factor is human resources' qualification (quality), which is only 0,02 points ahead of the company's shared vision. The lowest importance factor among organizational factors evaluated by experts is *Staff turnover*, which shows as low as 0,05 points and is closely followed by the *Sufficiency of human resources*, which experts evaluated as low as 0,06 points. In this group of factors, the opinion of experts is less consistent with the survey-based factors' correlation analysis results in manufacturing companies – according to the results of the companies' survey, the highest correlation coefficients were obtained for a) the *Training* factor, evaluating its effect on the frequency of use of knowledge acquired in knowledge transfer, and b) for the *Compliance with company policy* factor, when evaluating its effect on the extent of knowledge transfer implementation. However, in the experts' assessment, the *Quality of human resources* was considered the most important factor and the second

most important factor in the survey. *Staff turnover* was recognized as the least important factor in both studies – the survey and the experts' evaluation.

The study also evaluated the relative value of the factors' groups, identifying their values in the transfer of knowledge of production companies. Table 9 below illustrates how the experts assessed the groups of knowledge transfer factors among one another in order of importance. The experts considered the most important group of factors to be individual factors (average value of 0,42), followed by mentoring factors (0,3), and as the least important, but closely following – the organizational factors (0,28). Compared to the results of the survey of manufacturing companies, where the most significant correlation was found for organizational factors, then for the individual factors of recipients, and the least for mentoring factors, the experts may have found individual factors the most important group because knowledge transfer, for the most part, is highly dependent on how employees as individuals can learn and absorb the acquired knowledge themselves so that they can then be used in the company.

Table 9. Comparison of groups of factors affecting knowledge transfer. (Source: Made by the authors based on experts' survey via AHP)

| Experts | Weights of the Factors' groups | | |
|----------------|--------------------------------|-------------------|------------------------|
| | Individual factors | Mentoring factors | Organizational factors |
| 1 | 0.14 | 0.57 | 0.29 |
| 2 | 0.66 | 0.09 | 0.25 |
| 3 | 0.43 | 0.43 | 0.14 |
| 4 | 0.63 | 0.11 | 0.26 |
| 5 | 0.10 | 0.21 | 0.69 |
| 6 | 0.45 | 0.23 | 0.32 |
| 7 | 0.14 | 0.57 | 0.29 |
| 8 | 0.70 | 0.07 | 0.23 |
| 9 | 0.43 | 0.43 | 0.14 |
| 10 | 0.57 | 0.29 | 0.14 |
| Average | 0.42 | 0.30 | 0.28 |

To conclude on experts' assessment of the factors affecting knowledge transfer, it can be concluded that the opinion of the experts largely matches the results of the survey of manufacturing companies – in two of the three-factor groups, i.e., in the group of individual factors and the group of mentoring factors. Small differences are observed in the opinion of experts and companies in the organizational factors' group, and the comparison of the groups of factors in terms of importance is different.

Based on the results of the conducted qualitative and quantitative research in order to methodologically assess the readiness of knowledge transfer in a mechanical engineering and metalworking industry production company, the authors have **developed equations** to calculate and show quantitatively the performance of knowledge transfer indicators used in the study – the achieved stage of knowledge transfer and the frequency of use of acquired knowledge. For each of the performance indicators, as well as for both indicators jointly, equations are composed of the factors with statistically significant correlations based on the survey of production companies, as well as the weight coefficients based on experts' AHP assessment results, both for factor groups and individually for each factor. Equations are created according to the following principle (Eq. 1.):

Equation 1. The knowledge transfer performance equation. (Source: Developed by the authors.)

$$\begin{aligned} & \text{The achieved stage of knowledge transfer} = & (1) \\ & = \mathbf{G1w} (F1w*v + F2w*v + \dots + F#w*v) + \mathbf{G2w} (F1w*v + \dots + F#w*v) + \\ & \quad + \mathbf{G3w} (F1w*v + \dots + F#w*v) + \mathbf{G#w} (F1w*v + \dots + F#w*v) \end{aligned}$$

Where, $G#w$ – factors' group weight; $F#w$ – factor weight; $F#v$ – factors value.

The formulation of the equations consisted of several methodological (systematic) steps:

- 1) Identification of factors showing statistically significant correlation with each of the performance indicators (companies' survey – see Appendix 4. Companies survey questionnaire; and correlation analysis);
- 2) Defining the values of the statistically significantly correlating factors. The values derive from the respective questions/answers of the survey and are set from 0 to 1 in tertiles (0, 0.33, 0.66, 1) and quartiles (0, 0.25, 0.5, 0.75, 1) (see Appendix 5. Factors' statement values.);
- 3) Obtaining weights for each factor and group of factors (AHP assessments by experts – see Appendix 6. AHP questionnaire for comparing factors affecting knowledge transfer);
- 4) In case one of the factors or groups of factors is excluded, the weights of factors and groups of factors obtained in the AHP questionnaire are recalculated proportionally;
- 5) Creating an equation allowing for quantified calculation of knowledge transfer performance, considering the values and weights of the respective statistically significant correlation factors and their corresponding groups.

As a result, two sets of equations determine the knowledge transfer stage achieved and the frequency of use of acquired knowledge; the factors and their respective groups used in the equations are determined based on the correlation results between factors and the two dependent variables. The quantified calculated results obtained using the equations can vary from 0 to 1.

In the current study based on the MASOC Latvia case study, the acquired knowledge transfer stage in manufacturing companies in Latvia expressed is as follows (Eq. 2):

Equation 2. The achieved stage of knowledge transfer, MASOC Latvia case study. (Source: Developed by the authors.)

$$\begin{aligned} & \text{The achieved stage of knowledge transfer} = & (2) \\ & = \mathbf{IFG(0,6)} * (\mathbf{RAFKA}(0,21*0/0.33/0.66/1) + \mathbf{RAC}(0,79*0/0.33/0.66/1)) + \\ & \quad + \mathbf{OFG(0,4)} * ((\mathbf{HRQL}(0,74*0/0.33/0.66/1) + \mathbf{OIP}(0,26*0/0.33/0.66/1)) \end{aligned}$$

, where

IFG – Individual factors' group, **0,6** – IFG total average weight recalculated;

RAFKA – Recipient's ability to focus on knowledge transfer; 0,21 – RAFKA weight from AHP experts and 0;0.33;0.66;1 – value from companies' survey (Q9);

RAC – Recipient's absorptive capacity; 0,79 – RAC weight from AHP experts; 0;0.33;0.66;1 – value from companies' survey (Q9)

OFG – Organizational factors' group, **0,4** – OFG total average weight recalculated;

HRQL – Human resource quality; 0,74 – HRQL weight from AHP experts; 0/0.33/0.66/1 – value from companies' survey (Q21);

OIP – Organization's internal policy; 0,26 – OIP weight from AHP experts and 0/0.33/0.66/1 – value from companies' survey (Q21).

Using the same principle, the equation of the frequency of use of knowledge acquired by manufacturing companies was also obtained:

Equation 3. The usage frequency of the acquired knowledge, MASOC Latvia case study. (Source: Developed by the authors.)

$$\begin{aligned}
 & \text{The usage frequency of the acquired knowledge} = \quad (3) \\
 & = \text{IFG}(0,42) * (\text{RAC}(0,52*0.33;0.66;1) + \text{RCA}(0,18*0.33;0.66;1) + \text{RE}(0,30*0.33;0.66;1)) + \\
 & \quad + \text{MFG}(0,30) * (\text{SMIS}(0,7*0.25;0.5;0.75;1) + \text{QDM}(0,3*0.25;0.5;0.75;1)) + \\
 & \quad + \text{OFG}(0,28)* (\text{OST}(0,07*v) + \text{HRQN}(0,08*v) + \text{OT}(0,16*v) + \text{OF}(0,15*v) + \text{OSV}(0,31*v) + \text{OS}(0,12*v) + \text{OIP}(0,12*v))
 \end{aligned}$$

where

IFG – Individual factors’ group, **0,42** – IFG total average weight;

RAC – Recipient’s absorptive capacity; 0,52 – RAC weight from AHP experts and 0.33; 0.66 – value from companies’ survey (Q9);

RCA – Recipient’s confidence in their abilities; 0,18 – RCA weight from AHP experts and 0.33; 0.66 – value from companies’ survey (Q9);

RE – Recipient’s experience; 0,30 – RCA weight from AHP experts and 0.33; 0.66 – value from companies’ survey (Q9);

MFG – Mentoring factors’ group, **0,30** – MFG total average weight;

SMIS – Senior management involvement and support; 0,7 – SMIS weight from AHP experts and 0.25-0.5-0.75-1 – value from companies’ survey (Q17);

QDM - Quick decision-making; 0,3 – QDM weight from AHP experts and 0.25-0.5-0.75-1 – value from companies’ survey (Q17);

OFG – Organizational factors’ group, **0,28** – OFG total average weight;

OST – Organization staff turnover; HRQN – Human resource quantity; OT – Organization’s training;

OF – Organization’s finances. OSV – Organization’s shared vision. OS – Organization’s structure.

OIP – Organization’s internal policy.

– weight from AHP experts and v – value from companies’ survey (Q19-Q23)

To verify the accuracy of the equations, four questionnaires from the survey of companies were tested, the results of which are illustrated below (Fig. 3):

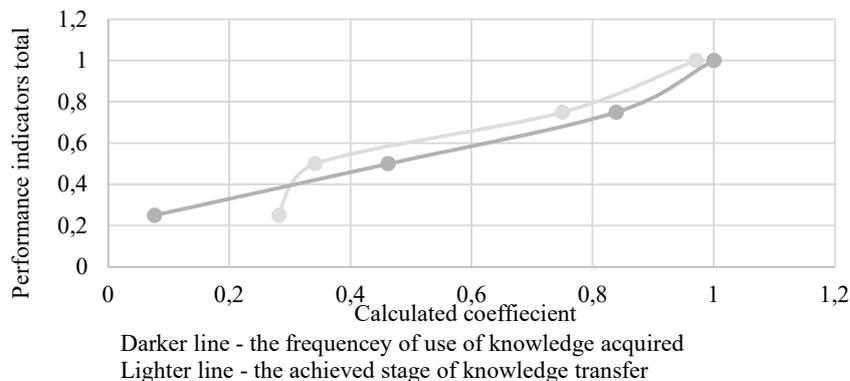


Fig. 3. Approbations of knowledge transfer calculation methodology equations. (Sources: Made by authors based on method approbation)

Figure 3 shows both performance indicators having an upward trend, i.e., the higher calculated coefficient is for those companies that have reached a higher stage of knowledge transfer and use the acquired knowledge the most after the conclusion of the knowledge transfer project.

Overall, it must be noted that the methodological calculation model's thorough validation process affirmed its accuracy and showed its meaningful efficacy, strengthening its applicability to provide reliable results.

Conclusions

Based on the systematic review of the scientific literature, knowledge transfer is a complex and complicated process with comparatively short and low-level conceptual research. It is concluded that there is yet no common understanding of the concept of *knowledge transfer* in studies. Depending on the authors, knowledge transfer can also mean knowledge acquisition and knowledge sharing, which are only part of the knowledge transfer, which is a much more complex process. However, all these concepts include both explicit and tacit knowledge. In addition, all definitions and considerations emphasize the importance of communication; equally, acquiring knowledge is a crucial factor.

The mechanical engineering and metalworking industry is one of Latvia's most exportable industries. Therefore, its development is critical. To ensure competitive export products and services, they must be as innovative as possible with high added value, which can be achieved by carrying out knowledge transfer projects, for example, by attracting the experience of companies from other sectors in Latvia and abroad, as well as higher education and research institutions.

Knowledge transfer in manufacturing companies is influenced by 14 factors, which can be divided into three groups: individual recipients, mentoring, and organizational factors. According to experts, the groups of factors affecting knowledge transfer in the production sector are ranked in the following order – individual factors of recipients, mentoring factors, and organizational factors. The survey of manufacturing companies found that the strongest correlations are in the group of the recipients' individual factors. *The absorptive capacity of recipients* is the most frequently mentioned factor in literature sources. The empirical study found the highest correlation with knowledge transfer performance. Experts have given the most weight to this factor, so it is considered the most critical factor affecting knowledge transfer, which managers should pay attention to. Therefore, to develop the absorptive capacity of employees, companies must provide training not only on the acquisition and use of knowledge but also on identification from external sources. Therefore, internal R&D work must be carried out.

The study employs a novel approach combining statistical analysis and AHP assessments to develop equations' calculations to assess a company's readiness for knowledge transfer projects quantifiably. The methodology was developed and tested using the data obtained from questionnaires filled by Mechanical Engineering and Metalworking Industry companies in Latvia and data from expert interviews and representatives of industries in Latvia. Since the research is, in essence, based on a scientific literature review resulting in factors affecting the knowledge transfer in general, and given the principally similar strive for innovation via knowledge accumulation in both private and public sectors, the latter searching for more efficient and productive provisions and implementation of public policies and services (see e.g. Putans & Zeibote, 2021), the assessment method can be adjusted to other sectors, including the public sector. In this respect, although the method is well validated and shall be used further, the authors point out several research peculiarities to preserve academic integrity: a) taking into account the innovative nature of the method and its development during the factual progress of research, sets of factors submitted for expert evaluation for weights determination (Appendix 6. AHP questionnaire for comparing factors affecting knowledge transfer) on several occasions have been

slightly different; b) also possible survival bias are present in the research as the data is obtained only from companies that have had knowledge transfer projects. In further studies, factors in companies where knowledge transfer does not occur should also be collected and considered; c) Lastly, the presented assessment method considers only hypothetically positive effects (or lack thereof) of identified factors. Further research must include hypothetically negative effects (or lack thereof) of the factors' correlation with dependent variables for better comparison-based method validation.

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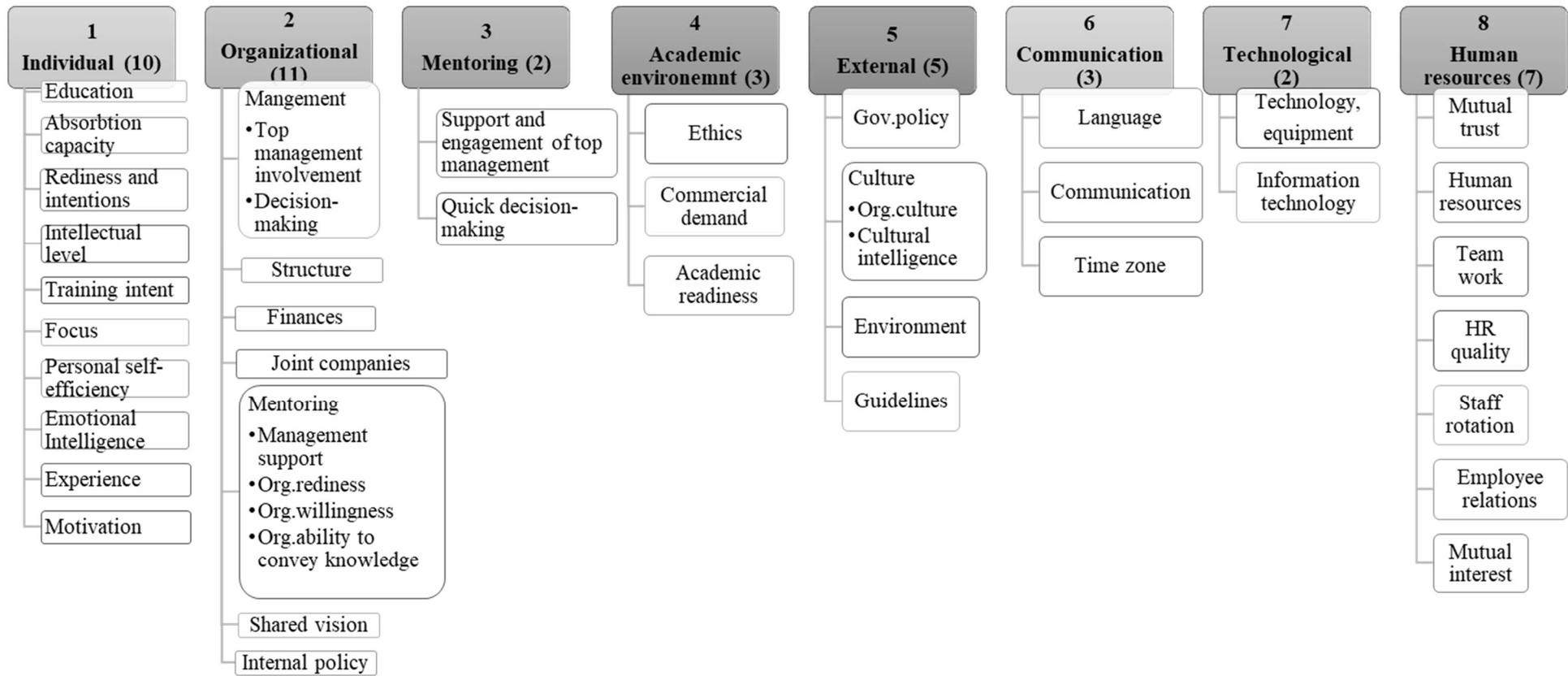
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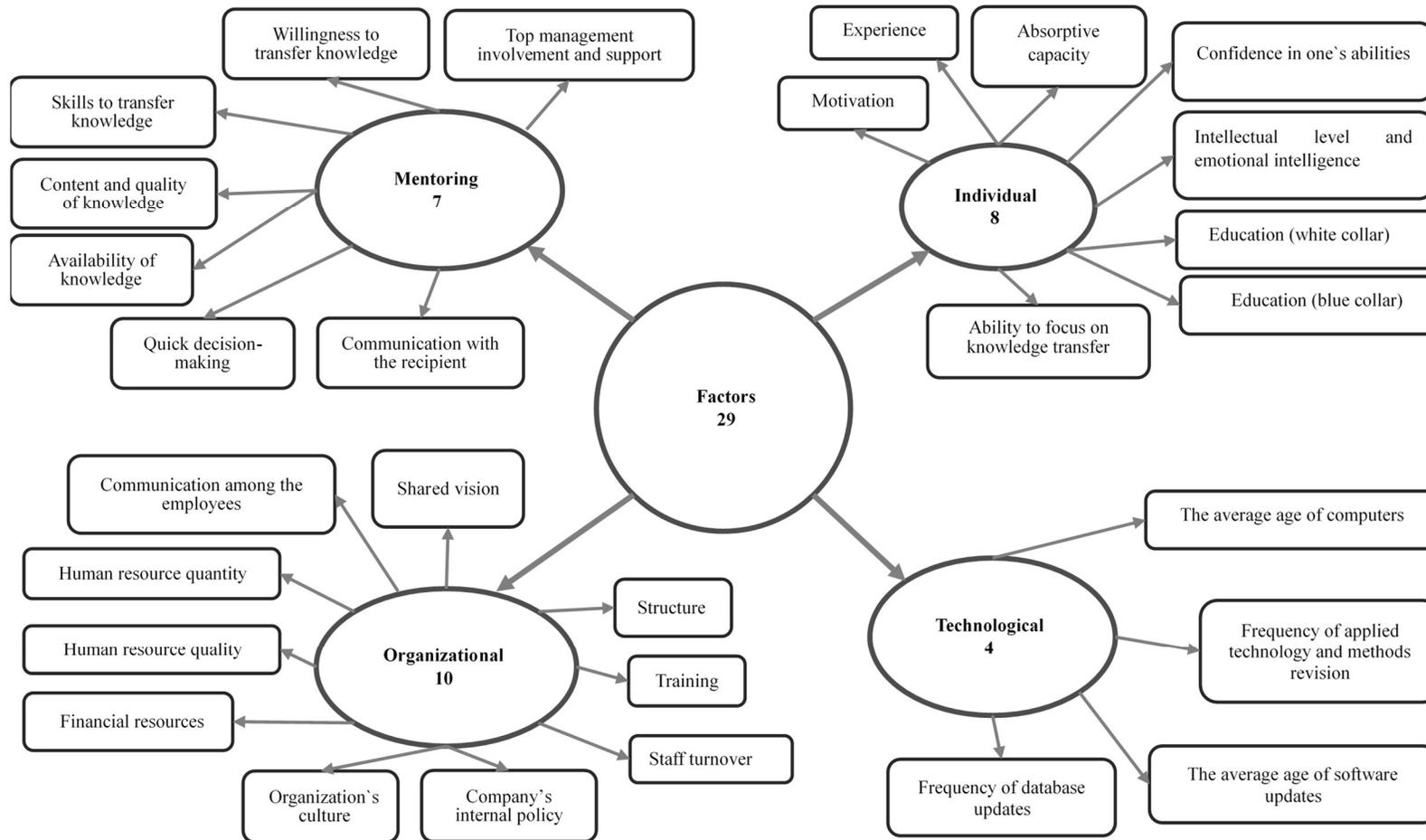
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Appendix 1. Groupings of the determined knowledge transfer factors



Appendix 2. Results of the systematic literature review: factors' map of 29 factors across 4 major groups.



Appendix 3. Knowledge transfer factors` hypotheses

Hypotheses (16) about individual factors:

- H.2.1: The recipients' ability to focus on the knowledge acquisition process has a positive correlation with the achieved stage of knowledge transfer.
- H.2.2: The recipients' ability to focus on the knowledge acquisition process has a positive correlation with the frequency of use of knowledge acquired in knowledge transfer.
- H.2.3: The motivation of recipients has a positive correlation with the achieved knowledge transfer stage.
- H.2.4: The motivation of recipients has a positive correlation with the frequency of using the knowledge acquired in knowledge transfer.
- H.2.5: The intellectual level of recipients, including emotional intelligence, has a positive correlation with the achieved stage of knowledge transfer.
- H.2.6: The intellectual level of recipients, including emotional intelligence, has a positive correlation with the frequency of using knowledge acquired in knowledge transfer.
- H.2.7: The recipients' absorptive capacity has a positive correlation with the achieved stage of knowledge transfer.
- H.2.8: The recipients' absorptive capacity has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H.2.9: The recipients' confidence in their abilities has a positive correlation with the achieved stage of knowledge transfer.
- H.2.10: The recipients' confidence in their abilities has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H.2.11: The recipients' existing work experience has a positive correlation with the achieved stage of knowledge transfer.
- H.2.12: The recipients' existing work experience has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H.2.13: The education level of the learning white-collar workers has a positive correlation with the achieved stage of knowledge transfer.
- H.2.14: The education level of the learning white-collar workers has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H.2.15: The education level of the learning blue-collar workers has a positive correlation with the achieved stage of knowledge transfer.
- H.2.16: The education level of the learning blue-collar workers has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.

Hypotheses (8) about technological factors:

- H3.1: Lower average age of computers has a positive correlation with the achieved stage of knowledge transfer.
- H3.2: Lower average age of computers has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H3.3: Lower average age of software updates has a positive correlation with the achieved stage of knowledge transfer.
- H3.4: Lower average age of software updates has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H3.5: Frequent updates of databases have a positive effect on the achieved stage of knowledge transfer.
- H3.6: Frequent updates of databases have a positive effect on the frequency of using the knowledge acquired in the transfer of knowledge.
- H3.7: Frequently renewed technologies, knowledge, and methods used to implement the activity have a positive effect on the achieved stage of knowledge transfer.
- H3.8: Frequently renewed technologies, knowledge, and methods used to implement the activity have a positive effect on the frequency of using the knowledge acquired in the transfer of knowledge.

Hypotheses (14) about mentoring factors:

- H4.1: Availability of knowledge has a positive correlation with the achieved stage of knowledge transfer.
- H4.2: Availability of knowledge has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H4.3: Content and quality of knowledge has a positive correlation with the achieved stage of knowledge transfer.
- H4.4: Content and quality of knowledge has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H4.5: Communication of mentors with trainees has a positive correlation with the achieved stage of knowledge transfer.
- H4.6: Communication of mentors with trainees has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H4.7: The ability of mentors to transfer knowledge to trainees has a positive correlation with the achieved stage of knowledge transfer.
- H4.8: The ability of mentors to transfer knowledge to trainees has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H4.9: The willingness of mentors to transfer knowledge to trainees has a positive correlation with the achieved stage of knowledge transfer.
- H4.10: The willingness of mentors to transfer knowledge to trainees has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H4.11: Involvement and support of senior management have a positive effect on the achieved stage of knowledge transfer.
- H4.12: Involvement and support of senior management have a positive effect on the frequency of using the knowledge acquired in the transfer of knowledge.
- H4.13: The ability of senior management to make decisions quickly has a positive correlation with the achieved stage of knowledge transfer.
- H4.14: The ability of senior management to make decisions quickly has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.

Hypotheses (20) about organizational factors:

- H.5.1: Communication among employees has a positive correlation with the achieved stage of knowledge transfer.
- H.5.2: Communication among employees has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H.5.3: Low staff turnover has a positive correlation with the achieved stage of knowledge transfer.
- H.5.4: Low staff turnover has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H.5.5: Sufficiency of human resources has a positive correlation with the achieved stage of knowledge transfer.
- H.5.6: Sufficiency of human resources has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H.5.7: Quality of human resources has a positive correlation with the achieved stage of knowledge transfer.
- H.5.8: Quality of human resources has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H.5.9: Training has a positive correlation with the achieved stage of knowledge transfer.
- H.5.10: Training has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H.5.11: Financial resources for employee training have a positive effect on the achieved stage of knowledge transfer.
- H.5.12: Financial resources for employee training have a positive effect on the frequency of using the knowledge acquired in the transfer of knowledge.
- H.5.13: Compliance with company's policy (written norms) has a positive correlation with the achieved stage of knowledge transfer.
- H.5.14: Compliance with company's policy (written norms) has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.
- H.5.15: Compliance with organization's culture (unwritten norms) has a positive correlation with the achieved stage of knowledge transfer.

H.5.16: Compliance with organization's culture (unwritten norms) has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.

H.5.17: Shared vision has a positive correlation with the achieved stage of knowledge transfer.

H.5.18: Shared vision has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.

H.5.19: Communication among employees has a positive correlation with the achieved stage of knowledge transfer.

H.5.20: Communication among employees has a positive correlation with the frequency of using the knowledge acquired in the transfer of knowledge.

Appendix 4. Companies survey questionnaire

1. Has your company implemented new knowledge transfer (knowledge acquisition, transformation and distribution) project during the last 3 years, which is concluded at the given moment? (*New knowledge and technologies are understood as those that may have already been used in other companies but are new to your company. If several projects were implemented, please answer only about 1, in your opinion, the most important knowledge acquisition project.*)
 - Yes
 - No
2. When concluding a new knowledge transfer (knowledge acquisition, transformation and distribution) project, to what extent was the knowledge acquired?
 - Knowledge was acquired
 - Knowledge was acquired and transformed to the company's needs
 - Knowledge was acquired, transformed for the company's needs, and distributed among the company's structural units
 - Knowledge was acquired, transformed for the company's needs, distributed among the company's structural units and is still being used
3. When concluding a new knowledge transfer (acquisition, transformation and dissemination) project, how often did the acquired knowledge continue to be used?
 - Never
 - Rare
 - Sometimes
 - Often
 - Always
4. Please indicate the age of the technologies listed below in the company when the knowledge transfer (acquisition, transformation and dissemination) project was implemented?

| <i>Technology / Oldness</i> | Less than 1 year | 1-3 years | 4-6 years | 7 or more years |
|---|---------------------|--------------|--------------|--------------------|
| Average age of computers (from the time of purchase) | | | | |
| Average age of software updates (how long since the last updates) | | | | |

5. Please indicate how often the technologies listed below were updated in the company's knowledge transfer (acquisition, transformation, and dissemination) project. (*Update means an update made during the knowledge transfer, not one made as a result of the knowledge transfer.*)

| <i>Statements / Frequency</i> | Never | Rarely | Sometimes | Often | Always |
|-------------------------------|-------|--------|-----------|-------|--------|
| | | | | | |

| | | | | | |
|--|--|--|--|--|--|
| Databases (e.g., a database of potential customers, a compilation of technologies used by competitors, etc.) | | | | | |
| Technologies, knowledge, and methods used to implement the activity | | | | | |

6. Please evaluate the situation regarding the learners involved in the knowledge transfer (acquisition, transformation, and distribution) project concluded in your company. (Please provide an overview of the overall average situation in the company.)

| <i>Statement / Evaluation</i> | Fully disagree | Rather disagree | Rather agree | Fully agree |
|---|----------------|-----------------|--------------|-------------|
| Recipients were able to focus on the process of acquiring knowledge | | | | |
| Recipients were motivated to learn new knowledge | | | | |
| Recipients' ability to think logically and understand ideas, as well as their ability to identify, control, express their emotions, and perceive the emotions of others, were relevant to acquiring knowledge | | | | |
| Recipients could identify, acquire, and use knowledge in performing their daily duties | | | | |
| Recipients felt confident in their abilities in the process of acquiring knowledge | | | | |
| Recipients have extensive work experience | | | | |

7. Approximately what proportion of your company's white-collar employees has a master's degree? (White-collar workers are workers who perform professional, managerial, or administrative work in an office or other administrative setting.)

- | | | |
|-------------------------------|-------------------------------|--------------------------------|
| <input type="radio"/> 0 % | <input type="radio"/> 31-40 % | <input type="radio"/> 71-80 % |
| <input type="radio"/> 1-10 % | <input type="radio"/> 41-50 % | <input type="radio"/> 81-90 % |
| <input type="radio"/> 11-20 % | <input type="radio"/> 51-60 % | <input type="radio"/> 91-100 % |
| <input type="radio"/> 21-30 % | <input type="radio"/> 61-70 % | |

8. Approximately what part of your company's blue-collar employees (recipients) has a professional education (secondary vocational education) certificate? (Blue collar is a class of workers who perform manual, skilled, or unskilled work.)

- | | | |
|-------------------------------|-------------------------------|--------------------------------|
| <input type="radio"/> 0 % | <input type="radio"/> 31-40 % | <input type="radio"/> 71-80 % |
| <input type="radio"/> 1-10 % | <input type="radio"/> 41-50 % | <input type="radio"/> 81-90 % |
| <input type="radio"/> 11-20 % | <input type="radio"/> 51-60 % | <input type="radio"/> 91-100 % |
| <input type="radio"/> 21-30 % | <input type="radio"/> 61-70 % | |

9. Were mentors assigned to employees in the process of knowledge transfer (acquiring, transformation, and distribution) in your company? (A mentor teaches or provides help and advice to a less experienced and often younger person.)

- Yes
- No

10. In the process of mentoring, mentors communicated with trainee employees. (A mentor teaches or provides help and advice to a less experienced and often younger person.)

- Never
- Rare
- Sometimes
- Often

- Always

11. During the mentoring process, the mentor (someone who teaches or gives help and advice to a less experienced and often younger person):

| | Fully disagree | Rather disagree | Rather agree | Fully agree | Mentors were not assigned |
|---|----------------|-----------------|--------------|-------------|---------------------------|
| Conveyed the planned knowledge in the mentoring process to educated employees in an understandable way | | | | | |
| Voluntarily transferred knowledge and taught trainees (i.e., management did not have to motivate and force mentors to transfer knowledge regularly) | | | | | |

12. All employees involved in the knowledge transfer (acquisition, transformation, and distribution) project had access to support materials (e.g., literature, brochures, instructions, presentations, or any other materials in the e-environment).

- Fully disagree
- Rather disagree
- Rather agree
- Fully agree

13. The available support materials (e.g., literature, brochures, instructions, presentations, or any other materials in the e-environment) were available in a timely manner, they were complete, related to the intended purpose of knowledge transfer (acquiring, transformation, and dissemination) and contained the most current information.

- Fully disagree
- Rather disagree
- Rather agree
- Fully agree

14. Within the framework of the knowledge transfer (knowledge acquisition, transformation and distribution) project, the top management of the company:

| <i>Statements / Frequency</i> | Never | Rarely | Sometimes | Often | Always |
|---|-------|--------|-----------|-------|--------|
| Participates and supports the mentoring process | | | | | |
| Can make quick decisions | | | | | |

15. Employees learning in the company communicate with other employees at all stages of knowledge transfer (acquisition, transformation, and dissemination).

- Never
- Rare
- Sometimes
- Often
- Always

16. Staff turnover (rotation) in the company is:

- Very low
- Low
- Average
- High
- Very high

17. The company has a sufficient number of employees for the tasks.

- Fully disagree
- Rather disagree
- Rather agree
- Fully agree

18. The company's employees' qualifications are appropriate for the tasks.

- Fully disagree
- Rather disagree
- Rather agree
- Fully agree

19. Please evaluate the situation in your company on the following statements and frequency.

| Statements / Frequency | Never | Rarely | Sometimes | Often | Always |
|--|-------|--------|-----------|-------|--------|
| There are trainings for company employees to improve their qualifications | | | | | |
| The company pays for training of employees to improve their qualifications | | | | | |

20. Please evaluate the situation in your company on the following characteristics.

| | Fully disagree | Rather disagree | Rather agree | Fully agree |
|---|----------------|-----------------|--------------|-------------|
| Company employees follow values and unwritten work norms | | | | |
| Company employees follow the internal working procedures (written work norms) | | | | |
| Company employees have a clear vision of the company and understand it | | | | |
| Company employees can freely exchange information with each other, regardless of divisions or departments | | | | |

Appendix 5. Factors' statement values.

| N# | Factor's code for the equation | Factors → Statement (respective questions Q from the Survey) | Answer options and value (for each question /statement separately) | |
|----|--------------------------------|---|---|------------------------|
| 1 | IFG | <u>INDIVIDUAL FACTORS' GROUP</u> | | |
| 1 | RAC | The recipients' absorptive capacity ← Recipients were able to identify, acquire, and use knowledge in performing their daily duties (Q6) | <i>For each factor:</i> Fully disagree Rather disagree Rather agree Fully agree | 0 0.33 0.66 1 |
| 2 | RE | The recipients' existing work experience ← Recipients have extensive work experience (Q6) | | |
| 3 | RCA | The recipient's confidence in their abilities ← Recipients felt confident in their abilities in the process of acquiring knowledge (Q6) | | |
| 4 | RAFKA | Recipient's ability to focus on the knowledge acquisition process ← Recipients were able to focus on the process of acquiring knowledge (Q6) | | |
| 2 | OFG | <u>ORGANIZATIONAL FACTORS' GROUP</u> | | |

| | | | | |
|---|------|--|--|-------------------------------|
| 1 | OT | Organization Training ← There are trainings for company employees to improve their qualifications (Q19) | Never Rarely Sometimes Often Always | 0 0.25 0.5 0.75 1 |
| 2 | OF | Organization Finance for training ← The company pays for training of employees to improve their qualifications (Q19) | For each factor: Fully disagree Rather disagree Rather agree Fully agree | 0 0.33 0.66 1 |
| 3 | OIP | Organization Internal Policy ← Company employees follow the internal working procedures (written work norms (Q20) | | |
| 4 | OSV | Organization Shared Vision ← Company employees have a clear vision of the company and understand it (Q20) | | |
| 5 | OS | Organization Structure ← Company employees can freely exchange information with each other, regardless of divisions or departments (Q20) | | |
| 6 | HRQN | Human Resources Quantity ← The company has a sufficient number of employees for the tasks (Q17) | | |
| 7 | HRQL | Human Resources Quality ← The company's employees' qualifications are appropriate for the tasks (Q18) | | |
| 8 | OST | Organization staff turnover ← Staff turnover in the company is (Q16): | | |
| 3 | MFG | <u>MENTORING FACTORS' GROUP</u> | | |
| 1 | SMIS | Senior management involvement and support ← Senior management participates and supports the mentoring process (Q14) | Never Rarely Sometimes Often Always | 0 0.25 0.5 0.75 1 |
| 2 | QDM | Quick decision-making ← Senior management can make quick decisions (Q14) | | |

Appendix 6. AHP questionnaire for comparing factors affecting knowledge transfer.

Group 1 – Individual factors.

1. Recipients' ability to focus on the process of acquiring knowledge.
2. Recipients' absorptive capacity – the ability to identify, acquire and use knowledge.
3. Employees' confidence in their abilities.
4. Experience – the amount of existing work experience of the recipients.

| | | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Which of the learner's individual factors and to what extent are mutually more important in the transfer of knowledge (acquisition of knowledge, its transformation and dissemination)? | | | | | | | |
| Please mark which of the given factors is more important (Factor 1 or Factor 2) and to what extent it is more important (1 – both factors are equally important; 3 – the selected factor is slightly more important than the other factor; 5 – the selected factor is more important than the other factor; 7 – the selected factor is much more important than the other factor; 9 – the selected factor is immeasurably more important than the other factor). | | | | | | | |
| | Factor 1 | Factor 2 | 1 | 3 | 5 | 7 | 9 |
| 1. Recipients' ability to focus on the process of acquiring knowledge or 2. Recipients' absorptive capacity (ability to identify, acquire and use knowledge) | <input type="checkbox"/> |
| 1. Recipients' ability to focus on the process of acquiring knowledge or 2. Employees' confidence in their abilities | <input type="checkbox"/> |

| | | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1.Recipients' ability to focus on the process of acquiring knowledge or 2.Experience | <input type="checkbox"/> |
| 1.Recipients' absorptive capacity (ability to identify, acquire and use knowledge) or 2.Employees' confidence in their abilities | <input type="checkbox"/> |
| 1.Recipients' absorptive capacity (ability to identify, acquire and use knowledge) or 2.Experience | <input type="checkbox"/> |
| 1.Employees' confidence in their abilities or 2.Experience | <input type="checkbox"/> |

Group 2 – Mentoring factors.

1. Top management involvement and support – the involvement of the company's top management in the mentoring process and providing comfort, encouragement, or assistance.
2. Quick decision-making – the ability of top management to quickly make decisions on various issues, evaluating pros and cons to facilitate the transfer of knowledge within the company.

| | | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 2. Which mentoring factors and to what extent are mutually more important in transferring knowledge (acquisition of knowledge, its transformation, and dissemination)? | | | | | | | |
| Please mark which of the given factors is more important (Factor 1 or Factor 2) and to what extent it is more important (1 – both factors are equally important; 3 – the selected factor is slightly more important than the other factor; 5 – the selected factor is more important than the other factor; 7 – the selected factor is much more important than the other factor; 9 – the selected factor is immeasurably more important than the other factor). | | | | | | | |
| | Factor 1 | Factor 2 | 1 | 3 | 5 | 7 | 9 |
| 1. Top management involvement and support or 2. Decision-making (top management ability to quickly make decisions) | <input type="checkbox"/> |

Group 3 – Organizational factors.

1. Staff turnover – change of personnel (rotation) in the company.
2. Sufficiency of human resources – a sufficient number of company employees.
3. Quality of human resources – qualification of human resources for the tasks.
4. Training – teaching employees the skills necessary to upgrade their qualifications (upskilling).
5. Financial resources for employee training.
6. Compliance with company policy – employees follow internal work procedures (written work norms).
7. Shared vision – the company's employees have a clear understanding of the vision of the company.
8. Organizational structure – company employees can freely exchange information with each other, regardless of divisions or departments.

| | | | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|
| 3. Which organizational factors and to what extent are mutually more important in transferring knowledge (acquisition of knowledge, its transformation, and dissemination)? | | | | | | | | |
| Please mark which of the given factors is more important (Factor 1 or Factor 2) and to what extent it is more important (1 – both factors are equally important; 3 – the selected factor is slightly more important than the other factor; 5 – the selected factor is more important than the other factor; 7 – the selected factor is much more important than the other factor; 9 – the selected factor is immeasurably more important than the other factor). | | | | | | | | |
| | Factor 1 | Factor 2 | 1 | 3 | 5 | 7 | 9 | |
| 1.Staff turnover or 2.Sufficiency of human resources | <input type="checkbox"/> | |
| 1.Staff turnover or 2. Quality of human resources | <input type="checkbox"/> | |
| 1.Staff turnover or 2.Training | <input type="checkbox"/> | |
| 1.Staff turnover or 2.Financial resources for employee training | <input type="checkbox"/> | |

| | | | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1.Staff turnover or 2.Compliance with company policy | <input type="checkbox"/> |
| 1.Staff turnover or 2.Shared vision | <input type="checkbox"/> |
| 1.Staff turnover or 2.Shared vision | <input type="checkbox"/> |
| 1.Sufficiency of human resources or 2.Quality of human resources | <input type="checkbox"/> |
| 1.Sufficiency of human resources or 2.Training | <input type="checkbox"/> |
| 1.Sufficiency of human resources or 2.Financial resources for employee training | <input type="checkbox"/> |
| 1.Sufficiency of human resources or 2.Compliance with company policy | <input type="checkbox"/> |
| 1.Sufficiency of human resources or 2.Shared vision | <input type="checkbox"/> |
| 1.Sufficiency of human resources or 2.Organizational structure | <input type="checkbox"/> |
| 1. Quality of human resources or 2.Training | <input type="checkbox"/> |
| 1. Quality of human resources or 2.Financial resources for employee training | <input type="checkbox"/> |
| 1. Quality of human resources or 2.Compliance with company policy | <input type="checkbox"/> |
| 1. Quality of human resources or 2.Shared vision | <input type="checkbox"/> |
| 1. Quality of human resources or 2.Organizational structure | <input type="checkbox"/> |
| 1.Training or 2.Financial resources for employee training | <input type="checkbox"/> |
| 1.Training or 2.Compliance with company policy | <input type="checkbox"/> |
| 1.Training or 2.Shared vision | <input type="checkbox"/> |
| 1.Training or 2.Organizational structure | <input type="checkbox"/> |
| 1.Financial resources for employee training or 2.Compliance with company policy | <input type="checkbox"/> |
| 1.Financial resources for employee training or 2.Shared vision | <input type="checkbox"/> |
| 1.Financial resources for employee training or 2.Organizational structure | <input type="checkbox"/> |
| 1.Compliance with company policy or 2.Shared vision | <input type="checkbox"/> |
| 1.Compliance with company policy or 2.Organizational structure | <input type="checkbox"/> |
| 1.Shared vision or 2.Organizational structure | <input type="checkbox"/> |

IMPERMANENCE OF THE VISUAL IDENTITY OF POLISH LOCAL AND REGIONAL GOVERNMENTS

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Abstract

Research purpose. The literature on place branding lacks long-term and quantitative studies on the rebranding of territorial brands. Place branding consultants recommend that they should be reviewed and refreshed approximately every decade. However, it is emphasised that rebranding is demanding for the territorial organisation, and a place brand change should be undertaken in a methodical manner. Therefore, the objective of the study is to compare this process with the theoretical postulates summarised in the literature on the subject.

Design / Methodology / Approach. The research method used was visual content analysis. The collected data were verified by individual interviews with representatives of local governments. The authors have been conducting a research project on Polish local and regional governments since 2011. Therefore, it is possible to summarise the changes, modifications, and rebranding of Polish territorial brands in the period 2011-2023. The queries were conducted regularly in the years 2011-2024 (the end date was the day of local government elections in Poland on April 7, 2024).

Findings. More than 250 logos have been withdrawn or replaced, and approximately 100 have never been implemented. Research confirmed that the number of changes is large (more than 30% of logos have been replaced by new ones), but it is difficult to determine one or even the dominant cause of such serious organisational changes.

Originality / Value / Practical implications. A review of the literature allows us to draw a conclusion about the lack of long-term research on the functioning and changes of the content of logos practised by places. Therefore, a 10-year study on the population of all local government units in Poland provides data that supports the development of territorial branding theory and allows analytical support for territorial rebranding processes. The research discussed is significant because it reveals, first, the frequency of changes and, second, the difficulty in defining the causes of these changes.

Keywords: place brand; rebranding; longitudinal research; visual communication.

JEL codes: B40, M30, H70, Z18.

Introduction

Nowadays, cities, regions, and countries communicate with their surroundings in a way previously developed by business organisations. Marketing and branding are also typical activities for territorial entities that, in order to attract tourists, retain residents, or invite investors, undertake activities typical of business for many years. Today, marketing and branding are independent disciplines of applied sciences with their own research methods, theories, and conclusions from empirical research. The aim of the article is to present, through the analysis of visual signs used in place branding in Poland, the issue of rebranding territorial brands. The literature on place branding lacks long-term and quantitative studies on the rebranding of territorial brands. Place branding consultants recommend that they should be reviewed and refreshed approximately every decade (Conradsen, 2022; Olins, 2009; Silber, 2023), the literature on the subject points out, that this cycle may be disrupted by unexpected shocks, such as

the COVID epidemic (Ayozie, 2020). However, it is emphasised that rebranding is a demanding process for territorial organisation due to the continuity of the place identity (Ujang, 2017; Wang, 2016), public funds needed for that process and tradition, which plays a special role for community, that is why, a place brand change should be undertaken in a methodical manner (Mroz-Gorgon, 2019; Stasiuk & Maison, 2014; Wheeler & Meyerson 2024). Therefore, the objective of the study is to compare this process with the theoretical postulates summarised in the literature on the subject.

The starting thesis of the presented research is the comment of Claude Raffestin (Raffestin, 2012): “Representations are like currency: they are subject to inflation and progressively lose their value. In other words, some tend to take it that reality is represented in a less and less adequate manner” (p. 125). Taking the above thesis as a starting point, the authors hypothesized that the logo and visual identification systems do not meet these expectations. To verify such a hypothesis the authors started building the database in 2011 (Dzik, 2011). The catalogue was systematically updated during its duration, regular reviews were carried out at least once a quarter. Since the research project on visual identities of Polish self-government units has been conducted by the authors for approximately 12 years, it is possible to summarise changes, modifications, and rebranding of Polish territorial brands in the period 2011-2024 and make comparison of these processes with theoretical postulates contained in the literature on the subject 2024 (the end date was the day of local government elections in Poland on April 7, 2024) and attempt to verify the general hypothesis.

According to the concept of Per Mollerup, the brand can be analysed as three concentric circles that encompass the following elements (Mollerup, 2013, p. 46):

1. core, i.e., what is subject to the branding process, and the core in the case of place branding is a place with its characteristics (*genius loci*),
2. presentation, which in the author’s understanding mainly means visual identification,
3. the image of the brand in the recipients’ awareness.

When comparing the above descriptions with the Anna Giza brand concept, the following triggers for rebranding can be identified (Giza, 2017, p. 167):

1. Changes in the core (the place itself), caused by social, political, or economic changes (e.g. collapse of some industry or administration changes) and the resulting objective need to change the way of brand presentation.
2. Changes in the structure and product offer of the city/municipality/region resulting from strategic decisions, as happened in Bilbao and is now called the 'Bilbao effect'. In this city, several comprehensive changes were carried out, including a decaying industrial district revitalisation, the monuments of the old town were taken care of, the urban transport system (two metro lines) was initiated and finally building The Guggenheim Museum Bilbao, among others. These changes in the architecture and socioeconomic structure of the city played an essential role in the crafting of a new image of Bilbao and a new Bilbao brand emerged (Lucas, 2023).
3. Significant technical problems in the practised identification system, such as errors, omissions, and structural issues related to the brand architecture (Wheeler & Meyerson, 2024), which are so essential that they require the creation of a new visual identification system.
4. Disturbances resulting from differences between current visual presentation and cultural changes. Mollerup underlines in his requirements for a logo that fulfils its functions (Mollerup, 2013): “14. Fashionability. Is the trademark fashionable? Sometimes, a trademark should be fashionable, even if that means that it may eventually become unfashionable” (p.93). If trends in culture change, the logo may become obsolete and also require a change. This is the argument used by the Warsaw authorities in Poland when they changed the identification (the logo) in 2023.
5. And finally, difficulties in relations with recipients. If research or other factors, e.g. an image crisis, indicates that the identification has unfavourable associations for the brand, the visual identification should be exchanged or updated. Research shows that the scandal encompassing the logo of the place is not a common phenomenon, which does not mean that individual cases can be ignored due to the social resonance of the rumour, the application of the law, and the skilful management of the media crisis

(Adamus-Matuszynska & Dzik, 2019). For example, in 2022 the authorities of Cologne removed the reference to the cathedral from its logo, which caused much controversy and negative comments among residents and other recipients. The city was accused of denying its cultural heritage (Nijenhuis, 2022).

Bearing in mind five factors that may determine a change in the identification system mentioned above, the following hypotheses should be formulated:

1. Any changes in the political, social, and economic systems influence the local government's decision to change the visual representation of the unit.
2. Changes in infrastructure, architecture, or other elements that create the identity of a place influence the change of visual identity.
3. Every weakness of the visual identity noticed or mentioned by experts or/and citizens/tourists influences the decision to change it.
4. Cultural trends and new ideas in art, as well as fashion, are factors influencing decisions on changes in the visual identity of local government units.
5. Both scientific and marketing research revealing the weaknesses of visual identity influence the decisions of local government authorities to change the visual identity.

Considering the theoretical assumptions and 12 years of research on the content of territorial logos in Poland, the following research questions were asked:

1. How often do territorial units rebrand their place brand in Poland?
2. What are the reasons for making the decision to rebrand the place's visual identification?
3. How is this process carried out and how is it communicated?

The answers to these questions were formulated based on the analysis of changes in the content of the logos of the Polish territorial units.

Literature Review

In research and analyses dedicated to creating and changing the brand of companies and products, it is emphasised that the rebranding process takes place when it is necessary to strengthen the brand on the market or improve operational performance (Miller et al., 2014). Merrilees and Miller (2008) define corporate rebranding as “the change between an initially formulated corporate brand and a new formulation” (p. 538). This definition is so ambiguous that it may evoke many associations with terms such as brand repositioning, makeover, renewal, refreshment, and reinvention (Miller et al., 2014). Moreover, the rebranding literature often accepts a phenomenon-driven approach, with few studies found to have adopted no theoretical bases (Miller et al., 2014). Image and reputation can also be perceived as drivers that influence an organisation to rebrand itself. The model of the rebranding process by Muzellec and Lambkin (2006) outlines the drivers and objectives of rebranding within companies. The model brings together possible causes for rebranding, such as changes in ownership, changes in corporate strategy, changes in the external environment, and changes in competitive position. Mroz-Gorgon and Haenlein (2021) summarise the state of research stressing that there are few publications and studies in the literature that describe and explain the effects of rebranding strategies. In the same way that large companies sometimes overhaul or completely replace their images and relaunch themselves as fresh corporate brands, some cities try to establish completely new brand identities (Bennett & Savani, 2003).

An extended literature review done by Miller et al. (2014) proves that all place rebranding cases have a proactive trigger. They suggest that this proactive trigger is “an identified opportunity to enhance the brand which drives the rebranding initiative” (Miller et al., 2014, p. 270). Ashworth et al. (2015) mention that an increase in mobility of people forces cities to compete and to ensure sustainability and economic development. In the same context, Boisen et al. (2011) support that the increase in city branding campaigns leads to a greater awareness of perceived competition among cities. Additionally, place rebranding strategies often focus on regenerating cities or locales, such as in the case of New York, the city's reputation was rebuilt in the ‘I love NY’ campaign carried out in the 1970s (Eskilson, 2012), with the aim of transforming the place into a brand. A review of databases (Google Scholar and EBSCO)

using the query ‘place/territory/city rebranding’ showed that there are only a few dozen such articles and that they are mainly single case studies or theoretical analyses of the co-creation process (Hakala et al., 2020). Therefore, the authors assume that, in the literature on the subject, the notions of place branding and rebranding concepts overlapped. Due to the above, a problem arises with the operational definition of rebranding, i.e. what activities are rebranding and what are not. The authors, following Stuart (2003), assumed that rebranding includes a change of the logo and slogan. The author also points to a name change, but in the case of place branding in Poland, this is extremely rare. In the research period only, the West Pomeranian Voivodeship changed its marketing name to “Western Pomerania”, gave up its previous slogan and changed its previous logo (Rsocko, 2023).

Research Methodology

Visual content analysis was used as a research method to examine the content of the logos of the examined places. It was chosen to learn about changes in icons, signs, and images contained in the logo content over the years. This tool allows us not only to learn about the content of the logo but also to make comparisons between the signs used by a particular territorial unit. It is a method that is practised in both qualitative and quantitative research. Its inventor, Berelson (1952), defined the method as the objective, systematic, and qualitative description of the content disclosed in the communication. This method is a valid research scheme for place branding (Byrom et al., 2007; Govers & Go, 2009; Hashim, 2017). The content analysis of the graphic symbols used in the promotion consists of the following four stages (Rose, 2016):

1. Finding images: Logos of self-government units were found on official websites, social networks, and other promotional publications. The researchers also contacted officials for interviews, especially when there were doubts about the meaning of the content.
2. Developing categories for coding: Coding means attaching a set of descriptive labels (or categories) to the images.
3. Coding the images: Applying distinguished categories to places’ logos.
4. Analysing the results: Formulating conclusions and discussion of the questions.

Using a qualitative thematic coding methodology, a categorical framework was created for the classification of the logos studied. A content analysis approach was applied to examine and assess the images used in the logos collected from the local and regional government units in Poland.

Over the course of 12 years, the authors analysed the visual identification systems of all local and regional government units in Poland, of which there are 2,873 in total. During the presented research, 1350 logos were found, and content was analysed in terms of motifs and themes. They have been those that have been being practically used and that have been withdrawn, never implemented, as well as those cases that had not been clearly classified.

Research Results

The process of collecting logos of Polish territorial units began in 2011. During these 12 years, 1350 logos were collected, changes were noticed and divided into the following types:

- a. Officially not implemented logo (ONI). These are situations in which it was possible to confirm that the authorities had conducted a public competition or other procedure (e.g. public procurement) to select appropriate for the unit logo, identification system, promotion strategy, or other document containing a visual identification proposal. The queries were made on official websites, public information bulletins, local government newspapers, and by contacting relevant offices. These were situations where the entity's authorities chose a logo, but no action was taken to implement the visual logo into the entity’s marketing practice.
- b. Logo without official confirmation (LWC). These are situations where the information was found in another source than official local regional sources. For example, information about the logo appeared on the websites of the media (especially local media), on the websites of

consulting companies, and branding agencies; however, the local authorities themselves did not officially inform recipients about the adoption of the logo.

- c. **Unclassified logo (UL).** This is a situation in which it was not possible to confirm whether the logo was used in marketing activities and to what extent. This group mainly includes logos that were identified for the period before 2011 and those that appeared on the websites of institutions or private persons not related to local government units. Procedures and information came from other than official sources, and the creation of the logo could not be confirmed in any way (e.g. competitions organised by public institutions were interrupted at the stage of selection).
- d. **Withdrawn logos (WL).** The following reasons led to recognise that the logo was withdrawn:
 - The logo was withdrawn by an official act of law.
 - Media statements (interviews, testimonials, comments, etc.) prepared and published by local administration representatives informing about the withdrawal of the logo.
 - Due to the conclusive connection between place branding and political processes (Mabillard et al., 2024), a logo was considered withdrawn if it was not used after 2018. This period was assumed due to the last term of the local government office in Poland (2018-2024).
- e. **Replaced logo (RL).** This is a group of logos that have been replaced by new signs or have been subject to such far-reaching modification that it is observable by recipients who do not have professional training in graphic design (e.g. Krakow).

The number of logo changes made in the years 2011 - 2024 in local and regional government units in Poland, divided into voivodeships, is presented in Table 1.

Table 1. Logo changes in 2011-2024 (Source: Created by the authors)

| Voivodeship | ONI | LWC | UL | WL | RL |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | number of logos |
| Lower Silesia | 5 | 0 | 7 | 17 | 5 |
| Kuyavian-Pomeranian Voivodeship | 3 | 0 | 5 | 5 | 2 |
| Lubelskie | 4 | 0 | 3 | 8 | 2 |
| Lubuskie | 2 | 0 | 2 | 4 | 3 |
| Lodz Province | 0 | 1 | 3 | 11 | 5 |
| Lesser Poland | 2 | 2 | 8 | 11 | 5 |
| Masovian Voivodeship | 0 | 3 | 12 | 23 | 8 |
| Opole Voivodeship | 0 | 0 | 2 | 4 | 4 |
| Podkarpackie | 2 | 2 | 4 | 4 | 1 |
| Podlasie | 2 | 1 | 2 | 4 | 2 |
| Pomeranian Voivodeship | 2 | 1 | 4 | 5 | 2 |
| Silesian | 3 | 3 | 7 | 22 | 8 |
| Swietokrzyskie | 1 | 1 | 1 | 3 | 3 |
| Warmian-Masurian Voivodeship | 4 | 2 | 4 | 4 | 3 |
| Greater Poland | 2 | 4 | 7 | 17 | 7 |
| West Pomeranian | 3 | 1 | 7 | 12 | 6 |
| Sum | 35 | 21 | 78 | 154 | 66 |

Of the 1350 visual signs recognised during the investigation as logos of local and regional government units, 354 were changed within 12 years for the reasons mentioned above. This means that the content of these signs has been changed to show other iconic elements of the places they symbolise. In total,

there are 354 changes and additional situations that are difficult to clearly assess, that is, over 35% of local government units with territorial logos have changed the content of these signs over the last 12 years. It can also be analysed from the perspective of all units in Poland. There are 2873 territorial units in Poland, so 12% of them changed their logo during the analysed period.

To sum up, it should be emphasised that over a period of 12 years, every tenth commune in Poland decided to change the content of the logo. The research results show that the durability of this content is not long. Therefore, questions arise about the reasons why these changes are taking place. One of them are the recommendations of researchers who underline that the content should be adapted to the present. Other studies emphasise that political, cultural, and social changes taking place both in the place to which the logo applies, as well as in its closer and further surroundings, influence decisions to change the logo. To learn about the conditions of these changes, it is necessary to study each case separately, because each city, village, or district has its history, iconic places, symbols, and historical and cultural heritage.

Conclusions

The number of logos changed is relatively large, but it is difficult to clearly identify the causes of these changes. Logos commissioned by local government authorities are sometimes not implemented or rejected without explaining the reasons, making it difficult to know the direct causes.

One of the most respected branding practitioners and theorists on branding and rebranding processes expressed the opinion that (Olins, 2009) “Branding changes are not ordered on a whim. There is always a good reason for them. However, he also adds that this important reason may be [...] a new CEO who wants to make a good start...” (p. 57). On the other hand, in the literature on place branding, it is difficult to find scientific studies indicating what the logo life cycle should be. There are many incidental variables that influence the durability/changeability of a brand.

There is no clear answer to the question of how many years a logo should be practised because it depends on many factors, such as marketing strategies, changes in consumer preferences, market competition, innovations and many others (Garbarski & Krzyzanowska, 2023). However, a large number of unimplemented, withdrawn and changed logos of the Polish LGU between 2011 and 2024 remain unexplained. Taking into account the postulate contained in the study cited by Olins (2009) that visual identification should be verified every 8-10 years, the changes described above can be considered strategically justified.

The literature on branding indicates that the visual identification of brands loses value over time - the brand image weakens (Klint et al., 2014): “The brand image held by consumers can reach a point where a business or product has to rebrand itself or risk not bringing in sales” (p. 2). Three groups of reasons can be identified for this situation: strategic, design, and (operational). Strategic reasons concern rebranding (Mroz-Gorgon, 2019) and are proposed to revitalise the brand, as well as influence its life cycle (Witek-Hajduk, 2010). Design reasons are related to fashion or popular trends. As Mollerup (2013) underlines, a sign designed to be fashionable inevitably ceases to be so after some time. The poor graphic quality of the signs, which the authors confirmed during the consultation work, was the reason for changing the logo of the Mazowieckie and Podlaskie provinces. Warsaw’s authorities changed the logo, arguing that the withdrawn sign had become ‘unattractive and unmodern’ (UM Warszawa, 2022). The last group of reasons concerns the visual identification management system (VIS), and a detailed analysis shows that these reasons can be divided into four subgroups (Klint et al., 2014):

1. In the VIS project itself (project level)
2. In the implementation of the VIS project (project level/user level).
3. In the current use of VIS in its current form (user level).
4. In the design and implementation of further instruments (user level/project level).

In the first subgroup, one can distinguish reasons related to the requirements of the authorities and the local community towards the logo, e.g.: defined brand values or lack of such definition, brand architecture, improperly defined market(s) (target groups), brand boundaries (what the brand should and should not cover). In this subgroup, there may be problems with the flexibility of the system (e.g. in

Starachowice the authorities decided that the withdrawn logo was not suitable for the Internet, which the authors personally confirmed), the selection of basic elements (fonts, colours, illustrations) and finally with the lack of uniqueness of individual components (e.g. using Windows system fonts or Apple).

Implementation issues concern documentation management and access to it, e.g.: the authors confirmed three cases (Radzionkow, Wronki and Wrzesnia) that the documentation was incomplete, which made it impossible to introduce the logo into marketing practice and manage it effectively. Another reason for changing the logo was the internal and external hostility towards the visual identification system developed by the individuals implementing the project. Internal hostility means a situation in which employees do not accept the system and do not want to use it. External hostility concerns problems in cooperation with external partners, e.g. printing houses point out technical errors. The last subgroup of operational and management problems is the stability (rigidity) of the VIS. The developed system does not provide for the possibility of changes, updates, and adaptations to changing media and technologies. The authors identified two such cases, Krakow and Sandomierz logo, in which the local government units, in cooperation with the creators of the original projects, were required to introduce changes to the rather rigid visual identification system due to the necessity to adopt the system to new technologies.

The authors' research indicates additional reasons for changing the logo of places. These are as follows: (1) procedural errors, some logos were selected during competitions that are not interesting for professional graphic designers, which sometimes resulted in rumours in the public sphere as happened in the case of Rudziniec and Wadowice; (2) the electoral cycle (e.g., in the case of Bytom, Polkowice or Ketrzyn powiat); (3) unrepresentative online voting to select a sign, as it happened in Chrzanow or Tczew powiat; and finally (4) ideology which resulted in the need to change the logo of the Swietokrzyskie Voivodeship, because the previous one was related to legends, and the current authorities believed that the logo should contain catholic content. The authors confirmed all these cases through interviews at relevant local government offices.

Rebranding by changing the name is also more difficult in branding places than in business. The research confirmed only three cases of changing the name of a place, i.e. Stargard Szczecinski to Stargard, Jelenia Gora County to Karkonosze County (in these cases VIS remained unchanged) and West Pomeranian Voivodeship to West Pomerania out of over 2,800 local governments in Poland.

Finally, it should be emphasised that changing the logo as a symbolic sign with which the commune wants to be associated and recognised is a process dependent on place identity. The latter, in turn, is strongly related to the history and tradition of the place, which is important for what sociologists and psychologists call place identity, and which urban planners call the spirit of the place. This is why further research on the causes of changes in the visual identity of a place should link the content of the logo and its change with place identity.

In summary, single logo changes can and sometimes are justified, but there remains a more general question about the number of changes, given the fact that cities (and other territories) are more durable brands than commercial brands (Mollerup, 2013). However, during the investigation, a striking event was observed in the case of the change that took place in Suwalki on February 21-22, 2024, where a new visual identification was introduced and withdrawn within one day (Fig. 1). As the Branding Monitor (2024) wrote: "Thus, it was probably the fastest rebranding of the introduced brand change in Poland, and maybe even in the world". This case encouraged the authors to conduct an individual interview in the city of Suwalki with one of the officials. As confirmed, the implementation of the new logo was to help in the local government election campaign. However, it turned out that the rebranding proposal had been used by opposition's election committees to attack the city authorities. As the respondent informed, the attempt to change the city's visual identification had such a serious impact that there was a second round of elections for the city's mayor. This is one case of the impact of political activities on decisions about visual identification, proven in research. However, given the increasing role of politics in social life, it can be hypothesized that the logo may become a tool in political competition. This is another issue that requires further in-depth research.

| | |
|---|---|
| Logo 2011-2024 Withdrawn logo, replaced with a new one, and returned | The logo was valid for 1 day, February 22/23, 2024 |
|  |  |

Fig. 1. Suwałki logo (Source: Authors' research)

* So far, this case has not been subjected to scientific analysis. Media sources:

<https://radio5.com.pl/2024/02/stare-logo-zostaje/>

<https://www.suwalki.info/wiadomosci/z-zycia-miasta/nowe-logo-nie-przetrwalo-nawet-doby>

<https://www.radio.bialystok.pl/wiadomosci/index/id/236099>

In summary, it should be noted that, in the case of a place brand, it is difficult to indicate a model that would allow defining the reasons why it is necessary to change or modify the content of the logo, which is an expression of the visual identity of the place. The logo of a city, region, or country is intended to reveal the most important characteristics of a given place for the community. They change rarely, and certainly at a very slow pace. Therefore, in the case of place rebranding, there is no empirically justified model for changing the content of the logo. Many factors determine the content of the logo of a place, as well as determinants that impact the need for such a change.

The limitation of the presented research is the fact that the research was carried out in one country, Poland, which must have been important for the indicated research conclusions. However, so far, other researchers analysing similar issues have not formulated a universal model of both place branding and place rebranding. The place as the subject of marketing activities probably escapes the theory derived from commercial experience. Another limitation of research is the process of creating visual symbols of a place. It is a complex process in which many entities participate (residents, decision-makers, graphic designers, etc.), influenced by history, cultural heritage, and the current needs and expectations of the community.

A study of 354 cases of changing or withdrawing place logos in Poland reveals that they were not proactive triggers, as indicated by Miller et al. (2014). A detailed analysis of each case shows that decisions were subjective and resulted more from the political goals and aspirations of authorities than from marketing analysis as it is practised in business.

The research discussed is important for place branding or territorial marking because it reveals, first, the frequency of changes and, second, the difficulty in defining the causes of these changes. However, the most important conclusion resulting from this research is the thesis that each case of a territorial unit should be examined not only by analysing the content of the logo but also by using other research tools that will allow one to recognise the motivations of both the commissioners and the creators of the signs. Therefore, to verify the hypotheses presented, it is not enough to analyse the frequency of changes. Extensive research is needed to consider the representations and perception of logos.

In addition, the logo is a sign with which the inhabitants of a given place should also identify. Therefore, further research should link the issue of place identity and/or the spirit of the place with the content of the logo, both at the theoretical (sociological, psychological, marketing, and management) and practical levels (creating and changing the content of the place logo).

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CHANGES IN IT PROJECT MANAGEMENT AWARENESS ACCORDING TO BUSINESS PROCESS MANAGEMENT EXPERTS' OPINION: COMPARATIVE STUDY 2017-2023

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Abstract

Purpose. The main purpose of this article is to compare experts' opinions over two time periods to examine the differences in IT project management awareness and perception. The study was based on opinions expressed in a survey conducted in 2017 and 2023 during symposium meetings related to business process management.

Methodology. The paper's methodology is based on a theoretical and research approach. The survey questionnaire was constructed using a literature analysis and the authors' own experience. The authors formulated a hypothesis addressing the issue of how awareness regarding IT project management has changed over the last five years. The main hypothesis was supplemented by auxiliary hypotheses concerning the variation regarding awareness of: the need to implement information systems into organizations, the need to apply process management within these implementations, and the determinants and effects of IT project management.

Main results. The main results and findings of the research were determined by the validity of the hypotheses using the Fisher-Snedecor test. In addition, differences in city and Euclidean distance indices were calculated, which indicated the directions of changes in experts' views on the place and role of project management. The results pointed to the existence of significant discrepancies between experts' awareness in 2017 and 2023. The conclusions obtained from the survey may have important implications for both business practitioners and educational purposes.

The theoretical contribution. Findings: the findings show the opinions of experts including individuals with a strong research interest and those with an academic background, and also incorporated respondents with substantial practical experience. Part of the respondents' competence was related to years of using traditional project management methods, which in some way also shapes the approach to agile and hybrid methodologies.

Practical implications (if applicable). The conclusion for future project management education at universities, consulting firms, specialized courses, etc. shows profiling in the direction of modern IT development trends correspond to the changes connected with strategies of modern mobile companies with remote access to the data, taking into account changes connected based on representatives from Generation Z, the demographic currently entering the workforce.

Keywords: process management; project management; organization information system; the impact of project management on the organization.

JEL codes: M10.

Introduction

Project management, a field of study and its methods emerged in a strictly practical domain. It encompassed various economic activity sectors, from the military and construction industries to business, culture, etc., ultimately including information technology (Szczepanska-Woszczyna & Gatnar, 2022). As the complexity of internal and external conditions for organizational operations increases, approaches to conducting business are shifting toward process management (Kerzner, 2022).

In addition, project management is developing in parallel with process management in the organization, which further complicates opinions on the joint development of these closely related fields (Donato, 2022; Henshall, 2023; Kochli, 2023; McDaniel, 2019; Team Kissflow, 2024).

Among them, IT projects are the most complex and expensive ventures; they have an interdisciplinary scope and are also "immersed" in the most cutting-edge technologies. At the beginning of this century, the management of these projects gained stability, reinforced by the status of two specific, seemingly universal standards that appeared to meet all possible requirements, rooted in classic project management methods, featuring an organized structure and established procedures, esp. in context of remote work (PM Alliance, 2024).

According to Standish Group (2021) by 2013, only 10-15% of projects implemented using these methods were fully successful. In response to this specific "ossification" of project management methods, twenty-two years ago the Agile Manifesto was created (PMI, 2017; DigitalAI, 2023; Soflab, 2023). Agile methods drew on the experience of the best traditional methods. After initial successes, when the rate of fully successful projects increased to nearly 40% (Guillory, 2022), further analyses have shown that the shift concerns projects in small and medium-sized enterprises. In contrast, relatively "large" projects are still implemented using traditional or hybrid methods (PMI, 2017; Soflab, 2023). This has led to the emergence of several developmental trends in project management in recent years (Cognilytica.com, 2023; Harrin, 2023; Holowka, 2016; Project Group, 2023; Work Automation Index 2022), which included: the application of artificial intelligence, the increased significance of agile and hybrid methods, the wider use of specialized software for process management in projects, and the increasing prominence of professional development and expertise among leaders of project teams (Harrin, 2023; Kuchta et al., 2017). This involves understanding fundamental concepts and evaluating phenomena associated with them. In the literature, this is a topic that is very rarely discussed, as the literature output and research mainly focus on the practical application of project management methods (Kerzner et al., 2022; Trocki & Buklaha, 2016), and, in terms of fundamental concepts, it often does not go beyond the conventional framework originating from the early 2000s (Kerzner, 2022). There are no comparisons that would be carried out over time, and the analyses conducted focus on the relationship between selected traditional and agile methods (Szelagowski, 2019), rather than a comprehensive picture of the attitude of experts to the changes taking place after the COVID-19 pandemic (Dziendziora et al., 2022; Lacova et al., 2022). Therefore, the study into the awareness of experts in this field (Błaszczak, 2022; Eurostat (2023) during dynamically changing development trends is a specific research gap that this article hopes to fill.

The main objective of this article is to examine the differences in experts' awareness (Marciszewski, 2011) concerning project management applied for the implementation of information systems within organizations, comparing two distinct periods in 2017 and 2023. The paper's research purpose is to compare experts' opinions in two periods to examine the differences regarding IT project management awareness and perception in two distinct periods in 2017 and 2023 before and after the COVID-19 pandemic. The main purpose of this article is to compare experts' opinions over two time periods to examine the differences in IT project management awareness and perception. The study was based on experts' opinions expressed in a survey conducted in 2017 and 2023 during symposium meetings related to business process management in Poland.

In this context, the authors define experts broadly as individuals engaged in various roles related to the development and implementation of information systems (business analysts, designers, programmers, implementers, testers, etc.), as well as long-time trainers and educators in this field, managers overseeing IT projects (e.g., project managers) and IT companies' executives (directors, board members, etc.). It is their awareness of both the current state and upcoming changes that will determine the development of project management in the coming years. Given the research gap in this area, the authors formulated questions aimed at discovering whether these trends are recognized by experts and how the situation has changed in terms of awareness of the transformations occurring in recent years. In particular, the survey focused on the possible changes in experts' awareness regarding their attitude towards the importance of implementing IT solutions in organizations and the areas in which, according to them, they yield the best results; the impact of process management in IT projects on project objectives during the digital

transformation of the organization; the skills necessary for the proper use of process management in projects; facilitators and barriers to the development of project management; effects of proper project management; organizational changes necessary for better project management in the organization and the attitude of the organization's management towards them; project management methodologies and elements of organizational culture which are most relevant to project management.

The above considerations have led to the formulation of the main research hypothesis in the article:

H0 – There is a significant discrepancy between experts' awareness of IT project management in two distinct periods in 2017 and 2023, i.e. before and after the COVID-19 pandemic.

The main hypothesis was supported by three auxiliary hypotheses regarding the existence of differences in terms of experts' awareness of:

H1 – There is a difference in terms of experts' awareness of the need to implement information systems in the organization in two distinct periods in 2017 and 2023.

H2 – There is a difference in terms of experts' awareness of the need to apply process management during the implementation of IT projects in two distinct periods in 2017 and 2023.

H3 – There are differences in experts' awareness of concepts, determinants, and effects of IT project management in two distinct periods in 2017 and 2023.

The authors surveyed to address the questions arising from this topic, and the most significant results are presented in this article. The responses allowed for determining whether the research hypotheses were confirmed, i.e., whether there were indeed significant differences in the awareness of experts regarding the issues presented above. The responses obtained in the course of the study will be used to verify the formulated hypotheses, and proving or disproving the hypothesis H0 directly relates to the core objective set forth at the beginning of this section.

The objective indicated in this paper is attained in the following manner. The second section provides a literature review that presents the current achievements in the field and establishes the research background for the presented studies. The third section contains a description of the adopted methodology, research procedures, and a description of the study sample. Next, the analysis of the obtained results, along with the interpretation and discussion of the differences, is presented. The final part of the work summarizes the obtained results, limitations arising from the adopted method, and directions for further research in this area. The conclusion for future project management education at universities, consulting firms, specialized courses, etc. shows profiling in the direction of modern IT development trends corresponds to the changes connected with strategies of modern mobile companies with remote access to the data, taking into account changes connected based on representatives from Generation Z, the demographic currently entering the workforce of Poland and others European Countries (Lacova at al., 2022; Meyer, 2020; Shpak at al., 2023).

Literature review

Awareness of project management depends on historically formed regulations, rules, opinions, and the course of implementation of these projects (Gabryelczyk et al. 2022). In this context, awareness is regarded as the perception of external phenomena related to IT projects and changes in their understanding based on one's knowledge or observations, or the environment, the evaluation and understanding of these phenomena, and predictions based on the identified phenomena (Holowka, 2016).

In the common perception, a project may be described as an effectively and methodically implemented undertaking (Dumas, et al 2018), understood as a sequence of complex but purposeful activities, carried out according to a specific procedure, an undertaking that is innovative, autonomous, deterministic, and carried out within financial, functional, time and quality constraints, and an autonomous venture which is executed with a certain amount of risk (Kerzner, 2022; Kerzner at al., 2022; vom Brocke et al. 2015) to satisfy customer needs (Darie at al., 2019; Kamprath & Roglinger 2011). A process, on the other hand, is most often defined as a set of interrelated repetitive activities that consequently help to achieve

a specific goal, generally satisfying customer needs (Juchniewicz, 2019). Thus, by definition, these concepts are similar, and in the traditional view, the main differences focus on unique endeavours or repeatable operations as well as comprehensive or individual/unit-based sets of tasks. Thus, project management is an integrated and unique set of decision-making activities conducted to achieve objectives, limited by available resources, performed according to specific methodologies (Chmielarz, 2015). Process management represents the entire set of activities concerning the planning and execution of a given sequence of activities within an enterprise to improve its operations - also executed using specific methodologies and tools (Trocki & Buklaha 2016). Contemporary projects shift the focus from dynamism and change management (Barnes, 2023; Morris & DeLapp, 1983) to dynamism (Szelągowski, 2019) guided by economic pragmatism; from pragmatism to knowledge management; from uniqueness to good management practices; from innovation to unconventionality guided by patterns; from risk threat to its minimization; from committed management to improving cooperation between teams and management, and from conflict resolution in the organization to cooperation aiming at minimizing and mitigating conflicts (Chmielarz, 2013). In the realm of process management, there is an evolving trend towards increasing the flexibility and adaptability of processes, moving away from a focus on stability and uniformity (Standish Group, 2015) and implementing automation guided by artificial intelligence mechanisms instead of simple automation to streamline processes across the organization, eliminating routine and traditionalism and encouraging managers' involvement to influence and improve process improvement (Work Automation Index, 2022).

The first issue that emerged in this context concerned the integration of artificial intelligence in project management, including the delegation of certain responsibilities traditionally held by project managers to AI systems (Alok, 2020; Enholm et al., 2022). A sizeable proportion of managers (86%) hold a favourable view of artificial intelligence, with a notable segment including those managers who have already adopted AI and reported tangible benefits. Among these respondents, 20% have observed enhanced efficiency and decision-making support. This includes using AI-powered platforms for forecasting and data visualization, outcome prediction, error reduction through pattern matching with successful models, and boosting project team performance with the aid of chatbots (Cognilytica.com, 2023). According to the report, more than half of the companies intend to implement chatbots (PMI, 2023; Thivemyway.com, 2023) within a year and a half, and 56% believe that their use can increase the effectiveness of projects and the commitment of team members to handling routine tasks.

Another aspect to consider is the increased role of agile practices in hybrid methodologies (PMI, 2017). The common perception is that traditional standards are typically employed for managing large-scale projects with substantial budgets and extensive scopes, and agile methods are applied for smaller-scale endeavours in small and medium-sized companies (DigitalAI, 2023). To enhance the adaptability and application across various project types, practitioners have started to combine these groups of methods. If a sub-project cannot be carried out using traditional or agile methods, hybrid methods are applied. A Project Management Institute (PMI) survey shows that about 57% of respondents use hybrid methods, and they use several methodologies within a single project (Reind, 2019). According to a report presented by VersionOne (DigitalAI, 2023), organizations that have implemented agile methodologies have seen an increase in the quality of their products, better engagement of management and project team members, and an associated increase in work efficiency. Implementing hybrid methodologies during a project is one of the primary trends since best practices from different methods are combined and tailored to the individual needs of projects and the organizations in which these projects are implemented.

The third aspect to explore is the growing popularity and common need to use specialized software for project management. This shift towards specialized software in project management is driven by two key factors (DigitalAI, 2023; ClickUp, 2023): first, the growing complexity of software projects necessitates more sophisticated design tools (Mathiesen et al. 2011). Second, advanced project management software meets customer demands more effectively by providing tighter cost control and enhancing the management experience from the user's perspective (Eicker et al. 2008).

The fourth aspect to analyse is better adaptation to user requirements. The era of one-size-fits-all solutions, particularly in software, appears to be waning. Users, who are critical to a project's success,

are increasingly demanding solutions tailored specifically to their unique requirements (Sonteya & Seymour, 2011).

In this framework, process management focuses on modelling as the core for organizational improvements. It involves creating a collection of process models, a common management language, and specific tools for targeted areas to support these changes (Karagiannis et al., 2022).

Additionally, there is a noticeable trend within project management for IT personnel, particularly project managers, to display a high level of professionalism, which includes strong soft skills, essential for leading project teams effectively. According to 92% of managers, human resources are as important as expertise, and 80% of respondents believe that the lack of highly skilled staff may be seen as a major issue in the labour market (Hrabal et al., 2021; Karagiannis et al., 2022). Awareness of these changes and their dynamics is presented in this article.

Research Methodology

The paper's methodology is based on a theoretical and research approach. The survey questionnaire was constructed using a literature analysis and the authors' experience. The authors formulated a hypothesis addressing the issue of how awareness regarding IT project management has changed over the last five years. The main hypothesis was supplemented by auxiliary hypotheses concerning the variation regarding awareness of: the need to implement information systems into organizations, the need to apply process management within these implementations, and the determinants and effects of IT project management. In this research, the following research procedure was used:

1. Literature analysis of key concepts related to process and project management and their determinants during IT implementation as well as identification of the current status and development trends of this field,
2. Testing a pilot version of the survey questionnaire on a randomly selected group of professionals attending an IT project management course, from the point of view of its comprehensibility and relevance of the questions,
3. Conducting the survey and preparing the collected data for analysis,
4. Comparative analysis of the results and the indicators calculated on their basis,
5. Concluding and making recommendations for further evaluation of the place and role of processes in IT projects in the organization.

The questionnaire was correctly completed by eighty-seven experts in 2017 (Chmielarz & Zborowski, 2018) and forty-five experts in 2023 at symposiums related to process and project management.

The survey questionnaire consisted of three sections: the first section: the questions concerned awareness of the need to introduce information systems into the respondent's organization, which translates into increased revenues; the second - the respondents assessed the role of process management for their organization (process modelling, the impact of process management on the organization's operations, the knowledge and skills needed to manage processes, and the extent to which management supports process management in their organization); the third - the respondents identified the conditions and determinants of successes and barriers of an IT project, positive effects of applying project management and preferred groups of project management methods, shortcomings as regards communication between analysts and designers in conducting projects based on process models as well as support of project management by organizational culture.

The data sets from 2017 and 2023 were first brought down to comparability in MS Excel, and achieved, reliability analysis was applied in the form of the α -Cronbach coefficient. For all evaluation criteria, α -Cronbach's coefficient indicates the internal consistency and reliability of the sample – in this case, it was greater than 0.95. Research hypotheses were formulated as detailed in the first section, with assumed probabilities equal to 0.05. To verify the hypotheses, the significance level α for a right-skewed Fisher-Snedecor distribution was counted. The Fisher-Snedecor test was used here to compare the degree of significance of the two data sets from 2017 and 2023 and compare with the p-value determined from the

test values (that is, to de facto compare the test results of the FScalculated test value with the tabulated value of Fcr). If $p \leq \alpha$ then we reject the hypothesis, if $p \geq \alpha$ then we accept the hypothesis. In addition, in all sections, the basic indicators of variation: city distance and Euclidean distance were calculated, and for each research criterion, the variance and standard deviation.

The research samples from both selected years were slightly different. While the overall number of women and men was similar in each, there was a significant difference in terms of age. In 2017, there were 36% more respondents under the age of thirty at the symposiums, and there were nearly 26% more respondents aged 36-50 in 2023. There were also 18% more respondents aged 50+. This translated into variations in educational backgrounds. The research sample in 2023 was that over 50% of the survey respondents had a doctoral or higher scientific degree, which decreased the share of individuals with a bachelor's/engineering degree. Generally, it can be concluded that the 2017 symposium succeeded in gathering younger employees engaged in IT projects who were experts in their fields, while in 2023, the participants were older, with more experience and somewhat different skills. Hence, the biggest differences were observed in the group of education-related indicators (city distance -112%, Euclidean distance - 49%). In both years, respondents came from cities with over 500,000 residents (44% each year), but differences exist. Still, differences were noted in the proportion of rural inhabitants (17% in 2023, 5% in 2017) and residents of towns with fewer than 50,000 inhabitants (2% in 2023, 16% in 2017).

Research Results

Selected analyses are shown below. In the first section, survey participants assessed the significance of implementing information systems within their organization (see Fig.1). In this context, the most substantial shift in perspective (a 12% rise) was observed regarding the evaluation of the attribute that defines the application of information systems as an important strategic initiative promoted by the management. As many as 14% of respondents expressed this opinion in 2023. This shift primarily reduced the emphasis on categories such as ongoing monitoring of the situation within the company and its surroundings and the development of new activities in the organization, with both categories receiving 8% fewer responses. As the difference between the highest and lowest values increased to 6%, there was an increase in the values of both the variance (by 0.20% to 0.55%) and standard deviation (by 5.09% to 7.40%). In 2023, respondents highlighted two other critical aspects besides the support of strategic initiatives, namely, the support of information processes at the operational level (12%, a decrease of 6%) and substantial support for all information processes across the entire company (10%). The least important to respondents (6% of responses) in 2023 was ongoing monitoring of the situation in the company and its environment. The sum of absolute differences for all options, i.e., city distance amounted to 45.06%, and Euclidean distance was established at 5.10%.

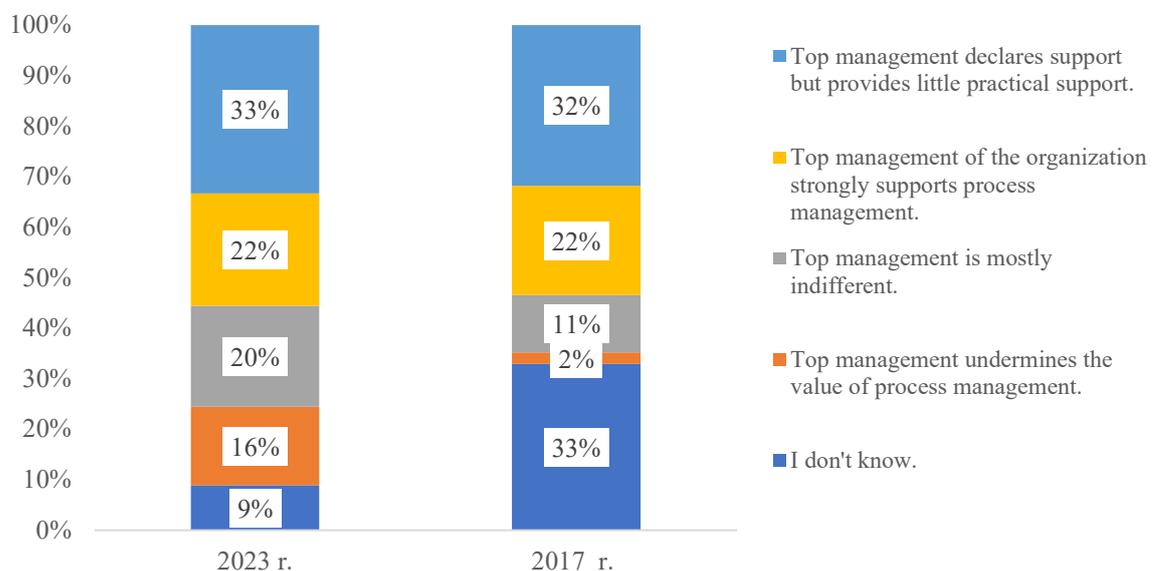


Fig. 1. The importance of process management for the organization's management (Source: Authors)

Regarding the evaluations of areas influenced by the introduction of information technology into organizations, the highest percentage of respondents (9%) emphasized that digital transformation provided a flow of human resources for the organization and their qualitative development, while nearly 9% pointed to introducing new products and services to the market (an increase of 7%). Additionally, 7% of respondents believed that this facilitated efficient funding for the organization's activities (a 6% increase). The city distance was slightly lower at 38.01%, and the Euclidean distance was established at 2.66%.

If we consider the relationship of the responses from 2023 to 2017 and relate them to the previously mentioned trends, they undoubtedly point to the experts' awareness of the importance of introducing IT into the organization, promoted by management, and the understanding of the need to support processes across the organization (an increase of more than twofold), and not just processes at the operational level. In contrast, less importance is given to the ongoing monitoring of the situation in and around the company. In the area of computer-supported activities, the greatest focus is on leveraging information technology to ensure the availability of skilled human resources, as well as the introduction and development of new products and services. This aligns well with the aforementioned trends.

The second section of the survey analysed awareness of the need to apply process management during the implementation of IT projects (see Fig. 2). The focus was on attributes such as the frequency of application of process management in an IT project, its impact on the organization's operations, the competence of staff in this area, and management support for process management, which translates into proper management of IT projects (LinkedIn Report, 2023). In 2023, process modelling supported by specialized software, indicating a modern approach to design, is used during selected analyses of complex project issues according to 9% of experts. This is almost eight times more than in 2017. Indeed, there has been an almost twofold increase in the attribute "always," but it does not exceed 1% of responses. The assessment that it is used during every pre-design analysis appears 7 times less frequently than in 2017.

There was also a decrease of 5% in responses that it is not used at all. The data reveals a substantial growth in recognition of the importance of process management within organizational structures. This indicates an increase in the awareness of the need for process management, especially considering that in 2023, 16% of respondents believe that it is very important for the success of a project and the coordination of activities during its implementation (an increase of 13%), along with a 9% decrease in declarations about the moderate impact of process management on the project. Central to the activities in 2023 is the proficiency in mapping out project processes, as indicated by 4% of participants, and initiating organizational changes, for example, the creation of a BPM competence centre. For the respondents, the awareness of the need to have knowledge of change management in an organization (13%) and strategic process management (9%) has decreased. There is also a diminishing gap between the option stating that the organization's leadership declares support for process management but practically does not support it (9%), and the one indicating strong leadership support for these actions (6%).

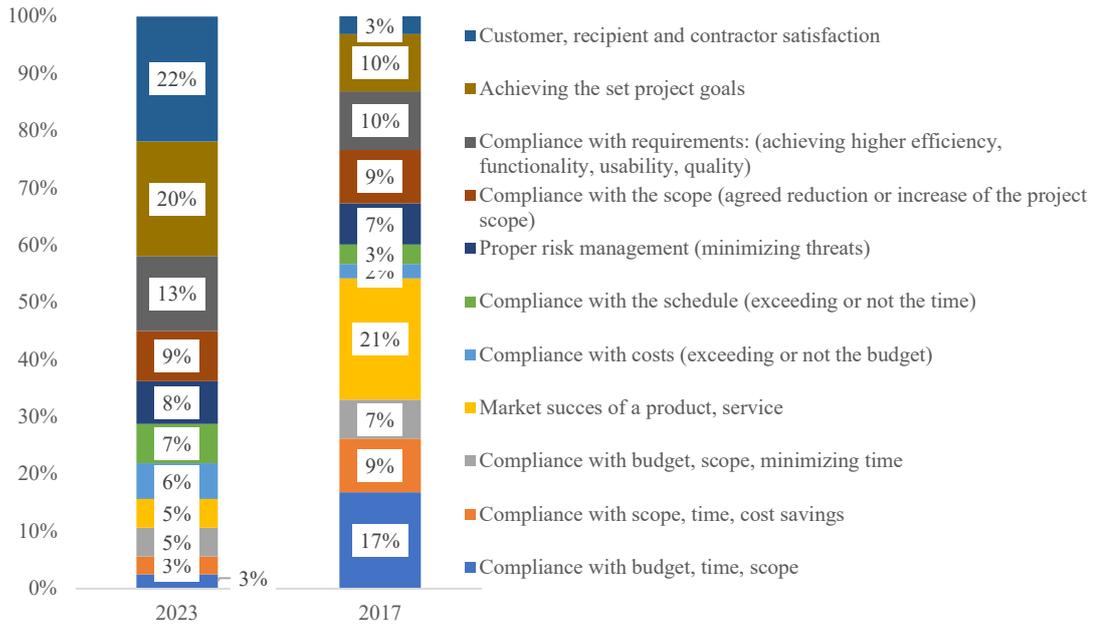


Fig. 2. The list of determinants of IT project success (Source: Authors)

The third section of the survey addressed the determinants and effects of IT project management (see Fig. 3). Over 40% of the questions concerned the knowledge and understanding of the concept of information technology projects. In this regard, statements, and assessments of the characteristics of projects (expediency, determinism, uniqueness) were similar in 2017 and 2023 (city distance at the level of 17.06%, Euclidean distance established at 0.56%). The same was true for determining the characteristics of their implementation - in both years, the most important were: keeping up with changes, economic pragmatism and dynamic (Szelagowski, 2019) project control (city distance was low in this case - 8.53%, Euclidean distance 0.14%). In other cases, the results regarding differences in responses were very similar (Szelagowski, 2019).

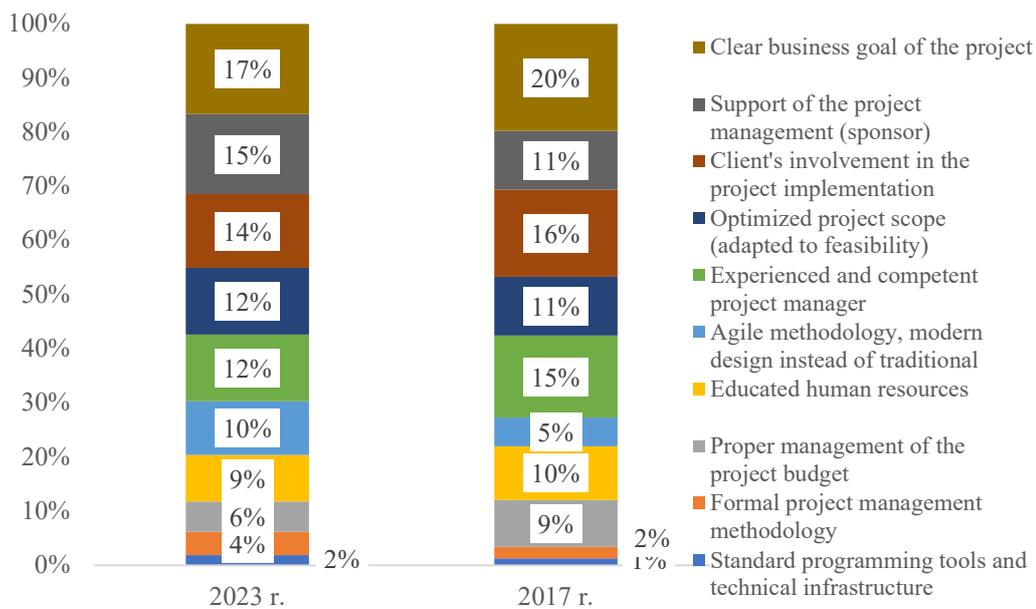


Fig. 3. Determinants of the success of an IT project supported by process management (Source: Authors)

The other options concerned situational awareness derived from the practical experience of experts. At present, project management methods are divided into three groups: traditional, agile, and hybrid, the

latter combining features of the other two. Respondents were asked which of these dominated the market in 2017. Based on their own experience, survey participants attributed 44% of projects to the agile methods category, 35% to traditional, and 21% to the hybrid category. Five years later, these proportions have already changed: hybrid methods dominate with the level of indications established at 37%; followed by agile methods amounting to 34%, and finally, traditional projects constituting 29% (see Fig. 4).

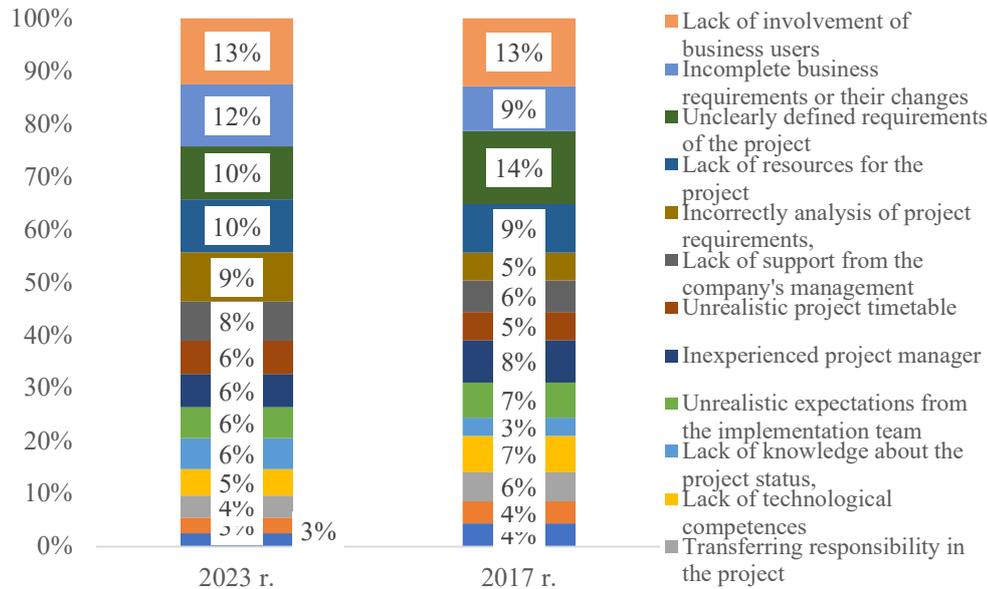


Fig. 4. Constraints to the success of an IT project supported by process management (Source: Authors)

Discussion

The most important determinants of IT project success in both years were identified as the clear business objective of the project (requirements specified with the consideration of existing constraints, in 2023 at the level of 17%, and in 2017 at the level of 20%), customer commitment to the project (14-16%) and an experienced and competent project manager (12-15%). In 2023, there were, admittedly, slight decreases in the shares of responses in these categories, at the level of 16-19%, but this did not change the order of their ranking. The greatest increase (by 5% to 10%) was related to the respondents' perception of the importance of agile, modern design methodologies based on business intelligence replacing existing methods. Similar ratings in both years also occurred in assessments of views on the main barriers to implementing IT projects. The ranking has essentially remained unchanged, with the top three positions being: lack of engagement from business users and information from them (13% each), incomplete business and functional requirements or their frequent changes (9-12%), and vaguely defined project requirements (10-14%). Differences in the dynamics of these categories ranged from 3 to 38%. City distance was also small in this case and amounted to 25.85%, and Euclidean distance was established at the level of 0.64%. In contrast, there was a wide variation in opinions concerning the positive effects of the IT project. In 2017, the largest number of survey respondents (21%) indicated achieving a product or service that was successful in the market, and 17% emphasized conformity with the basic parameters of the project - adherence to budget and timeline, even with an expanded scope. Concerning 2023, the differences were established at 14-16%, and the effects were assessed quite differently. The most significant effect was the satisfaction of the customer, recipients, and contractors (22%) and the achievement of the goals of the project (20%), with differences concerning 2017 established at the level of 10-19%. This explains the city distance at the level of 78.35% and the Euclidean distance established at 9.96%. The recommendation to improve process management in projects includes setting up dedicated teams, called Competency Centres, which specialize in Business

Process Modelling and Project Management. Currently, 60% of survey participants (compared to 62% in 2017) acknowledge that their organization has a unit responsible for modelling or analysing processes for designing management information systems. There is a significant consensus within these major categories. Unfortunately, in the remaining areas, there are discrepancies reaching 6-7%. Existing organizational units like Competence Centres are now mainly concerned with participating in projects to improve processes (18% at present, an increase of 7%) and setting rules and methods for all process initiatives in the organization (17%, in 2017 at the level of 10%).

The results presented in all sections of the study confirmed most of the trends observed in the literature (Gabryelczyk et al., 2022; Karagiannis, 2022; Szelagowski, 2018).

If not directly, then in the form of the attributes associated with these trends. Recent trends have highlighted a growing imperative to integrate advanced business intelligence systems into modern design strategies and move away from traditional methodologies (Creasey, 2024). The increased importance of hybrid and agile methods was confirmed. There was also a clear expression of the need for specialized software in process management. Most attention was paid to the “human” elements of project management, i.e., the need to hire highly qualified personnel who are open to change, responsible and flexible regarding customer preferences, and have excellent teamwork skills.

In the first section, there was a statistically significant variation in the attributes of awareness of the necessity to implement information systems in the organization in 2017 and 2023. The Fisher-Snedecor ratio calculated for this group was 2.6216, with a critical value of 2.5769, which makes it possible to consider the alternative hypothesis H1 to be confirmed.

In the second section, there was a slight exceedance of the critical threshold of the Fisher-Snedecor index ($F_{Scr}=2.0302$) by the calculated index ($F_{Scalculated}=2.0878$), $F_{Scr}<F_{Scalculated}$, which shows the significance of the variation in responses in this section and substantiates the validity of H2 hypothesis.

Despite the detailed analysis of the discrepancies present in the third section, a significant difference between the critical value of the Fisher-Snedecor inverse test ($F_{Scr}=2.4381$) and the value counted for all attributes $F_{Scalculated}=6.0054$ was obtained only for the question concerning the tasks of the Competence Centre, so only in this case, a statistically significant difference in the respondents' evaluations occurred. The remaining evaluations (especially those concerning the theoretical issues) did not confirm this significance. Thus, overall, the value of the Fisher-Snedecor inverse test for the entire third section ($F_{Scalculated}=1.0266$) was less than the critical value ($F_{Scr}=2.3723$), which means that hypothesis H3 was not supported.

Following the confirmation of auxiliary hypotheses H1 and H2, the main hypothesis H0 concerning the existence of significant differences between experts' awareness and perception of IT project management in 2017 and five years later, in 2023, has also been positively verified. In this case, the value of the Fisher-Snedecor inverse test for the entire study ($F_{Scalculated}=1.5075$) was greater than the critical value ($F_{Scr}=1.2365$), which means that hypothesis H0 was verified positively.

The results presented in all sections of the study confirmed most of the trends observed in the literature (Driver, 2022). If not directly, then in the form of the attributes associated with these trends. Recent trends have highlighted a growing imperative to integrate advanced business intelligence systems into modern design strategies and move away from traditional methodologies. The increased importance of hybrid and agile methods was confirmed. There was also a clear expression of the need for specialized software in the area of process management. Most attention was paid to the “human” elements of project management, i.e., the need to hire highly qualified personnel who are open to change, responsible and flexible as regards customer preferences, and have excellent teamwork skills.

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To summarize the discussion there are some basics:

- over the past five years, i.e., the period 2017-2023, there has been a change in the experts' perception of IT project management, as proven by this study (hypothesis H0 was confirmed),
- in particular, significant discrepancies occurred regarding the need to implement IT systems in the organization as a success factor (hypothesis H1 was proven) and awareness of the need to apply process management during the implementation of IT projects (hypothesis H2 was positively verified),
- however, there were no statistically significant changes regarding the awareness and perceptions of the IT project management concepts, conditions, and effects (hypothesis H3 was not validated).

Conclusions

The main results and findings of the research were determined by the validity of the hypotheses using the Fisher-Snedecor test. In addition, differences in city distance and Euclidean distance indices were calculated, which indicated the directions of changes in experts' views on the place and role of project management. The results pointed to the existence of significant discrepancies between experts' awareness in 2017 and 2023. The conclusions obtained from the survey may have important implications for business practitioners and educational purposes. The results obtained in the course of the study allow the authors to draw the following conclusions:

- the changes that have occurred are positive and coincide with project management development trends found in the literature (Longhurst & Choi, 2024; Sharman, 2023),
- among experts, in most cases, there was a consensus in understanding the basic concepts and conditions of project management against the background of project management theory (Gurnov, 2024; Nathaniel, 2023), whose awareness was analysed in 2017 and 2023. However, when it came to references to practical attributes, the diversity of opinions and views increased,
- recognition of process management as a supporting, or even necessary, tool for IT project management has increased (Gabryelczyk, et al. 2022; Landau, 2023; Pogue, 2022), especially in the context of the analysis of complex project-related problems, awareness of the determinants (a 10% increase in the importance of modern project management methods) and barriers to project management (lack of business user involvement and information from business users, incomplete business and functional requirements or their frequent change) has not changed in recent years, which is in line with studies presented by, for example, the Standish

Group (2021), there has been a diversification regarding awareness of the positive effects of applying IT in the organization, where the satisfaction of the customer, the recipients or final users, the contractors and the achievement of the set goals of the project came to the fore, contrary to the 2017 assessments, experts assessed that the dominant methodologies today are hybrid and agile methodologies (81%), but the realistic approach visible in their perspectives is substantiated by the fact that 29% of the applications are attributed to conventional methodologies (comparable to LinkedIn Workplace Learning Report, 2023).

The surveys conducted among experts had certain limitations. First of all, they included also individuals with a strong research interest and those with an academic background. It also incorporated respondents with substantial practical experience. However, it is worth noting that there were a limited number of representatives from Generation Z, the demographic currently entering the workforce.

Therefore, further research should also cover the population of young people - future potential IT employees to analyse their opinions regarding the place and role of IT projects in the implementation of management support systems. In addition, it would be beneficial to conduct research examining the relationship between process management and project management, as well as the potential for integrating artificial intelligence within these domains.

The importance and novelty of the research showed the findings based on the opinions of experts including individuals with a strong research interest and those with an academic background, and also incorporated respondents with substantial practical experience. Part of the respondents' competence was related to years of using traditional project management methods, which in some way also shapes the approach to agile and hybrid methodologies.

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EXPLORING CHATGPT'S EFFICACY IN IDENTIFYING POTENTIAL BUSINESS PARTNERS: A COMPARATIVE STUDY

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Abstract

Purpose. This study aims to evaluate the effectiveness of using ChatGPT for a practically important but under-researched task in the scientific literature: the preliminary search and identification of potential business partners or counterparties.

Design/Methodology/Approach. An experiment was conducted where ChatGPT was tasked with suggesting ten digital marketing agencies for each of three countries - Germany, Latvia, and Poland, including links to these agencies' homepages. The accuracy of the responses was verified. The study also compared the accuracy of responses between the latest version of ChatGPT (ChatGPT 4o) and the previous version (ChatGPT 4) connected to the Internet.

Findings. Both versions of ChatGPT were found to make a significant number of errors or inaccuracies when identifying potential business partners that met predefined criteria. Moreover, the frequency of these errors increased when searching in countries with smaller populations and economies. It was also found that the newer version, ChatGPT 4o, did not demonstrate improved accuracy compared to ChatGPT 4, which was connected to the Internet. Both versions of ChatGPT examined in the study provide a higher level of accuracy in identifying potential partners in countries with larger economies and populations.

Originality / Value / Practical Implications. This research contributes to a practical understanding of the limitations and capabilities of AI tools in identifying business partners, providing valuable information for both practitioners and researchers in the field. This study also provides a benchmark for determining the accuracy of ChatGPT in performing common and important business tasks such as preliminary search and identification of business partners. The results of the study provide a basis for future research to track the progress of language models in similar business applications. The proposed evaluation methodology can be applied to future research aimed at assessing the capabilities of language models in solving business problems.

Keywords: ChatGPT; AI language model; Identification of business partners; Risk assessment; Decision making.

JEL codes: O33, M15, D83.

Introduction

Until about the second half of 2022, AI products were mainly developed and applied for the benefit of specific large companies. The development of AI products could be afforded by a relatively small number of companies, as it required a significant amount of funding.

As a result of the launch of ChatGPT and other generative AI products, all companies, including a huge number of micro, small and medium-sized companies, as well as self-employed individuals and freelancers, have gained access to generative AI products.

Consequently, in less than a year since the advent of generative AI products, a very significant proportion of companies have begun to widely use these products. For example, according to a survey conducted in February 2023 among 1000 US companies, 49% of companies reported that they use ChatGPT, and 93% of these companies plan to expand the use of this chatbot. Another 30% of companies said they plan to start using ChatGPT, and 85% of them said they will start using it within the next 6 months (Resume Builder, 2023).

The effective application of ChatGPT is relevant for a huge number of companies and individual entrepreneurs. Thus, in 2019, there were more than 322 million MSMEs in 176 countries (World Bank, 2019). However, it would be correct to also include freelancers and self-employed individuals as business users of ChatGPT and other generative AI products. Approximately 1.57 billion people in the global workforce are freelancers (Howarth, 2024). Based on the results of the Resume Builder survey (2023), it can be assumed that at least several tens of millions of MSMEs are already using ChatGPT alone, and the number of these user categories will increase rapidly. And, as usual, when applying products built based on new technologies, one of the most important issues is to assess the capabilities of these products at this stage of their development.

Research notes that ChatGPT 4 have tremendous potential to transform marketing and provide more accurate information than previous PLMs (Rivas & Zhao, 2023) and that ChatGPT will significantly increase the effectiveness of marketers in various marketing areas (Jain et al, 2023). ChatGPT can be used as an advanced search engine (Fraiwan & Khasawneh 2023). However, it is noted that ChatGPT has difficulty handling difficult or strange situations because it lacks context understanding, although ChatGPT shows significant improvement (George et al, 2023) and that using ChatGPT at the current stage of development requires care in its application (Rana, 2023), otherwise, the results may be inaccurate (Fraiwan & Khasawneh, 2023). The literature notes a paucity of empirical research on marketing applications of ChatGPT (Grashoff & Recker, 2023).

However, we did not find articles that test the effectiveness of using ChatGPT to find counterparties or business partners of companies. Although it seems obvious that in the context of a slowdown in economic growth and the threat of a recession and, accordingly, a decrease in demand, as well as the presence of sanctions restrictions, the task of finding new buyers, buyers, suppliers and other counterparties is an important factor in the long-term sustainability of companies. Accordingly, many companies and entrepreneurs have a need to improve the efficiency of the search for counterparties that meet certain criteria and will try to use ChatGPT for this purpose.

Therefore, in this article, we plan to answer two research questions. First, how effective is the use of ChatGPT for preliminary search and identification of business partners or counterparties.

Secondly, since the literature has reported significant performance benefits with each subsequent version of ChatGPT (Plevris et al, 2023; Ahsan et al, 2023), we will examine whether the latest version of ChatGPT, ChatGPT 4o, which became available in May 2024, more effective for solving the problems of preliminary search for potential partners in the B2B segment compared to the previous version - ChatGPT 4, connected to the Internet.

As a result of our experiment, we empirically proved that both the latest versions of ChatGPT make a significant number of errors or inaccuracies when preliminary searching for potential business partners that meet certain criteria.

The article is structured as follows. In the second section, we present the theoretical background of using ChatGPT for marketing and search purposes, as well as the risks associated with using ChatGPT. In the third section, we present the research methodology. In the fourth section, we present the results of our experiment in finding business partners in the case of using ChatGPT 4.0, connected to the internet and in the case of using ChatGPT 4o and compare the obtained results. In the fifth section, we present the conclusion and recommendations for future research.

Literature Review

Generative AI products, especially ChatGPT and ChatGPT4, have great potential to transform marketing by automating tasks by providing more accurate information than previous PLMs (Rivas & Zhao, 2023). ChatGPT can be used effectively for marketing (Jain et al, 2023). When using ChatGPT, marketing tasks took less time to complete, and the result was of higher quality (Noy & Zhang, 2023). As a result of the implementation of ChatGPT, a giant leap in marketing is expected over the next few years (Rivas & Zhao, 2023).

As companies strive to achieve desired business outcomes more effectively, it's hard to imagine an aspect of marketing practice that GenAI won't touch (Peres et al, 2023). As a result of the introduction of generative AI products, particularly ChatGPT, a number of interesting tools will become mainstream, becoming a standard feature in, for example, web search (Teubner et al, 2023). Accordingly, GenAI will make modern marketing tools more accessible to MSMEs as well as individual entrepreneurs (Peres et al, 2023). ChatGPT can help small businesses improve efficiency and reduce marketing costs (Bianchini, 2023). It is also noted that further research is needed on ChatGPT as a marketing research tool (Jain et al, 2023).

Microsoft's decision to invest in ChatGPT and include it in its Bing search engine has already set off waves in search engine ecosystems (Cutler, 2023). ChatGPT has unleashed a new war in information retrieval (Rana, 2023). The paradigm shifts in access to information brought about by ChatGPT could benefit everyone using tags (Haleem et al, 2022). ChatGPT can help companies generate leads and increase conversion rates (Ahsan et al., 2023; Ray, 2023). ChatGPT helps reduce the time spent gathering information (Seetharamapura, 2023). ChatGPT can be used for market research to better understand the customer base and areas for customer expansion (Rahaman, 2023). Many users believe that ChatGPT will replace traditional search engines such as Google because it can provide simple and concise results, makes research easier and takes less time. Technological advancement with chatbots may indicate significant advances in web search (Cutler, 2023). ChatGPT can be used effectively for search (Jain et al, 2023). The introduction of ChatGPT has provided a much more efficient web search experience (George et al, 2023). ChatGPT4 is noted to have several improvements over the previous version, including overall performance and response quality (Plevris et al, 2023; Ahsan et al., 2023).

When evaluating the many opportunities that ChatGPT offers, it must be considered that any new technology should be used consciously, and its pros and cons should be understood, therefore ChatGPT should be used carefully as a research and practice tool (Jain et al, 2023). ChatGPT shows significant improvements but still struggles to handle difficult or strange situations (George et al, 2023). Without a doubt, ChatGPT is the future, but care must be taken until these products reach the required level of maturity (Rana, 2023). Although AI models such as ChatGPT are in the early stages of scaling, companies have begun to use these models in many business areas. But care must be taken when applying such models, as such models are not yet fully mature technology (Chui et al, 2022). Therefore, the use of such products requires managers to be more cautious. For example, ChatGPT sometimes generates completely inaccurate information in response to a user's question and does not have a built-in mechanism to inform the user about this or challenge the result (Chui et al, 2022). ChatGPT (like all models) is not infallible. If researchers rely too heavily on model results, they may introduce errors or inaccuracies into their research (Fraiwan & Khasawneh, 2023). AI tools, particularly ChatGPT, can pose potential risks to marketers, consumers, and other stakeholders as they may extract information from inaccurate sources and therefore provide incorrect information, as well as generate responses based on information that is inherently out of date (Rivas & Zhao, 2023).

A key risk driver is GPT-4's ability to generate publicly accessible but difficult-to-find information, shortening the time users spend on research and compiling this information in a way that is understandable to a non-expert user (OpenAI, 2023).

ChatGPT is mainly trained on data up to 2021, so newer events may still need to be found in other sources of information (George et al, 2023). The accuracy of models such as ChatGPT may be questionable as they are still under development and lack context understanding (George et al, 2023). ChatGPT is a generalized pre-trained transformer (GPT) trained on an existing dataset that is at least

two years old. Therefore, latency is one of the disadvantages of GPT. It follows that GPT is only as good as the data it is trained on (Shen et al, 2023). ChatGPT ignored emotional, controversial, provocative, and manipulative questions and stuck to what it was taught (Seetharamapura, 2023). Just like humans, generative AI can make mistakes. ChatGPT, for example, sometimes "hallucinates", which means that it confidently generates completely inaccurate information in response to a user's question and has no built-in mechanism to signal this to the user. Filters are not yet effective enough to catch inappropriate content (Chui et al, 2022). ChatGPT, depending on the data it was trained on, may not be very objective in its analysis (Ahsan et al., 2023). When asking ChatGPT questions, you need to clearly define the problem and what information you plan to collect. It is also important to ask clear, concise, and specific questions and provide additional information or clarification as needed (Zierock & Jungblut, 2023). The effectiveness of LLM as a productivity tool will undoubtedly depend on the user's ability to use it (Teubner et al, 2023). Users should be aware of ChatGPT limitations and take steps to mitigate these risks (Fraivan & Khasawneh, 2023). Managers must be clear about the risks involved at the early stage of ChatGPT technology development (Chui et al, 2022). Improving the results of ChatGPT in marketing also depends on its correct application. Therefore, the use of ChatGPT in marketing needs to be carefully considered to avoid potential risks (Rivas & Zhao, 2023).

Summarizing the review of the literature, we stated that the researchers note the following aspects of using ChatGPT in the transformation of marketing and the search for customers and partners. First, ChatGPT has tremendous potential to transform marketing. Secondly, ChatGPT can be effectively used to find clients, partners and other information. Thirdly, despite the beginning of the mass use of ChatGPT, it must be considered that generative AI technologies have not yet reached the level of maturity and in some cases give insufficiently accurate and sometimes erroneous answers. Therefore, the use of ChatGPT requires caution, awareness of potential risks and taking measures to mitigate them, as well as certain knowledge from workers using ChatGPT.

However, despite the numerous mentions in the reviewed literature of the versatile capabilities of ChatGPT in marketing research, expanding the customer base and search, we did not find studies that examined the effectiveness of using ChatGPT around preliminary search and identification of potential partners and contractors.

Research Methodology

The research methodology is based on an experiment to evaluate the effectiveness of using ChatGPT for preliminary search business partners.

We planned the experiment in such a way that the experiment on finding business partners corresponded to the solution of a typical problem for companies from any sector of the economy that carry out import and/or export operations.

To correctly select the most versatile search object for the experiment, in late February and early March 2024, we conducted a survey of CEOs, COOs or CMOs of twenty-eight SMEs from various sectors - industry, wholesale and services of CEE countries that are members of the EU, which have imported and/or export operations. The survey among CEOs and TOP managers was conducted only with the purpose of identifying the most pressing marketing tasks for export companies, which may be typical for companies producing and selling various types of products or services, based on the assumption that these tasks can be effectively solved using ChatGPT.

As a result of the survey, the search for a digital marketing agency was chosen as the object of the search for a potential business partner in the three most important markets for the companies surveyed - Germany, Latvia and Poland.

We have followed the guidelines and rules outlined in the Ethical Principles for the European Economist, recommended by the European Economic Association (2022).

We conducted an experiment that included eight stages. The first six stages were aimed at testing ChatGPT's contextual understanding of responses.

The seventh and eighth stages of the experiment were aimed at assessing the accuracy of identifying potential business partners or counterparties and checking the accuracy of providing links to the home pages of companies proposed by ChatGPT.

The latter two stages are the focus of the current paper.

Stage 7. ChatGPT 4, connected to the Internet, was asked to find ten digital marketing agencies in each of three countries - Germany, Latvia and Poland - and to provide links to the websites of these digital marketing agencies.

After receiving the responses, we manually checked the links provided by ChatGPT to see if the recommended companies were digital marketing agencies and if these companies were in the countries we specified. If the link did not work or it was a link to another company, we manually searched the company's home page by company name and country affiliation and checked whether these companies were digital marketing agencies and whether these companies were in the target countries.

Stage 8. After that, we performed a similar experiment with ChatGPT 4o in the same sequence. Note that ChatGPT 4o is connected to the internet. Next, we compared the obtained response results from ChatGPT 4o with those of ChatGPT 4 connected to the Internet. The experiment was conducted in August 2024. All questions were asked from one account. Questions were asked in English. The results of the experiment for Germany are presented in Appendices 1 and 2, for Poland in Appendices 3 and 4, and for Latvia in Appendices 5 and 6.

A comparison of ChatGPT 4 connected to the Internet and ChatGPT 4o was performed due to the following reason:

1. In the recommendations on the methodology of conducting and creating the design of scientific research, it is recommended to conduct a comparison with comparable samples, data, etc., so that the results obtained can be compared.
2. Following this principle of constructing the methodology of scientific research, in the process of conducting the experiment we found that the latest version - ChatGPT 4o in solving the marketing tasks considered in the study (preliminary search for potential business partners and/or contractors by certain criteria) has slightly lower accuracy compared to the previous version - ChatGPT 4, connected to the Internet.

As a result of our comparison of the latest and previous versions of ChatGPT, we were able to draw the following additional conclusions. Firstly, for solving the problems of preliminary search and/or identification of business partners, the previous version of ChatGPT - ChatGPT4, connected to the Internet, demonstrated slightly better results than the latest version - ChatGPT 4o, which allows us to conclude that for solving the problems considered in our experiment, it is possible to use not only the latest version - ChatGPT 4o, but also the previous version - ChatGPT 4, connected to the Internet. Secondly, we noted the lack of progress in the results of the preliminary search of potential business partners and/or contractors in the ChatGPT 4o version compared to the previous version, which indicates a non-linear level of progress in subsequent versions of GPT for solving some problems in the field of information search and marketing, which is also an interesting scientific conclusion, proven by conducting an experiment and comparing the responses of ChatGPT 4o and the previous version of ChatGPT.

Research Results

Identification of digital marketing agencies received from ChatGPT

In this subsection, we check whether ChatGPT 4, connected to the Internet and ChatGPT 4.o correctly presented the answers based on the first part of our question. Namely, whether the companies presented in the ChatGPT answers are digital marketing agencies from Germany, Latvia and Poland (see Fig.1).

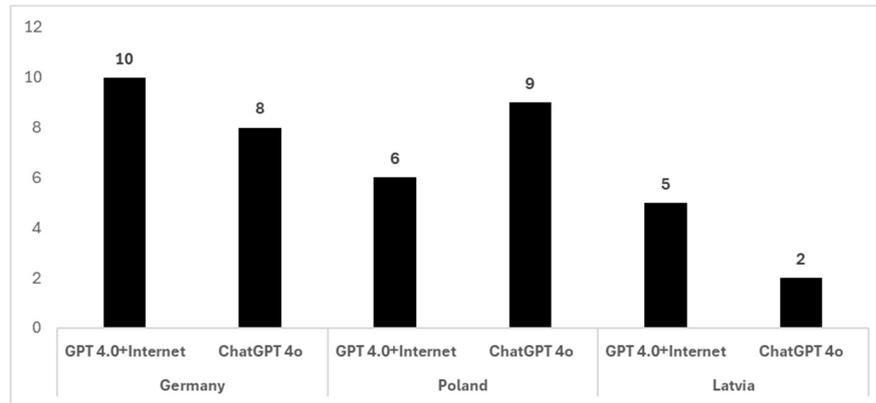


Fig. 1. Results of checking the correctness of the identification of digital marketing agencies received from GPT (Source: Created by the authors)

The analysis of the responses received showed that out of the thirty possible valid responses totalling three countries, the Internet-connected ChatGPT 4 correctly identified twenty-one companies that are digital marketing agencies. Accordingly, the validity of the answers provided by ChatGPT 4 connected to the Internet was 70%. ChatGPT 4o correctly identified nineteen companies that are digital marketing agencies, which is 63.3% valid responses. When comparing the performance of the two versions of ChatGPT, we found that ChatGPT 4 connected to the Internet, i.e. the earlier version of ChatGPT, provided results that were 6.7 percentage points more accurate than the latest version of ChatGPT, i.e. ChatGPT 4o.

In our opinion, the effectiveness of the ChatGPT versions considered in the study seems to be insufficient due to a rather high share of unreliable information, especially considering that both ChatGPT versions considered in the study are connected to the Internet.

Analysing the results obtained separately by country, we found that the most accurate answers were obtained by digital marketing agencies in Germany -18 valid answers out of 20 possible, which is 90%. The lowest accuracy of ChatGPT answers was for digital marketing agencies in Poland -15 valid answers out of 20 possible, which is 75%. The lowest accuracy of ChatGPT answers was for digital marketing agencies in Latvia - 7 valid answers out of 20 possible, which is 35%.

If we consider the results obtained in the context of the size of the economy, number of companies or population of the countries considered in the study, the size of the economy, number of companies and population in Latvia is several tens of times lower than in Germany and Poland. The size of the economy and population in Germany is several times larger than in Poland. On this basis, we can make a preliminary assumption that ChatGPT at this stage of development of this language model provides more accurate information on larger countries (in terms of size of economy, number of companies and population).

Comparing the reliability of the results obtained between ChatGPT 4 connected to the Internet and ChatGPT 4o between the three countries considered in the study, we did not find homogeneous trends. For example, ChatGPT 4 connected to the internet provided more accurate information than ChatGPT 4o for companies in Germany. Conversely, among digital marketing agencies in Poland, ChatGPT 4o provided more accurate information. Since the differences in the obtained performance results between ChatGPT 4 connected to the Internet and ChatGPT 4o differ only slightly, we cannot draw a reliable conclusion about a significant advantage of one of the two versions of ChatGPT we examined. However, we can conclude that even though the versions of ChatGPT we reviewed are the penultimate and the latest versions and both of them are connected to the Internet, the error rate in obtaining information about companies based on the company's main specialisation is quite high.

Our results correlate with the viewpoint of Chiu (2023), who finds that ChatGPT sometimes generates completely inaccurate information.

The reason for the significant number of errors may be that ChatGPT products have not yet reached a sufficient level of maturity Rana (2023). Chiu (2023) also finds that ChatGPT sometimes generates completely inaccurate information.

We note another interesting aspect in the ChatGPT responses. Each of the two versions of ChatGPT for a small country like Latvia provided a completely inconsistent list of ten digital marketing agencies. For Poland, there was only one match of recommended digital marketing agencies, and for Germany, there were four matches. Since we sent the questions from the same IP address, this fact may indicate that the reviewed ChatGPT versions have or use different sources of information and do not have sufficient domain or industry expertise.

Checking the links of digital marketing agencies represented by ChatGPT

In the era of digital technologies and the development of digital information and marketing tools, most companies operating in the B2B segment, including digital marketing agencies, have their own website or homepage, which contains some information about the company, including information about the company's specialisation and products. The availability of such information allows for a more efficient preliminary search for potential partners in the B2B segment according to certain criteria, and for digital marketing agencies to attract potential target customers more efficiently. Therefore, in this subsection, we will present the results of our testing of the websites of digital marketing agencies that were suggested as potential partners because of our queries to ChatGPT 4 connected to the Internet and ChatGPT 4o, as well as compare the effectiveness of the results obtained using the two versions of ChatGPT considered in the study.

For this purpose, we checked whether the link of the recommended ChatGPT digital marketing agencies works, and whether the specified address gives a link to the homepage of this company (see Fig. 2).

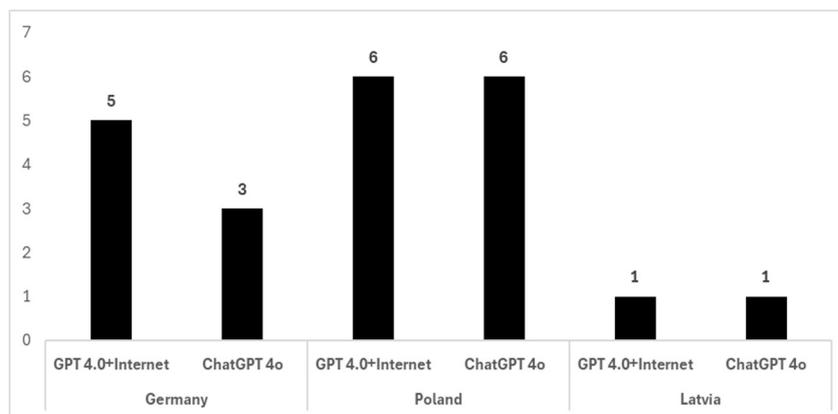


Fig. 2. Results of checking the correctness of the identification of digital marketing agencies received from GPT (Source: Created by the authors)

Our analysis shows that out of thirty ChatGPT 4 submissions, connected to the Internet via three country links, only in 12 cases (40%) information corresponding to reality was received. Namely, the link was opened, it was the link of the company mentioned in the recommendation, and the company provided services to find potential buyers. In ChatGPT 4o the accuracy of the information provided was lower - only in ten cases out of thirty (33.3%) the link opened, it corresponded to the name of the digital marketing agency recommended by ChatGPT 4o, and the agency provided digital services to find potential buyers. However, the difference in the reliability of responses between the two ChatGPT versions under such quantitative indicators cannot be considered significant and needs to be tested on a larger number of countries and a larger number of potential partners requested.

The share of correct ChatGPT answers was almost two times lower compared to the answers about the names of recommended digital marketing agencies discussed in the previous subsection of our survey. This can probably be explained by the fact that the information found on a company's homepage is more

detailed information that requires more in-depth analysis, logic and verification by ChatGPT. For example, in cases where a company's website does not match the company name, is not working or does not contain any information.

As in the previous subsection of our study, the earlier version of ChatGPT, namely ChatGPT 4 connected to the Internet, gave a slightly higher result than the latest version, ChatGPT 4o.

As in the previous subsection of our study, ChatGPT presented the least reliable results for Latvia (only 10%). However, the results obtained for Poland (40%) were more reliable than for Germany (26.7%), in contrast to the data we obtained in the previous subsection, in which the data for Germany were more reliable.

In both subsections of the study, the lowest level of reliability obtained from ChatGPT was for digital marketing agencies in Latvia. Given this fact, we can conclude that there is a significant difference in the level of reliability of ChatGPT responses to symmetric questions in the context of different countries.

As we mentioned in the previous section, perhaps the significantly lower level of accuracy of ChatGPT responses for digital marketing agencies in Latvia (and possibly other small countries) is due to the lack of depth of ChatGPT information related to small countries, including the level of domain and/or industry expertise.

We found that when applying ChatGPT 4 connected to the Internet, as well as the latest version of ChatGPT - ChatGPT 4o when using these generative artificial intelligence products for preliminary partner search in the B2B segment, a rather high number of errors and inaccuracies occur. Based on this, it can be concluded that the current use of the ChatGPT products considered in the study is not effective enough for the preliminary identification of partners or counterparties in the B2B segment.

There are several reasons why using ChatGPT may not give companies the expected results.

- Human intuition and judgment: ChatGPT is an extensive language model with the capabilities of a fully-fledged conversational AI chatbot. In response to a broad variety of cues and inquiries, the system can converse and create human-like prose since it has been trained on a large corpus of material. However, it lacks the intuitive and judgmental capabilities of a human being, which are essential when selecting business partners.
- Specialized expertise: ChatGPT is not taught any industry-specific vocabulary or jargon. This implies it could not grasp the specifics of various sectors or the requirements of various enterprises.
- Lack of Contextual Understanding: The business backdrop, industry dynamics, and unique needs of each company are not fully understood by ChatGPT. The results it produces may be excessively broad or ill-suited to the demands of the business.
- Reduced Capacity for Data Collection: There is currently no way to undertake an in-depth investigation or collect detailed information about prospective business partners using ChatGPT.
- Lack of Personalized Recommendations: Choosing the right business partners requires a deep understanding of the organization, its objectives, and the market in which it operates. It is possible that ChatGPT will provide broad suggestions that do not address the unique requirements of your business.
- Extremely Fluid and Changing Markets: Keeping up with the trends and dynamics of the market is essential for success in the business world, and finding reliable partners is no easy task. It is possible that ChatGPT's information is not current or precise enough to be useful.
- Inadequate social networking skills: Networking inside an industry is an excellent way to meet potential business partners. ChatGPT does not allow you to network with actual people or businesses.
- While ChatGPT is useful for many purposes, choosing business partners calls on skills such as human judgment, familiarity with a certain field and ability to conduct extensive study.

Conclusions

Our study has both practical and scientific significance. Our practical contribution is that we have determined the level of accuracy of answers to ChatGPT questions, which will allow employees of companies and other organizations to more consciously choose tools to more effectively preliminary search for partners and contractors and similar ones.

We also found an interesting phenomenon that ChatGPT's accuracy in preliminary searches and company identification is higher when searching in countries with larger economies and higher populations. However, due to the small number of countries and their belonging to one region, this finding is tentative and needs to be tested on a larger number of countries from different regions and continents.

In addition, we found that at this stage of development of these language models, the efficiency of using ChatGPT 4.0 connected to the Internet and ChatGPT4o for solving the problems considered in our study is practically the same. This allows companies to use either of the two considered versions of ChatGPT at their own discretion. It also indicates that the progress in the performance of subsequent versions of ChatGPT for solving some problems is not obvious.

Our study is probably the first scientific publication on the evaluation of the effectiveness of using generative AI products for preliminary search and identification of potential business partners and contractors.

Our article contributes to the scientific literature on the application of generative AI in general and for marketing purposes as follows.

First, the level of effectiveness of the ChatGPT application for preliminary search and identification of potential business partners and counterparties that we have determined can be a starting point for future research on measuring the progress of language models and comparing their effectiveness with other tools and for solving similar business problems. Secondly, the methodology we proposed for assessing the effectiveness of using language models can be used in future similar studies. Thirdly, our assumption that the level of accuracy of ChatGPT responses may depend on the size of the economy and/or population is also a scientific novelty and a hypothesis for the following research.

Our study contributes to the following theories.

First, the research contributes to theories related to the technology adoption lifecycle. The study focuses on ChatGPT's place in the lifecycle concerning business search functions and that GenAI products like ChatGPT are not yet fully mature at this stage of their development for solving business tasks like preliminary search and identification of business partners, especially in smaller or niche markets like Latvia.

Second, we contribute to Information Retrieval Theory, which focuses on how systems collect, process, and provide relevant information. The study evaluates the effectiveness of ChatGPT in extracting accurate data from companies and websites in different countries. The results of our study contribute to the understanding of the current limitations of ChatGPT as a tool for information extraction in niche business cases. The study found significant error rates (in some cases over 30%), adding empirical evidence to the broader discussion of AI accuracy and its practical limitations at this stage of ChatGPT's development.

Our research also touches upon some aspects of decision theory when using generative AI products such as ChatGPT. This is expressed in the fact that we test and demonstrate the need to evaluate the effectiveness of generative AI products planned for searching and identifying potential partners and contractors when making decisions about choosing products to solve this problem.

The level of accuracy of ChatGPT answers we have determined is also a starting point that will allow subsequent research studies to measure the progress of language models and other tools for solving such and similar business problems, as well as to apply our proposed evaluation methodology in similar future studies.

One of the main mistakes of some company employees when applying ChatGPT for solving business tasks may be the misconception that at this stage of its development, ChatGPT is a universal tool for effectively solving almost all or many information-analytical tasks. Therefore, to reduce or mitigate possible errors and risks when making decisions about using ChatGPT by companies for preliminary search and identification of potential business partners or counterparties, we have formulated several recommendations.

First, when making decisions about using ChatGPT (or other generative AI products), it is necessary to familiarize oneself with information about which tasks ChatGPT is effective and for which tasks ChatGPT is not yet effective enough. One way to obtain such information could be to ask ChatGPT about the effectiveness of ChatGPT for a specific task, which the user can ask ChatGPT himself before deciding to use ChatGPT for specific company tasks.

Second, to verify the quality of the answers received from ChatGPT, quick sample tests can be conducted based on information that the company asking the questions is confident in or that the ChatGPT information can be quickly verified to be accurate.

Thirdly, errors in ChatGPT answers may be the result of insufficient qualifications and skills of workers in using generative AI products. To obtain a more accurate answer, the user should formulate the question in as much detail as possible and describe all the parameters of the requested information, as the accuracy of the question asked influences the quality of the answer that will be received from ChatGPT.

Fourth, it is necessary to verify the answers received from ChatGPT (and other language models). The depth and frequency of verification of the responses received may depend on the level of potential risks and other negative consequences that may arise from the use of erroneous information.

Fifth, companies and entrepreneurs need to closely follow the progress of generative AI products to take advantage of new opportunities.

In addition, it should be recognized that it is already possible to extend the functionality of ChatGPT and other generative AI products, including search, due to the use of plug-ins. In addition, it can be expected that ChatGPT will soon make significant progress, including in search, also because of the ten-billion-dollar investment from Microsoft (Bloomberg, 2023a), as well as competition from significant potential competitors such as Google (Bloomberg, 2023b) and other little-known or yet unknown start-ups.

In the following research, it would be advisable to consider the level of ChatGPT's progress in the area of preliminary search of potential clients and counterparties of companies, including using plug-ins. And, to compare the efficiency of ChatGPT search with other information retrieval tools. In addition, it would be worthwhile to test our findings on a wider range of countries of different populations and economic sizes from different regions and continents.

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Conflicts of Interest

The authors declare no conflict of interest.

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Appendix 1. Checking the results obtained from GPT 4.0 + Internet

Country: Germany

Question: Write 10 digital marketing agencies from Germany. Our goal is to attract customers to our website. Add links to their websites for these agencies.

| Digital marketing agencies | Digital marketing agency name check | Company link found by Google search for GPT 4.0+Internet suggested company name |
|---|-------------------------------------|---|
| 1. SaphirSolution - Based in Cologne, this agency focuses on PPC, SEO, content marketing, and more, tailoring strategies to optimize customer journeys and increase business profitability. Visit SaphirSolution | Digital marketing agency | The link works |
| 2. Jeau Digital - A small agency from Cremlingen that specializes in SEO and content marketing, aiming to provide timely and professional services. Visit Jeau Digital | Digital marketing agency | The link does not work |
| 3. Elespacio - Located in Berlin, Elespacio offers advertising, digital strategy, and social media marketing, noted for their creative and exceptional performance. Visit Elespacio | Digital marketing agency | The link works |
| 4. EPOS Marketing - This Düsseldorf-based agency offers branding, marketing strategy, and public relations, focusing on B2B companies. Visit EPOS Marketing | Digital marketing agency | The link does not work |
| 5. Mediacharge - A Munich agency specializing in PPC, digital strategy, and content marketing, known for their comprehensive approach to digital marketing. Visit Mediacharge | Digital marketing agency | The link works |
| 6. ONEDOT GmbH - Located in Michelstadt, ONEDOT offers marketing automation and comprehensive digital marketing strategies tailored to B2B services. Visit ONEDOT GmbH | Digital marketing agency | The link shows another company |
| 7. KAIPS MARKETING® - A versatile agency based in Germany, offering services across advertising, marketing advice, and more, with a focus on manufacturing and B2B services. Visit KAIPS MARKETING® | Digital marketing agency | The link does not work |
| 8. BlogTec - Specializing in SEO and content marketing, BlogTec is situated in Twistringen and works to enhance online visibility and drive business growth through effective content strategies. Visit BlogTec | Digital marketing agency | The link works |
| 9. Cheetah Conversions - A Berlin-based firm offering content marketing, conversion optimization, and PPC solutions, particularly adept at serving small businesses. Visit Cheetah Conversions | Digital marketing agency | The link works |
| 10. 3W FUTURE - Based in Leipzig, they provide a blend of corporate photography, e-commerce development, SEO, and social media marketing. Visit 3W FUTURE | Digital marketing agency | The link does not work |

Appendix 2. Checking the results obtained from GPT 4o

Country: Germany

Question: Write 10 digital marketing agencies from Germany. Our goal is to attract customers to our website. Add links to their websites for these agencies.

| Digital marketing agencies | Digital marketing agency name check | Company link found by Google search for GPT 4o suggested company name |
|---|---|---|
| <p>1. SaphirSolution (Niederkassel, Germany) Specializes in PPC, SEO, and conversion optimization, making it suitable for driving traffic and leads to your website. Website</p> | Digital marketing agency | The link works |
| <p>2. Löwenstark (Multiple Locations) A full-service online marketing agency with expertise in e-commerce and B2B marketing, offering services like PPC, SEO, and content marketing. Website</p> | Digital marketing agency | The link works |
| <p>3. Gramercy Global Media (Berlin, Germany) Focuses on SEO, PPC, and web design, catering to the needs of B2B clients in technical fields. Website</p> | Digital marketing agency | The link does not work |
| <p>4. SEOfactory (Berlin, Germany) Specializes in SEO and content marketing, helping businesses increase organic traffic and visibility. Website</p> | This company is not a digital marketing agency | The link does not work |
| <p>5. EPOS Marketing (Düsseldorf, Germany) Known for strategic brand marketing and digital campaigns, this agency is ideal for B2B companies looking to enhance their online presence. Website</p> | Digital marketing agency | The link does not work |
| <p>6. Elespacio (Berlin, Germany) An integrated marketing agency with a focus on digital strategy, social media, and advertising, providing a comprehensive approach to digital marketing. Website</p> | Digital marketing agency https://www.topinteractiveagencies.com/digital/agency/profile/europe/germany-deutschland/elespacio/ | The link does not work |
| <p>7. Die Webmeister (Essen, Germany) Offers SEO and PPC services, tailored to B2B clients aiming to optimize their digital advertising efforts. Website</p> | Digital marketing agency | The link does not work |
| <p>8. Jeau Digital (Cremlingen, Germany) Focuses on SEO and content marketing, delivering sustainable growth through targeted online strategies. Website</p> | Digital marketing agency | The link does not work |
| <p>9. Admiral Media (Berlin, Germany) Specializes in performance marketing and is recognized for driving results in competitive digital environments. Website</p> | Digital marketing agency. But not from Germany | The link works, but digital marketing agency is not from Germany |
| <p>10. HIGHER-UP Digital (Munich, Germany) Focuses on content marketing and SEO, helping B2B service providers attract more clients through tailored digital strategies. Website</p> | Digital marketing agency | The link works |

Appendix 3. Checking the results obtained from GPT 4.0 + Internet

Country: Poland

Question: Write 10 digital marketing agencies from Poland. Our goal is to attract customers to our website. Add links to their websites for these agencies.

| Digital marketing agencies | Digital marketing agency name check | Company link found by Google search for GPT 4.0+Internet suggested company name |
|--|---|---|
| 1. MTA Digital - Specializes in e-commerce performance, PPC, SEO, and social media marketing with a transparent and data-driven approach. Visit Website | Digital marketing agency | The link works |
| 2. Webmetric - A conversion optimization company that focuses on user experience and performance marketing. Visit Website | Digital marketing agency | The link works |
| 3. zjednoczenie - Offers digital strategy, social media marketing, and web design, serving mid-market to enterprise-level companies. Visit Website | Digital marketing agency | The link works |
| 4. ICEA Group - Provides comprehensive digital strategies, including SEO and content marketing. Visit Website | Digital marketing agency | The link works |
| 5. Cyboticx - Specializes in web development, custom software development, and AI to enhance digital marketing strategies. Visit Website | Digital marketing agency, but not from Poland | The link works/ Digital marketing agency, but not from Poland |
| 6. Human Agency - A relatively new agency that provides digital strategy, advertising, and market research services. Visit Website | Digital marketing agency | The link works |
| 7. Black Rabbit - Focuses on creating engaging and relevant B2B tech content, including video production. Visit Website | Video marketing agency (not a digital marketing agency) | The link works but this company is not a digital marketing agency |
| 8. PROGMATIQ - Known for building websites that stand the test of time and help agencies build their brand online. Visit Website | This company is not a digital marketing agency | The link works but this company is not a digital marketing agency |
| 9. Redvike - A development agency that also provides digital marketing services focusing on mobile and web development. Visit Website | This company is not a digital marketing agency | The link works but this company is not a digital marketing agency |
| 10. SEMPIRE - Specializes in SEO, content marketing, Google Ads, and social media, with a strong focus on maximizing website potential. Visit Website | Digital marketing agency | The link works |

Appendix 4. Checking the results obtained from GPT 4o

Country: Poland

Question: Write 10 digital marketing agencies from Poland. Our goal is to attract customers to our website. Add links to their websites for these agencies.

| Digital marketing agencies | Digital marketing agency name check | Company link found by Google search for GPT 4o suggested company name |
|---|-------------------------------------|---|
| <p>1. Bluerank - Specializes in SEO, PPC, and programmatic advertising. They have extensive experience with technology companies and have worked with global clients.</p> <p>Website: Bluerank</p> | Digital marketing agency | The link works |
| <p>2. Zest - A Warsaw-based agency that focuses on ROI-driven campaigns, particularly in PPC and social media marketing.</p> <p>Website: Zest</p> | Agency not found | The link does not work |
| <p>3. iCEA Group - Based in Poznań, they offer comprehensive digital marketing services, including SEO and e-commerce marketing, tailored for tech industries.</p> <p>Website: iCEA Group</p> | Digital marketing agency | The link works |
| <p>4. Verseo - Known for their expertise in Google Ads and search marketing, Verseo has a strong track record in B2B marketing.</p> <p>Website: Verseo</p> | Digital marketing agency | The link works |
| <p>5. Elephate - A Wrocław-based agency that focuses on SEO and content marketing, with a specialization in tech and B2B sectors.</p> <p>Website: Elephate</p> | Digital marketing agency | The link works |
| <p>6. JustIdea Agency - This Kraków agency provides a wide range of digital marketing services, including PPC and conversion optimization, suitable for B2B markets.</p> <p>Website: JustIdea Agency</p> | Digital marketing agency | The link works |
| <p>7. Tango Digital Agency - A boutique agency offering global digital marketing solutions, ideal for scaling digital products.</p> <p>Website: Tango Digital Agency</p> | Digital marketing agency | The link does not work |
| <p>8. MAN Digital - Specializes in account-based marketing for B2B tech companies, helping businesses sell more effectively.</p> <p>Website: MAN Digital</p> | Digital marketing agency | The link does not work |
| <p>9. Sempai - Offers a mix of SEO, SEM, and content marketing services, focusing on achieving high conversion rates for their clients.</p> <p>Website: Sempai</p> | Digital marketing agency | The link works |
| <p>10. Webrockets - A Warsaw-based agency that combines digital marketing with software development, providing tailored solutions for complex digital problems.</p> <p>Website: Webrockets</p> | Digital marketing agency | The link does not work |

Appendix 5. Checking the results obtained from GPT 4.0 + Internet

Country: Latvia

Question: Write 10 digital marketing agencies from Latvia. Our goal is to attract customers to our website. Add links to their websites for these agencies.

| Digital marketing agencies | Digital marketing agency name check | Company link found by Google search for GPT 4.0 + Internet suggested company name |
|--|---|---|
| <p>1. NoBorders: Specializes in digital strategy services.</p> <p><u>Website: NoBorders</u></p> | <p>Digital marketing agency</p> <p><u>https://noborders.digital/</u></p> | The link from GPT does not work |
| <p>2. Robler: Offers a range of digital marketing services with a focus on brand building in the digital realm.</p> <p><u>Website: Robler</u></p> | <p>Digital marketing agency. But not from Latvia</p> <p><u>https://robleragency.com/</u></p> | The link from GPT does not work |
| <p>3. Itero: Active in digital strategy and could assist with online marketing strategies.</p> <p><u>Website: Itero</u></p> | This company is not a digital marketing agency | The link works, but it's not a link to the digital marketing agency |
| <p>4. Juice Digital Agency: Specializes in digital strategy and innovative digital solutions.</p> <p><u>Website: Juice Digital Agency</u></p> | <p>Digital marketing agency</p> <p><u>https://juicedigage.com/</u></p> | The link from GPT does not work |
| <p>5. PHD Latvia: Experienced in digital strategy, providing strategic insights for digital marketing.</p> <p><u>Website: PHD Latvia</u></p> | This company is not a digital marketing agency | The link from GPT does not work |
| <p>6. Infinitum Agency: Known for digital advertising, SEO, and creative strategy.</p> <p><u>Website: Infinitum Agency</u></p> | <p>Digital marketing agency</p> <p><u>https://infinitum.agency/kontakti/</u></p> | The link from GPT does not work |
| <p>7. TrafficDog: Specializes in boosting eCommerce success and web traffic conversion.</p> <p><u>Website: TrafficDog</u></p> | <p>Digital marketing agency</p> <p><u>https://trafficdog.com/contact-us</u></p> | The link from GPT does not work |
| <p>8. Mediapark: Offers comprehensive services from project planning to UI/UX and development.</p> <p><u>Website: Mediapark</u></p> | This company is not a digital marketing agency | The link works, but this is not a company from Latvia, but from Lithuania, and not a marketing agency |
| <p>9. Bettrweb: A full-service web development agency focusing on business websites.</p> <p><u>Website: Bettrweb</u></p> | This company is not a digital marketing agency | The link does not work |
| <p>10. RealWeb Marketing Agency: Provides international digital marketing and SEO services.</p> <p><u>Website: RealWeb Marketing Agency</u></p> | <p>Digital marketing agency</p> <p><u>https://realweb.lv/</u></p> | The link works |

Appendix 6. Checking the results obtained from GPT 4o

Country: Latvia

Question: Write 10 digital marketing agencies from Latvia Our goal is to attract customers to our website. Add links to their websites for these agencies.

| Digital marketing agencies | Digital marketing agency name check | Company link found by Google search for ChatGPT 4o suggested company name |
|--|--|---|
| <p>1. Infinitum 8</p> <p>Specializes in SEO, PPC, and content marketing with experience in the tech sector. Infinitum 8 Website</p> | An agency with a similar name, Infinitum Agency was found. Digital marketing agency Infinitum 8 was not found. | The link works, but it's not a link to the digital marketing agency |
| <p>2. WBPRO</p> <p>Offers comprehensive digital marketing services including SEO, social media marketing, and email campaigns. WBPRO Website</p> | This company is not a digital marketing agency | The link from GPT 4o does not work |
| <p>3. Cloudy Digital</p> <p>Focuses on SEO, PPC, and social media marketing for tech wholesalers. Cloudy Digital Website</p> | Digital marketing agency. But not from Latvia | The link from GPT 4o does not work |
| <p>4. Digital Marketing Group</p> <p>Provides services including SEO, PPC, content marketing, and digital strategy with a focus on tech industry clients. Digital Marketing Group Website</p> | Digital marketing agency. https://www.marketing.lv/ | The link from GPT 4o does not work |
| <p>5. Market Me Good</p> <p>Specializes in SEO, PPC, and content marketing for tech and B2B clients. Market Me Good Website</p> | Digital marketing agency. https://marketmegood.com/ | The link works |
| <p>6. Digital Marketing Agency (DMA)</p> <p>Focuses on performance marketing including SEO, PPC, and social media advertising. Digital Marketing Agency Website</p> | Digital marketing agency. But not from Latvia https://www.digitalmarketingagency.com/ | The link works, but the page is empty |
| <p>7. FCR Media Latvia</p> <p>Offers digital marketing services such as SEO, PPC, and social media management. FCR Media Latvia Website</p> | This company is not a digital marketing agency | The link works, but a digital marketing agency has a different name |
| <p>8. SEO Guru</p> <p>Specializes in search engine optimization and digital advertising for tech companies. SEO Guru Website</p> | Digital marketing agency. But not from Latvia https://www.seoguru.online/ | The link from GPT 4o does not work |
| <p>9. Net-Sprint Latvia</p> <p>Provides digital marketing services including SEO, PPC, and content marketing for tech wholesalers. Net-Sprint Latvia Website</p> | Agency not found | The link from GPT 4o does not work |
| <p>10. DEFA Latvia</p> <p>Focuses on SEO, PPC, and social media marketing with experience in the tech sector. DEFA Latvia Website</p> | This company is not a digital marketing agency | The link from GPT 4o does not work |

EXPLORING RELATIONS BETWEEN METHODS OF ASSURING QUALITY, CERTIFIED MANAGEMENT SYSTEMS, ADOPTION OF TECHNOLOGIES AND COMPANY PERFORMANCE

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Abstract

Research purpose. Integrating advanced technological solutions into production management and control systems heralds a new era of enhanced efficiency and defect mitigation in manufacturing processes. A significant reduction in human errors marks this advancement and encompasses the adoption of technological and environmental innovations. These elements, in synergy with quality assurance methods and certified management systems, are the foundations for the factory of the future. However, the pace of adoption of these digital technologies varies across different companies and industrial sectors and is influenced by distinct factors. This research aims to investigate the relations between methods of assuring quality in production, certified management systems, adoption of digital technologies for production management and control, and the performance of manufacturing companies in terms of product quality and customer satisfaction.

Design / Methodology / Approach. In this study, the authors employed a multivariable analysis approach, utilizing data from the Latvian and Finnish subsets of the European Manufacturing Survey 2022 (EMS, 2022) data collection.

Findings. Manufacturers utilizing traditional quality and production management approaches tend to adopt new technologies. However, using digital technologies to manage and control manufacturing processes alone does not ensure better product quality and increased customer satisfaction.

Originality / Value / Practical implications. The study enhances understanding of the nexus between established production management practices and the integration of digital technologies. Insights into this interplay enable manufacturing companies to streamline their digital transformation, optimizing operations for the benefit of the company, its customers, and the environment.

Keywords: Certified Management Systems; Digital Technology; Manufacturing; Production; Quality assurance.

JEL codes: L6, O11, P18.

Introduction

In the current time of uncertainty, high competition, and technological advancement, manufacturing companies must innovate in their operations and customization to maintain and grow their competitiveness (Kopp et al., 2020). As technology evolves, companies must continually improve and update their products and operations to stay ahead of their competitors. This constant innovation is critical because the existing product or methods may quickly become obsolete in the rapidly changing operational environment. By introducing new technologies and improving their processes, companies can offer better products, increase efficiency, and respond more effectively to market demands, thereby ensuring their competitiveness in their industry (Tasleem et al., 2015). Technological progress also

disrupts widely used management practices (Fadilasari et al., 2024; Skuza, 2019). Although the adoption and implementation of digital technologies, often referred to as Industry 4.0 technologies, have become increasingly popular and considered to be beneficial, the practical adoption and execution encounter many difficulties (Ali & Johl, 2022). Embracing standards-based management systems can lead to cost reductions, process optimization, increased sales and market share, improved reputation, better environmental and economic performance (Eng Ann et al., 2006), increased productivity and profitability (Mohanraj & Kumar, 2019), and higher product quality by reduction of errors and defects (Ramdass & Masithulela, 2018), alongside fostering a culture of continuous improvement (Sanchez-Lizarraga et al., 2020). Standards facilitate alignment with industry-specific requirements and state-of-the-art solutions and can be used to improve systems, processes, services, and products (Pilena et al., 2021).

The integration of Industry 4.0 technologies into existing manufacturing management systems remains an unexplored area (Buer et al., 2018; Kolberg & Zuhlke, 2015; Tortorella et al., 2019). While numerous studies have previously examined how quality and environmental management contribute to the competitiveness and sustainability of manufacturing companies (Haddaden & Safwan Altarazi, 2023; Liu et al., 2022; Potkany et al., 2022; Zhao et al., 2022) and how the adoption and integration of digital technologies impact quality management practices (Fadilasari et al., 2024; Robertsone & Lapina, 2022; Tortorella et al., 2019) the influence of quality management methods and standards-based management systems on the adoption of digital technologies remains underexplored. The research of Tortorella et al. (2019) examines how the adoption of Industry 4.0 technologies moderates the connection between Lean production and improvements in operational performance. Fadilasari et al. (2024) look into the challenges of quality management principles application in Industry 4.0.

The research of Ali and Johl (2022) analyses the effect of Total Quality Management (TQM) digitalization on Industry 4.0 readiness, having a company size as a moderator. Tasleem et al. (2015) investigate the relationship between TQM and technology management practices. However, according to the authors' best knowledge, there is no research on the impact of quality management and assurance practices on technology adoption.

The current research investigates how and to what extent standards-based management systems like ISO 9001 or similar, methods of assuring quality in production (TQM, procedures, continuous improvement of production processes) impact the implementation of digital technologies and whether these technologies have a positive impact on the performance of manufacturing companies in terms of quality and customer satisfaction. To be able to achieve these objectives, a survey was conducted to collect data, followed by a statistical analysis demonstrating the current situation in manufacturing companies in Finland and Latvia.

Literature Review

Quality Management and the Adoption of Technologies for Production Management and Control

Quality and production management are critical to a manufacturing company's longevity and directly affect its operational performance. The ability to satisfy and even surpass customer expectations by continuously improving is crucial for the survival of companies (Salikon & Saadon, 2023). Quality management (QM) focuses on enhancing product and service quality to achieve customer satisfaction (Sanchez-Lizarraga et al., 2020). Thus, QM is an integral part of overall company management, offering a variety of methods and tools for production control, problem-solving, and improvement (Skuza, 2019), leading to higher product quality and competitive advantage. Quality management can also enhance innovation by effectively transforming new ideas into marketable products and facilitating the adoption of advanced technologies (Udofia et al., 2021). Some methods and approaches, like the implementation of standards-based management systems, Six Sigma, and Lean, are often more widely used than other methodologies (Potkany et al., 2022).

The previous studies indicate that adopting quality management practices allows manufacturing companies to analyse quality-related data better, leading to increased customer satisfaction and improved management of suppliers, product design, and processes, thereby enhancing the quality of the

products and services offered (Alshourah, 2021; Bon & Mustafa, 2013; Lakhali et al., 2006; Liu et al., 2022). Process management and product design directly impact manufacturing companies' performance (Liu et al., 2022). Previous studies have also confirmed that QM facilitates environmental innovations - product and process improvements aiming to optimize resource consumption and use, thus contributing to achieving sustainability goals and generally having a significant positive effect on corporate sustainable development (Zhao et al., 2022).

Total Quality Management (TQM) is a concept of continuous improvement with the involvement of all functions of the organization widely used in manufacturing for production management and increase of the competitiveness related to product quality, customer satisfaction, productivity, and profitability (Potkany et al., 2022). Globally, organizations adopt TQM principles to achieve excellence in their operations. Combined with technology adoption, TQM contributes to achieving sustainability and better organizational performance (Tasleem et al., 2015).

ISO 9001 is an international certifiable standard that sets the requirements and criteria for quality management systems (QMS) (ISO, 2015a). Its primary focus is attaining and exceeding customer expectations and requirements (Sanchez-Lizarraga et al., 2020). Many previous studies have confirmed that ISO 9001 implementation has a significant positive impact on companies' operational and business performance, mainly in terms of product quality, customer satisfaction, productivity, and market share (Al-Refaie et al., 2012; Bakhtiar et al., 2023; Nurcahyo et al., 2021).

Manufacturing companies use the application of standards to apply a standardized approach in the development and implementation of management systems, addressing customer requirements and gaining competitive advantage (Potkany et al., 2022) for the improvement of environmental and social performance and better use of company resources (Eng Ann et al., 2006). Compliance with legislation, organizational strategy, and the need to improve internal processes are the factors that may affect the decision to implement standards-based management systems (Suzanska & Robertsons, 2023). In many cases, the certification is also requested by existing and prospective customers (Ramdass & Masithulela, 2018) and can be crucial for the business. However, some research indicates that the primary barrier to adopting standards-based management systems is often the lack of clear customer demand for such certifications (Sanchez-Lizarraga et al., 2020).

Successful implementation of standards-based quality management systems allows companies to adopt the TQM philosophy (Mohanraj & Kumar, 2019). Standards-based QMS put the requirements for established consistent processes, document procedures, continuous performance monitoring and improvement, customer orientation, and employee involvement (Hoyle, 2009). This systematic approach aligns with TQM principles, such as continual improvement, customer-focused organization, total employee involvement, and a process-centred, strategic, and systematic approach (ASQ, 2024; Zairi, 1991). By implementing standards-based quality management systems, companies create a foundation on which TQM principles can be built.

The studies also confirm that manufacturing companies become more internationally competitive when introducing standards-based quality management systems (Ramdass & Masithulela, 2018). However, traditional management practices are insufficient to compete and sustain in the contemporary business environment as operations become more complicated (Javaid et al., 2022). The survival and sustainability of manufacturing companies in the highly competitive environment are related to their ability to coordinate their efforts across various functions and to adopt and integrate advanced technologies in manufacturing. These technologies ensure flexibility and enhance quality in production (Dangayach & Deshmukh, 2006). Traditional methods of production control often lack the flexibility to adapt quickly to the changes in the market, demand uncertainty, and product variety (Weckenborg et al., 2023).

Among the factors affecting the implementation and integration of digital technologies in manufacturing companies, the previous research highlights data usage and legal aspects, such as legislation and IT standards, IT infrastructure, workforce commitment, collaboration, and teamwork (Zhao et al., 2022). The role of external support from the government, research institutions, and consultants is also underlined. The literature also mentions the factors that may negatively affect technology

implementation – workers' acceptance of technology, fear of job loss, and occupational health and safety issues (Kopp et al., 2020).

It is also assumed that the motivation and success of digital technology implementation depend on the experience and the efficiency of current methods and systems used in manufacturing. The study within American manufacturing companies implementing ERP systems demonstrated that those companies that want to improve external market and supply chain performance must first achieve foundational improvements in internal operational performance to enhance customer satisfaction and supply chain benefits. (Stratman, 2009). A study by Jung et al. (2023) demonstrated that the expectations of adopting smart factories depend on the performance of current production systems. If the current production methods, systems, and tools are well established and effective, they improve the overall performance of manufacturing companies; therefore, digital technology implementation is expected to enhance the performance further, thus creating motivation for smart technology adoption.

Nonetheless, despite numerous benefits, many companies still struggle with the integration of digital technologies (Tortorella et al., 2019). Therefore, companies look for solutions how to implement the technologies in a more efficient and effective way. Quality management within organizational contexts is critically important for enhancing operational efficiency, customer satisfaction, competitive advantage, and aligning business objectives with customer needs (Fadilasari et al., 2024). Thus, traditional methods for quality assurance and management, including standards-based management systems, may serve as the solid foundation for the adoption and integration of digital technologies in manufacturing.

Technology Adoption and Company Performance

Research and practical applications are increasingly focusing on the automation and digitalization of manufacturing processes, as the manufacturing industry is an important production sector of the national economy of many countries (Guo & Su, 2023). Industry 4.0, with its technologies, is a technological revolution based on the advancement of technology to increase the efficiency of business, engineering, and production processes, improve quality, and ensure sustainability (Ali & Johl, 2022). Industry 4.0 technologies corresponding to success factors offer a variety of economic advantages (Bhatia & Kumar, 2022).

Manufacturing companies are forced to become more flexible, resilient, and cost-efficient to respond faster to increasing customer demands and changes in the external environment, offering a better product and service quality at lower prices and minimizing resource utilization. Industry 4.0 technologies assist companies in conquering such challenges by the increase in productivity, efficiency, and flexibility of manufacturing processes, reduction of equipment downtime, better visibility and control of processes, collaboration, improved product quality and customization, faster response to customer demands, shorter product launch and delivery times, flexibility increase regarding production volumes, optimization of resource consumption leading to reduction of costs and enhanced information exchange (Bhatia & Kumar, 2022). Industry 4.0 presents manufacturing companies with answers to the challenges of how to enhance their current operations and practices (Rahardjo et al., 2023).

Rapid technological advances have the potential to transform production management and control within the manufacturing sector, leading to the creation of smart factories (Rahmani et al., 2022; Sony & Naik, 2020). The concept of the "factory of the future," powered by digitalization and automation, is considered crucial for gaining a competitive edge in the global market (Anumbe et al., 2022). Adopting Industry 4.0 technologies is necessary to ensure flexibility and customization, leading to improved organizational performance (Javaid et al., 2022).

The implementation of advanced technologies facilitates better integration of customers and suppliers in supply chains, which leads to significant improvements in operational performance through increased profits, sales growth, and increased customer satisfaction and loyalty (Soesetyo et al., 2024). The research of Saad et al. (2023) also indicates that technology adoption positively impacts customer satisfaction. Adopting RFID technology can enhance organizational agility, leading to improved overall performance (Zelbst et al., 2011). ERP system implementation can improve operational performance (Stratman, 2009). Digital technologies may facilitate cost reduction, improve product quality, and enrich

customer experience (Wan et al., 2023). Based on the results of the literature overview, the following hypotheses have been forwarded:

H1: Companies that have certified QMS and methods of assuring quality in production in place also adopt technologies for production control.

H2: The implementation of production control technologies has a positive impact on product quality.

H3: The implementation of production control technologies has a positive impact on customer satisfaction.

The conceptual model of the research is shown in Figure 1.

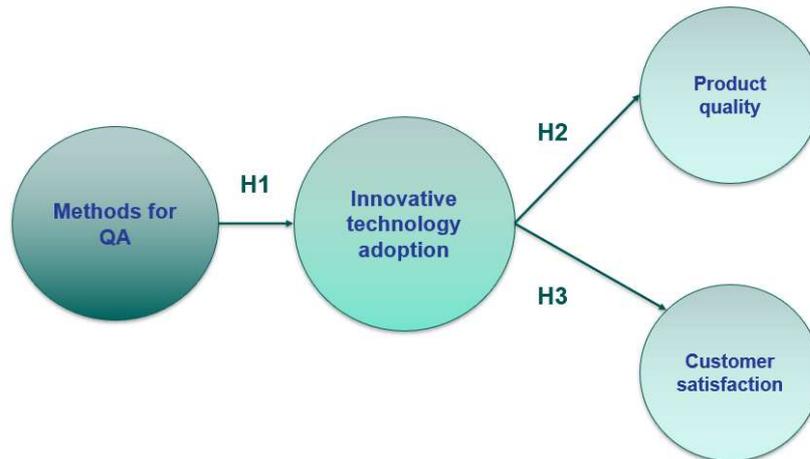


Fig. 1. Conceptual model of the research (Source: Created by the authors)

The authors propose that integrating quality management practices with advanced technologies is essential for manufacturing companies to maintain competitiveness and sustainability in the contemporary business environment. Adopting digital technologies enhances operational efficiency, contributes to improving product quality, and increases customer satisfaction. As manufacturing companies continue to navigate the challenges of globalization and market volatility, the synergistic relationship between quality management systems and technology adoption will be increasingly critical in driving performance and ensuring long-term success.

Research Methodology

For the current study, the multivariable analysis technique was applied based on data corresponding to the Latvian and Finnish sub-samples of the European Manufacturing Survey 2022 (EMS, 2022) edition data collection. European Manufacturing Survey is organized every three years and is managed by a consortium of 19 European universities and research institutes. The Fraunhofer Institute for Systems and Innovation Research (ISI) coordinates the survey.

The survey period is October 2022 – March 2023. The online questionnaire was sent to 2500 manufacturing companies in Finland and 548 manufacturing companies in Latvia. The target group of the respondents consisted of companies' Chief Executive Officers, Plant directors, and Production managers. The response rate in Finland is 5%, with 123 companies participating in the survey; in Latvia, it is 13 %, with 71 manufacturing companies' respondents. In terms of industries (Figure 2), the survey covers metal, machinery and equipment, textile, food, drink, manufacture of computers and electronics, electrical equipment, pharmaceutical, chemical, rubber and plastic, wood products, and furniture production.

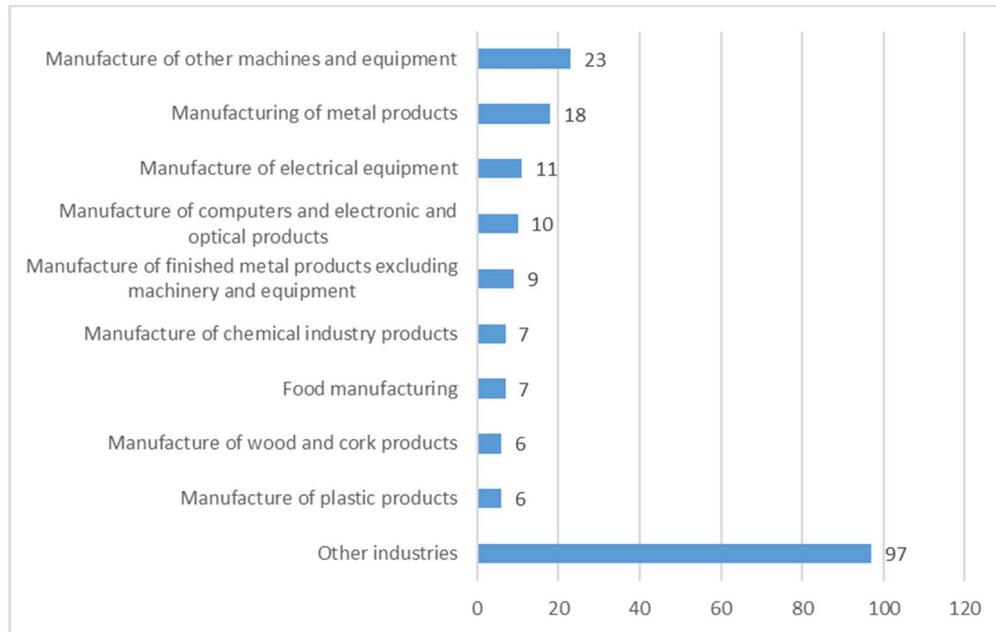


Fig. 2. The distribution of companies by industries (Source: Created by the authors)

Companies' distribution by size by number of people employed, shown in Figure 3, is categorized as Small (up to 49 employees), Medium-sized (50 to 249 employees), and Large (employ 250 or more people) (OECD, 2024).

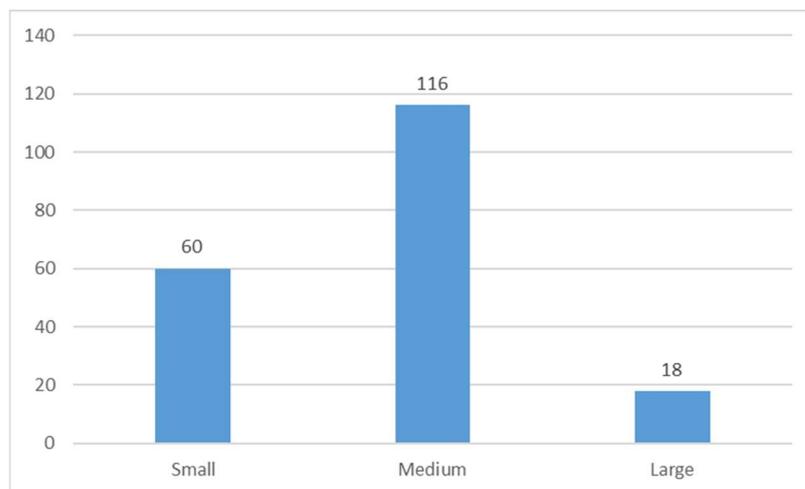


Fig. 3. The distribution of companies by size (Source: Created by the authors)

Company performance was measured by two variables: Product quality and Customer satisfaction. In the survey, the question related to product quality was "What is the percentage of products or semi-finished products that have to be scrapped or reworked due to quality issues?." Customer satisfaction was measured by the number of customer complaints in the percentage of delivered orders ("Client complaints about quality were received for what percentage of delivered orders?").

The independent variable was measured by asking the question, "Which of the following organizational concepts are currently used in your factory?" and the Yes/No option for the "Methods of assuring quality in production (e.g., Total Quality Management procedures, certificates, continuous improvement of production processes)."

Innovative technology adoption was measured by asking the question in the survey: "Which of the following technologies for production control are currently used in your factory?" and the following answer options:

- Mobile/wireless devices for programming and controlling machinery and facilities, e.g., tablets;
- Digital solutions to provide drawings, work schedules, or work instructions directly on the shop floor;
- Software for production planning and scheduling, e.g., ERP or APS system;
- Techniques for automation and management of internal logistics, e.g., Warehouse management systems, RFID;
- Digital exchange of product/process data with suppliers and customers (Electronic Data Interchange (EDI));
- Product-Lifecycle-Management-Systems (PLM) or Product/Process Data Management;
- Near real-time production control system, e.g., Systems of centralized operating and machine data acquisition;
- Industrial robots for manufacturing processes, e.g., welding, painting, and cutting;
- Industrial robots for handling processes, e.g., depositing, inserting, sorting, and packing processes.

These variables are dichotomous, with a value of 1 if the technology is present and a value of 0 if otherwise.

The data was compiled using Microsoft Excel. The data was standardized for comparison purposes, and Pearson's correlation coefficient was used to determine the relationships between different variables. Correlation analysis was performed using the programming language Python and functions provided in the "pandas", "statsmodels", and "scipy.stats" libraries. The "matplotlib.pyplot" library was used to visualize the results. The software solution was written as code in the Python programming language by the authors.

Research Results

The correlation data shows that the essence of Methods of assuring quality in production, e.g., TQM, procedures, certification, and continuous improvement of production processes, has a moderate positive statistically significant association with the adoption of the following technologies as shown in Figure 3: Software for production planning and scheduling, e.g., ERP or APS system, Product-Lifecycle-Management-Systems (PLM) or Product/Process Data Management, Techniques for automation and management of internal logistics, e.g., Warehouse management systems, RFID, and Mobile/wireless devices for programming and controlling machinery and facilities, e.g., tablets,. Digital solutions to provide drawings, work schedules, or work instructions directly on the shop floor), Digital exchange of product/process data with suppliers and customers (Electronic Data Interchange (EDI)), Near real-time production control systems, e.g., Systems of centralized operating and machine data acquisition, have a weak positive correlation with the Methods of assuring quality in production. There is no correlation or insignificant negative correlation with Industrial robots for manufacturing processes, e.g., welding, painting, and cutting, and Industrial robots for handling processes, e.g., depositing, inserting, sorting, and packing processes. However, these results are not statistically significant, indicating the necessity for further and deeper analysis.



Fig. 4. The impact of methods of assuring production quality on adopting production control technologies
(Source: Created by the authors)

The strongest correlation ($r=0.41$, $p=0.0004$) is observed with the Software for production planning and scheduling, e.g., ERP or APS system. This can be explained by the fact that production planning and scheduling are essential to increase manufacturing efficiency. Companies that have implemented methods for quality assurance, certified management systems, and TQM in production would seek ways to increase efficiency and reduce waste and errors by using these technologies.

Comparing Latvia and Finland, it is found that in Latvia, 72% of companies reported having methods of assuring quality in production. In Finland, this figure is slightly higher at 74%.

The impact of technology implementation on product quality is shown in Figure 5. Product quality is measured by the percentage of products or semi-finished products that must be scrapped or reworked due to quality issues. As can be seen, there is a weak negative correlation, which is statistically significant at $p=0.0499$ with Digital exchange of product/process data with suppliers and customers. This means that with the adoption of this technology, the number of products needing to be scrapped or reworked decreases slightly, albeit weakly. The correlation between adopting other technologies and product quality is not statistically significant.

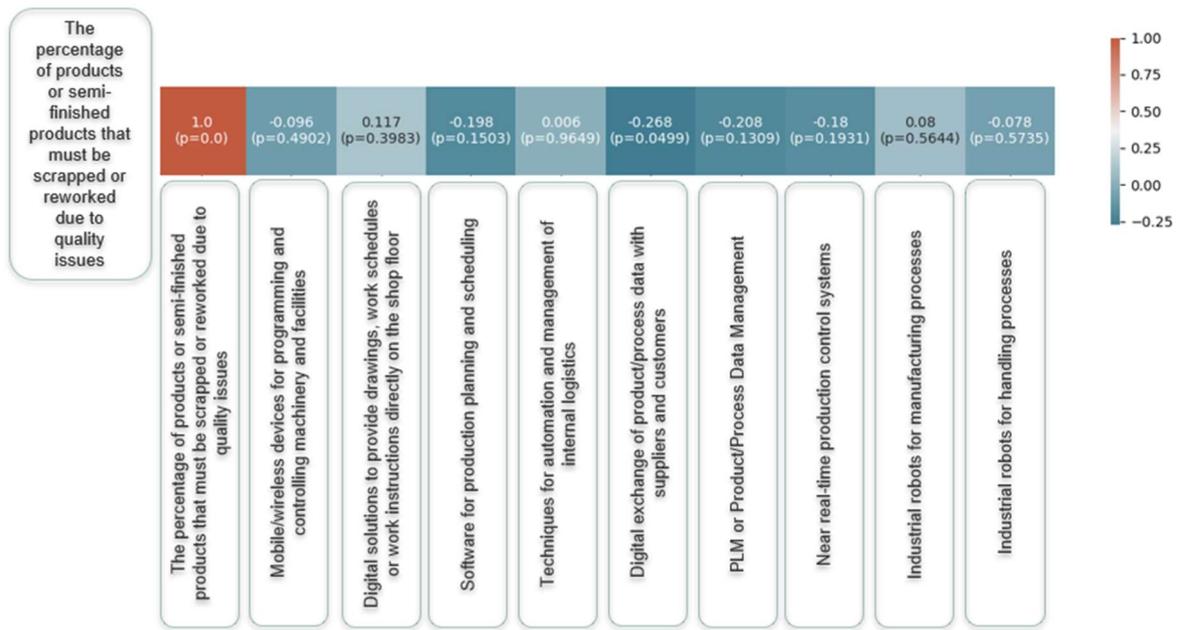


Fig. 5. Technologies impact on product quality (Source: created by the authors)

The similar findings shown in Figure 6 are related to the technology implementation and customer satisfaction measured in terms of customer complaints about quality in the percentage of orders delivered. Without the Digital Exchange of product/process data with suppliers and customer systems, this would become highly disadvantageous since process control is evident in the equivalence level of advanced planning and scheduling systems.



Fig. 6. Technologies' impact on customer satisfaction (Source: Created by the authors)

Digital Exchange of product/process data with suppliers and customers and Software for production planning and scheduling (ERP) show a minor negative correlation with customer complaints, meaning the number of complaints decreases with the implementation of these technologies. However, with $p=0.0592$, only Digital Exchange of product/process data with suppliers and customers can be considered statistically valid. The close integration of software-customer-interface (SCI) into production planning and control can be a powerful technology that can reduce negative customer feedback.

Thus, while H1 was implicitly supported, hypotheses H2 and H3 were only partially confirmed. While current research does not fully address the coincidence delineation interval (or confidence interval), this remains an important area for future investigation.

Discussion and Conclusions

The relationships highlighted by these correlations emphasize the crucial role a robust organizational foundation plays across diverse aspects of a business, ranging from internal operations to external customer satisfaction. Previous studies demonstrated positive direct and indirect impacts of technology implementation on the overall and operational performance of the companies, including product quality improvement and increased customer satisfaction and loyalty (Javaid et al., 2022; Saad et al., 2023; Soesetyo et al., 2024; Stratman, 2009; Wan et al., 2023; Zelbst et al., 2011), current research demonstrates that the technology alone does not have a significant positive impact on product quality improvement, the reduction of failures and customer complaints, as H2 and H3 were only partially confirmed.

Companies that have implemented quality assurance methods such as TQM, continuous improvement, and certified management systems are more likely to adopt ERP systems or similar production planning and scheduling technologies due to the complementary nature of these tools. TQM and similar quality management practices focus on improving processes, reducing waste, and enhancing overall organizational efficiency—objectives that align closely with the goals of ERP systems and the reasons why companies invest in them. With the joint effect of TQM, ERP, and organizational performance, organizations can achieve maximum strong excellence and remain in a competitive market. Companies can achieve maximum excellence through TQM, ERP, and organizational effectiveness and remain competitive in the market (Al-Dhaafri & Alosani, 2021).

ERP systems are designed to integrate various business processes effectively and efficiently across an organization, ensuring real-time data flow and streamlined operations. Companies already committed to quality assurance practices are well-prepared for the organizational change required to implement ERP systems, as both demand high levels of management commitment, employee involvement, and a focus on continuous improvement (Schniederjans & Kim, 2003).

The absence of or slight negative, although not statistically significant, correlation between Methods for quality assurance in production and implementation of industrial robots for manufacturing and handling processes can be explained by the fact that Quality assurance practices are generally aimed at enhancing process quality, reducing defects, and improving customer satisfaction through continuous improvement and adherence to standardized practices (Ramdass & Masithulela, 2018). The adoption of industrial robots is primarily driven by the need for automation to increase production speed and productivity, reduce labour costs, and handle recurring or monotonous tasks more efficiently. Industrial robots are often associated with substantial investments, the need for significant infrastructure modifications, and the complexity of integrating them into existing workflows. The strategic decision to implement robots is often related to the desire to enhance production flexibility, expand the scale of production, or respond to labour shortages (Guo & Su, 2023), which are not the primary purposes of quality assurance methods implementation in production.

The presented research results also underscore the need for a systemic approach, suggesting that improvements in one area often lead to benefits in others. The multisystem relationship between digital technology adoption and traditional quality assurance and management practices (H1) underscores its spotted light on technological integration. Correlations also emphasize the value of a client-centred approach, specifically in digital data exchange with suppliers and customers. These insights spotlight

the multifactorial dynamics of organizational quality in the modern business environment. However, further research is needed to validate these findings, mainly due to the limited geographical scope and sample size.

The pursuit of improved quality management and production control systems is paramount in modern industries, exerting direct influence on the sustainability and profitability of operations. The research findings underscore the importance of well-designed organizational concepts in achieving operational efficiency, product quality, customer satisfaction, and technological innovation. However, these insights should be considered in the context of the specific organizational circumstances and industry dynamics. Furthermore, strategies should be tailored to address the unique challenges and opportunities identified by thoroughly analysing these variables. The positive impact of digitalization on manufacturing will be seen over time, while exploration of long-term competitiveness and sustainable growth in the manufacturing sector is the question of the expansion of quality and environmental management systems in combination with the adoption of digital technologies.

A limitation of the present research is that it relies on a questionnaire survey conducted in the manufacturing companies of just two countries, and the number of respondents is relatively small.

The correlations found in this study suggest that there are complex relationships between different factors within a company that can affect the adoption of digital technologies for production control. Understanding these relationships can help companies make more informed decisions about where to invest resources and what strategies to pursue when adopting new technologies. Further, the study contributes to starting the discussion of traditional management methods and technology adoption, providing valuable insights for companies planning to navigate their digital transformation.

Future research can focus on expanding the dataset and using machine learning models to extend the inquiries into the contracting type of manufacturer to provide a more in-depth understanding of the relationships and their potential causal factors. In addition, a qualitative study could complement the quantitative data, providing insights into the practical challenges and strategies related to production control, quality and environmental management, and advanced digital technologies in the industries of Latvia and Finland.

Finally, implementing a comparative analysis with other countries that have participated in the EMS 2022 survey could provide a richer, more contextual understanding of the factors influencing technology adoption by manufacturing companies and its further impact on performance.

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BALTIC SEA REGION COUNTRIES' PROGRESS IN LEAVE-NO-ONE-BEHIND**Ilvija Pikturnaite¹, Jurgita Pauzuoliene², Foivos Anastasiadis³, Giannis T. Tsoulfas⁴**

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Abstract

Research purpose. The purpose of this study is to analyse the progress of the Baltic Sea Region countries in implementing the LNOB in a short-term trend. The study seeks to identify the stability of progress in a five-year period and examine which LNOB index dimensions and the sustainable development goals pose the greatest challenges in ensuring the inclusion of all members of society.

Design / Methodology / Approach. The qualitative research method, document analysis was applied in the research. The analysis of Europe Sustainable Development Reports (further – SDRs) (2019-2023 period) was completed to identify the Baltic Sea Region countries' progress in achieving the LNOB Index in the short-term trend. This analytical approach allowed a comprehensive examination of the progress recorded in the LNOB index. Through meticulous evaluation, dynamic changes unfolding over the specified five-year timeframe were unveiled, providing valuable insights into inclusive sustainable development in the Baltic Sea Region countries.

Findings. Five-year period data on the Baltic Sea Region's LNBO and SDG indicators show positive progress as the number of above-EU average countries is rising and the gap between the best and worst performers is narrowing. However, the LNOB progress is very uneven as the countries experienced some development and some regression (Finland decreased by 0.8 points, while Lithuania improved by 8 points). The analysis of LNOB dimensions revealed some challenges. In the dimension of poverty and material deprivation, countries have shown a declining trend due to lower trends for SDG2 Zero Hunger and SDG12 Responsible Consumption and Production. In the dimension of income inequality Denmark and Sweden have even worsened their trends due to the stagnating situation SDG8 Decent Work and Economic Growth and SDG10 Reduced inequalities. The dimension of Access To and Quality of Services have decreased due to declining trends in SDG4 Quality education. These findings indicate that even developed countries are vulnerable to global and national challenges.

Originality / Value / Practical implications. The originality of this topic lies in our approach to a detailed assessment of the progress of the countries of the Baltic Sea region using the LNOB index and the forecasted trends in achieving sustainable development goals. Rather than focusing solely on specific targets or indicators, we take a holistic approach by analysing the LNOB Index, providing insights into the region's commitment to sustainable development. We performed a detailed analysis of the LNOB index of the Baltic Sea region countries, based on the four dimensions of the index, and highlighted progress and challenges in the field of sustainable development.

Keywords: sustainable development; Leave No One Behind; Sustainable Development Reports; Baltic Sea Region countries.

JEL codes: Q01, R11.

Introduction

LNOB is the central, transformative promise of the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs) and targets. It represents the unequivocal commitment of all UN Member States to eradicate poverty in all its forms, end discrimination and exclusion, and reduce the inequalities and vulnerabilities that leave people behind and undermine the potential of individuals and humanity as a whole (Chakrabarti & Amarnath, 2023). It prioritizes the most vulnerable and marginalized members of society and is at the heart of the Sustainable Development Goals (SDGs). LNOB is a political commitment that states committed to when they signed on to the SDG Agenda (UNICEF, 2021). Acknowledging the interconnectedness of poverty eradication, economic growth promotion, and addressing diverse social and environmental needs, the SDGs offer an opportunity for all stakeholders, including national governments, international enterprises, and civil society, to contribute to a more sustainable world (Kostoska & Kocarev, 2019). The 2030 Agenda for Sustainable Development, adopted by the UN General Assembly in 2015, builds on the principle of “leaving no one behind”. The 2030 Agenda includes 17 goals that jointly will secure a better and more sustainable future for all (Johnsen et al., 2023). The SDGs stand out as they necessitate global cooperation, involving both developed and developing nations and represent an indivisible set of international priorities (Medina-Hernandez et al., 2023). The goals of the agenda draw attention to the most important environmental, social, and economic issues facing the world today (Verles & Vellacott, 2018), and cover a broad range of themes. It aims to eradicate poverty and hunger globally, address international inequality, establish peaceful and just societies, safeguard human rights, promote gender equality, empower women and girls, and ensure the sustainable preservation of the planet and its resources. Klasen and Fleurbaey (2018) observed that by 2030 the leaving no one behind agenda is one of the key priorities across the 2030 Agenda.

The UN Agenda acknowledges the importance of fostering peaceful, fair, and inclusive communities where justice is accessible to all, human rights are respected, governance is effective, and institutions operate transparently, efficiently, and with accountability across all levels. Morton et al., (2017) notice that this involvement is particularly crucial in developing and coordinating advanced analytical tools to measure progress and inform decision-making, fostering transparency, effectiveness, and accountability in institutions. The UN Agenda adopts an ambitious yet practical strategy to eradicate opportunity disparities, emphasizing that no individual should be overlooked in its objectives, and prioritizing policy efforts toward those facing the greatest challenges (Savic & Wang, 2020). Specifically, the core principle of LNOB, central to the UN Agenda, emphasizes the urgency of prioritizing the most marginalized and acknowledges the necessity of tackling poverty and disparities. The LNOB pledge implies that non-income-based inequalities should be tackled – particularly for those people facing multiple discriminations; and, that governments should prioritize the progress of marginalized groups (Munro, 2018). It entails tangible measures to alleviate poverty and inequality, mitigate vulnerabilities, and expedite the advancement of those who are the farthest behind (FAO, 2023). Agenda 2030 particularly highlights “children, youth, persons with disabilities, people living with HIV, older persons, indigenous peoples, refugees, internally displaced persons and migrants” (Munro, 2018).

People get left behind when they lack the choices and opportunities required to participate and benefit from development progress. All persons living in extreme poverty, in any form, are left behind, together with those enduring disadvantage(s) that deny or limit their choices and opportunities relative to others in society (UN Development Program, 2018). The phrase “Leave no one behind” is frequently associated with efforts in developing countries, where poverty, lack of infrastructure, and limited access to essential services are more pronounced. World Bank (2022) noticed that more than 1 billion people escaped extreme poverty during the three decades. By 2015, the global extreme poverty rate had been reduced by more than half. However, progress has slowed in recent years, in line with subdued global economic growth. The economic disruptions caused by COVID-19 and the subsequent war in Ukraine have led to a reversal in poverty reduction efforts. It has become evident that the global goal of eradicating extreme poverty by 2030 is now unattainable. High levels of debt in many countries have impeded a swift recovery while raising food and energy prices – partly driven by the Russian Federation’s invasion of Ukraine and climate shocks affecting major food producers – have made it increasingly difficult to resume progress in poverty reduction. These challenges have significantly altered the trajectory of

poverty alleviation, pushing the world even further off course from achieving the 2030 target. In 2020 alone, the number of people living in extreme poverty increased by over 70 million, marking the largest one-year rise since global poverty monitoring began in 1990. The pandemic has also exacerbated global inequality, with the poorest bearing the brunt of the economic impact; their income losses were estimated to be double those of the richest.

However, it is increasingly evident that developed countries also grapple with significant challenges related to social and economic inclusion. Despite their wealth and advanced infrastructure, developed nations face issues such as income inequality, social exclusion, and disparities in access to services. The LNOB index is closely linked to the SDGs, which all countries, including those in the Baltic Sea region, have committed to achieving. Despite overall economic development in the Baltic Sea region, disparities still exist within and between countries. Monitoring progress on the LNOB Index enables to track their advancement towards meeting SDG targets, particularly those related to reducing inequalities (SDG 10) and ensuring inclusive and equitable quality education (SDG 4). The analysis of the Baltic Sea Region LNOB Index is important to determine the extent and stability of progress in economically developed countries and to identify the areas of sustainable development facing the greatest challenges. We raised the research question: what LNOB progress is seen in the short term and which sustainable development goals pose challenges in the developed countries?

The purpose of this study is to analyse the progress of the Baltic Sea Region countries in implementing the LNOB. The study seeks to identify the stability of progress in a five-year period and examine which LNOB index dimensions and the sustainable development goals pose the greatest challenges in ensuring the inclusion of all members of society.

Literature analysis, synthesis, and qualitative research methods (document analysis) were applied in the research. The analysis of Europe's Sustainable development reports (2019-2023 period) was accomplished to identify the Baltic Sea region countries' progress in achieving the LNOB Index in the short-term trend.

Literature Review

Leave No One Behind (LNOB) is the core, transformative commitment of the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs). LNOB is not a prescriptive principle and responses from multilateral, European donor governments and international civil society organizations (ICSOs) are diverse. These include the integration of the principle into strategic plans, increasing the disaggregation of development programme data, an increased focus on “left behind” groups in monitoring and evaluation frameworks, and new initiatives to promote social protection and inclusive development (Munro, 2018). It embodies the absolute dedication of all UN Member States to eliminating poverty in every form, ending discrimination and exclusion, and decreasing the inequalities and vulnerabilities that marginalize individuals and hinder the potential of both people and humanity as a whole (UN Sustainable Development Group, 2024). As Stuart and Samman (2017) indicate, LNOB aims to address two coherent concerns: ending absolute poverty – in all its forms and ensuring that those who have been “left behind” (in relative terms or absolute terms) can “catch up” with those who have experienced greater progress. It also involves tackling discrimination and increasing inequalities both within and among countries, addressing their underlying causes (Sondermann & Ulbert, 2021). Mensah et al. (2022) highlighted the essentials (meaning, importance, history, framework, pillars, related key studies, and role of key actors) with respect to the LNOB pledge. And revealed, that the LNOB pledge has three-pronged strategic development imperatives: (i) to end poverty in all its forms, (ii) to stop the discrimination and inequality that have resulted in unequal outcomes for the disadvantaged population, and (iii) to reach the furthest behind first. Chakrabarti and Amarnath (2023) listed three interconnected ideas of the LNOB concept: equality, non-discrimination, and empowerment. These principles are rooted in the United Nations Charter, the Universal Declaration of Human Rights, and numerous global frameworks, conventions, and agreements that commit nations to protect the rights of the poor, homeless, women, children, people with disabilities, the elderly, minorities, migrants, and refugees worldwide. The Sustainable Development Goals (SDGs) elevate the LNOB trinity to a prominent position in the global sustainable development agenda like never before. These studies collectively

underline the importance of addressing inequalities in various domains (poverty, education, quality of the environment, and human rights) through the lens of the LNOB principle. They point to both progress and ongoing challenges in ensuring that all individuals, particularly the most disadvantaged, are included in sustainable development efforts.

The underlying idea of LNOB is to guarantee that development efforts and progress are inclusive, benefiting all segments of society, particularly those who are marginalized or vulnerable. This principle emphasizes addressing the needs of the most disadvantaged and ensuring that no one is excluded from the benefits of development initiatives (UN Sustainable Development Group, 2024).

The LNOB concept suggests that individuals experience exclusion due to a lack of necessary choices and capabilities for benefiting from human development (Sondermann & Ulbert, 2021). Following the Sustainable Development agenda, this aspiration strives to tackle widespread challenges of poverty, inequality, and exclusion that impede sustainable and inclusive human development (Katz, 2018). Mensah et al. (2021) notice that in numerous countries, sizable portions of the population reside in slums, and this phenomenon is on the rise. Simultaneously, in other nations, many individuals have limited or no access to formal education. Beyond mere neglect, people and countries encounter the compounded challenge of further marginalization, influenced by various factors such as globalization, technological advancements, climate change, and environmental degradation, rendering livelihoods unsustainable.

Although the principle of LNOB is very important, it is mostly in developing countries that LNOB indicators are studied and monitored. In contrast, in the context of developed and economically strong countries, the number of studies and publications on LNOB is lower. However, it is observed that research in the European context draws attention to the same issues as in the rest of the world. For example, Lacher (2024) analysed how access to adult education (AE) in Germany meets the principle of LNOB and explores the dynamics and challenges of the sector. The author noted that Germany has made progress in certain areas, the research points to partial compliance with the principle of LNOB and highlights persistent inequalities that are inadequately addressed by existing policies. Barcena-Martin et al. (2021) confirm that educational attainment significantly influences individuals' chances of avoiding being left behind, although the strength of this effect varies across countries. For example, in Sweden and Denmark, education has a relatively minor impact, whereas in Romania and Bulgaria, it plays a much more substantial role. This variation is likely related to the proportion of highly educated individuals in each country – the higher the proportion, the lesser the effect of education. Notably, in Greece, the disparity in the degree of being left behind by educational level is the highest for both highly and less-educated individuals. Ganzleben and Kazmierczak (2020) researched LNOB in terms of environmental inequality in Europe. The authors reveal that the quality of the environment varies significantly across East and West Europe, but also between countries, regions, and neighbourhoods within cities. The pollution depends on where you live and work. Garcia-Pardo et al. (2021) present a fuzzy multidimensional approach for the measurement of leaving no one behind principle underlying the SDGs in European countries. The authors revealed that the level of “legacy” and “at risk of poverty or social exclusion” are broadly the same across European countries. Buzeti et al. (2020) emphasize that health is the main building block of life chances, and the guidelines for leaving no one behind in health provide a framework and guidelines for LNOB and achieving the SDGs. Health limitations are another critical factor in determining whether someone is left behind. Those with chronic illnesses or conditions are significantly more likely to be left behind compared to those without such limitations. This effect is most pronounced in Belgium, Denmark, and the Netherlands, while in France and Austria, although health remains a decisive factor, its impact is comparatively less significant. According to the findings of Buzeti et al. (2020) Denmark presents a particularly notable case, with one of the highest left-behind rates among those with chronic illnesses and one of the lowest among those without, resulting in one of the largest disparities between these two groups. The authors emphasize that addressing the needs of the most vulnerable and reducing the gaps between different social groups is a key challenge for the 2030 sustainable development agenda and should be a priority for policymakers across Europe (Barcena-Martin et al., 2021).

There is a large number of documents and institutions highlighting the importance of the LNOB. Europe's 2020 strategy also recognizes that poverty, inequalities, and exclusion are among the greatest

challenges that need to be addressed in order to achieve inclusive and sustainable development. The Danish Institute for Human Rights (2024) points out that LNOB highlights fundamental human rights issues and helps identify left-out groups, and communities and provides data highlighting the problems and challenges faced by specific groups. In the open letter, The European Commission (2023) asserts that it is taking urgent action to give more to people and the planet. It states that the fight against poverty and inequality is urgent, with an estimated 120 million people pushed into extreme poverty in the past three years, making Europe a strong focus on the United Nations' 2030 SDGs. As a response to achieving the goals of sustainable development, European countries consider that no one should be left behind. In order to assess the progress, the LNOB index is calculated. The LNOB index embodies the resolute commitment of all UN Member States to eradicate poverty comprehensively, eliminate discrimination and marginalization, and diminish the disparities and vulnerabilities that hinder individuals and humanity's potential. It directs attention towards addressing discrimination and inequalities, which often intersect and compound, diminishing people's agency as rights holders. Many obstacles that people encounter in accessing services, resources, and equitable opportunities stem not merely from chance or resource scarcity, but rather from discriminatory legislation, policies, and societal norms that perpetuate the marginalization of specific groups (UN Sustainable Development Group, 2024). People who are marginalized from the development process often experience economic, social, spatial, or political marginalization. This exclusion is shaped by factors such as ethnicity, race, gender, age, disability, or a combination thereof, resulting in different forms of discrimination. They are often isolated from societal structures, lacking the means to access these structures, networks, and the necessary economic and social support systems to enhance their situations. Moreover, they are often overlooked in policy and program development, as they possess little to no voice, making them particularly vulnerable to being deprived of their civil, cultural, economic, political, or social rights (Katz, 2018; Machingura & Nicolai, 2018; Mensah et al., 2022). Addressing these systemic issues is essential for fostering inclusive and sustainable development that benefits all members of society.

As previously mentioned, sustainable development has been a core policy goal for the European Union (EU) for a considerable period. However, as the world faces the challenges of pandemics, intensifying geopolitical tensions, and ongoing wars, countries indicate rising poverty rates, unemployment, and even decreasing life expectancy. These challenges have fuelled calls to reduce or postpone the ambition of the SDGs. It is therefore important to analyse how countries are performing in terms of achieving the LNOB index. It is noted that the SDGs are guided by the principle of leaving no one behind. Based on Chakrabarti and Amarnath (2023) 17 SDGs have a total of 169 targets and 231 common indicators of which 100 may be considered LNOB indicators, each requiring disaggregated data on multiple parameters for effectively monitoring progress achieved in the implementation of the overarching sustainable development goal of leaving no one behind.

The LNOB index tracks inequalities along four dimensions: poverty, services, gender, and income (Europe Sustainable Development Report, 2023/2024). Based on theoretical analysis, we argue that LNOB is part of Agenda 2030 and is inseparable from the sustainable development goals. Meeting this pledge would leverage overall SDG achievements.

Table 1. Leave no one behind index relationship with SDGs (Source: Created by the authors based on the literature analysis)

| Leave no one behind index dimension | SDGs |
|--|---|
| Poverty and material deprivation | 1 SDG End poverty 2 SDG Zero hunger 12 SDG Responsible consumption and production 16 SDG Peace, justice, and strong institutions |
| Income inequality | 8 SDG Decent work and economic growth 9 SDG Industry, innovations, and infrastructure |

| | |
|-----------------------------------|--|
| | 10 SDG Reduced inequality 17 SDG Partnership for the goal |
| Access to and quality of services | 3 SDG Good health and well-being 4 SDG Quality education 6 SDG Clean water and sanitation 7 SDG Affordable and clean energy 11 SDG Sustainable cities and communities 13 SDG Climate action 14 SDG Life below water 15 SDG Life on land |
| Gender inequality | 5 SDG Gender equality |

Like it was mentioned before LNOB is a part of sustainable development goals. Comprising 17 SDGs, the UN Agenda 2030 is designed to address these areas comprehensively (UN, 2015). These goals seek to eradicate poverty and hunger globally, address international inequality, establish peaceful and just societies, safeguard human rights, promote gender equality, empower women and girls, and ensure the sustainable preservation of the planet and its resources. All SDGs help to ensure that no one is left behind. The LNOB index is a critical tool in the global effort to achieve the SDGs, ensuring that progress benefits all, especially those who are most often excluded.

Research Methodology

The analysis focused on the countries in the Baltic Sea Region. The EU Baltic Sea Region (BSR) comprises eight countries – Sweden, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, and Poland – with a collective population of 85 million, accounting for 17 per cent of the EU population. These countries share comparable characteristics and confront similar challenges.

The Baltic Sea Region (BSR) countries were chosen for analysis of the LNOB index for several reasons: first, the BSR comprises countries with varied economic statuses, from high-income nations like Sweden, Denmark, and Germany to emerging economies like Latvia, Lithuania, and Estonia. This diversity provides a rich context for analysing how different socioeconomic environments impact the LNOB index. Second, the BSR has a unique historical and cultural landscape, influenced by various periods of conflict, cooperation, and integration. Historical context can provide insights into current social inequalities and inform more effective policy responses. Third, many BSR countries are members of the European Union, benefiting from EU policies and funding aimed at reducing inequalities and promoting social inclusion. This makes the region a valuable case study for assessing the effectiveness of EU policies on the LNOB index. And fourth, many BSR countries have demonstrated a strong political commitment to social justice, human rights, and sustainable development. This commitment provides a supportive environment for initiatives aimed at ensuring no one is left behind.

In our research, we used document analysis. Document analysis involves the systematic examination and evaluation of written or digital materials, such as documents, texts, articles, reports, or any other form of content. We analysed Europe SDRs data in five years from 2019 to 2023. Europe SDRs (2019, 2020, 2021, 2022, 2023) were chosen for analysis as these reports integrate to a greater extent non-official data from research centres, scientists, and academia, non-governmental data sources. The year 2019 serves as a critical baseline for pre-pandemic conditions, allowing for a more accurate assessment of how events and data points evolved in response to COVID-19 and related global disruptions. By including 2019, the analysis can better contextualize the impact of the pandemic by distinguishing changes in data trends that occurred before, during, and after the peak COVID-19 years. Excluding it would risk skewing interpretations of post-2019 data by removing a pre-pandemic reference, potentially misrepresenting the scope and impact of COVID-19 on the trends observed. The analysis of Europe

SDRs (2019-2023 period) was conducted to identify the Baltic Sea Countries' progress in the LNOB index in a short-term period and identify the trends, challenges, and opportunities for sustainable development. The documents analysed in the research are presented in Table 2.

Table 2. Documents and material used for analysis (Source: Created by the authors)

| Documents and materials (see the reference list for full references) |
|--|
| <ul style="list-style-type: none"> • Sustainable Development Solution Network. A Global Initiative for the UN (2023/24). • Sustainable Development Solution Network. A Global Initiative for the UN (2022). • Sustainable Development Solutions Network and Institute for European Environmental Policy (2021). • Sustainable Development Solutions Network and Institute for European Environmental Policy (2020). • Sustainable Development Solutions Network and Institute for European Environmental Policy (2019) • United Nations (UN) (2023) • World Bank (2022) • Danish Institute for Human Rights (2022) |

The European Union and its member states are dedicated to this significant global framework agreement and are actively engaged in enhancing progress towards the SDGs (Rocchi et al., 2022). Europe conducts an autonomous quantitative evaluation of the advancement of the SDGs by the EU itself, its member states, and collaborating nations (Sustainable Development Solution Network. A Global Initiative for the UN, 2023/24). Every year the EU presents its SDR, where 34 European countries show their progress on the overall score and leave-no-one-behind score. In this article, we delve deeper into the analysis of the overall score of the LNOB index and SDGs. The comprehensive score evaluates the collective advancement towards fulfilling all 17 SDGs, representing a percentage of SDGs accomplishment. A score of 100 signifies the attainment of all SDGs. The LNOB index monitors disparities across four aspects: poverty, services, gender, and income. A higher score indicates that fewer demographic groups are marginalized or excluded. Through these indices, we aimed to assess and evaluate the advancements made by the Baltic Sea region countries over the specified five-year period. The analysis of progress and dynamics compares the annual increase or decrease of indices, the scope of the increase or decrease, and the position of countries' indicators compared to the EU average in order to measure the gap between leading and lagged behind countries in the achievement LNOB.

Research Results

Five-year period data on the Baltic Sea Region's LNBO indicators shows uneven progress (see Fig. 1). Even countries that perfectly conform to the LNOB principle, such as Denmark and Finland, have experienced some progress and some regression. The data also show that different countries' progress and regression occurred in different years, i.e. in 2020 Denmark's LNOB was declining while Finland's was increasing, while in 2021 the progress of these countries was reversed. In contrast, Sweden's LNOB, which has been increasing throughout the period, declined in 2023. In 2023 the LNOB indicator increased in Denmark, Germany, Latvia, Lithuania, and Poland, and decreased in Sweden, Finland, and Estonia. Thus, the data show that progress and regressions are not typical for the whole region.

The analysis of the progress of the BSR countries in implementing the LNOB principle showed that at the beginning of the period, four countries (Denmark, Sweden, Finland, and Germany) were above the EU average (72.7 points), while Estonia, Poland, Latvia, and Lithuania were below the average. Finland, which was the best performer in terms of LNOB implementation, was 13.7 points above the EU average. Lithuania, which was the worst performer in terms of LNOB implementation, was 10.7 points behind the EU average. By the end of the period, five countries (Denmark, Sweden, Finland, Germany, Poland) were already above the EU average (74.5 points). Finland, the best performer in terms of LNOB, was

11.1 points above the EU average, while Latvia, the lowest performer, was 5.9 points behind the EU average. Thus, the progress of the BSR countries is reflected in the rising LNOB rate, the number of above-average countries, and the narrowing gap between the EU average and the BSR countries.

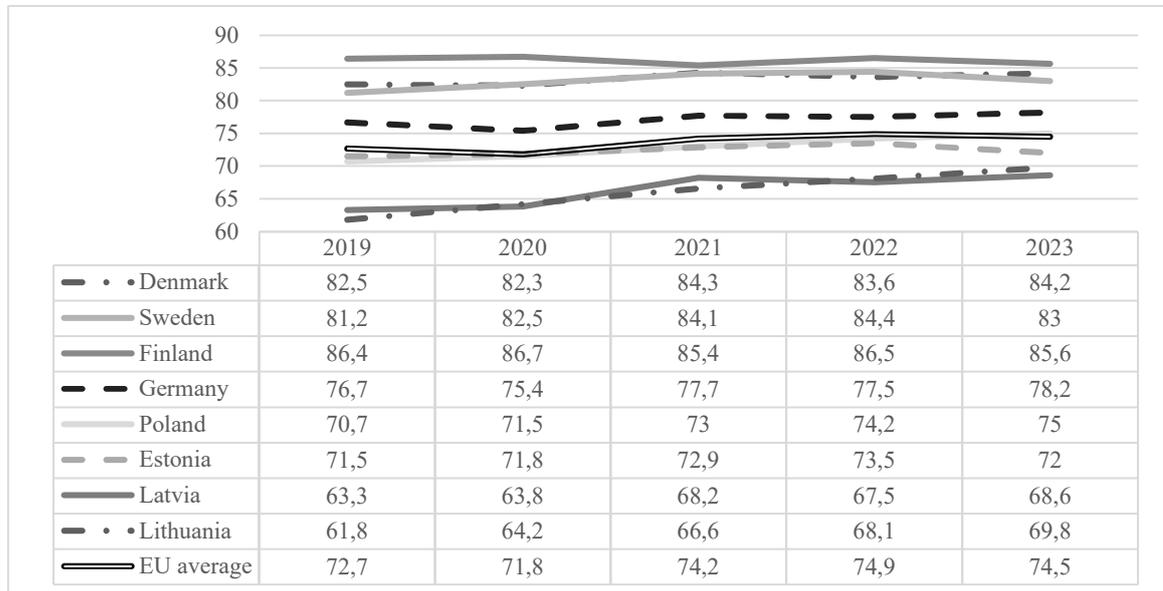


Fig 1. Baltic Sea Region countries progress in implementation of LNOB (Source: Created by the authors, using data provided in the Sustainable Development Solution Network. A Global Initiative for the UN (2019, 2020, 2021, 2022, 2023) Europe SDRs)

The five-year period analysis of the SDGs scoreboard for the Baltic Sea Region countries also shows that countries in the same region are not progressing evenly (see Fig. 2). All countries, except Germany, showed more or less significant SDGs progress at the beginning of the period. However, all the countries experienced stagnation or mild regression in 2021 and 2022.

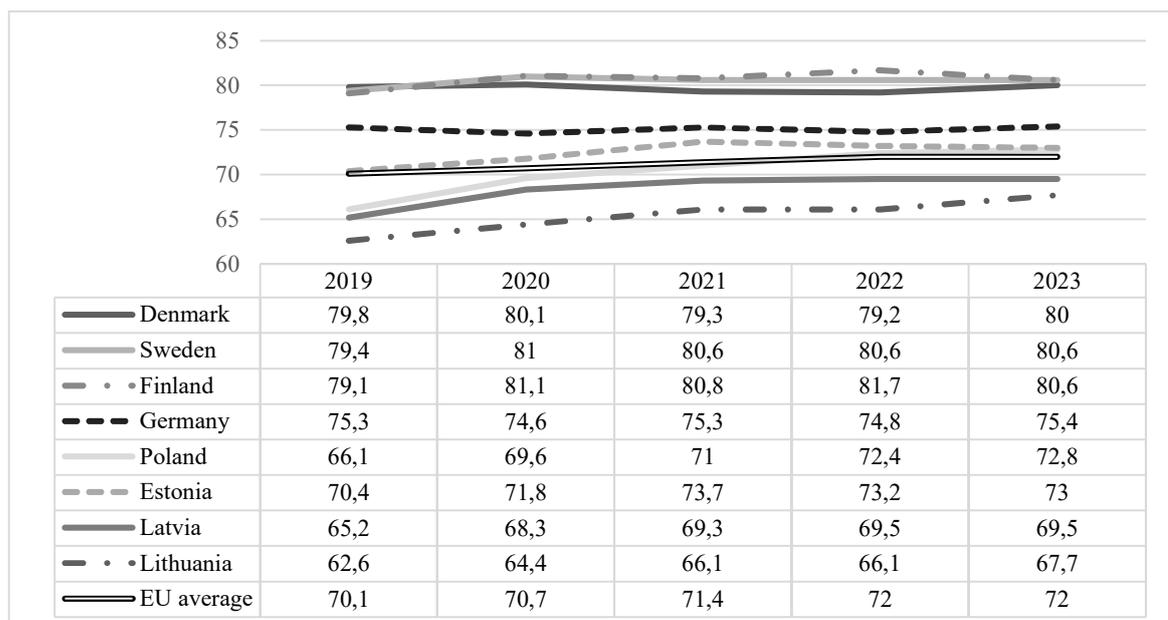


Fig 2. Baltic Sea Region countries progress in SDGs achievement (Source: Created by the authors, using data provided in the Sustainable Development Solution Network. A Global Initiative for the UN (2019, 2020, 2021, 2022, 2023) Europe SDRs)

The 2023 SDGs indicators also show that the same macro factors and circumstances in the European Union affect different countries differently: some countries have made progress (Denmark, Germany, Lithuania, Poland); Sweden and Latvia's performance has been on a similar level to the previous year; Germany and Estonia have slightly worsened their SDGs achievement results. The countries' SDGs index data reveal that at the beginning of the period, the most advanced country in SDGs implementation (Denmark) exceeded the EU SDGs average by 9.7 points, while the lowest performer (Lithuania) lagged by 7.5 points. At the end of the period, the most advanced countries in SDG implementation (Sweden and Finland) exceeded the EU SDGs average by 8.6 points. In comparison, the lowest performer (Lithuania) lagged by 4.3 points. The gap between the most advanced and the least advanced countries in the SDGs was 17.2 points at the beginning of the period and 12.9 points at the end. Thus, it can be concluded that the gap between the countries in the region is narrowing. Also, it can be stated that at the beginning of the period, five countries (Denmark, Sweden, Finland, Germany, and Estonia) were above the EU average (70.1 points), while Poland, Latvia and Lithuania were below average. By the end of the period, 6 countries (Denmark, Sweden, Finland, Germany, Estonia, Poland) were already above the EU average (72 points). Therefore, the progress of the Baltic Sea Region countries in the EU context is positive.

A comparison of the progress made by the countries in the Baltic Sea Region in terms of LNOB and SDGs (see Table 3) shows that, while the European Union average for both indicators is very similar (LNOB progress is 1.8, SDG progress is 1.9), individual countries in the region are making different progress in achieving the LNOB and SDG targets. Although Finland has maintained the position of the leading performer in LNOB during the short-term period, its LNOB indicator has dropped by 0.8 points over five years. Meanwhile, Finland's SDG progress for 2019-2023 was 1.5 points. The other two LNOB leaders, Denmark, and Sweden, as well as Germany, improved their LNOB progress by between 1.5 and 1.8 points. However, these countries' SDG progress is minimal, ranging from 0.1 to 0.2 points. Interestingly, although Estonia has improved its LNOB by only 0.5 points, but its SDG progress (2.6 points) is bigger than that of the leaders discussed above. The biggest improvements in LNOB were achieved by Lithuania (8 points), Latvia (5.3 points) and Poland (4.3 points).

Table 3. The annual progress data on the Baltic Sea Region Countries' LNOB and SDGs implementation (Source: Created by the authors, using data provided in the Sustainable Development Solution Network. A Global Initiative for the UN (2019, 2020, 2021, 2022, 2023) Europe SDRs)

| Country | 2020 | | 2021 | | 2022 | | 2023 | | Total progress | |
|------------------------|------|------|------|------|------|------|------|------|----------------|-----|
| | LNOB | SDG | LNOB | SDG | LNOB | SDG | LNOB | SDG | LNOB | SDG |
| Denmark | -0.2 | 0.3 | 2 | -0.8 | -0.7 | -0.1 | 0.6 | 0.8 | 1.7 | 0.2 |
| Sweden | 1.3 | 0.6 | 1.6 | -0.4 | 0.3 | 0 | -1.4 | 0 | 1.8 | 0.2 |
| Finland | 0.3 | 2 | -1.3 | -0.3 | 1.1 | 0.9 | -0.9 | -1.1 | -0.8 | 1.5 |
| Germany | -1.3 | -0.7 | 2.3 | 0.7 | -0.2 | -0.5 | 0.7 | 0.6 | 1.5 | 0.1 |
| Estonia | 0.3 | 1.4 | 1.1 | 1.9 | 0.6 | -0.5 | -1.5 | -0.2 | 0.5 | 2.6 |
| Latvia | 0.5 | 3.1 | 4.4 | 1 | -0.7 | 0 | 1.1 | 0 | 5.3 | 4.1 |
| Lithuania | 2.4 | 1.8 | 2.4 | 1.7 | 1.5 | 0 | 1.7 | 1.6 | 8 | 5.1 |
| Poland | 0.8 | 3.5 | 1.5 | 1.4 | 1.2 | 1.4 | 0.8 | 0.4 | 4.3 | 6.7 |
| European Union average | -0.9 | 0.6 | 2.4 | 0.7 | 0.7 | 0.6 | -0.4 | 0 | 1.8 | 1.9 |

These countries have also significantly improved their SDG scores: Poland – 6.7 points, Lithuania – 5.1 points, Latvia – 4.1 points. In achievement of LNOB Estonia was in fifth position at the end of the period, but conceded it to Poland, which moved up from sixth to fifth place; Latvia conceded seventh

place at the end of the period to Lithuania, which moved up from eighth position. In the achievement of SDG Denmark, which was the region's leading SDG performer in 2019, has fallen to third position in five years. Sweden, in second place in the SDGs, and Finland, in third place, have improved slightly in the short term, and in 2023 together share first and second place. Other countries maintained their positions throughout the short term: Germany in fourth place, Estonia in fifth, Poland in sixth, Latvia in seventh, and Lithuania in eighth position. It is also worth noticing that only Lithuania and Poland have not experienced regression in the achievement of LNOB in the short term. Despite the significant improvement, the countries maintained similar positions in the overall list of countries in the Baltic Sea Region. Considering the data on the Finland and Estonia LNOB and SDG progress indicators it can be suggested that the comparison of progress data does not allow indicate trends between the achievement of both initiatives.

The data on the achievement of LNOB and SDG indicators and the significantly large gap in the growth (-0.8 for Finland, 8 for Lithuania) show the uneven implementation of these global initiatives and the difficulties faced by developed countries in the achievement of sustainable prosperity and inclusion. The contrasting LNOB trajectories (e.g., Denmark's decline in 2020 followed by progress in 2021, while Finland showed an inverse pattern) indicate that the factors influencing LNOB outcomes are not regionally synchronized but vary by national context. Undoubtedly the progress in a particular country depends on the intensity of the global challenges impact in a particular country (like COVID-19, economic downturns, inflation). But also research results and reports analysis suggest the hypothesis that the progress of particular country is dependent on the governmental economic and social policy decisions (for example in the SDR data on Finland it is indicated the increasing number of exports of pesticides banned in the EU and of people at risk of income poverty after social transfers, increasing housing overburden rate), the increasing social complexity and challenges faced by healthcare system (for example increasing suicide rate in Estonia and declining indicators on population with good or very good health or self-reported unmet need for medical examination and care in Finland), challenges in education systems (for example worsening results on underachievers in mathematics and variation in mathematics performance explained by students' socio-economic status in Finland) and even worsening habits of native residents and migrants (for example worsening results on prevalence of obesity and human trophic levels, decreasing numbers on population reporting crime in their area, by income). These findings suggest that each country's policy choices in specific years likely influenced their LNOB progress or regression, rather than a uniform regional trend. Progress in the implementation of LNOB in BSR is generally positive, but regressions indicate the need for policy adjustments. While the overall LNOB performance in the region is improving, occasional regressions (e.g. Sweden's decline in 2023) mean that sustaining LNOB progress requires adaptive, country-specific strategies that respond effectively to changing challenges.

Based on such a hypothesis, more detailed challenges and opportunities for progress need to be explored by digging deeper into the detailed SDR data according to the model developed in the theoretical part of the study.

Trends in the dimensions of the LNOB index are based on SDR data indicated in SDG trends dashboards (2019, p. 6; 2020, p. 6; 2021, p.8; 2022, p. 8; 2023, p. 19). The dashboards predict whether countries will meet the SDG targets by 2030, with projections on a four-arrow scale: on track, moderately increasing, stagnating, and decreasing. In Table 4, these forecasts are converted into a numerical value (on track – 4, moderately increasing – 3, stagnating – 2, decreasing – 1) and calculated as an average across the dimensions indicated in the theoretical part (full data available in open access at LNOB dimensions composing SDG achievement trends). In the dimension of Poverty and Material Deprivation countries during the analysed period have lost from 0.25 up to 0.95, which implies a stagnant trend of progress. In this dimension, there has been only a declining trend. Finland has the biggest decrease in forecasts, Sweden has the worst trends for progress, and Estonia – the best. In this dimension, many countries have the lowest projections and trends indicated for SDG2 Zero Hunger and SDG12 Responsible Consumption and Production, and these goals are stagnating or decreasing. Such dynamics are in line with the World Bank's (2022) observations that COVID-19 and the war in Ukraine produced an outright reversal in progress in achieving the global goal of ending extreme poverty by 2030. "Rising food and energy prices – fuelled in part by the Russian Federation's invasion of Ukraine and climate

shocks among the world’s biggest food producers – have made a return to progress on poverty reduction more challenging than ever” (World Bank, 2022). The same challenges (economic recession, COVID-19, wars, weather extremes) are considered in the annual report of The Danish Institute For Human Rights (2022). “High food price inflation can in the short run have especially detrimental impacts on poorer households, which spend a larger share of their income on food” (World Bank, 2022). Challenges have affected every economy around the world. Yet the impact has not been uniform across countries. In the dimension of Income Inequality, some countries show declining trends, while others even show increasing trends. Lithuania, Estonia, and Poland are given positive forecasts for significant progress on SDG10 Reduced inequalities and SDG17 Partnership for the goals. But Denmark and Sweden have even lost 1,25 points due to the stagnating situation SDG8 Decent Work and Economic Growth and SDG10 Reduced Inequalities. According to the World Bank (2022) in 2020 the number of people living below the extreme poverty line rose since global poverty monitoring. But the findings of this research reveal contradiction with the World Bank's (2022) observations that, the richest people recovered faster from the pandemic, even further widening disparities. Also, scientific literature and different reports usually debate about ensuring the provision of the LNOB in developing or low-economy countries. However, these findings indicate, that even advanced countries need to rethink their economic and social policies to meet the needs of the most vulnerable part of the population as global challenges thus affect the poverty reduction trajectory of all countries in a substantial and lasting way.

The dimension of Access to and Quality of Services for most of the Baltic Sea region countries indicates worsening trends. According to the data of SDR reports, the predictions for most LNOB progressive countries – Denmark, Sweden, Finland, and Germany have decreased from 0,38 to 0,62 points. Poland also has experienced a reduction of 0,62 points. Only Latvia has managed to increase its situation trends by 0,38 points. Notably, in these countries, SDG4 – Quality Education (rated 4 at the beginning of the period and 2 at the end) was responsible for a significant downward trend. However, there are also downward trends in the achievement of the other targets that compose this LNOB indicator (SDG11 - Sustainable Cities and Communities, SDG15 - Life on Land). These findings correspond to insights of the World Bank (2022), that the poorest people “also suffered disproportionate setbacks in education and health, with massive learning losses and shortened lifespans”. The World Bank (2022) report highlights the importance of education for poverty reduction and also identifies the losses of education during the pandemic period when distance learning was applied. “More importantly, the learning loss will have significant long-term consequences for today’s students and even the wider society if students are unable to make up their losses. This is because the growth potential of economies over the long term will be lower” (World Bank, 2022).

Table 4. The dynamic of the Baltic Sea Region Countries’ trends in the LNOB index dimensions (Source: Created by the authors, using data provided in the Sustainable Development Solution Network. A Global Initiative for the UN (2019, 2020, 2021, 2022, 2023) Europe SDRs)

| LNOB index dimension | Country | Average of SDG goals composing the dimension trends | | | | |
|---|-----------|---|------|------|------|------|
| | | 2019 | 2020 | 2021 | 2022 | 2023 |
| Poverty and material deprivation (composed of averages of SDG1, SDG2, SDG12, SDG16) | Denmark | 3 | 3 | 2,5 | 2,25 | 2,5 |
| | Sweden | 2,67 | 2,5 | 2,25 | 2 | 2 |
| | Finland | 3,3 | 3,5 | 2,75 | 2,25 | 2,25 |
| | Germany | 2,67 | 2,75 | 2,75 | 2,5 | 2,25 |
| | Estonia | 3 | 2,75 | 2,75 | 2,5 | 2,75 |
| | Latvia | 3 | 2,75 | 2,5 | 2,5 | 2,25 |
| | Lithuania | 2,67 | 3 | 2,5 | 2,5 | 2,5 |
| | Poland | 3 | 2,5 | 2,5 | 2,5 | 2,25 |
| Income inequality | Denmark | 4 | 4 | 4 | 2,75 | 2,75 |

| | | | | | | |
|--|-----------|------|------|------|------|------|
| (composed of averages of SDG8, SDG9, SDG10, SDG17) | Sweden | 4 | 3,75 | 3,75 | 3 | 2,75 |
| | Finland | 3,25 | 3,25 | 3,75 | 3,25 | 3,5 |
| | Germany | 3,25 | 3,5 | 3,5 | 2,5 | 3,25 |
| | Estonia | 2,75 | 2,5 | 3,25 | 2,75 | 3,25 |
| | Latvia | 2,75 | 2,5 | 2,5 | 2,25 | 2,5 |
| | Lithuania | 2 | 2 | 3 | 3 | 3,25 |
| | Poland | 3 | 2,5 | 3,25 | 3 | 3,5 |
| Access to and quality of services (composed of averages of SDG3, SDG4, SDG6, SDG7, SDG11, SDG13, SDG14, SDG15) | Denmark | 3,25 | 3,25 | 2,88 | 2,5 | 2,63 |
| | Sweden | 3,13 | 2,75 | 2,88 | 2,75 | 2,63 |
| | Finland | 3,13 | 3,13 | 3,13 | 2,75 | 2,75 |
| | Germany | 3,13 | 2,75 | 2,75 | 2,63 | 2,75 |
| | Estonia | 3 | 3 | 3,13 | 3,13 | 2,88 |
| | Latvia | 2,75 | 3 | 3,25 | 3,25 | 3,13 |
| | Lithuania | 2,88 | 2,75 | 2,5 | 2,63 | 2,88 |
| Poland | 3 | 2,5 | 2,75 | 2,63 | 2,38 | |
| Gender inequality (composed of SDG5) | Denmark | 3 | 4 | 4 | 3 | 3 |
| | Sweden | 3 | 3 | 3 | 3 | 3 |
| | Finland | 3 | 4 | 3 | 3 | 3 |
| | Germany | 3 | 3 | 3 | 3 | 3 |
| | Estonia | 3 | 3 | 3 | 2 | 3 |
| | Latvia | 3 | 3 | 2 | 1 | 3 |
| | Lithuania | 2 | 3 | 3 | 3 | 3 |
| | Poland | 2 | 2 | 2 | 2 | 3 |

In the dimension of Gender inequality, the start of the period was characterized by improving or stable trends in most countries, but by 2022 the projections have worsened, especially in Latvia, where researchers have predicted a declining trend. However, in the 2023 SDR, all countries in the region are projected to follow the same unified improving trend.

It can also be seen from the data in Table 4 that, in general, the deterioration, that started in some LNOB dimensions from 2020 onwards, was still evident in 2023, or just stabilizing in that year. This shows that even advanced economies are vulnerable to global and national challenges (changes in the economy and labour market, changes in energy resources and food prices, etc.). It is therefore necessary to pay additional attention and look for opportunities to ensure the implementation of the LNOB principle at the national level. Considering the uneven development data and the perceived downward trend in the achievement of certain SDG targets, a progressive LNOB policy is essential for every government, even in very advanced countries. The World Bank (2022) report also identifies that if setbacks in poverty reduction are left unaddressed by policy action, they will have “lasting consequences for people’s lifetime income prospects and development more broadly”. As the World Bank (2022) report indicates “restoring progress in poverty reduction is possible when helped by strong and broad-based economic growth – not only in the poorest economies but in middle-income economies as well”. The World Bank (2022) report gives various examples of how countries used fiscal measures to reduce poverty during the pandemic. However, as military conflicts intensify around the world, countries are focusing their attention and finances on strengthening their military preparedness and capabilities. The reallocation of national budgets will undoubtedly reduce finances for other areas related to poverty reduction and the

achievement of LNOB. Also, increased migration flows, both within the region and from outside, pose problems for integration and social cohesion. Ensuring that migrants and refugees are properly supported and integrated into society is essential to ensure that no one is left behind. The level of development of the countries of the Baltic Sea region varies greatly, some countries have a higher standard of living and infrastructure than others. Differences in income, education, health care and social inclusion remain in the countries of the Baltic Sea region. Economic inequality prevails in the region, with large gaps between urban and rural areas, as well as between different socio-economic groups. Lithuania, for example, is short of over 600 teachers for the 2024 school year, which will undoubtedly lead to declining education indicators. The abovementioned findings suggest the following insights. Closing these gaps and ensuring equitable development across the region remains a challenge. As in many European regions, the countries of the Baltic Sea region are experiencing demographic changes, including an ageing population. Tackling these challenges necessitates collaborative action from governments, civil society organizations, and international partners to enact inclusive policies and initiatives that prioritize the requirements of marginalized and vulnerable groups, ultimately contributing to LNOB in the Baltic Sea region.

Five-year period data on the Baltic Sea Region's LNBO and SDG indicators show positive progress as the number of above-EU average countries is rising and the gap between the best and worst LNOB implementers is narrowing. However, the progress is very uneven as the countries have experienced some progress and some regression. A comparison of the indexes' progress shows that individual countries in the Baltic Sea Region are making different progress in achieving the LNOB and SDG targets. Finland's LNOB indicator has even dropped by 0.8 points over five years, meanwhile, its SDG overall progress was 1.5 points. Denmark, Sweden, and Germany improved their LNOB progress by between 1.5 and 1.8 points, and these countries' SDG progress is minimal (from 0.1 to 0.2 points). The biggest improvements in LNOB were achieved by Lithuania (8 points), Latvia (5.3 points) and Poland (4.3 points). These countries have also significantly improved their SDG scores: Poland - 6.7 points, Lithuania - 5.1 points, Latvia - 4.1 points. Challenges and opportunities for LNOB progress were explored by analysing SDR data indicated in SDG trends dashboards. In the dimension of poverty and material deprivation, countries have shown only a declining trend. In this dimension, many countries have the lowest projections and trends indicated for SDG2 Zero Hunger and SDG12 Responsible Consumption and Production, and these goals are stagnating or decreasing. Such dynamics are in line with the World Bank's (2022) and the Danish Institute for Human Rights (2022) reports observations that COVID-19 and the war in Ukraine produced an outright reversal in progress in achieving the global goal of ending extreme poverty by 2030. In the dimension of Income Inequality Lithuania, Estonia, and Poland are given positive forecasts for significant progress on SDG10 Reduced inequalities and SDG17 Partnership for the goals. But Denmark and Sweden have even worsened their trends due to the stagnating situation of SDG8 Decent Work and Economic Growth and SDG10 Reduced Inequalities. These findings contradict the World Bank's (2022) observations that, the richest people recovered faster from the pandemic, and indicate, that even advanced countries need to rethink their economic and social policies to meet the needs of the most vulnerable part of the native population as global challenges thus affect the poverty reduction trajectory of all countries in a substantial and lasting way. However, the implementation of these SDGs is also undoubtedly linked to the growing flows of economic migrants and refugees. Polvanesi (2023) highlights the peculiarities of social security coverage problems for displaced populations and notes that refugees are often "left behind" due to a range of political, legal, and operational barriers linked to their situation. Seyfert and Alonso (2023) indicate that refugees and migrants with a regular immigration status are mostly excluded from national active labour market interventions. The dimension of Access to and Quality of Services for Denmark, Sweden, Finland, and Germany has decreased due to declining trends in SDG4 – Quality Education. Analysis of trend indicators confirms predictions of UNESCO (Stanistreet, 2019, p. 509) about the world's failure to achieve Sustainable Development Goal 4 "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". The scientists and the Word Bank (2022) alert that the learning loss related to the COVID-19 pandemic will have significant long-term consequences social and economic consequences. Scientists also reveal gaps between the education system and implementation of the LNOB principles and achievement of SDGs. Germany's empirical study's findings revealed that low-skilled workers are less likely to participate in adult education programs that use digital media, and

Lacher (2024) suggests, that this inequality poses a challenge for the implementation of the political program and the principle of LNOB. Janczukowicz and Goreux (2023) discuss the disconnections of health care and health education systems with the changing population needs and health service requirements (for example, a lack of joint educational strategy addressing health literacy education provided to patients and communities) and call for addressing these issues. In the dimension of Gender Inequality all countries in the region are projected to follow the same unified improving trend. But still, scientists (Janczukowicz & Goreux, 2023) reveal the transgender healthcare situation as an area of exclusion and discrimination. Research revealed that even developed countries are vulnerable to global and national challenges (changes in the economy and labour market, changes in energy resources and food prices, etc.). It is therefore necessary to pay additional attention and look for opportunities to ensure the implementation of the LNOB principle at the national level. Considering the uneven development data and the perceived downward trend in the achievement of certain SDG targets, a progressive LNOB policy is essential for every government, even in very advanced countries. Otherwise, setbacks in poverty and inequality reduction will have lasting consequences for people's lifetime income prospects and development more broadly.

Conclusions

Leave No One Behind (LNOB) stands as the core and transformative promise of the 2030 Agenda for Sustainable Development. This principle embodies an unwavering commitment from all United Nations Member States to eliminate discrimination and exclusion while also addressing the inequalities and vulnerabilities that hinder individuals and communities. It is built on the principle that development benefits should reach all segments of society, particularly the most vulnerable and marginalized groups. The LNOB index is a critical tool for assessing and promoting equity in implementing the United Nations' Sustainable Development Goals (SDGs). The LNOB index tracks inequalities along four dimensions: poverty, services, gender, and income. In this research progress of LNOB, its stability, and its challenges are analysed through the implementation of all sustainable development goals in four LNOB dimensions: poverty and material deprivation, income inequality, access and quality of services, and gender inequality.

Data on LNOB and SDG indicators for the Baltic Sea Region countries reveal positive dynamics, with an increasing number of countries performing above the EU average and a narrowing gap between the best and worst LNOB implementers. However, progress is highly uneven, with countries experiencing some progress and some regression. Comparing the progress of the indices, it can be seen that the individual countries of the Baltic Sea region are making different levels of progress in achieving the LNOB and SDG goals. Finland's LNOB indicator has even fallen over five years, while overall SDG progress has risen. Denmark, Sweden, and Germany have improved LNOB progress, but these countries' SDG progress is minimal. Lithuania, Latvia, and Poland achieved the greatest improvements in LNOB. These countries also significantly improved their SDG scores. In terms of poverty and material deprivation, the countries showed only a downward trend. In this dimension, many countries have the lowest projections and trends for SDG2 Zero Hunger and SDG12 Responsible Consumption and Production, and these targets are stagnant or declining. But the findings of this research reveal contradiction with the World Bank's (2022) observations that, the richest people recovered faster from the pandemic, even further widening disparities. Also, scientific literature and different reports usually debate about ensuring the provision of the LNOB in developing or low-economy countries. However, these findings indicate, that even advanced countries need to rethink their economic and social policies to meet the needs of the most vulnerable part of the population as global challenges thus affect the poverty reduction trajectory of all countries in a substantial and lasting way.

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GOVERNANCE FRAMEWORK OF THE CENTRE OF GOVERNMENT

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Abstract

Research purpose. The study aims to analyse the existing governance framework within the Centre of Government (CoG) in Latvia, exploring operational functions of the CoG, including function implemented by the CoG – to participate in all selection and nomination processes of members of the supervisory boards of state-owned enterprises (SOEs), and to provide proposals for strengthening the governance framework of the CoG.

Design / Methodology / Approach. To compose the framework of the study, the state institutions that constitute the CoG in Latvia were first identified. In the next step of the study, according to the structure defined for the Latvian CoG, a literature review and data analysis were conducted on: (a) governance and its key principles of good governance in public administration and corporate governance, (b) the operational functions performance within the CoG, including its participation in the process of members selection and nomination for the supervisory boards of SOEs. Based on the study results, suggestions for the system of criteria for the governance framework of the CoG were developed.

Findings. Following the study into the governance framework of the CoG, it is discovered that effectiveness indicators are underused, and quality indicators need rationalization. The findings of the study suggest that the quality of the operational functions of CoG can be measured through the outcomes of the selection and nomination process for potential members of the supervisory boards of SOEs. Based on the study results, the following additional findings were made: (a) in order to achieve good corporate governance results in the selection and nomination process, it is necessary to utilize several additional criteria, which are essential not only for enhancing the effectiveness of the operational functions of CoG but also for effectiveness of the supervisory boards of SOEs; (b) to effectively ensure the development planning system's process, thereby strengthening its governance, transparency and compliance throughout public administration, there is a necessity in Latvia to enhance the effectiveness of the document development, approval, and monitoring processes.

Originality / Value / Practical implications. Proposed is a practically applicable criteria system, which allows to monitor and evaluate the management process at the CoG, thereby timely identifying areas of improvement and enhancing the overall quality of governance. The criteria system developed within the study can be flexibly adapted to governance framework development outside Latvia, particularly concerning issues related to the selection and nomination process and effective policy planning management. An original study approach has been implemented since the process of selection and nomination of supervisory board members of SOEs is considered in relation to the operational functions of the CoG.

Keywords: governance; centre of government; state-owned enterprises.

JEL codes: G34; H83

Introduction

The governance system in public administration often faces challenges that influence its effectiveness and quality. What are these challenges? Changes in the external and/or internal environment include a number of actions to improve or develop new policies which contribute to the effective implementation of governance principles. The interrelated challenges facing public administration in this case are

maintaining a balance of governance including responsibility for resource management, policy development, and respect for public interests (e.g., public participation, transparent decision-making).

One of the main components of the public administration governance system is the CoG (Davies & Vagi, 2023). Serving as the institutional nucleus of state administration entities, the CoG participates in adopting strategic decisions. The CoG operates within the rules and principles of governance to achieve desired results and maintain quality standards. Haddad et al. (2010) propose a holistic approach to the functions and roles of the CoG in the following key areas: supporting the cabinet (government communication, cabinet administrative support), reinventing government (service delivery improvement, institutional governance and efficiency, strategic government human resources management), steering overall policy-making (planning and budgeting synchronisation, national strategic planning, policy and legislation coordination), managing performance and programs (government program management, performance management) (p. 4). This holistic approach indicates that activities of the CoG are aimed at countries' development, including promoting its economic growth and addressing the needs of society. The authors point out that the functions of the CoG include not only national development strategies, policy development, management, and implementation of public services but also the function of formulating and implementing policies for the SOEs (for example, CoG (State Chancellery) is a coordinating authority for SOEs and holders of state capital shares). In addition, effective resource management is closely linked to the growth potential of a national economy. Halaskova et al. (2023) emphasize that effective governance of the state's financial system plays an important role in promoting economic growth (p. 13), besides, how effective and highly qualitative governance largely reflects not only on the indicators of the state's economy but also on "the well-being of its citizens" (Radziyevska, 2023, p. 135).

The study seeks to improve and strengthen the governance of the CoG in Latvia by evaluating the centre's operational functions and analysing the nomination process. The study's task is to examine the current structure at the CoG in Latvia, investigating its operational functions and involvement in the selection and nomination process of SOE supervisory board members.

The following hypotheses were put forward for the study:

- H1: the performance of the operational functions of CoG is linked to the results of the nomination process, as evidenced by the quality and timeliness of decisions on the selection and nomination of members of supervisory boards of the SOEs;
- H2: quality indicators provide a more complete assessment of the operational functions of CoG compared to effectiveness indicators since they better reflect the results achieved.

To establish the study's framework, the authors initially identified the state administration institutions forming the CoG in Latvia. Subsequently, adhering to the predefined structure for the Latvian CoG, the authors conducted a comprehensive review of the literature and analysed data pertaining to:

- governance and fundamental principles of good governance in public administration and corporate governance;
- the operational effectiveness of the CoG, encompassing its involvement in the selection and nomination procedures for members of SOEs supervisory boards.

Drawing upon the findings of the study, the authors proved the proposed hypotheses and formulated recommendations for the establishment of a set of criteria to strengthen the governance framework of the CoG.

Literature Review

Public administration operates in a unified hierarchical system and order, the core of its operation or "core executives" (Pollitt, 2020, p. 255) is formed by the CoG. Based on the literature review of CoG definitions in different periods of time, the authors highlight the following characteristics of the CoG (see Table 1).

Table 1. Characteristics of the CoG (Source: Created by the authors)

| Author | Characteristics |
|--------------------------|--|
| James & Ben-Gera (2004) | Consists of various bodies, advisory and support services to chief executives (p. 3) |
| Alessandro et al. (2013) | Consists of various institutions (units), advisory and support services to chief executives, “ <i>crosscutting governmental functions</i> ” (p. 9) |
| Beschel et al. (2018) | Consists of various bodies, and typical functions such as coordination, monitoring, etc. (p. 48) |
| Brown et al. (2021) | Consists of various institutions (structural units) and people, and provides support to chief executives (p. 6) |
| Shostak et al. (2023) | Consists of various institutions (units) and advisors, provides various types of support to chief executives, such functions as coordination, monitoring, coordination of policies and financial resources, etc. are typical (p. 26) |

The authors believe that the characteristics of the CoG indicate that it has characteristic actions that contribute to the achievement of policy objectives. Moreover, given that CoG has a hierarchical structure, reporting to the chief executives (for example, the Prime Minister), the specifics of its work concern and affect the entire public administration. Since the actions carried out by CoG affect subjects of various levels of government, the implementation of governance plays an important role.

Governance can be implemented in different ways (Fenger & Bekkers, 2016; Filgueiras et al., 2023; Fukuyama, 2013; Jose, 2007; Katsamunskas, 2016; Larmour, 1997; Liu, 2021; McGrath & Whitty, 2015; Tan et al., 2022; Wiarda et al., 2024; Xu et al., 2015). For example, Wiarda et al. (2024) note governance as a mission in which ongoing change creates the need for new ways and responsibilities of governance (p. 1), but McGrath and Whitty (2015) describe governance as a place of convergence. Katsamunskas (2016), analysing the governance structure, points out that governance is related to “the institutional capacity” (p. 134) of organisation, where, given “resource constraints” (p. 134), desired benefits (public and other) for society are provided in an efficient, responsible, fair and transparent way (p. 134), but Liu (2021) characterizes it as the responsible use of government powers to promote common good and meet the needs and interests of citizens, thereby “*achieving* the state of good governance” (p. 266).

To ensure the quality and effectiveness of governance, the principles of good governance are followed. The principles of good governance differ in public administration and corporate governance. Even though OECD (2023b) notes 32 principles of good public administration governance, it emphasizes one of the roles of the CoG in the coordination of effective and consistent public policy (p. 16). Coordination and harmonisation of policies are one of the central functions implemented by the CoG, since as a result of its activities, interconnected development planning documents are created in the country that correspond to the national development strategy or National Development Plan (NDP) and the financial resources planned therein. The NDP plays an important role not only in the development of the country’s economy but also in improving the quality of life of the country’s citizens, which means that the NDP is an instrument of long-term budget planning for the planned policies and reforms to be implemented. Furthermore, it should be noted that long-term policy planning is usually a complex process, for example, Chaponda et al. (2020), in their analysis of public investment management, note that including accurate financing in the national plans is a complex task; besides, a similar opinion express other researchers who analysed the NDPs and their implementation, additionally drawing attention to the fact that often it is difficult to obtain specific data on what has been done in the plan (Anam et al., 2024; Chimhowu et al., 2019; Filho et al., 2010; Vitola & Senfelde, 2011). Why else are NDPs important? NDPs are used to plan coherent structural plans in different sectors (e.g. education, social security, etc.) based on the included objectives and preliminary financing of activities. On the other hand, in Latvia, the NDP and the corresponding indicative financing information serve as the basis for medium-term national development planning documents (guidelines) developed by ministries within the same timeframe as the NDP. Accordingly, it is important not only to ensure mutual consistency of policy

documents but also to ensure their timely development and adoption in order to facilitate the effective and high-quality implementation of the NDP.

As mentioned above, corporate governance is based on its own principles of proper governance, although, there are still debates about which principles of corporate governance are the most effective and best (Bohdanowicz, 2015; Kuo & Lee, 2024; Levy Yeyati & Negri, 2023; Lu et al., 2022; Papenfuss & Wagner-Krechlok, 2023). In addition, it should be noted that effective governance increases the value of the company (Fioravante, 2021, p. 114), good governance refers to the processes through which decisions are made (Tomazevic et al., 2023) and governance quality can be improved to “maximize the benefit of the reforms” (Hu et al., 2023, p. 989), for example, SOE reforms. Effective and qualitative governance also influences the growth opportunities of SOEs, for example, Szarzec et al. (2021) note that the influence “of SOEs on economic growth” (p. 2) depends on “the level of institutional quality” (p. 2).

In Latvia there is a two-tier governance system for SOEs, meaning that some SOEs have both a supervisory board and a management board, which SOE will have a supervisory board depends on the amount of net turnover (more than 21 million euros) and the sum of the balance (more than four million euros) (Law on Governance of Capital Shares of Public Entity and Management of Capital Companies Thereof, Section 78). Therefore, the supervisory authorities of the largest SOEs are their supervisory boards, which represent both, the interests of holders of state capital shares and control of activities of the management board. On the other hand, public administration representatives from the CoG participate in the selection of members of the supervisory boards of SOEs, whose responsibilities include the implementation of the nomination process. The effectiveness and quality of the selection and appointment process for supervisory board members is reflected in the sustainable governance of SOEs (Moisello et al., 2024; Putra & Setiawan, 2024; Sigurjonsson et al., 2024), as emphasized by Magnúsdóttir et al. (2023) - “nomination committees have become important mechanisms for ..” ensuring “... good or sustainable governance” (p. 1). So, to ensure the quality and effectiveness of governance, it is necessary to adhere to the fundamentals of governance, which are shaped by the principles of good governance in both public administration and corporate governance.

The authors additionally note that there is a diversity of opinions among researchers on the issue of the existence and improvement of an effective and high-quality governance system, for example:

- Azimi and Shafiq (2020) recommend paying attention to all aspects related to good governance, in order to improve governance quality;
- assessing the quality of governance, Khyareh (2023) points out that strengthening the “governance system” (p. 8) itself must be constantly taken care of, since “economic growth” (p. 8) stimulates the growth of business activity, which is one of the conditions for good governance;
- Capano et al. (2023) note that the main “source of good governance” (p. 1) is the ability to analyse policies;
- Yahya Jafeel et al. (2023) note that “shareholder rights” (p. 5) are a key component of a sound “corporate governance system” (p. 5);
- Sidki et al. (2023) emphasize that effective governance of SOEs is reflected in the effective performance of tasks.

Taking into account above mentioned, the authors conclude that governance can be improved in various ways, but in order for the improvements to be effective and of high quality, it is necessary to understand the challenges facing governance.

Research Methodology

The study consisted of several parts, and the following methods were used for its implementation - literature review, content, and thematic analysis. In order to understand the theoretical concept of the CoG and to identify the institutions that form the CoG in Latvia, a literature review was conducted on

the concept and functions of the CoG, including considering Haddad et al. (2010) who developed the roles and functions of the CoG and its definitions in different periods. Using the knowledge gained from the literature review analysis of the regulations of 14 Latvian ministries was conducted to determine which ministries have typical functions of a CoG. Based on the lessons learned institutions making up the CoG were identified, and a definition of the CoG was developed.

The next stage of the research involved a review of the literature on good governance in public administration and corporate governance, linking it with the authors' framework for a CoG. Sequential steps were used in conducting a descriptive qualitative content analysis, identifying challenges of effective and qualitative governance concerning the operational functions and nomination process within it. In addition, the literature review identifies theoretical concepts of good governance as they apply to the Latvian CoG and its role in corporate governance, including participation in the nomination process.

In continuation of the study, the authors conducted a content analysis of the operational functions implemented by the CoG. The resources used in the analysis were selected based on their compliance with the specific structure of the CoG, study results on key principles of good governance at the CoG and corporate governance. The analysis of operational functions was based on: (a) a previously published study on the possibilities of improving the management of the CoG Latvia, in order to evaluate the significance of both managerial (governance provision) and operational functions (Cabinet of Ministers' operations) (Petrovska & Berzins, 2022a), (b) annual reports of institutions, that form Latvian CoG, in order to carry out the evaluation of achieved results and proposed courses of action, including indicators of effectiveness and quality of the CoG (Ministry of Justice, 2022; Ministry of Finance, 2022; State Chancellery, 2022), (c) NDP assessment to perform an exhaustive evaluation of the NDP2020, scrutinizing the attainment of predetermined developmental objectives, examining areas of shortfall and made investments (Cross-Sectoral Coordination Centre, 2022a). On the other hand, for evaluating the implementation of the nomination process, in the context of operational functions, authors relied on guidelines adopted in the country, which include issues necessary to ensure a successful nomination process for members of supervisory boards of SOEs (Cross-Sectoral Coordination Centre, 2020, 2022b) and previously published synthesis of research findings (Petrovska et al., 2023a, 2023b, 2023c; Petrovska & Berzins, 2022b). In-depth analysis of resources was also necessary to:

- analyse skills and roles of the CoG; researchers, in order to gain insights on how well-equipped the government is to make strategic decisions and implement different policies;
- assess operational functions to help identify areas for governance improvement at the CoG, ultimately contributing to better governance practices and outcomes;
- investigate the actions of holders of state capital shares during the nomination process to provide insight into the governance dynamics and decision-making processes;
- evaluate the effectiveness of the nomination process and propose solutions for enhancement to lead to improvements in governance structure and performance of SOEs, ultimately benefiting from good corporate governance principles.

The resources selected by the authors provided new, additional insights into the governance framework from the perspective of operational functions, as, using the thematic analysis method, the authors were able to integrate different perspectives on operational functions and draw new conclusions.

The study had several limitations. Although the CoG was analysed from the perspective of different authors, the study focused on the CoG in Latvia and the operational functions implemented in it. Since there are no completely identical NDPs, and each country has its own specific priorities and reforms that need to be implemented, to be able to compare NDPs authors analysed conclusions on the results of the implementation of NDPs, paying special attention to the ability of using financial resources. The study used the current legal framework for the nomination process in Latvia, which, although based on the OECD international guidelines on good corporate governance, may differ in other countries; in addition to the above, the implementation of the nomination process was analysed concerning supervisory boards, considering a two-tier SOE governance system operating in Latvia.

Research Results

Considering the institutional framework of public administration in Latvia Prime Minister (head of government) assumes a leadership role within the CoG. Operating under a coalition agreement, the Prime Minister holds significant sway in decision-making processes; key responsibilities of the Prime Minister entail shaping public policies and ensuring cohesive and coordinated government operations (State Administration Structure Law, 2002; Cabinet Structure Law, 2008; Regulations of the Cabinet of Ministers of September 7, 2021, No. 606)

Through an examination of Latvian public administration laws (State Administration Structure Law, 2002; Cabinet Structure Law, 2008; Law on Governance of Capital Shares of Public Entity and Management of Capital Companies Thereof, 2014) and regulations governing public entities (Regulations of the Cabinet of Ministers of September 7, 2021, No. 606; regulations of the 14 Latvian ministries; State Chancellery), authors have identified following public administration bodies constituting the CoG of Latvia:

- the State Chancellery is tasked with facilitating cohesive national development planning and orchestrating the alignment of diverse policies. Its functions encompass supervisory oversight and broad supervision of policy formulation, alongside the establishment of human resources policies of public administration; it performs tasks of coordinating authority for SOEs and holders of state capital shares, thereby ensuring reinforcement of good corporate governance principles (Brante et al., 2020);
- the Ministry of Justice plays a crucial role in ensuring adherence to legal standards, encompassing the monitoring of overarching policy formulation processes;
- the Ministry of Finance, being the primary public administration entity responsible for formulating financial policies, undertakes a supervisory oversight role and oversees the broader policy-making process. This involves monitoring the execution of the state budget and other financial mechanisms.

Taking into account the above structure, the authors define CoG as follows: the CoG is the instrument of the highest executive power of the state, which is in charge of national development planning, development of financial policies, and legal standards and overseeing their implementation.

Analysing differences between the key principles of good governance in public administration and corporate governance, the authors concluded that G20/OECD principles of good corporate governance are divided into several main areas: the responsibilities of the board (nomination process included), disclosure and transparency, sustainability and resilience (nomination process included), ensuring the basis for an effective corporate governance framework, institutional investors, stock markets and other intermediaries, the rights and equitable treatment of shareholders and key ownership functions (nomination process included) (OECD, 2023a). On the other hand, to implement good governance in public administration, OECD (2023b) identifies several roles of the CoG among the 32 principles of good governance in public administration:

- coordination and harmonisation of policies not only between various institutions but also within the CoG (OECD, 2023b, p. 16);
- providing support, in both - timely preparation of government decisions in accordance with regulations, making them clear and understandable, while ensuring that developed projects comply with established standards (OECD, 2023b, p. 16);
- clear coordination of internal and external communications (including the prevention of disinformation and fake news) (OECD, 2023b, p. 16);
- providing support in decision-making in various critical situations (including preparedness for possible crises in the future) (OECD, 2023b, p. 16).

The results of the analysis of operational functions indicate a positive perception of the governance of the policy planning system within the CoG. There is widespread confidence among CoG staff in the

system's ability to facilitate the planning, management, and organisation of various governance processes (Petrovska & Berzins, 2022a). This indicates that the CoG has developed a platform that supports and enhances the functioning of the policy planning system, contributing to overall governance effectiveness, which is in line with OECD principles of good governance at the CoG.

Based on an analysis of operational functions in the context of ex-post assessment of the Latvian National Development Plan for 2014-2020 (NDP2020) (Cross-Sectoral Coordination Centre, 2022a), the authors concluded that it contains an assessment of each NDP2020 priority, including information on the funding used for implementation, but it is not possible to determine the amount of actual costs, since the assessment of progress includes only approximate values.

Analysing various reports of ministries and the State Chancellery, the authors indicate that effectiveness indicators are used very rarely, mainly CoG uses metrics that, for example, contain information about the number of documents developed or the number of issues included, considered and approved at different sessions and sections (Ministry of Finance, 2022; Ministry of Justice, 2022; State Chancellery, 2022). In addition, it should be noted that the State Chancellery has created a unified public portal for the development, coordination, and harmonising of legal acts (the portal includes various types of draft documents, not only legal acts). The unified public portal is a data circulation information system, which allows anyone to get acquainted with and participate in the documents drafting at various stages of their development until their adoption by the Cabinet of Ministers. Considering that the unified public portal is a relatively new data circulation information system, it is too early to draw conclusions about its effectiveness. At the same time, it does not exclude the possibility of proposing an indicator, the implementation of which will help streamline the process of developing and approving draft development planning documents and legal acts.

Taking into account the results of operational functions, the authors propose the creation of several indicators of the effectiveness and quality of operational functions of the CoG in order to improve the policy development process. However, before turning to the presentation of indicators, it is necessary to explain the differences between the two terms – effectiveness and efficiency – to ensure a common understanding of the term used in the sequel – effectiveness indicator. The authors base their understanding of these two terms on Nagel's (1986) explanation, which relates effectiveness to the results of a certain policy, while efficiency – to expenses (incl. their reduction). The authors note that while the line between effectiveness and efficiency is difficult to draw, particularly, when planning policy or improving the nomination process, the effectiveness indicators included in the continuation are related to the improvement of the implemented policy, policy planning and implementation of the nomination.

The purpose of the quality indicator (Eq. 1, Table 2) is to monitor the approval of draft development planning documents (PD) and draft legal acts (LA) at meetings of the Cabinet of Ministers in a certain period of time so that the PD or LA draft should be no longer than six months from the draft's announcement on the unified public portal. The State Chancellery (in cooperation with line ministries) would be responsible for compiling the results of the indicator.

$$K(\%) = \frac{B}{A} \times 100 \quad (1)$$

where

K (%) is the number of PD/ LA drafts approved by the Cabinet of Ministers (no later than six months from the date of announcement of the draft on the unified public portal, per year (%));

B is the total number of approved PD/ LA drafts in six months during the time since the draft was announced on the unified public portal;

A is the total number of approved PD/ LA drafts per year.

Table 2. Six months' timeframe for PD/ LA draft approval (Source: Created by the authors)

| Target | Frequency | Source | Year to Year |
|--------------|-----------------|--|--------------|
| At least 75% | One time a year | Annual report developed by the State Chancellery | Yes |

The purpose of the effectiveness indicator (Eq. 2, Table 3) is to ensure consistency (compliance) of the NDP with the planned policy (planned financing) in such a way that the costs of implementing the NDP amount to at least 90% of the planned funding. The frequency and source of NDP monitoring in Table 3 are related to the Latvian legislation. The State Chancellery (in cooperation with line ministries) would be responsible for compiling the results of the indicator.

$$K(\%) = \frac{B}{A} \times 100 \quad (2)$$

where

$K(\%)$ is the execution from planned NDP financing, %;

B is the used NDP funding, *euro*;

A is an NDP planned financing, *euro*.

Table 3. The use of funding planned in the NDP (Source: Created by the authors)

| Target | Frequency | Source | Year to Year |
|--------------|---|---|--------------|
| At least 90% | Within a year after the expiration of the NDP | <i>Ex-post</i> assessment of NDP developed by the State Chancellery | No |

The results of the analysis of the nomination process reveal that the process of selecting and evaluating candidate members for supervisory boards of SOEs is laborious and often takes several months (Petrovska et al., 2023a; Petrovska et al., 2023c); the findings suggest that while the nomination committee operates within a closed system, it adheres to principles of good corporate governance and follows specific rules (Cross-Sectoral Coordination Centre, 2020, 2022b; Petrovska et al., 2023a). The results (Petrovska & Berzins, 2022b; Petrovska et al., 2023a; Petrovska et al., 2023c) indicate that a common reason for not continuing with an existing supervisory board member is that she/he has already had a relatively long history of service at the SOE's supervisory board, or that by using the nomination process, a better candidate can be identified, thereby strengthening the supervisory board's knowledge base. However, challenges such as time constraints and candidate rejection by the holder of state capital shares highlight the need for improved cooperation among stakeholders (Petrovska et al., 2023a). Time constraints emerge as a significant challenge in the nomination process, often leading to delays and additional evaluations; strengthening cooperation among stakeholders involved in the nomination process is crucial to overcoming these challenges and streamlining operations as well as strengthening collaboration can expedite decision-making and mitigate conflicts, ultimately enhancing the overall effectiveness of the nomination process (Petrovska et al., 2023c). Additionally, enhancing cooperation among supervisory board members and state representatives can contribute to the sustainable development of SOEs. Improvement in the nomination process is essential to ensure that supervisory board members possess the required qualifications and reputation (Petrovska et al., 2023b).

The State Chancellery plays a pivotal role in facilitating the nomination process, and its involvement has been instrumental in strengthening oversight and coordination (Law on Governance of Capital Shares of Public Entity and Management of Capital Companies Thereof, 2014; State Administration Structure Law; Regulations of the Cabinet of Ministers of January 7, 2020 No. 20 "Procedure for Nomination of Members of the Management Board and Supervisory Board in Capital Companies in which Capital Shares Belong to the State or a Derivative Public Person"; Cross-Sectoral Coordination Centre, 2020, 2022b). Although the nomination process for members of supervisory boards of SOEs is

well structured, the authors suggest that holders of state capital shares can work to streamline the nomination process and achieve the long-term goals of SOEs while upholding the principles of good governance. An analysis of the results of the nomination process shows the need to optimize the time spent on creating a nomination committee. In addition to the above, to improve the quality and effectiveness of governance at the CoG in relation to the nomination process, it is necessary to conduct time monitoring of activities associated with the timing of the holder of state capital shares decision regarding the candidate nominated by the nomination committee. Improvements in these areas will particularly strengthen the following principles of good corporate governance: sustainability and resilience, board responsibilities, and the rights and equitable treatment of shareholders and key ownership functions (OECD, 2023a).

The authors propose to develop the following quality and effectiveness indicators in order to improve the nomination process.

The purpose of the quality indicator (Eq. 3, Table 4) is to determine the number of decisions made on the nomination of current supervisory board members for the next term in office if the performance results of the member is sufficient. This metric encompasses assessing the performance contribution of both the CoG and SOEs. The State Chancellery (in cooperation with line ministries whose SOEs have supervisory boards) would be responsible for compiling the results of the indicator.

$$N(\%) = \frac{B}{A} \times 100 \quad (3)$$

where

$N(\%)$ is the number of decisions per year if the performance of the supervisory board members is sufficient %;
 B is the number of decisions assessed per year if the performance of the supervisory board members is sufficient;
 A is the total number of decisions made per year.

Table 4. Promotion to next term of office based on sufficient performance (Source: Created by the authors)

| Target | Frequency | Source | Year to Year |
|---------------|-----------------|--|--------------|
| Less than 50% | One time a year | Annual report developed by the State Chancellery | Yes |

The purpose of the quality indicator (Eq. 4, Table 5) is to determine the number of decisions made regarding the advancement of existing supervisory board members to the next term in office, if the performance of the supervisory board member is good/very good. Similar to Eq. 3, Table. 4, this indicator also covers the contribution to the evaluation of the performance of both - CoG and SOEs. The State Chancellery (in cooperation with line ministries whose SOEs have supervisory boards) would be responsible for compiling the results of the indicator, ensuring that the data collection is transparent, and based on normative acts and guidelines, thus avoiding potential political influence. The authors point out that the indicators included here (Eq. 4, Table 5) and further (Eq. 5, Table 6 & Eq. 6, Table 7) are related to the assessment of the performance of the members of the supervisory boards of SOEs when the supervisory board of SOE presents to the holder of state capital shares individual assessment of the supervisory board members together with an assessment of the performance of relevant functions of the supervisory board. Since the State Chancellery, as an institution within the CoG, is involved in the implementation of the nomination process and acts as a coordinating institution for the management of SOEs and state capital shares, included indicators (Tables 4, 5, 6), although obviously not showing major improvements, provide insight into the policy results and CoG performance.

$$N(\%) = \frac{B}{A} \times 100 \quad (4)$$

where

N (%) is the number of decisions per year if the performance of the supervisory board members is good/ very good;
 B is the number of decisions assessed per year if the performance of the supervisory board members is good/ very good;
 A is the total number of decisions made per year.

Table 5. Promotion to next term of office based on good/ very good performance (Source: Created by the authors)

| Target | Frequency | Source | Year to Year |
|--------|-----------------|--|--------------|
| 80% | One time a year | Annual report developed by the State Chancellery | Yes |

The purpose of the quality indicator (Eq. 5, Table 6) is to identify the organisation of the candidate selection process when selecting members of the supervisory board of SOEs, if the nomination process has ended with a positive result. Outcomes of the indicator will help in understanding potential inefficiencies or challenges within the selection process, allowing for targeted improvements or interventions to enhance its effectiveness and streamline it. The State Chancellery (in cooperation with line ministries whose SOEs have supervisory boards) would be responsible for compiling the results of the indicator.

$$N(\%) = \frac{B}{A} \times 100 \quad (5)$$

where

N (%) is the number of cases per year, %;
 B is the number of organized selections of candidates for members of the supervisory boards of SOEs if it ended with a positive result;
 A is the number of organized selections of candidates for members of the supervisory boards of SOEs per year.

Table 6. Selections of SOE Supervisory Board Members with a positive result (Source: Created by the authors)

| Target | Frequency | Source | Year to Year |
|---------------|-----------------|--|--------------|
| Aspire to 90% | One time a year | Annual report developed by the State Chancellery | Yes |

The purpose of the effectiveness indicator (Eq. 6, Table 7) is to identify the decision-making time of the holder of state capital shares after receiving the candidate of the nomination committee. The benefit of such monitoring is the evaluation of the effectiveness and responsiveness of the holder of state capital shares in decision-making. The State Chancellery (in cooperation with line ministries whose SOEs have supervisory boards) would be responsible for compiling the results of the indicator.

$$N(\%) = \frac{A}{B} \times 100 \quad (6)$$

where

N (%) is the average time for a holder of state capital shares to make a decision, %;
 A is the average number of working days used to make a decision;
 B is the number of working days in one month.

Table 7. Time spent in decision-making (Source: Created by the authors)

| Target | Frequency | Source | Year to Year |
|--------|-----------|--------|--------------|
|--------|-----------|--------|--------------|

| | | | |
|---------------------------------|-----------------|--|-----|
| For no more than 1 month (100%) | One time a year | Annual report developed by the State Chancellery | Yes |
|---------------------------------|-----------------|--|-----|

The purpose of the effectiveness indicator (Eq. 7, Table 8) is to determine that no more than four weeks are needed to form a nomination committee. With the help of this indicator, it will be ensured that the process of establishing the nomination committee is timely and efficient with a clear deadline of no more than four weeks, thus facilitating the smooth operation of the nomination process.

$$N(\%) = \frac{A}{B \times 20} \times 100 \quad (7)$$

where

$N(\%)$ is the average time to form a nomination committee (%);

A is the total number of working days spent on forming the nomination committee;

B is a number of formed nomination committees;

20 is the number of working days in one month.

Table 8. Time spent in forming a nomination committee (Source: Created by the authors)

| Target | Frequency | Source | Year to Year |
|--|-----------------|--|--------------|
| Within no more than 20 working days (100%) | One time a year | Annual report developed by the State Chancellery | Yes |

The authors believe that they have succeeded in proving both of the proposed hypotheses because the study reveals that:

- in fact, by comparing the quality and effectiveness indicators related to the CoG, the authors conclude that the processes related to the quality indicators may be better as they reflect the broader long-term results and satisfaction of the parties involved (interested parties), which are necessary for assessing the operational functions of the CoG. For instance, the CoG primarily uses metrics such as the number of documents developed or the number of issues considered and approved at different sessions and sections, while the CoG assesses the progress of policy priorities, including information on funding, it lacks assessment of actual costs of implementing NDP2020. Collection and analysis of quality indicators related to CoG is an effective way to continuously improve CoG governance thus improving the overall CoG performance. At the same time, the authors note that various indicators are important for creating conditions that facilitate solutions for various governance problems. (H2)
- when reviewing the relationship between the nomination process and performance, it is necessary to focus on measurable aspects, such as quality and timeliness of decision-making. Study shows that CoG operational functions are crucial when it comes to ensuring that governance processes are both efficient and in line with policy objectives. In this context, the nomination process plays a vital role in improving the effectiveness and quality of SOE performance, as effective nomination processes help ensure that professionals become members of SOE supervisory boards, thereby improving not only overall governance but also guiding SOEs towards achieving the goals they have set. The State Chancellery's pivotal role in facilitating the nomination process highlights its importance in strengthening oversight and coordination. While the nomination process is well-structured, holders of state capital shares can work to streamline it further and achieve the long-term goals of SOEs while upholding principles of good corporate governance. (H1)

Discussion

Analysis of the CoG framework and its definitions showed its complex system, which corresponds to Beschel et al. (2018), James and Ben-Gera (2004), Shostak et al.'s (2023) descriptions of the characteristics features of the CoG, concerning both the provision of direct support and strategic guidance to the chief executive and the implementation of the main coordination function performed by the CoG. Given the complexity of the organisational structure of the CoG, as well as the general nature of its definitions, the authors believe that it is useful to conduct further research on the CoG in different governance settings to clarify not only the capabilities of the CoG to ensure multi-level coordination, but also to study how different governance models affect the effectiveness of the CoG.

Multi-level coordination is one of the central operational functions of the CoG since the result of the work is the creation of NDP. The authors believe that the implementation of NDPs is a challenge. The challenge that countries, including Latvia, face is they cannot accurately plan the costs of the activities included in NDPs, as Chimhowu (2019) highlighted, there is a gap between planning and financing. As in the case of Chimhowu (2019), the authors ask whether this gap is a consequence of various financial constraints, unforeseen external events, or the inability to plan precise expenditures for a longer period of time, for example, six years, which is the average durations of the NDP? A possible answer lies in the division of responsibility between financing and planning national development. According to the authors, this problem indicates the need to improve the coherence of these two processes. Therefore, the authors believe that future research would benefit from investigating NDP by focusing on detailed case studies to understand the reasons and factors influencing the alignment of these two processes. In general, the analysis of the Latvian NDP (NDP2020) shows the need to monitor the implementation of the NDP and monitor the timely approval of PD / LA in the government, which facilitates the timely transfer of the NDP to the level of sectoral policy.

This study also analysed governance and principles of good governance. Our study confirms the view expressed in the literature, that governance is not an exception, but a universal requirement that contributes to the effective functions of an organisation (Katsamunskā, 2016; McGrath & Whitty, 2015). When applying the principles of good governance, it is important to understand that it is not only a matter of following rules and order, but also a dynamic process (Filgueiras et al., 2023), requiring the balancing of various interests (for example, the implementation of the coordination function). Effective and high-quality governance also affects the SOEs ability to achieve the set key performance indicators. For example, good corporate governance principles note not only the importance of the nomination process in promoting the sustainability of an SOE, achieving financial, non-financial and general strategic goals, but also the important role of the nomination process in the mechanism of good governance, so that the governance system is effective and of high-quality (OECD, 2023a).

Nomination committees play an important role in improving corporate governance as they are the mechanism through which good corporate governance practices are implemented. The above is not inconsistent with Putra & Setiawan (2024) who emphasize that the primary role of the nomination committee is to protect the interests of all parties involved, which helps maintain not only governance balance but also improve profitability. Furthermore, Moisello et al. (2024) emphasize that nomination committees are responsible for both - defining the selection criteria and making selections according to the established criteria. Thus, establishing clear selection criteria helps to create an effective and competent supervisory board, which is necessary for effective corporate governance. In summary, nomination committees are recognized as key components of the corporate governance structure.

Despite the results of the study, it had several limitations. Governance and its implementation principles were analysed in the context of the CoG framework, with a special focus on the nomination process and the development of the NDP. The study is largely based on existing literature and legal framework, which may not reflect current reforms in public administration, SOEs or changes in any of the functions implemented by the CoG.

Conclusions

Governance, a cornerstone of effective CoG operations, is a dynamic process that ensures the organisation navigates challenges and maintains equilibrium. Despite internal and external pressures, a well-governed CoG can effectively address problems and achieve its objectives. The diverse principles

of good governance underscore the complexity of evaluating governance systems. Variations in assessments of governance effectiveness and quality highlight the need for ongoing review and improvement.

Analysis of operational functions within the CoG's policy planning system reveals a positive perception of its governance. This suggests widespread confidence in the system's ability to facilitate planning, management, and organisation across various governance processes. The CoG has developed a platform that supports and enhances the functioning of the policy planning system, contributing to the overall quality and effectiveness of its governance.

The findings of this study present a significant contribution to the enhancement of governance processes within the CoG. Based on the study findings, the authors propose the creation of several indicators to evaluate the effectiveness and quality of the functions of the CoG, particularly focusing on improving the NDP assessment and nomination process. Authors believe, that developed quality and effectiveness indicators for better CoG governance would:

- help to improve the nomination process and NDP assessment, thereby strengthening principles of good corporate governance and public administration;
- provide valuable insights into the efficiency and cost-effectiveness of NDP, aligning with the principles of good governance in public administration and corporate governance.

This study presents a novel approach to examining the nomination process for supervisory board members of SOEs within the context of the CoG's operational functions. By adopting an integrative perspective, we gain a comprehensive understanding of how governance processes at the CoG influence critical decision-making within SOEs, identifying potential areas for improvement.

A key advantage of our proposed criteria system is its adaptability. Although developed for the Latvian context, the system can be easily adapted to governance frameworks in other jurisdictions. This flexibility is particularly valuable for addressing issues related to the selection and nomination process and effective NDP management. As such, our criteria system offers a valuable tool for governance practitioners worldwide.

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THE ROLE OF INDUSTRY 4.0 IN THE CONTEXT OF ECONOMIC PERFORMANCE OF ENTERPRISES: A LITERATURE REVIEW

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Abstract

Research purpose. This literature review aims to comprehensively examine the role of Industry 4.0 in shaping the economic performance and sustainability of enterprises within Central European countries and provide a nuanced understanding of the impact of Industry 4.0 technologies on corporate performance in this regional context. Implementation of Industry 4.0 technologies, such as IoT devices, artificial intelligence, and robotics, enhances operational efficiency. This efficiency can lead to cost reductions, improved production processes, and streamlined supply chains, positively impacting the economic performance of enterprises. Increased innovation often translates to the development of new products and services, driving revenue growth and positively affecting economic metrics.

Design / Methodology / Approach. Employing a literature review methodology, snowballing techniques, and bibliometric analysis, this study examines a wide range of scholarly articles, reports, and publications to discern patterns, current trends, and empirical evidence related to the nexus between Industry 4.0 adoption and corporate outcomes.

Findings. The findings reveal the multifaceted influence of technologies such as automation, artificial intelligence, and the Internet of Things on key economic indicators, including revenue growth, cost efficiency, and profitability, across various industries. Additionally, the review highlights the current trends, identifies methodological approaches, and suggests potential avenues for future research.

Originality / Value / Practical implications. This synthesis contributes valuable insights to the discourse on Industry 4.0's implications for economic performance and sustainability, adds significant value to the understanding of the intersection between technological advancements and economic outcomes in the business landscape, offering a foundation for scholars, practitioners, and policymakers interested in navigating the transformative landscape of advanced technologies within the business context.

Keywords: industry 4.0; economic performance; economic sustainability.

JEL codes: G30, M14.

Introduction

Economic health analysis is an indispensable component throughout the entire life cycle of a business. The economic condition of the organisation serves as a significant indicator of its present state. Corporations are compelled to adjust to the prevailing market conditions as a result of dynamic market shifts and persistent competitive pressure. Business managers have the ability to influence the future trajectory of the organisation by making decisions based on an assessment of its economic health. For instance, they may determine the company's future trends and orientations in order to enhance its

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competitiveness and appeal to potential investors. An essential economic indicator is the competitiveness of economies and businesses, as stated by Gavurova et al. (2020). Each sane entrepreneur initiates a business venture with the objective of achieving success. The company, however, ultimately encounters a crisis point and is compelled to adjust in order to survive in the business environment, as defined by the life cycles. However, the processes that operate within the organisation are also of equal significance. The advent of digitization has prompted significant changes in the course and structure of business processes, qualitatively altered methods and approaches in management, influenced modifications in established business models, generated the emergence of novel professions, and necessitated expansions of education, skills, and abilities among the human workforces. Moreover, it has caused a shift in the economy and has the potential to accelerate various significant developments.

The integration of Industry 4.0 within organisations aims to revolutionise industrial production through the implementation of cutting-edge technologies and digitization. To enhance global competitiveness, globalisation necessitates production that possesses sufficient adaptability to satisfy market demands (Schwab, 2016). This objective can be realised through the implementation of Industry 4.0 technology in the value chains and manufacturing processes of the organisation. In order to ensure the successful execution of Industry 4.0, the integration process must revolutionise industrial facilities into intelligent factories that prioritise connectivity and interoperability. Industry 4.0 is a technological and socioeconomic phenomenon distinguished by the implementation of information systems for product decision-making, intelligent manufacturing of big data, and advanced real-time analytics (Zabojnik, 2015). Real-time production planning, which is a defining feature of intelligent manufacturing facilities and the foundation of big data analysis in Industry 4.0 and artificial intelligence, enables interoperability and interconnection among the Internet of Things made possible by technological advancements. The inception phase of smart factory development (Malkowska et al., 2021) involved the manufacture of a solitary product utilising assembly lines comprised of devices that possess clearly defined functionalities. As the expansion persisted, additional opportunities, such as the mass production of a variety of goods, were investigated. Presently, computer numerical control (CNC) technology advancements permit flexible manufacturing. In order to adapt to the demands of a dynamic market, manufacturers have the ability to modify both the variety and quantity of their products.

Cyber-physical production systems, which form the foundation of intelligent facilities, are distinguished primarily by their autonomy and decentralisation. These systems integrate physical systems with information and communication technologies (Ionescu, 2021). Cyber-physical manufacturing systems communicate and capture data throughout the entire industrial process by integrating with real-time manufacturing planning via the Internet of Things. The communication protocol utilised by computer-physical systems is governed by informational Internet of Things systems that are AI-powered. Enhanced connectivity facilitates the acquisition and interchange of up-to-date information pertaining to every facet of industrial operations (Marik, 2016). Cyber-physical manufacturing systems are self-regulating, capable of analysing the outcomes of previous actions and learning from them while making decisions based on real-time data and algorithms. Software providers in decentralised smart factories include enterprise resource planning (ERP) applications, cyber-physical manufacturing networks, decision algorithms based on artificial intelligence, and manufacturing execution systems (MES) (Svabova et al., 2021). Maintaining consistent Wi-Fi connectivity is essential for facilitating communication among computers situated on the shop floor. The Industrial Internet of Things is a globally interconnected network that facilitates continuous connectivity and enhanced machine interaction in accordance with specific standards. The Industrial Internet of Things falls within the broader domain of the Internet of Things (IoT). This sector is predicated on the utilisation of sensor networks, big data-driven decision-making, and real-time monitoring of computerised physical systems (Bonab, 2017).

Some intelligent manufacturing duties require human-machine interaction due to the impossibility of completely automating them. Nevertheless, although these duties were previously executed manually, they remain a substantial progression. Humans can communicate with and provide information to machines. With the addition of life cycle monitoring and location sensors to manual production, smart factories are capable of manufacturing intelligent goods, which significantly simplifies maintenance

(Lazaroiu & Harrison, 2021). Product Lifecycle Management is a business activity that oversees and controls the complete life cycle of products, starting from their conception and ending with their retirement (Sjodin et al., 2018). It operates within computerised physical manufacturing networks and is accountable for the management of the manufacturing process. Considering the company's product identification and its contribution to anticipated profit, it functions as a critical element of intelligent manufacturing facilities while simultaneously safeguarding employee health. Product life cycle administration is, nevertheless, a formidable task. These components consist of organisational frameworks, personnel, product data, and various approaches, among others (Stark, 2016). Cloud manufacturing and big data analysis are essential components of Industry 4.0. Smart factory machines possess the capability to acquire knowledge and engage in real-time interactions with their surroundings, in addition to their tangible manifestations, by virtue of a cloud-based virtual identity (Tao et al., 2019). The implementation of cloud-based data collection in conjunction with cyber-physical systems enables the maintenance of uninterrupted data exchange (Pavlinek & Zenka, 2016).

Industrial artificial intelligence, IoT sensor networks, and real-time big data analytics are collaborating to facilitate the convergence of the physical and digital realms. Threat detection and decision-making in real-time are made possible through the collection and analysis of data (Verhof et al., 2021). It is a production-enhancing procedure that decreases errors. The proliferation of geographically dispersed data centres on a global scale enables organisations of all sizes to enhance and optimise their productivity. It is costly to construct one's own data centres and computing clouds. Intelligent networked sensors enhanced real-time analytics, and information systems for product decision-making are all components of Industry 4.0 (Schot & Steinmueller, 2018). Physical objects are created using additive manufacturing, also referred to as 3D printing, which operates by depositing successive layers into a three-dimensional framework, using digital 3D models as inspiration (Brioschi et al., 2021). The adaptability of additive manufacturing processes is what gives them their value. Before the advent of mass production, this approach was predominantly employed to rapidly prototype products (Horn & Ola, 2012), as it offered a cost-effective substitute for manufacturing small quantities of high-quality goods.

Furthermore, the integration of computational data into the physical environment is classified as an advanced manufacturing technology (Volker, 2014). This information may be transmitted to visual components that are incorporated into the enterprise's environment. Augmented reality assists employees with challenging duties in a dynamic workplace in real-time (Krulicky & Horak, 2021). Artificial intelligence (Goel & Gupta, 2020) is an innovative technological advancement that presents a positive supplement to the manufacturing process by empowering machines or computers to execute tasks that resemble human actions. Pisar & Bilkova (2019) define artificial intelligence as the capacity of machines to emulate human intelligence by utilising synthetic knowledge. Understanding intelligent learning-enabled processes requires an appreciation of the significance of IoT-based robotic systems in automated manufacturing operations. The variability in production utilisation of robots can be attributed to their suitability for distinct industrial sectors. Industry 4.0, which encompasses manufacturing, logistics, and office administration, is concurrently influencing the development of robot capabilities (Kubickova et al., 2021). Robot palletizing significantly affects both production time and output through the implementation of intelligently connected sensors, cognitive decision-making algorithms, and real-time process monitoring (Lamon et al., 2020). The imperative for enterprises to adopt Industry 4.0 is due to the pivotal function that technology plays in surmounting economic competition (Popescu et al., 2022). Not limited to production change, the implementation of Industry 4.0 encompasses all services and activities along the entire value chain (Vinerean et al., 2022). Organisations will probably seek to utilise Industry 4.0 technologies in conjunction with their current resources. It is necessary to devise a method for precisely transforming widely available technologies and devices to conform to this new paradigm (Hamilton, 2022; Nica, 2021).

The primary objective of this paper is to examine the role of Industry 4.0 in shaping the economic performance and sustainability of enterprises within Central European countries and provide a nuanced understanding of the impact of Industry 4.0 technologies on corporate performance in this regional context. This research endeavours to examine the convergence of Industry 4.0 and enterprise economic

performance, providing an original viewpoint on the far-reaching consequences that digitalization and advanced technologies can have on business activities and economic results.

The paper is structured in a subsequent manner. The first part of the paper is devoted to the description of the methods used. Focusing on the literature review approach, bibliometric analysis offers an assessment of the existing literature in a quantitative way. The results and discussion section provide the outputs of the Web of Science articles analysis, using Bradford’s Law and bibliometric analysis in the form of bibliometric map and clusters which are formed by categorizing outputs into specific fields. These clusters are further discussed in a broader context. The conclusions section summarizes the main ideas of the paper, as well as the implications for policymakers, business professionals, and academicians who may learn from this assessment of Industry 4.0 adoption in different corporate units and take appropriate measures.

Research Methodology

By conducting a literature review that addresses new trends and impacts of I4 on the operation and economic performance of enterprises, valuable insights into how Industry 4.0 influences the economic performance of enterprises can be provided. To conduct the literature review, the Web of Science database was used. The initial search, using the combined words “industry 4.0” and “economic performance,” brought 549 scientific outputs worldwide. However, to be able to analyse the documents, their relevance and significance in the given field, we focused only on the papers written in English and of course those, which could be easily retrieved. The final set consists of 84 documents which are further analysed (Table 1).

Table 1. Analysed sources (Source: created by the authors)

| Description | Results |
|---------------------------------|----------------|
| MAIN INFORMATION ABOUT DATA | |
| Timespan | 2016-2023 |
| Sources (Journals, Books, etc.) | 60 |
| Documents | 84 |
| Annual Growth Rate % | 52.57 |
| Document Average Age | 2.57 |
| Average citations per doc | 28.19 |
| References | 6,563 |
| DOCUMENT CONTENTS | |
| Keywords Plus (ID) | 400 |
| Author's Keywords (DE) | 227 |
| AUTHORS | |
| Authors | 189 |
| Authors of single-authored docs | 3 |
| AUTHORS COLLABORATION | |
| Single-authored docs | 3 |
| Co-Authors per Doc | 2.25 |
| International co-authorships % | 21.23 |
| DOCUMENT TYPES | |
| Article | 84 |

Following a comprehensive analysis, the VosViewer software was employed to generate a term co-occurrence map from the text data and aggregate the most significant research categories. The factor weight influences both the label and circle size of the item. A closer appearance on the map indicates a stronger association between the terms, corresponding to a larger distance. On a cartographic representation, objects of greater mass are given greater prominence than those of lesser mass. The two weight attributes that are commonly used are the links property and the aggregate link strength attribute. According to Vosviewer (2024), the links and total link strength attributes of an item indicate the quantity and overall strength of links it maintains with other items, as well as the strength of those links specific to that item. The terms are categorised into distinct clusters based on their colouration; terms that are affiliated with the same cluster exhibit more intimate relationships than those that are not. An object may only belong to a single cluster. VOS Viewer supports a wide range of property types for its items. By default, items in the network visualisation are represented by their label and a circle. The colour of an object is determined by the cluster to which it is assigned. Connector lines are utilised to represent links. The map was generated utilising the normalisation method and association strength determined from bibliographic information. The association strength approach is utilised to normalise the intensity of the relationships between objects when this option is selected (Vosviewer, 2024).

Results

The period of the analysis was chosen directly from the beginning of the I4 principles into the corporate practice. With only three scientific outputs published in the first year (2016), the topic seemed to be in its early stages. The state of affairs remained unaltered until 2019. However, as illustrated in Figure 1, the implementation of the fourth revolution in technology was expedited by COVID-19, and businesses increasingly turned to big data, cloud computing, artificial intelligence, and the speed of 5G networks (French et al., 2021). Significant progress and contributions to research have been consistently observed since 2020 when the quantity of publications doubled to six. The acceleration of digital transformation and the integration of Industry 4.0 technologies into corporate operations in response to market dynamics and to ensure economic stability was clearly demonstrated by the COVID-19 pandemic. A substantial surge in the quantity of publications (29 scientific papers) occurred in 2023, suggesting that the discipline has either garnered considerable attention or that specific findings have stimulated further investigation.

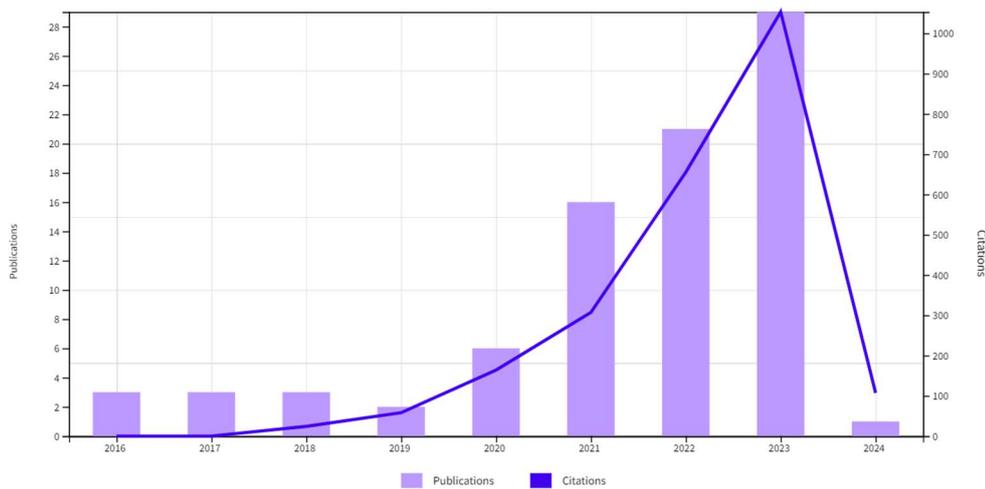


Fig. 1. Yearly research publication (Source: created by the authors)

Figure 1 also illustrates the number of citations received by the publications, indicating that the articles have had a significant impact. The number of citations has increased 10 times in the analysed period. In order to preserve conciseness and concentrate on the most abundant sources, table 2 only includes the top 10 most cited articles.

Table 2. Most-cited articles (Source: created by the authors)

| Authors | Title | Cited by | Average citation per year |
|-------------------------|---|----------|---------------------------|
| Kiel et al. (2018) | Sustainable industrial value creation: Benefits and challenges of Industry 4.0 | 365 | 45.63 |
| Nagy et al. (2018) | The role and impact of Industry 4.0 and the Internet of things on the business strategy of the value chain – The case of Hungary | 276 | 39.43 |
| Kohtamaki et al. (2020) | The relationship between digitalization and servitisation: The role of servitisation in capturing the financial potential of digitalization | 258 | 51.6 |
| Khan et al. (2021) | Industry 4.0 and circular economy practices: A new era business strategies for environmental sustainability | 181 | 45.25 |
| Dhamija & Bag (2020) | Role of artificial intelligence in operations environment: A review and bibliometric analysis | 110 | 22.00 |
| Tang et al. (2022) | Industry 4.0 technology and circular economy practices: business management strategies for environmental sustainability | 106 | 35.33 |
| Alkaraan et al. (2023) | Corporate transformation towards Industry 4.0 and financial performance: The influence of environmental, social, and governance (ESG) | 85 | 21.25 |
| Yu et al. (2022) | Circular economy practices and Industry 4.0 technologies: A strategic move of automobile industry | 85 | 21.25 |
| Potocan et al. (2021) | Society 5.0: Balancing of Industry 4.0, economic advancement, and social problems | 69 | 13.8 |
| Lin et al. (2023) | Industry 4.0: Driving factors and impacts on firm's performance: An empirical study on China's manufacturing industry | 64 | 10.67 |

A summary of the article-based research areas that precisely correspond to the article's subject is provided in Figure 2. A significant proportion of papers (27%) are published in the field of business economics. With a combined total of 42 records, engineering and environmental sciences ecology are also the foremost research domains (according to the Web of Science database's categorization of journals into multiple research areas).

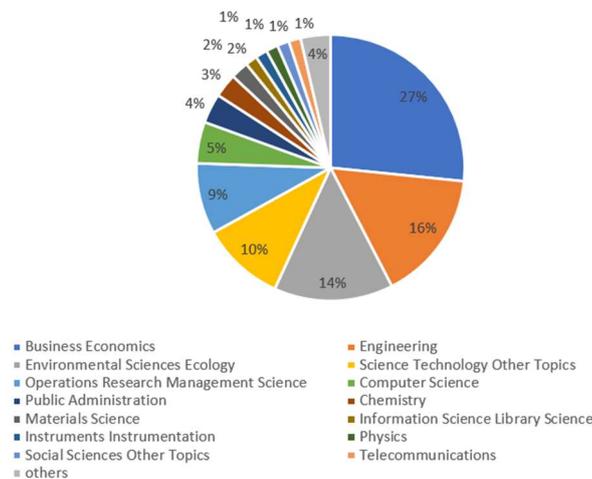


Fig. 2. Records distribution based on fields of the study (Source: created by the authors)

Based on the set of publications, Bradford's Law was applied. This technique identifies three zones of productivity; thus, relevant journals can be split into three categories. Each group contributes to the same number of articles. As shown in Tables 2 and 3, zone 1 includes seven journals with a total number of 27 articles. The Sustainability journal is the one with the top position as it has published ten articles. This zone 1 features scientific journals that are probably the main resource for scholars working in the field and that regularly publish articles on the subject. Zone 2 includes 20 journals with a total number of 28 articles. This category includes a wider variety of publications (usually these journals published one or two papers) that are not exclusively focused on the topic but occasionally analyse it. Zone 3 has the widest variety of publications (29) which are published in 33 journals. Although these magazines do not routinely cover the research subject, only occasionally.

Table 3. Most frequent sources/journals (zone 1) (Source: created by the authors)

| Journal title | Record count | % of 84 |
|--|--------------|----------|
| Sustainability | 10 | 11.905 % |
| Technological Forecasting and Social Change | 5 | 5.952 % |
| International Journal of Production Research | 3 | 3.571 % |
| Business Strategy and the Environment | 3 | 3.571 % |
| Applied Sciences Basel | 2 | 2.381 % |
| Benchmarking An International Journal | 2 | 2.381 % |
| Environmental Science and Pollution Research | 2 | 2.381 % |

Table 4. Zone-wise distribution of journals (Source: created by the authors)

| Zone | Journals | % Journals | Articles | % Articles | Multiplier |
|-------|----------|------------|----------|------------|------------|
| 1 | 7 | 11.67 % | 27 | 31.14 % | - |
| 2 | 20 | 33.33 % | 28 | 33.33 % | 2.85 |
| 3 | 33 | 55.00 % | 29 | 34.53 % | 1.65 |
| Total | 60 | 100 | 84 | 100 | 3.25 |

The accuracy computation is as follows:

$$\begin{aligned}
 &1 : n : n^2 \\
 &7 : 20 : 33 \\
 &7 : 7 \times 2.25 : 7 \times (2.25)^2 :: 1 : n : n^2 \\
 &7 : 15.75 : 35.44 > 58.19 \tag{1} \\
 &\% \text{ error} = \frac{58.19 - 60}{60} = -3.02 \%
 \end{aligned}$$

The findings of the analysis indicate that Bradford's law accurately described the provided data, with an error rate of 3.02%. That is to say, it conforms to the law of dispersion within the designated mapping region.

The subsequent stage of the analysis involves the development of bibliometric maps that aggregate the most significant research categories and the generation of a term co-occurrence map. This map is generated using the text data. Bibliometric analysis quantitatively evaluates publications in order to

detect patterns and trends. This process has resulted in the development of numerous significant topics that have significantly influenced the trajectory of the state of the art in this research field. We conducted a critical preparatory phase prior to clustering, during which we meticulously identified and eliminated synonyms to ensure the uniqueness of each category. Improving the accuracy and relevance of the resultant clusters necessitated the prevention of confusion between concepts that are conceptually similar but distinct.

The minimum number of occurrences of a term in our cases was established at level 10, with 28 terms satisfying the criterion. On the basis of the relevance scores calculated for each of these 28 terms, the terms deemed most pertinent were chosen. By default, sixty per cent of the most pertinent terms are selected. The parameters in question were implemented using Vos Viewer, an application that efficiently classifies the data (Figure 3). The factor weight influences both the label and circle size of the item. A closer appearance on the map indicates a stronger association between the terms, corresponding to a larger distance.

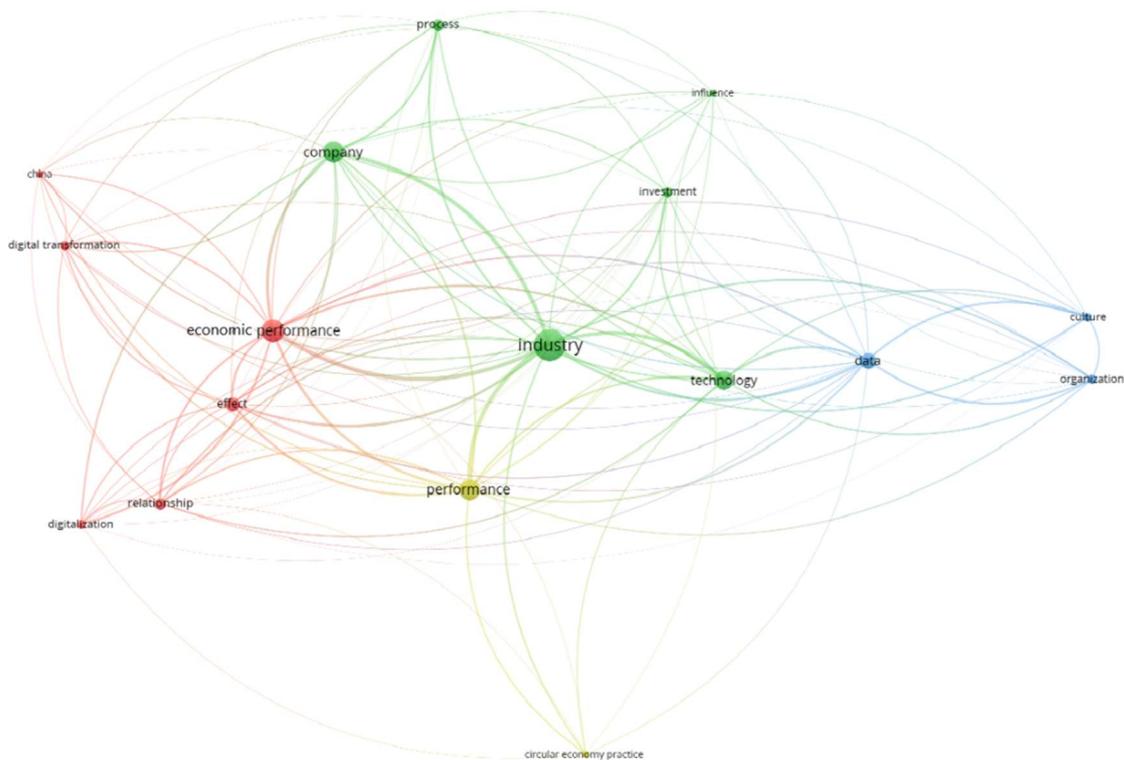


Fig. 3. Bibliometric analysis (Source: created by the authors)

Four significant clusters, each delineated by a distinct colour, are evident on the bibliometric map using the link data, total link strength, occurrence between keywords and their relevance. This visual representation provides insight into the progression and thematic structure of the influence of Industry 4.0 on the economic performance of businesses (see Table 5).

These clusters, which are derived from an analysis of scientific publications, also reveal current Industry 4.0 trends and their influence on the economic performance of businesses. With the aim of attaining operational excellence, businesses (particularly those in central Europe) are progressively adopting Industry 4.0 technologies within the framework of digital integration. The implementation of digital integration enables the supervision and regulation of manufacturing processes in real time, resulting in enhanced output and reduced expenses. In an effort to inform strategic decisions, organisations are placing a greater emphasis on data analytics, which capitalises on the enormous quantities of data produced by interconnected devices. The adoption of advanced technologies influences financial reporting practices, requiring adaptations to account for new business models and valuation methods. However, cultural, and institutional factors vary across the countries and the implementation and

effectiveness of Industry 4.0 is strictly influenced by these factors, especially in terms of economic performance. Moreover, with the increasing reliance on data-driven decision-making, there is a trend towards investigating the ethical considerations associated with data usage in Industry 4.0 and also its role in promoting sustainability and green practices.

Table 5. Thematic evolution (Source: created by the authors)

| Cluster | Terms included | Occurrences | Links | Total links strength | Relevance |
|---------------------|---------------------------|-------------|-------|----------------------|-----------|
| Digital integration | digitalization | 16 | 11 | 274 | 2.26 |
| | digital transformation | 20 | 11 | 289 | 1.16 |
| | China | 10 | 11 | 180 | 0.72 |
| | economic performance | 95 | 16 | 1,364 | 0.56 |
| | relationship | 26 | 16 | 389 | 0.48 |
| | effect | 38 | 15 | 639 | 0.43 |
| Business operation | company | 80 | 15 | 1,037 | 1.09 |
| | industry | 183 | 16 | 2,084 | 1.01 |
| | process | 25 | 13 | 336 | 0.70 |
| | technology | 64 | 16 | 913 | 0.49 |
| | investment | 18 | 14 | 273 | 0.36 |
| | influence | 10 | 13 | 177 | 0.30 |
| Cultural factors | culture | 14 | 19 | 327 | 2.30 |
| | organization | 16 | 11 | 365 | 2.23 |
| | data | 46 | 16 | 778 | 1.30 |
| Circular economy | circular economy practice | 11 | 8 | 165 | 1.05 |
| | performance | 79 | 16 | 1,188 | 0.57 |

Digital technology has a moderately positive effect on the overall performance of a corporation. However, innovation performance is most significantly impacted, followed by operational efficiency and economic performance (Oduro et al., 2023). Pucci et al. (2023) conducted an analysis of the significance of digital integration as it pertains to the economic performance of small and medium-sized enterprises. According to their findings, the extent of digital integration has a positive impact on firm performance, while digital integration itself has no effect. Moreover, organisations that prioritise open innovation may attain significantly superior performance results. Ribeiro-Navarette et al. (2023) demonstrated that the degree of digitalization, as assessed by the intensity of digital management, can account for differences between industries and businesses. Furthermore, the authors asserted that the greatest degree of digitalization is present in the largest organisations. Furthermore, small enterprises operating in less competitive countries make substantial investments in the environment, prioritising value creation over adherence to regulatory obligations (Herieda et al., 2023). Nevertheless, during periods of intense competition, major and extremely major corporations make substantial environmental commitments with the aim of enhancing their reputation and public acceptance. Finally, the researchers made the finding that the correlation between corporate environmental responsibility and the implementation of digitalization is impacted by the level of informality. Kohtamaki et al. (2020) proposed a nonlinear U-shaped interaction to describe the relationship between digitalization and service innovation that enhances economic performance. The results emphasise the criticality of a successful interaction between innovation and digitalization, as organisations may face the digitalization paradox if this interaction is not established. Thus, for organisations to generate value through service

innovations, Industry 4.0 technologies must be implemented methodically (Atif et al., 2021). The correlation between I4 technologies and governance mechanisms is considered the most significant determinant of both the creation of sustainable value and the economic performance of an organisation (Alkaraan et al., 2023; Aldrighetti et al., 2023). Therefore, it is apparent that Industry 4.0 plays a crucial role in the process of value creation, as it produces the most substantial transformative impact (Nagy et al., 2018). Faria et al. (2022) conducted an analysis of the manner in which Portuguese enterprises enhanced their competitiveness, economic performance, and operational efficiency within the framework of the Industry 4.0 strategy subsequent to receiving governmental economic assistance.

According to Chaudhuri et al. (2024), Industry 4.0 applications accelerate the development of a culture of data-driven decision-making within an organisation. By bolstering their innovative capabilities and data-driven culture, the implementation of Industry 4.0 technology affects the social, competitive, and economic performance of businesses, according to a theoretical model developed using PLS-SEM. Michna and Kmeciak (2020) demonstrated that the inclination to implement Industry 4.0 in business entities is more significantly influenced by open-mindedness rather than knowledge-sharing. Furthermore, regardless of enterprise size, financial success, and the desire to adopt Industry 4.0 are positively correlated. Furthermore, it is critical to assess the impact of Industry 4.0 on supply chain capabilities and circular economy practices to optimise business performance (Dura et al., 2022; Yu et al., 2021). The empirical evidence substantiates the notion that Industry 4.0 has a positive influence on supply chain capabilities and the implementation of circular economy principles. In addition, empirical evidence establishes a correlation between circular economy methodologies and enhanced economic and operational performance of businesses. Liu et al. (2023) emphasised the significance of implementing I4 production technologies and fostering a circular economy culture in order to enhance the economic and environmental performance of businesses. The study by Khan et al. (2021) confirms that the emergence of new business models is supported by Industry 4.0 technology and circular economy practices. Moreover, in addition to its operational capabilities, Industry 4.0 possesses the capacity to substantially augment economic performance and environmental performance. As a result, the current research offers recommendations for organisations seeking to incorporate Industry 4.0 principles into their manufacturing operations with the aim of achieving sustainable goals (Alkaraan et al., 2022; Tang et al., 2022). Industry 4.0 integration has emerged as an innovative framework for industrial companies to address environmental and economic concerns, ensure competitiveness, and establish a viable business model in line with the prevailing circular economy trend (Ali et al., 2022; Samadhiya et al., 2023).

Industry 4.0 plays a pivotal role in enhancing the financial and economic performance of enterprises. The integration of advanced technologies, including automation, artificial intelligence, and the Internet of Things, significantly improves operational efficiency, leading to cost reductions and increased profitability (Kamble et al., 2020). By optimizing production processes and enabling real-time data analysis, Industry 4.0 allows firms to make informed decisions, which enhances financial forecasting and risk management capabilities (Schumacher et al., 2016). The scalability and flexibility offered by these technologies enable enterprises to quickly adapt to market changes, fostering a sustainable competitive advantage (Liao et al., 2017). Digitalization of supply chains, another key aspect of Industry 4.0, reduces lead times and inventory costs, which positively impacts the financial performance of firms (Zhou et al., 2015).

Additionally, the use of big data and analytics helps in identifying new revenue streams and customer preferences, leading to increased revenues (Russmann et al., 2015). The precision and customization enabled by Industry 4.0 technologies enhance product quality, allowing companies to capture higher market shares and improve profit margins (Moeuf et al., 2018). Predictive maintenance, powered by AI and IoT, minimizes downtime and reduces operational expenses, further boosting profitability (Qi & Tao, 2018). Despite the substantial initial investment required for adopting Industry 4.0 technologies, which may negatively affect short-term financial performance, these investments lead to long-term economic benefits (Oesterreich & Teuteberg, 2016). Overall, enterprises that implement Industry 4.0 are likely to experience improved financial resilience and superior economic outcomes in a competitive landscape (Kagermann et al., 2013).

Conclusions

A number of significant patterns have emerged within the domain of Industry 4.0 and its implications for corporate economic performance. The industrial sector's integration of advanced technologies and the adoption of digitalization have a substantial impact on the economic outcomes and operational processes of businesses. Initially, industry 4.0 incorporates a variety of technologies, including the Internet of Things, artificial intelligence, big data, and automation, which facilitate cost reduction and improved operational efficiency. Industry 4.0 facilitates a transition to more personalized and customized products and services. Enterprises are utilizing sophisticated technologies to satisfy the increasing demand for customized solutions, which in turn enhances customer satisfaction and loyalty and stimulates revenue growth. Consequently, this has a positive effect on economic performance. Industry 4.0 supports sustainability initiatives and CSR efforts by enabling resource optimization, energy efficiency, and waste reduction. Enterprises that embrace sustainable practices through Industry 4.0 technologies can enhance their brand reputation, attract environmentally conscious customers, and achieve long-term economic sustainability. Supportive policies, incentives, and regulatory frameworks are designed to foster innovation, investment, and competitiveness.

Moreover, the adoption of advanced technologies influences economic reporting practices, requiring adaptations to account for new business models and valuation methods. Many existing studies focus on short-term outcomes. Nevertheless, research should investigate the long-term economic implications of Industry 4.0 adoption, taking into account factors such as sustained competitiveness, market share, and overall economic sustainability over an extended period. There is a lack of comprehensive studies exploring how the adoption of Industry 4.0 technologies correlates with the economic performance of enterprises of different sizes in Central European countries. Understanding the impact on small and medium-sized enterprises (SMEs) versus large corporations is crucial. However, analysing the role of Industry 4.0 in shaping the economic performance and sustainability of enterprises, the current study was solely focused on the articles from the Web of Science database, which were available for free download and only in the English language, which may be considered the main limitation of the study. Thus, further research should be focused on this issue to reveal the development and implementation of Industry 4.0 in European enterprises and reveal if the trends in this field are the same compared to the global ones. Offering a foundation for academics, practitioners, and policymakers interested in facing the transformative landscape of advanced technologies within the business context, this analysis adds significant value to the understanding of the intersection between technological advancements and economic outcomes in the environment of business entities. It also adds valuable insights to the discourse on Industry 4.0's implications for economic performance and sustainability.

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FILM POLICY AND FILM PRODUCTION: THE POTENTIAL OF BALTIC CO-PRODUCTIONS AND NEW FILM FUND

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Abstract

The film industry can be considered the most important in creative industries since it possesses the characteristics of industrial organization, a high degree of demand uncertainty, contractual agreements, and business practices. What is more, the film industry strongly influences the other sub-sectors, because of the broad-based advantages that it delivers in terms of employment and economic growth. On the other hand, the economic value of creative industries does not arise from their relative contribution to economic value, but from the co-ordination of new ideas and technologies thereby influencing change in economic and cultural processes. Since European film industries are fragmented, there is a constant need to rethink possible model for their continuous growth. This is especially relevant in the context of smaller film industries in Europe such as in the Baltic States, because their budgets for film production are relatively small compared to bigger film industries. Therefore, in order to foster new industry development, which would also reflect the regional context of the Baltic States and its location strengths, the potential of co-productions - mission-economy approach is proposed as it emphasizes market co-creation, co-shaping, partnerships between business and public sector and other managerial and technological innovations.

Research purpose and objectives. The aim of the study is to provide new recommendations for the film centres in Lithuania, Latvia and Estonia regarding film policy based on the mission-economy approach. In order to achieve the aim two objectives were set: 1) to analyse the current financial support model for the national film production and co-productions in the Baltic film industries and 2) to investigate whether the Baltic co-productions can have a new value for the audience.

Design / Methodology / Approach. The study used both qualitative and quantitative methods for data extraction and analysis. Firstly, descriptive statistics as a method was used to analyse the financial support for national film production in Lithuanian, Latvian and Estonian film industries during 2018-2023 and the releases of co-produced films between the Baltic States. Furthermore, 6 semi-structured interviews with experts from the Baltic film industries were conducted.

Findings. As a result of the research, the authors conclude that there is long-term potential in the Baltic co-production films, but they have to be more oriented towards the audience and reflect the genre as in the case of Nordic films. Moreover, financial support models for co-productions in the Baltic film industries are different in regard to applications and their management. Therefore, a potentially new “Baltic Film and TV Fund” could be established to foster regional co-productions.

Originality / Value / Practical implications. As a result of the study, the authors have developed recommendations for the film policy that would reflect the new value of the Baltic co-productions. The results of the research can be used by the Lithuanian Film Centre, the National Film Centre of Latvia, and the Estonian Film Institute to continue establishing the “Baltic Film and TV Fund”. The research results will be partly used for further research within the framework of Audrius Dabrovolskas' doctoral thesis.

Keywords: film policy; film production; creative industries; mission economy; Baltic film industries.

JEL codes: M1, Z1, Z110, Z180.

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Introduction

The late 1990s was the period when the appearance of film funds, film commissions and film-friendly policies in Europe experienced certain acceleration influenced by public institutions where creativity was understood not as artistic value, innovativeness or the freedom of expression of talent, but as added economic value, driver of development and the ability to multiply tangible benefits to accrue marketable knowledge (Cucco, 2018). Mitkus and Nedzinskaite-Mitke (2016) emphasized that film industries on a global scale are a growing part of the world economy contributing to film-specific employment and stimulating other economic sectors of the country thus being one of the most important segments of the creative industries. In addition to this, many countries are aiming to grow their creative industries because of the broad-based advantages they deliver, for example in terms of employment, heritage awareness, consumer interest, economic growth, exports, tourism, and so-called national soft power (Olsberg & Barnes, 2014).

Since creativity is not something that only artists or the creative team (writer, director, and producer) do, it is vital to note its role in innovation and the importance of creativity as an application relevant to all the various elements of specialisation involved in content production (Ward, 2004). Furthermore, geography (including filming locations), regional development agendas and the convergence of film production and other forms of content delivery allow us to see the global economy and commodification of culture more neutrally in regard to polemics of national cinema (Ward, 2004). Moreover, different technologies, practices, fields of specialization, and knowledge-intensive jobs formed the core of the creative industries with an emphasis on skill sets that could be applied across a number of industry sectors (Morawetz et al., 2007; Ward, 2004).

On the other hand, market-driven interests are also powerful when national and European film policies are addressed, especially due to the goals of countering US dominance, which require efficient competitive standards (Miranda & Santos, 2024). Small film industries such as Lithuanian, Latvian, and Estonian have a low audiovisual capacity and limited domestic markets for local film production. Consequently, considering the highly uncertain demand for the films and the costs of their production the question is about if producing more films can guarantee more audience. Therefore, the aim of the study is to provide new recommendations for the film centres in Lithuania, Latvia and Estonia concerning film policy based on a mission-economy approach. The latter approach is emphasizing the need for and importance of the policy direction, which can help solve concrete problems.

Literature Review

Film policy and the allocation, the administration of financial support for national film production in Europe are closely interlinked. According to Orankiewicz (2022), there are direct and indirect public support as financial intervention by the public authorities in the day-to-day running of a market sector. In European film industries, there are different support models: starting with the granting of prizes, loans, and credits for film producers, and finishing with the most common assistance to production – subsidies (Guback, 1969). The continued existence of national intervention in the film industry, combined with the proliferation of supra- and infranational initiatives has made policy-making more complex in a world characterised by the bloated profusion of policies and it is paramount to stress the changing role of film policies since policy-making has become increasingly complex due to the dramatic development of technology (Mingant & Tirtaine, 2018). If we look at the global level, sub-national and multicultural perspectives were already emphasized in the 1990s, which shows how complicated is the management of supranational organisations in regard to national film policies (Moran, 1996). On the other hand, small states especially those that dealt with tremendous post-soviet transformation, tend to have more multifunctional ministries, and there is often no clear-cut division between policy formation and implementation (Sarapuu, 2010), which brings to the attention not only economic aspects of national cinema in smaller film industries, but administration and management too.

Susan Ward (2004) has emphasized that convergence has caused governments worldwide to rethink film policy that acknowledges film and television as part of a much larger ‘creative sector’. Changing film policy partially came from the development of the global film industry, which started to be viewed as a

shining example of a “new economy” (Morawetz et al., 2007). Another argument was related to the specifics of geographical location, which provides a competitive advantage and especially how that information could be used later. Cunningham et al. (2008) highlighted four cultural and economic approaches that reveal the connections between technology and business in the cultural economy on a global scale.

The first (welfare) approach is characterized as a “subsidy approach” because the creation of public goods requires subsidies or state support since the economic value of these products does not meet the value criteria established in the market economy. The value of these products can still be defined as non-market value because cultural activities have a negative impact on the state economy due to higher consumption of resources – more resources are used rather than created (Cunningham et al., 2008). If we apply this model to film industries in Europe, there is a belief that national cinema plays an important role in negotiating cultural identity and articulating social consciousness (Gao, 2009), consequently, this prevents interruption of subsidies for the national film production based only on economic results. On the other hand, for a film to become a cultural object additional factors must be met – the film has to be viewed by an audience (Mitkus & Nedzinskaite-Mitke, 2016).

The second (competition) approach differs from the first in a way it characterizes the creative industries as being the same industry as any other. This argument is based on the fact that creative industries are neutral in relation to the country’s economy, as their productivity, influence on the creation and development of technologies and the promotion of innovation do not exceed the average contribution of other sectors (Cunningham et al., 2008). The problem with this model is that film industries in Europe are usually not successful economically in comparison to the Hollywood film industry and partially it is because of the cultural and artistic approach, which was applied in Europe while forgetting the profit.

The third (growth) approach reveals a positive relationship between economic growth in the creative industries and the overall economy of the country. In this context, creative industries are a catalyst for growth as they create new value in the global market economy, while culture becomes a crucial factor due to its added value in the overall economy and increased attention to it (Cunningham et al., 2008). Mitkus and Nedzinskaite-Mitke (2016) highlighted the importance of economic outcomes for the country’s development, which is generated by the film industry and especially the film production services sector, which contributes to the local economy.

The fourth (innovation or creative economy) approach is described as an element of the innovation system in the economy. The economic value of creative industries does not arise from their relative contribution to economic value, but from the co-ordination of new ideas and technologies thereby influencing change in economic and cultural processes. Also, co-production and in general international projects that usually have considerably larger budgets than the Baltic films often bring with them the latest innovations in film or other technical novelties, which allows local filmmaking crews to renew and develop their knowledge (Mitkus & Nedzinskaite-Mitke, 2016). Skilled production and its service sector means not only foreign money is left in the local economy, but also the employment, experience and acquired skills that later are used (Mitkus & Nedzinskaite-Mitke, 2016).

The latter model is relevant in the context of policy missions since they are related to the direction and concrete problems to be solved. According to Kattel and Mazzucato (2018), mission-oriented innovation policy relies on two pillars:

1. Setting a purpose for public investments;
2. Creating conditions for new markets: enabling spillovers from “big science” in the form of new demand and supply.

Since mission-oriented innovation policy is a market-shaping public investment and policy framework that aims to shift the direction of innovation systems, market failure as proposed by creative industries in the welfare “subsidy approach,” is not an approach to be followed as a theoretical foundation for public sector activities. To create new value, which would be generated collectively by a range of stakeholders, including the private sector, the state and civil society, the market and the economy itself should be seen as an outcome of the interactions and the state should be considered as a lead investor and risk-taker (Mazzucato et al., 2019). According to Foray (2018), mission-oriented policy is not only

about centralized strategic decision-making, governance, and evaluation capabilities but also concerns a logic of strategic choice, selection, and establishment of priorities with a logic of decentralized and entrepreneurial information and initiatives. If the role of the public sector is limited to one that simply “administers”, “fixes”, “regulates”, and at best “facilitates” and “de-risks” the private sector, it prevents us from thinking creatively about how to allow public sector vision, risk-taking, and investment to lead and structure the necessary transformational changes (Mazzucato, 2016). Mazzucato (2016) also suggests the necessity of transformational changes in public policy since certain organizational culture and policy capacity are required because if certain failures (that could be considered as learning opportunities) resulting from experimentations are allowed, then the next round can be financed using the rewards coming out from successes. According to Lindner et al. (2016), these transformations are paramount, because new practices that are established allow institutions to continue operating with the aim of improving innovation capacities by ‘getting the structures right,’ thereby overtaking the question of ‘getting the structures right to achieve what?’ One of the aims might be related to diffusing new technologies since activities and interactions of a network of institutions in the public and private sectors are to initiate, import, and modify them (Freeman, 1995), but the market itself must be redefined as an outcome of the interactions between different agents, including public policy makers (Mazzucato, 2016). In the organizational context, there is a necessity to transform public organizations into ones that welcome learning, experimentation and self-discovery and the crucial element in organizing the state for its market-creating role is building absorptive capacity (Cohen & Levinthal, 1990). This capacity would allow public agencies to learn in a process of investment, discovery and experimentation and see policy as a process.

Research Methodology

The aim of the research is to provide new recommendations for the film centres in Lithuania, Latvia, and Estonia in regard to film policy based on a mission-economy approach. Objectives were formulated as follows: 1) to analyse the current financial support model for the national film production and co-productions in the Baltic film industries and 2) to investigate whether the Baltic co-productions can have a new value for the audience.

For the first objective, the critical analysis of statistical data (financial support for national film production, market share of national film production, the number of co-produced films and TOP-10 most watched co-productions) was selected. The critical analysis of statistical data was based on descriptive statistics (Vaughan, 2001). The statistical data was collected from *Facts and Figures* reports published during the 2015-2024 period. The reports are published every year by the Lithuanian Film Centre, the National Film Centre of Latvia, and the Estonian Film Institute.

For the second objective, the content analysis of the interviews was selected. 15 questions for the experts of the Baltic film industries were prepared according to the mission economy principles that are applied in the context of film policy (financing, market shaping and co-creation, innovations, and partnerships).

In total – 6 experts were selected. Three experts represented the Lithuanian Film Centre, the National Film Centre of Latvia, and the Estonian Film Institute that on a daily basis deal either with financial support administration for national film production and co-production or are responsible for the most important decision-making related to film policy. The other three experts were represented by film production companies that deal with co-productions and at least had one production that reached TOP-10 most watched films per year in the Baltic States – Fralita Films (Lithuania), Ego Media (Latvia) and Allfilm (Estonia).

Interviews were taken in October-November of 2023. The length of the semi-structured interviews was ranging from 34 to 64 minutes. 5 interviews were conducted and recorded using the MS Teams platform and one interview was conducted via email. The analysis of information gathered from semi-structured interviews with the experts was performed using the content analysis method (Bryman & Bell, 2007), which was applied in order to code, categorize, evaluate, and calculate the frequency of the answers from experts of the film industries. The categories and their evaluations are represented in the tables number 2 to 7. The evaluations that were provided by the experts are structured by the highest frequency

meaning the higher the frequency – the more matching evaluation between all experts that were interviewed.

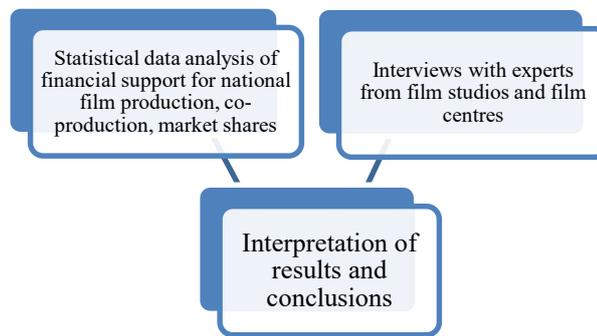


Fig. 1. Research methodology (Source: created by the authors)

Figure 1 represents the use of a mixed-method approach, which allows to capitalize on the strengths of each while offsetting their respective weaknesses and is useful when it comes to data evaluation and triangulation. This is useful when different aspects of a phenomenon are studied such as financial support for national film production and co-production, the decisions taken in order to shape the market, and where the relationship between macro and micro levels are explored (Bryman & Bell, 2007).

Research Results

While comparing the financial support for national film production in Lithuania, Latvia, and Estonia it is noticeable the growth especially from 2019 till 2021 and then from 2022 and further on.

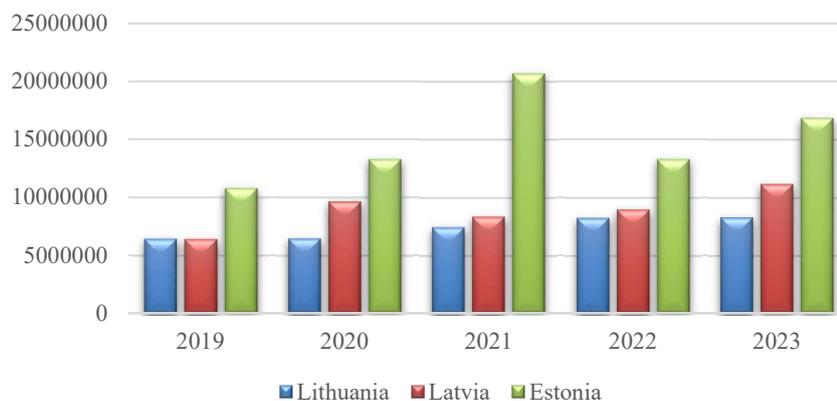


Fig. 2. Financial support (EUR) for national film production in the Baltic film industries (Source: Facts and Figures, 2023, 2024)

The increase in financial support does not always guarantee the growth of attendance and market shares. Figure 3 indicates that while Lithuanian and Latvian film production received more financial support, the market share of national films decreased in recent years. A similar situation happened in Estonia, and this might be related to post-covid influence on the audience since from 2022 the market share of Estonian films started again to increase.

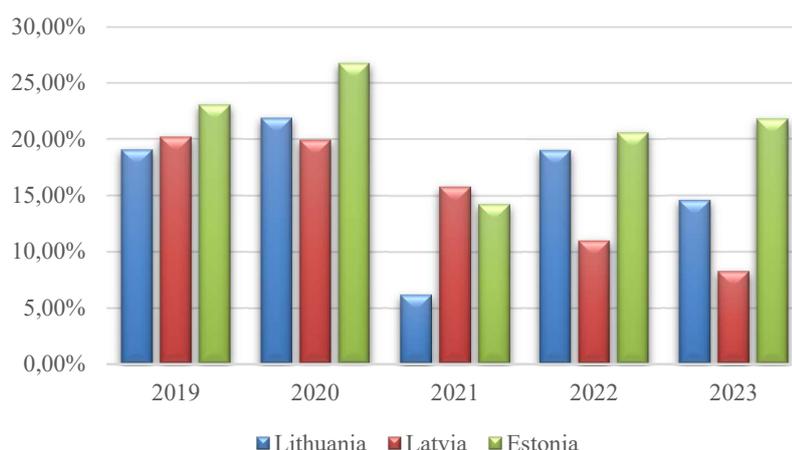


Fig. 3. National film production market share in the Baltic film industries (Source: Facts and Figures, 2024)

Another paramount factor is the increasing number of co-productions between the Baltic States and other countries. The Baltic countries are co-producing more than twice as many films compared to the 2015-2018 period when only 10 films (Dabrovskas, 2023) were produced between Lithuania, Latvia, and Estonia.

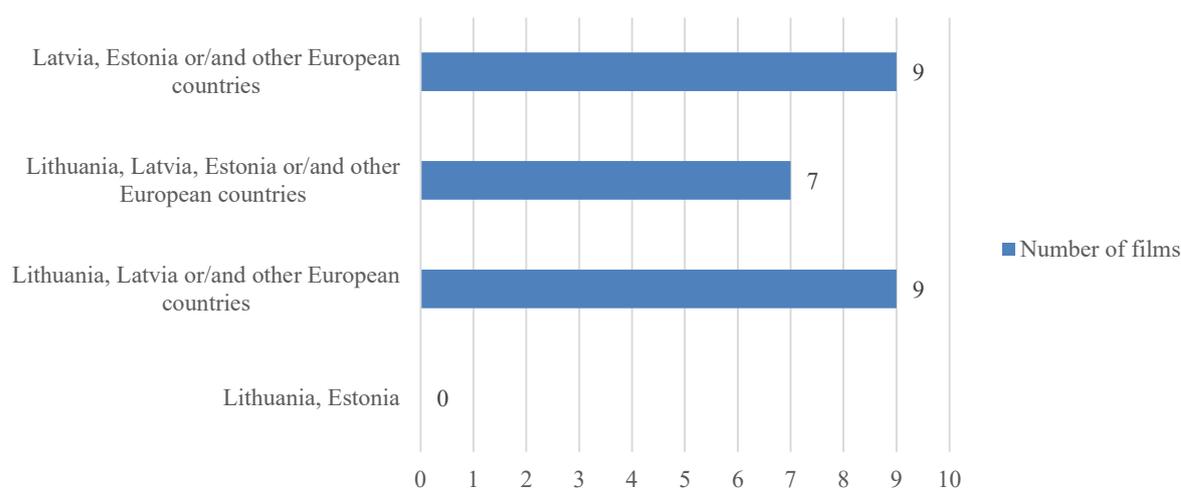


Fig. 4. Co-produced films between Lithuania, Latvia, Estonia, and other countries during 2019-2023 (Source: Facts and Figures, 2024, 2023, 2022, 2021, 2020)

Moreover, the Baltic co-productions started to be recognised by the audience. Especially, the co-produced films are visible and visited in cinema theatres in Latvia and Estonia since they were the major co-production countries.

Table 1. Baltic co-productions in TOP-10 most watched films per year (Source: Facts and Figures, 2023, 2022, 2021, 2018, 2015)

| Year | Film title | Production country | Admissions | GBO (EUR) | Position in TOP-10 | Exhibition country |
|------|------------------|-------------------------|------------|-----------|--------------------|--------------------|
| 2022 | January/Janvāris | Latvia/Lithuania/Poland | 35267 | 152620 | 10 | Latvia |

| | | | | | | |
|------|-----------------------------------|----------------------------------|-------|--------|---|-----------|
| 2021 | The Sign Painter/Pilsēta pie upes | Latvia/Czech Republic/Lithuania | 70372 | 309567 | 1 | Latvia |
| 2020 | Dawn of War/O2 | Estonia/Finland/Latvia/Lithuania | 75270 | 489137 | 4 | Estonia |
| 2017 | Sangarid/ The Dissidents | Estonia/Latvia/Finland | 85306 | 480610 | 4 | Estonia |
| 2014 | Lošējas/Spēlmanis/The Gambler | Lithuania/Latvia | 7 891 | 357144 | 8 | Lithuania |

When we take into consideration that 10 years ago the question was about domestic films in TOP-10 and their market shares in Lithuania, Latvia, and Estonia, but recently it is noticeable the potential of Baltic co-productions that already can reach TOP-10. For instance, at least two co-produced films in Latvia and Estonia were reaching a significant number of admissions between the 2017 and 2022 period. It means that there is already an audience interested in the Baltic co-productions. Therefore, the question is about what factors have an influence on this type of film production.

Table 2. National film production and its financing (Source: Author collected interviews with experts)

| Categories | Evaluation | Frequency |
|--------------------------|--|-----------|
| National film production | Culture and its policy, tradition, national identity, art, and economic element | 5 |
| | Relevant to the audience | 4 |
| | More financing needed | 4 |
| | Market share of national films is increasing | 3 |
| | Not enough investment in film marketing | 2 |
| | Film is stuck in old funding models | 2 |
| | Bigger box office of national films creates interest for private capital to invest | 2 |
| | Family (genre) oriented films do better | 1 |
| | Lack of cinema theatres in regions | 1 |

Information provided in Table 2 indicates that national cinema in the Baltic film industries is considered a culture and art that needs policy, yet at the same time economic element is recognized. This is especially relevant in the context of financial support, which is still needed even though national cinema is increasingly relevant to the local audience.

Table 3. Market shaping and co-creating (Source: Author collected interviews with experts)

| Categories | Evaluation | Frequency |
|---|---|-----------|
| Future trends of national film production | Adaptation to market changes (for instance, more production of TV series) | 2 |
| | Separate support scheme for genre films is needed (for example, for children and youth films) | 2 |
| | More focus on the target audience | 2 |
| | Technological and genre developments | 2 |
| | Balance between art and entertainment | 2 |
| | Local talent | 1 |
| | Film education is needed to grow the audience for national films and Baltic co-productions | 1 |

Therefore, the future trends of national cinema in Lithuania, Latvia and Estonia are related to adaptation to market changes, more focus on the target audience, genre films and their development together with separate support schemes. Similarly, the potential of Baltic co-productions is recognized.

Table 4. Co-production and its financing in the Baltic film industries (Source: Author collected interviews with experts)

| Categories | Evaluation | Frequency |
|---------------|--|-----------|
| Co-production | Majority co-production attracts audience and minority does not (target audience and unknown Baltic actor problems) | 5 |
| | TV and VOD distribution is selected instead of exhibition in cinema theatres (distribution problems) | 5 |
| | If filmmakers have stories that travel to other Baltic States – co-production is natural | 5 |
| | Special support scheme for minority co-production needed or higher financing in general | 4 |
| | Potential in future (also, currently becoming increasingly accessible in all Baltic States) | 4 |
| | Baltic Film and TV Fund would be relevant for film production companies doing co-productions, but political agreement to boost cooperation is needed | 3 |
| | Competitive advantage and skills in filmmaking that international environment creates | 3 |
| | The biggest problem is language if the film is not in English | 3 |
| | Orientation towards genre films and involving broadcasters | 2 |
| | Programmes that support Baltic development (Baltic-Italian) | 2 |
| | Film policy should address the demand of markets | 1 |

Current limiting factors of Baltic co-productions and their attendance are related to unknown Baltic actors, who are only known in their home country, languages, targeting the audience and distribution. Since minority co-productions are not attracting enough audiences to cinema theatres, video-on-demand distribution is selected and partially solves the problem of attendance. On the other hand, better stories and scripts are needed to attract the audience too. At the moment small TV series are produced in Latvia, but higher financing in general is needed. There is potential in future related to dubbing films for children and using more actors from minority co-production partners.

Table 5. Innovations in the Baltic film industries regarding national film production (Source: Author collected interviews with experts)

| Categories | Evaluation | Frequency |
|-------------|---|-----------|
| Innovations | AI engagement in the system of film policy management and administration (for instance, application submission) needed | 3 |
| | Erasmus exchange for short mobility as an opportunity for scriptwriters to exchange ideas in the Baltic States or other European countries | 3 |
| | Lack of strategy and funding to foster sustainability in the film industry | 3 |
| | Private facilitators could more engage in supporting local content (film and TV series) | 2 |
| | Public participation, which allows one to express an opinion about evaluating certain film projects (currently working in Latvia) | 2 |
| | Changes are needed in the way financing is being provided for the film centres and also cash rebates for private investors in the local market (not only for foreign film production) | 2 |

If we analyse innovations that are needed for the development of the Baltic film industries, AI engagement is mentioned to design the application system for financial support and its administration

as well as the lack of strategy and funding to foster sustainability of the industry. Erasmus+ short mobilities were mentioned too, which would potentially help to develop better scripts for the Baltic films.

Table 6. Partnerships in the Baltic film industries regarding film production (Source: Author collected interviews with experts)

| Categories | Evaluation | Frequency |
|---|--|-----------|
| Partnerships between public and private sectors | Film centre is a platform that unites producers and other film associations | 3 |
| | Film centres and film producers cooperate when promoting films locally or internationally (in film festivals) | 2 |
| | In regard to film policy, only exchange of information is possible, but not one Baltic film policy | 1 |
| | Experts from film distribution companies could be involved in decision-making (expert commissions that decide about financial support for film production) | 1 |

In regard to partnerships, film centres already help to unite producers, and other associations and public participation in Latvia is useful, because it allows different experts to express their opinions even though not always the National Film Centre of Latvia use it when deciding about financial support for national film production.

When producers apply for co-production support they face different deadlines in Lithuania, Latvia, and Estonia. If a regional fund were established it could result in a different system. Another issue is related to support schemes for co-production. Currently, co-productions compete for financing altogether with other applications therefore there is a need for a separate support scheme for the films that would compete with the same genre films.

Table 7. The Baltic Film and TV Fund (Source: Author collected interviews with experts)

| Categories | Evaluation | Frequency |
|---------------------------------|---|-----------|
| Joining Nordic Film and TV Fund | We would be happy to join, but not ready yet, because of lack of financing | 3 |
| | Baltic public broadcasters' investment policy and attitude, which is not in favour of local productions | 1 |
| | Joining would be better for the Baltic film industries and then it would be possible to have third co-production country from Nordic region | 1 |
| Baltic Film and TV Fund | Would allow to create stronger films and is needed | 4 |
| | Would allow being more visible and stay more relevant, supported by the audience, and would foster Baltic co-productions | 2 |
| | Would allow one to represent all three Baltic States and participate in bigger projects | 2 |
| | Would solve deadline problems of co-production applications that apply for financial support in Lithuania, Latvia, and Estonia | 2 |
| | One national cinema might dissolve, because of competition | 1 |

For a high-quality product that would target an international audience more funding should be allocated and the Baltic Film and TV Fund could potentially do this. The Fund would also help to foster Baltic co-productions and would allow to represent all three Baltic States. Positioning the Baltic film industries as a region in European film industries potentially could attract bigger projects to work with.

If we compare the situation in other small film industries in Europe such as in Scotland, Ireland, and Denmark (MacPherson, 2010), there is either a weak positive, slight positive or moderate positive correlation between production volume and market share. It means that the more financing is allocated

the more it can impact the market share of the films. On the other hand, financial factors are not the only ones to consider since the successful completion of major productions such as *The Frighteners*, *Hercules* and *Xena* enhanced New Zealand's reputation as a potential film location and paved the way to the making of *The Lord of the Rings* trilogy (Leotta, 2015). Moreover, the so-called Nordic countries have the tendency to select policy solutions that are consensual and based on consultation with both public and private stakeholders, which also reflects the Nordic Model or Media Welfare State (Ibrus & Rohn, 2019). The establishment of the Nordic Film and Television Fund in 1990 constituted a move towards international co-production and distribution for both television and film, which also meant a stronger position of audiovisual content in the Nordic region and beyond while intensifying cross-boundary cooperation (Ibrus & Rohn, 2019) that is needed in creative industries.

Conclusions

Looking from the creative industries' perspective film industries in Europe would match the welfare or "subsidy approach," because of the government's active support for national film production. The current financial support model of the Baltic film industries is no exception and as it is possible to notice – the growth of this type of support does not always guarantee that national film production will reach bigger market shares. As research results showed, there is already a lack of investment in marketing, which is a separate – film distribution problem. Moreover, the future trends are related to market adaptation, separate support schemes for genre films and also rethinking the current financial support model.

As it is possible to see from the descriptive statistics analysis and interviews with film industry experts, co-productions between Lithuania, Latvia, Estonia, and other European countries are growing and there is a potentially new value for the Baltic film industries, its films and region. Even though the audience is still not as interested – especially if we take into consideration the minority co-production, the exchange of ideas, and technical personnel and portraying the Baltic locations are needed to promote competitive advantage, skills and positioning the Baltic region internationally to attract bigger film productions (also from Hollywood film industry).

Looking from a mission-economy perspective, there is still a constant need for innovations and partnerships between business and the public sector. Some society and business experts' involvement in the Baltic film industries is related to public participation, which allows expressing an opinion about evaluating certain film projects (in Latvia), but sustainability is not addressed strategically, AI engagement is about to be used in future, Erasmus+ short mobilities are also not used as much to foster future script writer collaboration in Lithuania, Latvia and Estonia.

Partnerships are working in a limited way where film centres in the Baltic States are only acting as platforms to unite producers. Consequently, there is a need for a new structure that would allow to unite more industry players such as public broadcasters to invest more in film production, which could be not only local but regional. More financial support for the Baltic co-productions, its distribution, and the involvement of public and private sectors to exchange management practices and to foster new value, co-creation and co-shaping of the Baltic film production markets are necessary for the economic growth, stronger films, and their better visibility. The Baltic Film and TV Fund would be a new step and a challenge for the Baltic film industries but is necessary in order to address the issues of the film policy.

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BRANDS AS HUMANS: HOW BRAND VIRTUOUSNESS RELATES TO BRAND AUTHENTICITY AND BRAND ATTACHMENT

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Abstract

Research aim. Authenticity has become an essential quality for brands, with 86% of consumers preferring brands that are perceived to be authentic (Stackla, 2021). As a result, the drivers of brand authenticity are gaining momentum as an important research object. The role of brand virtuousness and its connection to brand authenticity and brand attachment has received limited attention from the consumer perspective. Meanwhile, the relationship between virtuousness and authenticity has been thoroughly investigated in other fields, such as personality research. Based on personality literature, comparable patterns of association can be anticipated when considering brands as relational entities. Therefore, the arguments elucidating the relationship between the virtuousness of personality and authenticity can be extended to the realm of brand. Given the above, this study aims to examine how brand virtuousness affects brand authenticity and brand attachment.

Design / Methodology / Approach. This study employed a quantitative research approach by administering an online questionnaire (www.qualtrics.com) to respondents randomly assigned to two conditions: one with instructions to choose an authentic brand and another to name an inauthentic brand. The data were obtained from a convenience sample of Lithuanian adults (N=461; women= 70.9%; men= 29.1%; age mean =33.26; SD=12.29). The study constructs were measured using pre-existing 5-point Likert-type scales that were adapted to the focus of the current research. PLS-SEM (SmartPLS Version 4.1.0.6) was employed to test research hypotheses.

Findings. Our findings show that brand virtuousness and brand authenticity have a positive and significant effect on brand attachment. Furthermore, brand virtuousness exhibited a positive and significant impact on brand authenticity. Finally, as expected, brand authenticity mediated the link between brand virtuousness and brand attachment. Consumers are drawn to brands that exude virtue, and the more authentic a brand is perceived to be, the more consumers tend to stick with it.

Originality / Value / Practical implications. This study contributes to the brand literature by expanding our understanding of personality theory-grounded antecedents in relation to brand authenticity and brand attachment. Drawing on personality literature, this study proposes novel explanations for the impact of brand virtuousness on brand attachment through brand authenticity. The findings suggest that marketers would benefit from incorporating virtuousness properties into their brand strategies and communication campaigns, as it aids in the establishment of a stronger consumer-brand connection and increases perceived brand authenticity.

Keywords: brand virtuousness; brand authenticity; brand attachment.

JEL code: M31.

For many years, researchers have been studying the reasons why consumers become attached to a brand, of which there are many, and why they are more likely to make repeat purchases and be interested in a particular brand. In recent years, researchers have become increasingly involved in studying brand authenticity. Authenticity has become an essential quality for brands, with 86% of consumers preferring brands that are perceived to be authentic (Stackla, 2021). As a result, the drivers of brand authenticity are gaining momentum as an important research object. Brand authenticity is now considered to be one of the factors that determines the success of a brand and also influences the perception of brand value by consumers (Arya et al., 2019). Previous research has reflected the influence of brand authenticity on brand attachment (Kumar & Kaushik, 2022) by incorporating and exploring the role of nostalgia in this relationship (Chen et al., 2021). Research has examined elements of authenticity such as quality, heritage, sincerity, brand affection (Safeer et al., 2021) and loyalty (So et al., 2013). With the increasing focus on brand authenticity, it is important to analyse what authenticity is, what its antecedents are and how brand authenticity influences consumer behaviour. One possible antecedent of authenticity is virtuousness, which reflects the values, morals and beliefs held (Guevremont & Grohmann, 2016). Research on the phenomenon of virtuousness in relation to brands is very limited but relevant.

There has been little research into the moral aspect of branding in consumer behaviour research. As a result, it is difficult to explain how it influences consumers' attachment to a brand. The relationship between virtuousness and authenticity has been explored extensively in other contexts, such as personality research. Literature suggests that similar patterns can be expected for brands. Thus, the reasoning used to explain the nature of the link between personal virtuousness and authenticity could be extrapolated to branding. In light of the arguments put forward, the scientific problem is formulated in terms of the question: how does the *virtuousness* of a brand affect its *authenticity* and *attachment* to it. This study aims to investigate the effect of brand virtuousness on brand attachment through brand authenticity. Based on the theoretical foundation of personality, the current study hypothesises that brand virtuousness positively influences brand authenticity, which in turn positively affects brand attachment. The study applied a cross-sectional research design of the correlational type and the online questionnaire to test anticipated hypotheses.

Literature Review

The phenomenon of brand attachment. Jahn et al. (2012) describe brand attachment as a relational concept that reflects the emotional connection that a consumer has with a brand. A strong emotional connection between the consumer and the brand is a driver of consumer loyalty. Bairrada et al. (2018) point out that brand affection not only leads to consumer loyalty but also to positive word-of-mouth feedback, which makes a brand more resistant to negative information. Once a consumer's attachment to the brand is in place, the consumer will have a long-term relationship with the brand (Chen et al., 2022). Brand attachment refers to a strong emotional bond between the consumer and the brand, where the consumer sees the brand as part of himself or herself, feels a sense of commitment to the brand, recommends the brand to others and is willing to pay a premium price. Hung and Lu (2018) divide the phenomenon of emotional attachment to a brand into two dimensions: one is the rosy side (positive emotions) consisting of affection, passion and connection, and the other is the blue side (negative emotions) consisting of the separation distress and anxiety, anticipated regret, missing and sadness. In this study, the conceptualisation of brand attachment is in line with Hung and Lu (2018).

The concept of brand authenticity. Brand authenticity is a genuine brand that has its own unique style, is open and honest with consumers, and endures through changing times and trends (Campagna et al. 2021). According to Oh et al. (2019), brand authenticity is not only one of the criteria for choosing a product but also a valuable property of a brand that helps consumers express themselves. In the literature, the construct of authenticity has been interpreted in approximately forty different dimensions (Akbar & Wymer, 2017). For example, Nunes et al. (2021) define brand authenticity as the holistic construct which includes elements of accuracy, connectedness, integrity, legitimacy, originality, and proficiency. Further, according to Campagna et al. (2021), brand authenticity, along with genuine uniqueness, possesses honesty and openness properties and is composed of three dimensions reflecting the following brand authenticity facets: consciousness, longevity, and self-empowerment. Akbar and Wymer (2017) associate brand authenticity with uniqueness, legitimacy, truthfulness to its claims, and absence of

falsity. Taken together, an authentic brand is primarily characterised by authenticity, originality, genuineness, and truthfulness. Therefore, the current study will refer to Bruhn et al. (2012) definition, which points out that authenticity is a multidimensional construct consisting of four dimensions: *continuity, originality, reliability, and naturalness*.

Conceptualisation of brand virtuousness. One way of influencing consumer behaviour through feelings and emotions is to emphasise virtuousness. The concept of virtuousness is closely related to, if not synonymous with, ethics. To be in line with socially acceptable ethical standards, a brand should be sustainable, socially responsible, environmentally friendly, ecologically sound and take care of its employees (Garanti, 2019). According to Sit et al. (2021), brand virtuousness is equated with values, virtue, morality, and nobility, and is linked to a lack of interest in commercial matters and the deliberate disregarding of commercial motives. According to Spielmann (2021), virtuousness is associated with goodness and evokes positive emotions, which may determine the consumer's choice of a particular brand. Based on Spielmann (2021), brand virtuousness is defined by manifestations of *honesty, virtue, fairness, and righteousness*.

Hypotheses Development

The link between brand virtuousness and the consumer's attachment to the brand. Research shows that virtuousness has a positive impact on consumer brand attachment (Sodergren, 2021). Virtuousness influences brand attachment through loyalty because loyalty is perceived as a moral trait, which is also a sign of brand attachment (Akoglu & Ozbek, 2021; Japutra et al., 2018; Wolter et al., 2022). It should be noted that the moral character of a brand influences loyalty through the emotional connection felt by the consumer, which forms a long-term relationship (Chen et al., 2022; Hung & Lu, 2018; Malar et al., 2011; Park et al., 2010). Consumer attachment to a brand is based on fundamental human values such as love of family, respect for others, honesty, and moral and ethical behaviour, which are the basis of virtuousness (Berthon et al., 2021; Guevremont, 2018). Research shows that consumers who rely on virtue and morality in their daily lives are more likely to be attracted to brands that espouse and publicly declare the same values (Choi & Winterich, 2013). Given above, we suggest:

H1: Brand virtuousness positively influences consumer brand attachment

The link between brand authenticity and consumer brand attachment. Brand authenticity has been shown to influence consumer purchase intention, leading to brand attachment (Kim, 2021; Lee & Chung, 2019; Oh et al., 2019; Safeer et al., 2021). Perceived brand authenticity influences consumer attachment to a brand through active consumer engagement in brand-related activities on digital channels (Arya et al., 2019). Empirical studies show that consumers tend to be attracted to authentic brands because they are in line with social norms and standards, and because they embody uniqueness, originality, exclusivity, and long-standing traditions (Moulard et al., 2016; Nunes et al., 2021). Consumers tend to identify with authentic brands that reflect their individuality, self-concept, emotions, and behavioural changes (Arya et al., 2019; Assiouras et al., 2015; Chen et al., 2022). The literature suggests that brand attachment is a consequence of authenticity. Based on the literature review, the following hypothesis is proposed:

H2: Brand authenticity positively influences consumer attachment to the brand

The link between the virtuousness of the brand and its authenticity. The relationship between brand virtuousness and its authenticity has not yet been widely researched. Virtuousness is understood as conformity to moral values (Tran & Keng, 2018). Empirical research has shown that brand virtuousness is a manifestation of values, morals and beliefs that have an impact on brand authenticity (Guevremont, 2018; Napoli et al., 2016; Sodergren, 2021). Social responsibility in brands reflects virtuousness, which has an impact on the perceived authenticity of the brand (Fritz et al., 2017). It can be assumed that authenticity is closely related to virtuousness or is even a consequence of it. Given the above, we hypothesise:

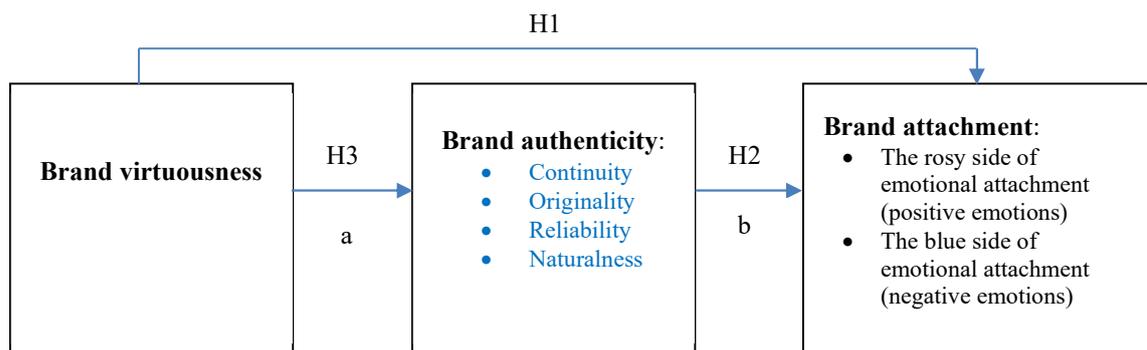
H3: Brand virtuousness positively influences brand authenticity

The literature review suggests that brand virtuousness enhances consumer-perceived brand authenticity, which, in turn, is expected to foster greater brand attachment. This pattern parallels personality research. For instance, virtue is understood as the internalization of moral traits, where an individual must possess the capacity to regulate their behaviour in order to align with a given set of standards (Baumeister & Juola Exline, 1999). Virtuousness, therefore, becomes a prerequisite for legitimacy and truthfulness, both of which are essential characteristics of authenticity.

In consumer research, brand virtuousness is proposed to act as a cue for authenticity due to its perceived integrity (Fritz et al., 2017). Consequently, brand virtuousness is regarded as an antecedent to brand authenticity (Sodergren, 2021). When consumers perceive a brand as authentic, they see it as being true to itself, sincere, and honest. These characteristics are expected to build trust and emotional closeness with the brand, leading consumers to view it as reliable and deserving of reciprocity. Empirical evidence supports this view, showing that celebrity authenticity positively influences emotional attachment (Kowalczyk & Pounders, 2016). Similarly, food brand authenticity has been found to predict consumer attachment to food brands (Assiouras et al., 2015). Based on the preceding discussion, we propose that brand authenticity plays a mediating role between brand virtuousness and brand attachment. Consequently, the following hypothesis is proposed:

H4: Brand virtuousness positively influences brand authenticity, which in turn positively affects brand attachment

Figure 1 below illustrates the hypothesised relationships between brand virtuousness, brand authenticity and the consumer's attachment to the brand.



H4: $a \times b$

Fig. 1. A conceptual model of the relationship between brand virtuousness, brand authenticity and consumer brand attachment (Source: Created by the authors)

Research Methodology

To test the hypotheses, a quantitative study was conducted using an online survey (www.qualtrics.com). The constructs were measured using the scales validated in previous studies. Brand virtuousness was measured using Spielmann's (2021) adapted four-item Likert-type 5-point scale (asking how honest, virtuous, fair, and righteous a brand is, where 1 - strongly disagree, 5 - strongly agree). Brand authenticity was measured using Bruhn et al. (2012) 5-point Likert-type scale, which has four dimensions: continuity (4 items), originality (4 items), reliability (4 items), and naturalness (3 items). Brand attachment was measured using Hung and Lu's (2018) Likert-type 5-point scale consisting of two dimensions, the rosy side of emotional attachment (5 items) and the blue side of emotional attachment (4 items) with a 5-point Likert scale.

All respondents were given a definition of brand authenticity in the preamble to the questionnaire. Then respondents were randomly assigned to one of two conditions. One group of respondents was asked to think of an authentic brand, name it and answer the questionnaire questions (measuring the constructs of the study) with the selected authentic brand in mind, while the other group of respondents was asked

to think of an inauthentic brand, name it and answer the same questionnaire questions (measuring the constructs of the study) with the inauthentic brand in mind. The dataset was obtained from a convenience sample of 487 Lithuanian adults. The convenience sample is deemed acceptable for theoretical effect testing. Convenient samples, especially those from students, are commonly utilized in brand attachment studies (Hemsley-Brown, 2023).

We used the inverse square root method to calculate the minimum required sample size. If the minimum significant path coefficient is unknown, the default value of 0.197 is used, which leads to a minimum sample size of 160 (assuming $\alpha = 0.05$ and 80% power) (Kock & Hadaya, 2018).

After data screening, invalid cases were eliminated, resulting in a usable sample of 461 respondents (women= 70.9%; men= 29.1%; age mean =33.26; SD=12.29, with higher education 69.4%, income: >1000 € 39.3%; 1001-2000 € 50.3%; 2001 EUR and more 10.4%). Our sample size exceeds the minimum requirement, ensuring a power of more than 80%.

There were 269 cases in the authentic brand group subsample and 192 cases in the inauthentic brand group subsample. The questionnaire included an open-ended question asking respondents to think about and identify a brand that they consider to be authentic or inauthentic. Respondents consider Nike to be the most authentic (mentioned 28 times), followed by Apple (19), Coca-Cola (17), Samsung (9), Gucci (8), Uoga uoga (7), Chanel and Adidas (6 each). The most frequently mentioned inauthentic brands were Zara (mentioned 8 times), H&M (7 times), Pepsi and Vici (6 times each). The responses show that respondents have mixed perceptions of brands, with some perceiving the same brand as authentic and others as inauthentic.

Next, we used the PLS-SEM (SmartPLS Version 4.1.0.6 software) to test the conceptual model. SEM is preferred for analysing cause-effect relationships and mediation models that include latent variables (Sarstedt et al., 2020) thus it was used in our study as a more advantageous alternative to regression analysis. Following standard procedures, we estimated measurement models first, followed by the structural model for hypotheses testing.

Research Results

Measurement model. To test the conceptual model, we defined brand authenticity as a higher-order reflective construct, which is in line with the approach used by Oh et al. (2019). To reduce the complexity of the relationships within the model, we similarly defined brand attachment as a reflective-reflective higher-order construct, represented by two components—rosy and blue sides of emotional attachment. Therefore, the measurement models in this study involve two higher-order constructs where both brand authenticity and brand attachment are specified as reflective-reflective higher-order constructs (HOC).

For the estimation of the measurement model, we applied the two-stage disjoint approach as outlined by Sarstedt et al. (2019). In the first stage, we linked all lower-order constructs, such as brand virtuousness, to the dimensions of brand authenticity (continuity, originality, reliability, and naturalness). Subsequently, we connected brand virtuousness to the next endogenous constructs, the two dimensions of brand attachment (the rosy and blue sides of emotional attachment), as per the conceptual model. Next, brand authenticity dimensions respectively were linked to both dimensions of brand attachment. The initial assessment of the model focused on the reflective measurement models of the lower-order components, which met all relevant criteria (for internal consistency and convergent validity, see Table 1, stage 1 results). Discriminant validity of the lower-order components was assessed using the Heterotrait-Monotrait Ratio (HTMT) and the Fornell-Larcker criterion (see Tables 2-3 respective 1st stage sections). As shown in Table 2, HTMT values are below the recommended threshold of 0,9, and in Table 3, the square root of the AVE for each construct exceeds its highest correlation with other constructs. Thus, the discriminant validity of the lower-order components was established.

Table 1. Reliability and validity results (Source: Created by the authors)

| Coding | Constructs and items | Mean | Outer loadings | Cronbach's alpha | CR (rho_a) | CR (rho_c) | AVE |
|---|---|-------|----------------|------------------|------------|------------|-------|
| 1st stage: lower-order reflective components | | | | | | | |
| BVirt | Brand virtuousness (BVirt) | 3,682 | | 0,907 | 0,909 | 0,935 | 0,783 |
| BVirt1 | Brand is honest | | 0,855 | | | | |
| BVirt2 | Brand is virtuous | | 0,899 | | | | |
| BVirt3 | Brand is fair | | 0,897 | | | | |
| BVirt4 | Brand is righteous | | 0,888 | | | | |
| BAutCon | Brand authenticity-continuity (BAutCon) | 4,082 | | 0,847 | 0,854 | 0,897 | 0,686 |
| BAutCon1 | I think brand is consistent over time | | 0,800 | | | | |
| BAutCon2 | I think the brand stays true to itself | | 0,851 | | | | |
| BAutCon3 | Brand offers continuity | | 0,886 | | | | |
| BAutCon4 | The brand has a clear concept that it pursues | | 0,772 | | | | |
| BAutOri | Brand authenticity-originality (BAutOri) | 3,590 | | 0,923 | 0,925 | 0,945 | 0,812 |
| BAutOri1 | The brand is different from all other brands | | 0,888 | | | | |
| BAutOri2 | Brand stands out from other brands | | 0,882 | | | | |
| BAutOri3 | I think the brand is unique | | 0,920 | | | | |
| BAutOri4 | The brand clearly distinguishes itself from other brands | | 0,913 | | | | |
| BAutRel | Brand authenticity-reliability (BAutRel) | 3,774 | | 0,898 | 0,900 | 0,929 | 0,767 |
| BAutRel1 | My experience with the brand has shown me that it keeps its promises | | 0,893 | | | | |
| BAutRel2 | The brand delivers what it promises | | 0,904 | | | | |
| BAutRel3 | Brand's promises are credible | | 0,898 | | | | |
| BAutRel4 | The brand makes reliable promises | | 0,803 | | | | |
| BAutNat | Brand authenticity-naturalness (BAutNat) | 3,775 | | 0,831 | 0,833 | 0,899 | 0,747 |
| BAutNat1 | The brand does not seem artificial | | 0,881 | | | | |
| BAutNat2 | The brand makes a genuine impression | | 0,873 | | | | |
| BAutNat3 | The brand gives the impression of being natural | | 0,839 | | | | |
| BAttRosy | Brand attachment-rosy side of emotional attachment (BAttRosy) | 2,976 | | 0,871 | 0,877 | 0,906 | 0,660 |
| BAttRosy1 | My feelings towards brand can be characterized by passion | | 0,835 | | | | |
| BAttRosy2 | My feelings towards brand can be characterized by affection | | 0,859 | | | | |
| BAttRosy3 | My feelings towards brand can be characterized by connection | | 0,834 | | | | |
| BAttRosy4 | My thoughts and feelings towards brand come to me naturally and instantly | | 0,759 | | | | |

| | | | | | | |
|--|--|-------|-------|-------|-------|-------|
| BAttRosy5 | My thoughts and feelings towards brand often come to mind on their own | 0,770 | | | | |
| BAttBlue | Brand attachment-rosy side of emotional attachment (BAttBlue) | 2,678 | 0,926 | 0,935 | 0,947 | 0,818 |
| BAttBlue1 | Losing brand forever would be distressing to me | 0,881 | | | | |
| BAttBlue2 | It is sad to imagine life without brand | 0,910 | | | | |
| BAttBlue3 | I will miss brand when brand is not around | 0,915 | | | | |
| BAttBlue4 | If brand was permanently gone from my life, I would be regretful | 0,913 | | | | |
| 2nd stage: higher-order reflective components | | | | | | |
| HOCBAut | Brand authenticity | | 0,878 | 0,885 | 0,916 | 0,733 |
| | LV_BAutCon | 0,809 | | | | |
| | LV_BAutOri | 0,856 | | | | |
| | LV_BAutRel | 0,866 | | | | |
| | LV_BAutNat | 0,892 | | | | |
| HOCBAtt | Brand attachment | | 0,806 | 0,827 | 0,911 | 0,836 |
| | LV_BAttRosy | 0,931 | | | | |
| | LV_BAttBlue | 0,897 | | | | |

In the second stage, we used the latent variable scores from the lower-order components of brand authenticity (continuity, originality, reliability, and naturalness) and the two dimensions of brand attachment (rosy and blue sides of emotional attachment) derived from stage one to estimate the second-stage measurement model. The reflective measurement model for the higher-order component of brand authenticity revealed high outer loadings for all four lower-order dimensions, ranging from 0,809 to 0,892, all above the threshold of 0,708. Similarly, the outer loadings for the rosy and blue sides of the attachment were also high, with values of 0,897 and 0,931, respectively. The AVE for the higher-order constructs of brand authenticity and brand attachment were 0,733 and 0,836, respectively, both exceeding the 0,5 threshold. Additionally, Cronbach's alpha and composite reliability measures for both higher-order constructs were satisfactory, exceeding 0,7. The detailed results of the 2nd stage are presented in the lower section of Table 1. Further evidence of discriminant validity is provided in Tables 2 and Table 3 respective sections, confirming that discriminant validity was established for both higher-order constructs.

Table 2. Heterotrait-monotrait Ratio (HTMT) (Source: Created by the authors)

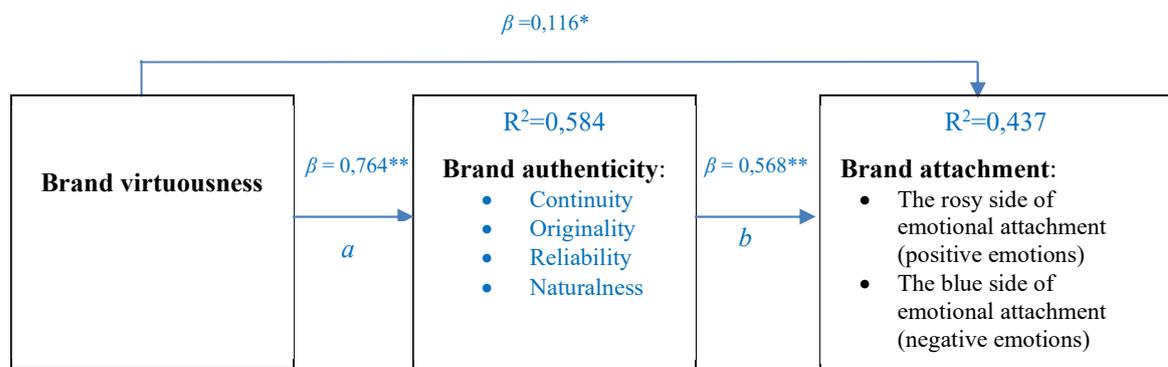
| 1st stage: | | | | | | | |
|------------|----------|----------|---------|---------|---------|---------|-------|
| | BAttBlue | BAttRosy | BAutCon | BAutNat | BAutOri | BAutRel | BVirt |
| BAttBlue | | | | | | | |
| BAttRosy | 0,749 | | | | | | |
| BAutCon | 0,425 | 0,536 | | | | | |
| BAutNat | 0,524 | 0,669 | 0,745 | | | | |
| BAutOri | 0,544 | 0,651 | 0,679 | 0,799 | | | |
| BAutRel | 0,547 | 0,658 | 0,677 | 0,810 | 0,693 | | |

| | | | | | | |
|----------------------------|-------|----------|---------|-------|-------|-------|
| BVirt | 0,450 | 0,643 | 0,664 | 0,811 | 0,642 | 0,799 |
| 2nd stage: | | | | | | |
| | BVirt | HOCBAAtt | HOCBAut | | | |
| BVirt | | | | | | |
| HOCBAAtt | 0,633 | | | | | |
| HOCBAut | 0,850 | 0,771 | | | | |
| <0,9 (Hair & Alamer, 2022) | | | | | | |

Table 3. Fornell -Larcker criterion (Source: Created by the authors)

| | | | | | | | |
|------------|----------|----------|---------|---------|---------|---------|-------|
| 1st stage: | | | | | | | |
| | BAttBlue | BAttRosy | BAutCon | BAutNat | BAutOri | BAutRel | BVirt |
| BAttBlue | 0,905 | | | | | | |
| BAttRosy | 0,675 | 0,813 | | | | | |
| BAutCon | 0,382 | 0,464 | 0,828 | | | | |
| BAutNat | 0,465 | 0,572 | 0,630 | 0,864 | | | |
| BAutOri | 0,507 | 0,585 | 0,602 | 0,701 | 0,901 | | |
| BAutRel | 0,505 | 0,586 | 0,593 | 0,701 | 0,633 | 0,876 | |
| BVirt | 0,418 | 0,575 | 0,584 | 0,706 | 0,589 | 0,722 | 0,885 |
| 2nd stage: | | | | | | | |
| | BVirt | HOCBAAtt | HOCBAut | | | | |
| BVirt | 0,885 | | | | | | |
| HOCBAAtt | 0,550 | 0,915 | | | | | |
| HOCBAut | 0,764 | 0,657 | 0,856 | | | | |

Structural model results. Next, we evaluated the structural model to test the hypotheses. The inner model VIF values ranged from 1,000 to 2,403, remaining below the threshold of 3, indicating that multicollinearity is not a concern. The structural model results are illustrated in Figure 2.



H4: $a \times b = 0,434^{**}$, * $p < 0,05$, ** $p < 0,01$

Fig. 2. Structural model results (Source: Created by the authors)

Consistent with our hypotheses, the path coefficients supported the positive effect of brand virtuousness on brand attachment ($\beta=0,116, p=0,034$), **supporting hypothesis H1**. Furthermore, a positive effect of brand authenticity on brand attachment was observed ($\beta=0,568, p=0,000$), **supporting hypothesis H2**. The effect of brand virtuousness on brand authenticity was also positive and significant ($\beta=0,764, p=0,000$), **supporting hypothesis H3**. Finally, as anticipated, the indirect effect of brand virtuousness through brand authenticity on brand attachment was positive and significant ($a \times b = 0,434, BCCI [0,355; 0,511]$), **supporting hypothesis H4**. A summary of the hypotheses testing results is presented in Table 4.

Table 4. Results of hypotheses testing (Source: Created by the authors)

| | Hypothesised relationships | Path coefficient | <i>p</i> -value/ Bias corrected confidence interval | Results |
|----|--|------------------|---|-----------|
| H1 | Brand virtuousness positively influences consumer brand attachment | 0,116 | $p=0,034^*$ | Supported |
| H2 | Brand authenticity positively influences consumer attachment to the brand | 0,568 | $p=0,000^{**}$ | Supported |
| H3 | Brand virtuousness positively influences brand authenticity | 0.764 | $p=0,000^{**}$ | Supported |
| H4 | Brand virtuousness positively influences brand authenticity, which in turn positively affects brand attachment | 0,434 | $p = 0,000^* /$ BCCI [0,355; 0,511] | Supported |

* $p < 0,05$, ** $p < 0,01$

Conclusions

The literature review shows that brand authenticity and brand attachment are widely researched topics, however, virtuousness, which is addressed in the personality field, has been little studied in the context of brands. Analysis of the research suggests that although these constructs have been studied separately, the links between them have not been fully explored. Therefore, the aim was to examine the relationship between the constructs of brand virtuousness, brand authenticity and brand attachment.

Our study shows that brand virtuousness has a statistically significant positive effect on consumer brand attachment; likewise, brand virtuousness has a statistically significant and strong positive effect on brand authenticity. Our results on the effect of brand virtuousness on consumer brand attachment corroborate the findings of studies conducted by Japutra et al. (2018), Malar et al. (2011), Park et al. (2010), Sodergren (2021). Further, the results of the study on the effect of brand virtuousness on brand authenticity are in line with the findings of Akbar and Wymer (2017) and Guevremont (2018).

Our study found that brand authenticity has a statistically significant positive effect on consumer brand attachment. The results of the present study are consistent with the findings of Morhart et al. (2015). Thus, in line with the prediction, authenticity positively affects the consumer's attachment to the brand. Brand authenticity can evoke feelings in consumers towards brands. If consumers perceive a brand as authentic, they may be inclined to feel emotions such as passion, affection, and connection to the brand, and at the same time would be sad and regretful if the brand disappeared. The results obtained in this study confirm and are consistent with those of Arya et al. (2019), Assiouras et al. (2015), Guevremont & Grohmann (2016), and others. The findings also support the idea put forward by Arya et al. (2019) that the influence of brand authenticity on consumer brand attachment is due to the authentic qualities of a brand, which make consumers feel attached to it. Our study also supports the hypothesis that brand authenticity mediates the relationship between brand virtuousness and brand attachment. When a brand

is perceived as more virtuous, it is also perceived as more authentic, which, in turn, increases attachment to the brand.

As for further research, given that brand authenticity can be assessed on up to forty different dimensions, it is important to find out which of these have the greatest impact on consumer decisions. The results of the study could then be used to determine which of the identified dimensions is likely to have the greatest impact on consumer attachment to the brand.

The limitations of this study include research sampling conducted in a single country and cultural context. Thus, future research could focus on replicating and testing the relationship between brand authenticity, virtuousness, and brand attachment in different cultural contexts. Next, the limitations of the current study can also be attributed to the correlational research design that was used. Thus, the focus of future research could be to test the theoretically assumed causal-effect model by means of an experimental research design to claim causation. Another limitation of this study is the use of a convenience sample, which limits the generalizability of the findings. The gender imbalance among the respondents warrants further investigation.

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LEGITIMACY STRATEGIES FOR COMMUNICATING CORPORATE ACTIVITIES USING SYMBOLIC VALUE

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Abstract

Research purpose. The objective of this paper was to identify the strategies for the use of symbols as communication tools by senior corporate executives in the era of a sudden change in the environment related to the outbreak of the COVID-19 pandemic. While it has been proved that the leadership style (whose part is to be informative) was affected by the pandemic it can be assumed that the effects of the pandemic can be found in CEO letters. The authors aim at examining to what extent the legitimacy context established by the legitimising CEO messages describing corporate activities and their results can be shaped by symbols embedded in the messages. Symbols understood as textual signs are used in such a way that labels and categories created by symbols have meaning in social interaction and when being intentionally selected enable necessary legitimacy. From the point of view presented in the paper, it is important to acknowledge that symbols facilitate interactions between organisational actors which may be strengthened depending on which form of value (ideological, comparative, isomorphic) symbols imply.

Design / Methodology / Approach. In the literature on the perspectives of the analysis of legitimacy of enterprises, the significance of the trend focusing on change agents, who, through their actions, attempt to give the processes of legitimacy formation a proper direction, can be emphasised. To achieve the research objective, letters from CEOs of enterprises diversified with regard to the reported changes in financial performance were analysed using manual content analysis based on the grounded theory approach. This technique was justified by the need to deal with highly contextual messages.

Findings. The obtained research results allowed identifying four types of legitimacy strategies for communicating corporate activities, in which embedded symbols play a different role due to the legitimacy context evolving under the influence of changes in the environment and approaches towards learning in enterprises associated with them. In this way, it has been shown that the approach towards the use of symbols has evolved in communication tools used by senior corporate executives in the era of a sudden change in the environment related to the outbreak of the COVID-19 pandemic. Among enterprises that register positive changes in financial performance when the level of uncertainty decreases, it can be observed that such kind of a group of enterprises appears to be less focused on the ongoing nature of legitimate work activities and ideological values to be generated by symbols embedded in their communication. Among enterprises that register negative changes in financial performance when the level of uncertainty decreases, it can be observed that enterprises appear to draw more attention to how their adaptation can be managed and are more focused on isomorphic values to be generated by symbols embedded in their communication.

Originality / Value / Practical implications. Gaining stakeholder legitimacy for corporate activities is a key element of sustainable development in many sectors, and the issue of using symbols, alongside the institutional perspective, constitutes a significant component of deliberations in that matter. The identified strategic patterns appear to be appropriate for companies across different sectors. When being used they may enable managers to build the legitimacy of their activities effectively, which is of great importance from the point of view of the developmental paths for those companies.

Keywords: corporate legitimacy; sustainability; symbolism; non-financial reporting; learning.

JEL codes: M14

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Introduction

The study of the messages of the senior executives of various companies has attracted the attention of researchers for years due to the significance attributed to, among other things, the letters at the beginning of the company's management reports (Bournois & Point, 2006; Kiattikulwattana, 2019; Kohut & Segars, 1992). CEO letters have become the accepted object of study in academic circles. This is because, by use of letters, the CEO may attempt to legitimise corporate activities which are explained in letters as the vision of the business activities is defined as well. Word Wide Web is said to be the main reason for the growth in the importance of CEO letters as a communication tool (Bournois & Point, 2006). This area can be explored from different points of view, including that concerning the CEO's approach towards discussing in the letters, on the one hand, the successes of the organisation, and on the other hand, how they take a stand on sometimes difficult matters, burdened with the possibility of causing objections among the recipients, i.e., the shareholders, but also the employees of the organisation. This becomes possible especially when there is a growing uncertainty in the environment, which companies are often facing nowadays and on an unprecedented scale (financial crisis, pandemic, war in Ukraine). It seems that, in particular, not only the scale but also the abruptness with which the changes occurred, makes it possible to perceive the outbreak of the COVID-19 pandemic as a period that should particularly attract the attention of the researchers. As Lorange (2021) notices until the emergence of COVID-19 corporate strategies were driven by a long-term focus on growth, however, the pandemic caused more attention to be paid to a shorter-term strategic horizon. While it has been proved that there is a positive relationship between employing a bricolage strategy and crisis-responding SMEs' organisational resilience in innovation activities (Park & Seo, 2024), since severe resource constraints and the need for creative utilization of available resources were emphasized in CEOs letters that are described later in the paper, it was the task CEOs involved in to attempt to explain changes in strategies that were triggered by the pandemic. Being complex they may resemble what Park and Seo (2024) described as a "bricolage strategy" and their explanation could require a specific approach to the communication. Together with an emphasized short-term strategic time horizon it put CEOs writing their letters under high pressure as they needed to communicate both clearly and convincingly. This is where symbolic values generated by textual symbols used by CEOs writing their letters could be of special importance.

The objective of the paper is to examine to what extent the legitimacy context established by the legitimising CEO messages describing corporate activities and their result can be shaped by symbols embedded in the messages. The paper uses two approaches, i.e., an approach focused on legitimacy strategies for communicating corporate activities (Hahn & Lulfs, 2014), and an approach focused on symbolic management (e.g. Bass et al., 2023; Elsbach, 1994), particularly on types of symbols and symbolic values (Schnackenberg et al., 2019). On that basis, we define symbols as textual signs by which the content they refer is signified so that labels and categories created by symbols have meaning in social interactions while possibly combining sufficiently supported statements with those that may lack sufficient support. From the point of view presented in the paper, it is important to acknowledge that symbols facilitate interactions between organisational actors which may be strengthened depending on the form of value that symbols are to take on (i.e. ideological, comparative, or isomorphic value, for details see the appendix, Table A2). This understanding is derived from how Schnackenberg et al. (2019) define symbols as their approach when referring to three existing perspectives on how symbols can be defined (i.e. semiotic, interactionist, general use – e.g. Ashforth & Humphrey, 1997; Basu et al., 1999; Gioia et al., 1994), attempts to add specificity to the organisational literature focused on symbols. At the same time, in this paper, the authors present their own perspective on how the concepts of embedded symbols and symbolic values can be described in the legitimacy context created by CEO messages. The research focuses on theory building, that is, contributing to the development of theory by formulating research proposals based on case observation within the framework of a comparative case study (Dul & Hak, 2008). The first part of the article introduces the subject of building corporate legitimacy and its possible relationship with the field of interest centred around symbolic management occurring with the use of proper communication. The second section discusses the research procedure. The third section describes and interprets the results of the research. The paper ends with a summary which formulates

the main conclusions drawn from the presented research procedure, indicates its limitations and outlines possible directions for further research.

Literature Review

One of the challenges that resulted from the pandemic was to keep employees fully informed while paying attention to avoid messages appearing confused which could relatively easily happen due to the constant changes in organisational policies and practices (AlMazrouei, 2023). In the literature, attention is paid to the organisational leaders' responsibility to communicate clearly and effectively even gaining importance when there is a time of high uncertainty as during COVID-19. Since the justified allocation of resources due to truthful information shared is to have a positive mediating effect between (transactional) leadership and trust, leaders' failure in the field of communication could have potentially a destroying effect on how relationships between organisations and their stakeholders are built (Visser & Scheepers, 2022).

Suchman presented legitimacy as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995, p. 574). In this paper attention is paid primarily to Suchman's proposed set of strategies for successively (1) gaining legitimacy (2) maintaining legitimacy, and (3) repairing legitimacy. Due to the multiplicity of forms that a reference point for making judgements on the legitimacy of a company by stakeholders can take (Bitektine & Haack, 2015; Suchman, 1995; Suddaby et al., 2017), the literature emphasises the role of properly constructed messages aimed at either supporting or de facto replacing the actual legitimisation efforts made by companies in the real world (Hahn & Lulfs, 2014). In this sense, it is possible to speak of legitimisation efforts of companies occurring more at symbolic or substantive levels. Nevertheless, the question can be asked whether and if so, to what extent, the use of various types of symbols by managers (who create a particular message that is as accurate as conditions of extraordinary uncertainty permit, and in which it is assumed that the role of their ability to justify a position increases) does not so much make (is supposed to make) stakeholders believe in the created state (though potentially with limited direct reference in reality), but helps to direct the company's efforts to achieve certain objectives. For adequately outlining them, letters to shareholders/stakeholders (Jonall & Rimmel, 2010) prove particularly useful, in which there is an expectation towards the management board, most frequently the CEO, to provide a point of view on key issues for the company. CEO letters can be used as tools indicating e.g. whether CSR issues (society, environment, economy, governance) can be considered as embedded in the corporate strategy. Noting that although fewer CSR issues during the financial crisis do not necessarily automatically indicate fewer activities on the CSR, Fehre and Weber (2015) emphasise that CEO communication provides a certain indication of the management board's attention within this scope. The CEOs paying less attention to social and governance issues may imply that CSR is not completely embedded in the corporate strategy and that other issues gain significance during the crisis. Meanwhile, for the purposes of the article, the thesis is assumed that appropriately prepared letters can constitute a kind of call addressed not only to shareholders but at least indirectly to the organisation's employees so that they can make an effort to implement the plans outlined in the letters through increased commitment. On the contrary, when a message initiated by the CEO focuses on a possibly favourable presentation of past achievements unless it is a foregone conclusion that it will raise doubts among the shareholders themselves, it may also not constitute a sufficiently convincing image of the situation for employees, who may perceive the outlook process carried out in this way as more significant to the company than the results of activities taken in reality. In this paper, it is considered sensible to examine the extent to which the appearance of embedded symbols in CEO messages may be accompanied by the creation of value for the organisation manifested also by the fact that such messages may not only impact the perception of audiences but are also clearly linked to the activities undertaken. Put differently, it may be said that the implementation of substantive legitimacy strategies results in the implementation of specified legitimate work activities. Undertaking them involves the preparation of messages about legitimate work activities. The messages may also result from the implementation of symbolic legitimacy strategies, however, then, they may less significantly reflect the actual activities taken or present them as more important than they really are.

The implementation of the indicated strategies resulting in the form of diverse types of messages shapes the legitimacy context understood as a compilation of diverse types of messages reflecting activities in the CEO letter. For the purposes of the paper, legitimacy strategies for communicating corporate activities are discussed in the context of the identified strategies for communicating corporate activities in which the roles of messages about the legitimate work activity contained in CEO letters and the distinguished three types of symbols embedded (these are ideological, comparative, and isomorphic) in these messages are simultaneously considered. Thus, the thesis according to which symbols may also appear in substantive approaches without making them biased is evaluated. What is significant as well, is the authors' approach to analysing corporate legitimacy management as a strategic process through the prism of learning. The process of creating a message that is accompanied by activities directed at either summarising the future or outlining it involves creating knowledge, which is also supported by the emerging (or not) effects of the undertaken activities (Boland & Tenkasi, 1995; Schnackenberg et al., 2019). The interest in the literature on how knowledge representations may facilitate among organisational members the processes of imagining each other viewpoints provides the possibility to consider CEO letters as possibly contributing to the organisational capability in the field of knowledge integration (Litchfield & Gentry, 2010; Newell & Edelman, 2008). The activities themselves may, in turn, result from aspirations more focused on implementing a selected option from among those available or taking more risks associated with trying novel solutions (Gupta et al. 2006; March, 1991). The exploration-exploitation paradigm initially proposed by March (1991) in his pioneering article received substantial attention in the management literature. It is proved that difficulties related to obtaining valid indicators of firms' inclination towards exploration or exploitation appear when using computer-aided text analysis to construct suitable measures (Ugur et al., 2024). What is important, those two types of activities can be referred to by other terms indicated by March (1991). From the authors' point of view, those terms which can be singled out are primarily innovation, flexibility, risk-taking in case of exploration and efficiency, implementation, and execution in case of exploitation (those words and their synonyms account for valuable hints when attempting to indicate which kind of activity tends to be preferable by a given company). The idea here is that when adaptive systems (like analysed companies) engage in only one type of activity (exploration or exploitation) to the exclusion of the second one can find themselves in a disadvantageous position – having many undeveloped (not useful) new ideas when being focused only on exploration or being trapped in stable equilibria whose suboptimality is to be noticed in case of companies being focused only on exploitation (March, 1991).

Taking into consideration the context of uncertainty resulting from the outbreak of the COVID-19 epidemic creates a unique opportunity to compile observations of enterprises anchored in various conditions (at the time of the outbreak as well as during its course influencing, to some extent, different sectors in different manners) and their reactions to them. In order to complete the analysis, complementary factors were taken into consideration that can be reasonably assumed to affect how CEOs communicate. These are customer proximity and industry complexity. In the literature, they are perceived as groups of factors which can condition the use of legitimacy strategies, and, at the same time, are relatively capacious. In addition, they were described in the literature in the context of the research problem, and they facilitate a clearer compilation of enterprises, to some extent on the basis of opposites. Comments on the issue of customer proximity factors are made by, inter alia Branco & Rodrigues (2008) and Purushothaman et al. (2000). In turn, Hrasky and Smith (2008) raise the issue of industry complexity.

Research Methodology

The authors of this paper conducted an analysis of CEO letters written for the years 2019 and 2020, mainly due to two factors. The first one is the awareness of the significance of these letters and the fact of their further appraisal by investors concerning the usefulness of the information. The other factor is a sudden increase in uncertainty caused by the COVID-19 pandemic and its potential negative influence on the possibility of achieving a competitive advantage by the enterprises in question. In 2020 preparing letters for the year 2019 coincided with the announcement of restrictions in more countries and a sharp increase in uncertainty ensued. In contrast, in the case of letters for 2020 written in 2021, the influence

of the pandemic on corporate performance already became largely visible and a gradual reduction in uncertainty ensued. The analysis was conducted with reference to the main factor relating to changes in financial performance in 2019 and 2020 and complementary factors connected with customer proximity and industry complexity.

Dul and Hak (2008, p. 176) define research aimed at theory building as research whose objective is to “contribute to the development of theory by formulating new propositions based on the evidence drawn from observation of instances of the object of study”. The researchers intended to determine whether there are noteworthy interactions between the messages about legitimate work activities used and different types of symbols embedded in them as a result of which symbolic values shaping the legitimacy context and thus constituting a value for the organisation could be created. In order to formulate proposals on the basis of theory-building-oriented research the proposals need to be grounded in observations that can be regarded as the basis for defining concepts on the basis of which the proposals are built. In order to obtain a credible final result several steps were taken toward the selected strategy of a comparative case study.

Sample selection was purposive. To address the research problem, a selection of companies was made, whose first criterion was the publication (for the financial year ending at the end of 2019 and 2020, respectively) of annual reports containing a CEO letter. Such a letter could sometimes be called in a different manner, e.g., a letter of the management board, nevertheless, it should be written by a person signed by name, most frequently a CEO, sometimes by a member of the management board, or by a CEO and a member of the management board (it was acceptable for the letters written for 2019 and 2020 to be written by other persons as a result of changes in the composition of the management boards of the companies). The authors believe that letters written during the initial stages of the pandemic (i.e. its outbreak and the first year that followed) are still a precious source of data on how CEOs reacted to this unprecedented environmental threat. The second criterion was the affiliation to various industries allowing for conducting an analysis on the basis of complementary factors (i.e., customer proximity and industry complexity), while it was essential that the enterprises selected for the research included both those with positive and negative changes in financial performance in the years 2019 and 2020 (with regard to previous years). Hence, the adopted criteria for the selection of the companies allowed for comparisons between companies of high proximity of customers with those of low proximity of customers. Similarly, the issue was considered regarding industry complexity (for details see the appendix, Tables F, G, H, I). The analysis of legitimate work activities formulated by CEOs required the adoption of specific resolutions relating to the proper framing of the role of messages more or less explicitly relating to the information dimension of the letter. Particular attention was paid to the way in which symbols embedded in messages can level the information nature of messages (intensifying difficulties in their reception, even against potential intentions of the author of the messages) or support it (thus carrying specific consequences for the activities undertaken). The paper does not ultimately address the question of whether an organisation does or does not possess legitimacy, nor the very mechanism for stakeholders to evaluate CEO efforts in the field of corporate legitimacy management.

A total number of 20 CEO letters were analysed (10 for each of the two years analysed), i.e., between 4 to 6 cases for the companies belonging to the identified groups between which comparisons were made. All selected letters are available for the public on companies' websites (included in the reference list). The letters included in the analysis were examples of structured texts in case of which the directly referring to shareholders begins the letter, the next short presentation of main achievements in the given year is presented, and plans for the future are outlined. Of course, in letters from the analysed period, even a significant part of them was focused on steps made by the companies in order to overcome threats resulting from the pandemic. In total, 20 selected letters consist of 13,526 words (674 words on average per letter in 2019 and 678,6 words on average per letter in 2020). The objective of the selection of 20 CEO letters was to have no less than three cases in each of the distinguished groups, i.e., for example, in the group of enterprises with favourable changes in financial performance in 2019 or the group of companies with high industry complexity, etc. The number of letters (cases) selected is considered sufficient based on Yin's views (2015) on lateral replication and theoretical replication. It makes it possible to recognise some groups of enterprises which in a given year are similar to themselves and at

the same time differentiate clearly when focusing on using symbols and messages in legitimate work activities. The recognised strategies can be considered as coherent categories that emerged from the study. Hence, this number of cases is sufficient for a comparative case study designed to generate the theory (Dul & Hak, 2008). Details related to the sample are included in Table 1. The selection of representative companies allows researchers to believe that assumptions concerning the high pressure put on CEOs should be fulfilled. The fact that the selected companies operate in different sectors allows researchers to draw more convincing conclusions. The authors due to the selected method are not able to argue that recognised patterns are to be observed anywhere in the world, however, the obtained results could potentially encourage other researchers to devote their attention to how CEOs in their countries make use of the communication tool such as a CEO letter. The following sources were used:

- <https://mangata.com.pl/en/investor-relations/financial-reports/>
- <http://www.orzel-bialy.com.pl/en/ir/okresowe/2020>
- <https://celonpharma.com/en/periodic-reports/>
- https://en.tauron.pl/investor-relations?sc_lang=en
- <https://ir.amica.pl/>
- <https://www.unimot.pl/relacje-inwestorskie/raporty-2022/okresowe/?lang=en#2020>
- <https://raportroczny.ing.pl/indexENG.html#wyniki-finansowe-title>
- <https://www.grupapsb.com.pl/grupa-psb/raporty-roczne>
- <https://grupadino.pl/en/financial-reports/>
- <https://grupapolsatplus.pl/en/investor-relations/results-centre/results-centre#2020>

Manual content analysis was used to analyse the texts of CEO letters. This approach is supported by the experience of other researchers. Duriau's findings on the use of computers to aid the textual analysis indicated that only 24 of the 98 articles analysed used a computer for part or all of the analysis conducted (Duriau et al., 2007, p. 22). For analyses that encompass also complex, i.e., subtle, and sophisticated techniques used within the framework of impression management, Brennan et al. (2009) recommend the manual content analysis. It is significant here that while computers can be used for coding categories that are easy to operationalise, coding persons manage complex categories in a more efficient manner (Conway, 2006). In manual analysis, a researcher codes keywords and statements directly from the content of the analysed text, which makes this method labour-consuming and cost-intensive. This also causes the sample to be limited and critical voices to emerge indicating the role of subjectivism in manual coding, nevertheless, this method allows for a more detailed and sophisticated analysis and comparisons (Brennan et al., 2009). Edgar et al. (2018, p. 1577) emphasise that the meaning-oriented manual analysis makes it possible to consider "words in their immediate surrounding textual context". Such subtilising of meaning analyses was a significant factor in determining that only articles in the authors' native language (i.e., Polish) were analysed which ensures full awareness of nuances of meaning. As Spear (2017) emphasises, it is proposed that any manual coding should be perceived as qualitative, which is appropriate for exploratory research. In such cases, the coding person has to interpret data on the basis of the coding instructions (Krippendorff, 2004). In this research, on the basis of the development of coding instructions, the coding of particular messages contained in CEO letters, constituting sampling units, was conducted. One sentence was assumed to constitute one recording unit, while in order to determine its right meaning each time attention was paid to its role in a broader context, i.e., paragraph or the whole letter (context unit). In the first stage of coding, codes relating to legitimate work activities indicated by the sentence were assigned to a given sentence, and in the second stage of coding, codes relating to the symbols embedded in the sentence (it was allowed to assign more than one code to a sentence in both first and second stage). Each stage was conducted twice by separately coding authors so that the results obtained individually could be agreed on. It is important that the developed coding instructions allow different coding persons to code particular sentences in the same way (Miles & Huberman, 2000; Spear, 2017). After completing individual coding by the authors, as a result of the discussion, an agreement was reached on the differences existing between the positions of the coding

persons (Miles & Huberman, 2000). After coding of the CEO letters taken into consideration, the following techniques were applied to generate meaning: 1) counting, which makes it possible to gain a quick sense of what one has in a large batch of data, verify suspicions, and also to preserve honesty throughout the analysis, thus increasing certainty about the statements made (Miles & Huberman, 2000) and 2) the technique of noting relationships between variables, where the main tactic of analysis consists in trying to detect a relationship between two or more variables, and may constitute the first step in considering causal relationships (Miles & Huberman, 2000). It should be emphasised that no testing of the effect of the messages about legitimate work activities used by CEOs and the symbols embedded in them was conducted among the audiences of annual reports. In such a situation it is not possible to determine, for example, whether the impression management techniques used in CEO letters impact on the audience or whether rather the audience regards them, for example, as annoying (Edgar et al., 2018).

Table 1 contains data on the companies whose letters were analysed as part of the research procedure conducted. Table A3 containing sample quotations taken into consideration during coding can be found in the appendix.

Table 1. Description of the sample (Source: Own elaboration on the basis of the companies' data: mangata.com.pl, orzel-bialy.com.pl, celonpharma.com, tauron.pl, amica.pl, unimot.pl, ing.pl, grupapsb.com.pl, grupadino.pl, grupapolsatplus.pl)

| Enterprise | Industry | Revenue from sales/2020 |
|--|---|-------------------------|
| Grupa Kapitalowa Cyfrowy Polsat S. A. | radio and television activities; telecommunications; auxiliary activities to financial services; production of decoders; call centre and premium rate services; wireline telecommunications; retail; wholesale; technical services; rental services; motion picture; video and television programme production, trade in gas fuels; financial activities; money broking; holding activities; software; | PLN 11,962.9 MLN |
| Grupa Kapitalowa Dino Polska S. A. | nationwide chain of medium-sized food supermarkets; investments in energy from alternative renewable sources that satisfy the needs of its markets and distribution centres | PLN 10,125.8 MLN |
| Grupa Polskie Sklady Budowlane Handel S. A. | chain of construction and renovation materials wholesalers; chain of home and garden stores; offer smart energy solutions for individual clients | PLN 7,500 MLN |
| Grupa Kapitalowa ING Bank Slaski S. A. | universal banking | PLN 6,231 MLN |
| Grupa Kapitalowa Unimot S. A. | independent importer of liquid and gas fuels; owner of a chain of petrol stations, installations of photovoltaic panels | PLN 4,769.9 MLN |
| Grupa Kapitalowa Amica S. A. | manufacture and sale of electric and gas domestic appliances; trade in household appliance; sale of maintenance; heating; hotel; catering services; rental and leasing | PLN 3,068.7 MLN |
| Grupa Kapitalowa Tauron Polska Energia S. A. | generation of electricity (also from renewable energy sources); hard coal mining; distribution; and sale of electricity; servicing of electricity consumers and distribution services to Tauron Capital Group companies; limestone mining; acquisition, transport and processing of biomass, management of by-products of coal combustion and mining; vehicle technical maintenance; real estate administration; protection of property; financial activity | PLN 1,051.9 MLN |

| | | |
|--|--|---------------|
| Grupa Kapitalowa Mangata Holding S. A. | production of fittings; production of casts; production of fasteners; production of components for the automotive industry; production of components for the engineering industry; industrial automation; production of forgings for the renewable energy sector; recovery of waste heat generated in own production processes | PLN 566.1 MLN |
| Grupa Kapitalowa Orzel Bialy S. A. | recovery of raw materials from segregated materials; recycling of used lead batteries; production of steel structures; maintenance and repair services; freight transport by road; service activity supporting the mining industry and quarrying | PLN 512.4 MLN |
| Celon Pharma S. A. | manufacture of medicines | PLN 139.3 MLN |

On the basis of the synthetic characteristics of the enterprises selected for the research sample, it can be noted that the 10 companies subjected to the research are large enterprises, sometimes with turnover in the billions of PLN, frequently operating also outside the country. The industries within which they operate had to, without exception, struggle with the consequences of the outbreak of the pandemic. However, its significance was not equal, and the main challenges could result from the disruption to supply chains, the need to provide thousands of employees with security, or the need to meet the challenges resulting from corporate solvency problems.

The data obtained for the purposes of the research make it possible to ponder the messages as well as the nature of the activities undertaken more deeply by the enterprises in the period directly following the outbreak of the pandemic as well as one year later when the prospect of an end to the pandemic began to emerge in connection with the vaccination campaign. As can be seen, the analysis was conducted with the division into two groups where changes in financial performance in a given year (2019 or 2020) in comparison with the previous year were the division criterion, due to the relations between the features of CEO messages and financial performance (Che et al., 2020). The authors of this paper are particularly interested in whether there are differences between the selected groups of enterprises against the background of the use of messages about legitimate work activities indicative of the fact that the companies take actions with different levels of activity (legitimacy context), as well as in how, from the point of view of communication (the symbolic dimension of legitimate work activities, i.e., at the message level) and undertaking of legitimate work activities (the substantive dimension of legitimate work activities, i.e., at the process level), their role can be influenced by the issue of embedding symbols generating a specific type of symbolic value in individual messages as a result of interaction with the legitimacy context. By paying attention to different types of values that can be generated by using textual symbols embedded in CEO letters (Schnackenberg et al., 2019) it is possible for authors to look at messages generated by CEOs in a wider way than it would be when being focused only on issues such as the level of accuracy of the letters or how much those letters possibly conceal (Hahn & Lulfs, 2014). By interpreting the CEO letter as (although specific one) kind of knowledge integrating tool (Litchfield & Gentry, 2010; Newell & Edelman, 2008) it becomes possible to consider consequences the letter could have for organisational life other than being “decoupled” (Suddaby et al., 2017). The authors comment on this subject more extensively in the next section.

Research Results

Description of research results

Counting of particular codes allowed each of the analysed groups of enterprises in each year taken into consideration in the analysis to define the legitimacy context. The activities undertaken within the framework of the previously indicated legitimacy strategies allowing for gaining legitimacy,

maintaining legitimacy, and repairing it, finding their more or less faithful reflection in messages about legitimate work activities, shape the legitimacy context, in which, as a rule, the significance of messages of a particular type defined at the level of codes assigned at the first stage is emphasised. On the other hand, to identify legitimacy strategies for communicating corporate activities, it was necessary (after identifying the dominant types of symbols for each group of companies on the basis of the codes assigned at the second coding stage) to trace the interaction of symbols with a specific legitimacy context so as to diagnose the possibilities for creating value for the organisation, which later made it possible to identify each of the four types of legitimacy strategies for communicating corporate activities. The described approach is presented in Figure 1.

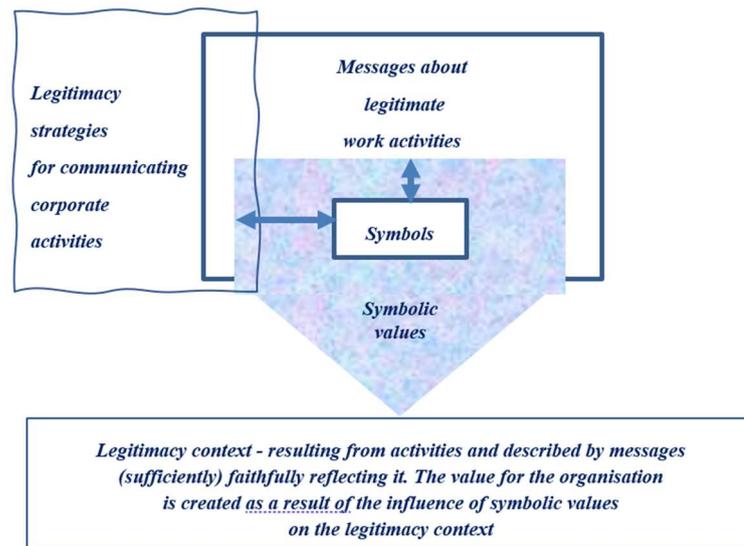


Fig. 1. Identifying legitimacy strategies (Source: Own work)

When defining legitimacy strategies for communicating corporate activities, Suchman's (1995) observations were suggested in the field of the extent of the activity attributed to various activities that make up legitimacy management. Gaining legitimacy requires making the greatest effort and proactivity, whereas repairing legitimacy is rather related to reactive corrective activities undertaken as a response to an unforeseen crisis. On the other hand, maintaining legitimacy once gained may appear as potentially the least demanding but, at the same time, necessary challenge. As it has been noted above, the implementation of the described strategies assumes the form of appropriate activities and messages reflecting them in a more or less faithful manner. Taking into consideration the correspondence of codes related to gaining legitimacy with more proactive legitimate work activities, codes related to maintaining legitimacy with activities within day-to-day operations of the enterprises, and codes related to repairing legitimacy with a reactive approach to action made it possible to define the legitimacy context for the purposes of formulating a partial definition of legitimacy strategies for communicating activity. In order to fully define the strategies indicated, a symbolic aspect in their naming was taken into consideration. To this end, attention was paid to the type of interaction on the part of the symbolic value generated as a consequence of the interactions of symbols embedded in the text with the legitimacy context. In the case of the marked impact at the message level (symbolic dimension), the communication was described as active.

As it has already been noted, the conducted research procedure made it possible to distinguish four legitimacy strategies for communicating corporate activities. The assignment of the enterprises subjected to the research to particular strategies and the way of defining them against the background of the adopted perception of uncertainty associated with them are presented in Table 2. What is worth mentioning, Table 2 includes terms (proactive and active) that may need additional explanation. A useful definition of proactivity is provided by Sharma and Vredenburg (1998) who argue that for companies to be considered proactive it is required that they operate align a consistent (across dimensions relevant to companies' range of activities and over time) pattern of given practices developed on basis of own

experience, not as a result of pressures within the industry or in fulfilment of given regulations. Although this definition is applied originally to environmental practices (and next in Demessie & Shukla's, 2024, research on sustainable marketing strategy) it helps to understand proactivity in the context of this research through the prism of communicating extra effort undertaken by companies to alleviate the tensions resulting from the pandemic. On the other hand, according to the literature (Mazzei, 2010), active communication behaviours can be related to building and maintaining relationships with outside people and institutions that are knowledge providers for the organisation. Hence, the use of symbols by the CEO to just influence others' perceptions related to legitimate work activities was called "active communication".

Table 2. Structure of the description of particular types of strategies (Source: Own elaboration)

| | | | | |
|---|---|---|---|--|
| 1. Intensity of 2. uncertainty, 3. year Messages, strategies, enterprises | CEO letters for 2019 | CEO letters for 2019 | CEO letters for 2020 | CEO letters for 2020 |
| As time goes by the level of uncertainty is assumed to be reduced | | | | |
| Indicative of activities being taken: | reactive | proactive | proactive | reactive |
| Characterised by the communication manner: | reliable | active | active and detailed | spare |
| 4. Legitimacy strategy | reliable communication of a more reactive activity | active communication of a proactive activity | detailed communication of proactive activities | spare communicating of less active activities |
| Enterprises | Enterprises noting negative changes in financial performance: GK Amica S. A., GK Mangata Holding S. A., GK Celon Pharma S. A., GK Tauron Polska Energia S. A. | Enterprises obtaining positive changes in financial performance: GK Unimot S. A., GK Cyfrowy Polsat S. A., GK Dino Polska S. A., GK Orzel Bialy S. A., Grupa Polskie Sklady Budowlane Handel S. A., ING Bank Slaski S. A. | 5. Enterprises noting negative changes in financial performance: GK ING Bank Slaski S. A., GK Mangata Holding S. A., GK Unimot S. A., Grupa Polskie Sklady Budowlane Handel S. A.; GK Tauron Polska Energia S. A. | 6. Enterprises obtaining positive changes in financial performance: GK Orzel Bialy S. A., GK Celon Pharma S. A., GK Dino Polska S. A., GK Amica S. A., GK Cyfrowy Polsat S. A. |

Table 3 includes summaries of the findings for the identified legitimacy strategies for communicating corporate activities:

Table 3. Identified legitimacy strategies for communicating corporate activities - summary (Source: Own work)

| <p align="center">Strategy of reliable communication of a reactive activity</p> | <p align="center">Strategy of active communication of a proactive activity</p> |
|--|---|
| <p align="center"><i>Compilation of messages about legitimate work activities (legitimacy context):</i></p> <p>(1) greater significance of the use of messages aimed at signalling a difficult situation in the environment; the use of messages aimed at presenting problems through the prism of causal relationships / weak features (occasional messages),</p> <p>(2) lesser significance given to the use of messages indicating the undertaking of adaptation activities and aimed at manoeuvring the attention of the audience (warming up the company's image).</p> <p>(3) presence of messages aimed at emphasising a continuous nature of legitimate work activities (mostly less accurate messages)</p> <p>(4) use of messages indicating the undertaking/planning of corrective actions /weak features (the messages did not appear in each case in the group)</p> <p align="center"><i>Symbols embedded in the messages about legitimate work activities:</i></p> <p>(a) greater significance of the use of the messages with embedded symbols generating comparative value (particularly in terms of communicating financial performance and competencies; also, by making references to broader industry data <weak feature, occasional messages>)</p> <p>(b) presence of messages with embedded symbols generating value of an ideological nature (relating to the messages containing emotive wording and those of an inspirational nature)</p> | <p align="center"><i>Compilation of messages about legitimate work activities (legitimacy context):</i></p> <p>(1) greater significance of the use of messages indicating the adoption of adaptation activities</p> <p>(2) the presence of messages aimed at manoeuvring the attention of the audience (warming up the company's image)</p> <p>(3) presence of messages aimed at highlighting the continuous nature of legitimate work activities</p> <p>(4) virtually no messages aimed at signalling a difficult situation in the environment and lack of messages indicating that corrective activities are being taken/planned</p> <p align="center"><i>Symbols embedded in the messages about legitimate work activities:</i></p> <p>(a) presence of messages with embedded symbols generating value of an ideological nature (related to the messages containing emotive wording and those of an inspirational nature)</p> <p>(b) use of messages with embedded symbols generating value of an isomorphic nature (relating to the messages highlighting the company's role in its environment)/weak feature (the messages did not appear in each case in the group)</p> |
| <p align="center">Strategy of active and detailed communication of a proactive activity</p> | <p align="center">Strategy of spare communication of a reactive activity</p> |
| <p align="center"><i>Compilation of messages about legitimate work activities (legitimacy context):</i></p> <p>(1) greater significance of the use of messages indicating that adaptation activities are being taken</p> <p>(2) greater significance of the use of messages aimed at emphasising the ongoing nature of legitimate activities (particularly more precise ones)</p> <p>(3) lesser significance of the use of messages aimed at signalling a difficult situation in the environment; the use of messages aimed at presenting problems through the prism of cause-effect relationships / weak feature (occasional messages)</p> <p align="center"><i>Symbols embedded in the messages about legitimate work activities:</i></p> <p>(a) greater significance of the use of messages with embedded symbols generating value of an isomorphic nature (particularly messages</p> | <p align="center"><i>Compilation of messages about legitimate work activities (legitimacy context):</i></p> <p>(1) lesser significance of the use of messages aimed at emphasising the ongoing nature of legitimate work activities, particularly more precise ones</p> <p>(2) lesser significance of the use of messages indicating the undertaking of adaptation actions and messages aimed at manoeuvring the attention of the audience.</p> <p>(3) use of messages aimed at signalling a situation in the environment as difficult / weak features (the messages did not appear in each case in the group)</p> <p>(4) use of messages indicating the undertaking/planning of corrective actions /weak features (the messages did not appear in each case in the group)</p> |

| | |
|--|---|
| <p>emphasising the role of the enterprise in the environment)</p> <p>(b) greater significance of the use of messages with embedded symbols generating value of a comparative nature</p> <p>(c) greater significance of the use of messages with embedded symbols generating value of an ideological nature (in the form of numbers and numerical expressions, and of inspirational nature)</p> | <p><i>Symbols embedded in the messages about legitimate work activities:</i></p> <p>(a) presence of messages with embedded symbols generating value of an isomorphic nature</p> <p>(b) lesser significance of the use of messages with embedded symbols generating value of an ideological nature (in the form of number and numerical expressions) and messages with embedded symbols generating value of a comparative nature</p> |
|--|---|

The table concentrates on the elements differentiating the identified strategies. For the characteristics to be complete, it is also necessary to indicate common features, particularly taking into consideration the fact that they frequently concern unspoken issues. From the point of view of the deficiencies identified, it is worth noting that, as highlighted by Merkl-Davies and Brennan (2017), since communication is, from a socio-interpretive narrative perspective, an inherently social phenomenon, the lack of (expected) communication on a given subject also constitutes communication by generating meaning. Therefore, the following common features of the strategy have been noted:

- occasional use of messages suggesting the possibility of stakeholder impact on the corporate decision-making process,
- occasional use of messages aimed at referring to a powerful reputation,
- lack of messages on the basis of which one could infer the company's requirements from its co-operators. There was also extremely limited use of messages indicating the way in which companies refer to the relationship resources they have established,
- the occasional appearance of the pursuit of providing a more detailed explanation of particular decisions,
- there are practically no messages indicating openness to different points of view on corporate activities and plans (whereas organisations may conduct activities aimed at monitoring the cultural environment and assimilating selected elements in the decision-making process, frequently using specially appointed liaisons who help the organisation learn about stakeholder values, beliefs, and reactions (Levitt & March, 1988; Scott, 1992; Suchman, 1995).

Interpretation of research results

Strategy of active communication of a proactive activity

In the indicated strategy, the symbolic value is generated as a result of interactions between, above all, ideological symbols embedded in the messages about legitimate work activities and a specific legitimacy context. This context is characterised especially by the messages indicating the undertaking of adaptation activities that signal a more proactive approach (Demessie & Shukla, 2024), and the messages aimed at warming up the company's image. The value of the organisation created as a consequence of the interaction of the indicated symbols with the legitimacy context may shape, in this case, not only the symbolic dimension of legitimate work activities (at the message level) but also their substantive dimension (at the process level), since the approach that assumes linking the enterprise to the society at the message level requires, inter alia, prior adaptation activities. Simultaneously, the appearance of such messages may suggest an increase in the range of adaptation activities in the future, the use of which means adaptation to stakeholder expectations in a way that does not require breaking from the dominant cognitive patterns (Bitektine & Haack, 2015; Oliver, 1991; Suchman, 1995). In the research, such communication is particularly ascribed to the enterprises characterised by high customer proximity. From the point of view of organisational learning, it can be noted that activities of an exploitative nature related to organisational learning are essential for highlighting the manner of communication in question (Gupta et. al.; 2006; March, 1991; Ugur et al., 2024). The high level of activity is accompanied by active

communication (Mazzei, 2010), which is aimed at providing messages in the shape that could be potentially expected by stakeholders, where references to the existing knowledge about the discussed phenomena and processes (Newell & Edelman, 2008) are of secondary importance (perspective making).

Strategy of reliable communication of a reactive activity

The analysed value is generated as a result of interactions between comparative and ideological symbols embedded in the messages about legitimate work activities and a specific legitimacy context. This context is mainly described by messages aimed at signalling the situation in the environment as difficult. These messages show a more reactive approach to action. The messages characterised, as a result of the embedding of ideological symbols, by inspirational references, reflect an indication made by companies of their potential to act in the future. References to the environment can be linked here to readiness to make an effort in order to gain a performance reputation (Kim et al., 2007). The symbolic value created with their involvement in the outlined legitimacy context may also shape the substantive dimension of legitimate work activities (at the process level). This type of open communication in the face of worsening financial performance should require planning and undertaking specific corrective activities. The value can be reinforced as a consequence of the impact of comparative symbols embedded in the messages. Although the value generated by such symbols is defined as underlying the perception of positive reputation, high status, and prestige (Schnackenberg et al., 2019), the comparisons contained in the messages referring to the reported negative changes in the performance may signal high information openness generating comparative value. From the point of view of organisational learning, it can be assumed that activities of exploitative and exploratory nature related to organisational learning are essential for highlighting the manner of communication in question (Gupta et al., 2006; March, 1991; Ugur et al., 2024). Communicating the undertaken activities, albeit not proactive, but reactive in nature, as pointed out by Demessie and Shukla (2024), concentrates on building meanings on the basis of existing knowledge of the results that need to be improved through the improvement of activities (sensemaking). Emphasising the potential for further changes requires references to prospective events and undertakings the knowledge of which is still being shaped, whereas the organisation itself can only openly show the challenges resulting from that it has already undertaken (perspective making).

Strategy of spare communication of a reactive activity

In this strategy, the generation of symbolic value serves as evidence of the steps taken by organisations in the search for new reference points. In view of favourable changes in financial performance, it is easier for enterprises to make an attempt to search for novel solutions in the future, thus current communication is less developed. The analysed value is generated as a result of interactions between isomorphic symbols embedded in the text and specific legitimacy context. This context is characterised by a limited participation of messages indicating the need for adaptation activities signalling a more reactive approach to action (Demessie & Shukla, 2024). The symbolic value generated by isomorphic symbols in the indicated legitimacy context may shape the substantive dimension of the legitimacy context (at the process level) requiring the organisation to show in its activities that it treats seriously predominant principles and regulations even regardless of how it can impact on other communicated aspects (Gehman et al., 2013; Schnackenberg et al., 2019; Zimmerman & Zeitz, 2002). The use of messages indicating that corrective activities are being undertaken (in the case of enterprises characterised by high customer proximity), relevant to the perception of procedures and structures of the organisation by stakeholders (Suchman, 1995; Suddaby et al., 2017), is also significant in the prospect of future exploratory activities. From the point of view of organisational learning, it can be assumed that activities of an exploratory nature related to organisational learning are essential for highlighting the communication manner in question (Gupta et al., 2006; March, 1991; Ugur et al., 2024). In this way, the search for areas of future activities is accompanied by spare communication aimed at outlining less clearly defined activities and their effects. It can signal a greater openness (Litchfield & Gentry, 2010) to future audiences' demands (perspective taking).

The strategy of active and detailed communication of a proactive activity

This strategy encompasses the symbolic value generated, which stems from making adaptation activities (especially in the group of companies operating in less complex industries) acceptable. The analysed value is generated as a result of interactions between, above all, isomorphic symbols and specific legitimacy context embedded in the text. This context is mainly described by messages pointing at undertaking adaptation activities and precisely describing daily operations and in this way signalling an open proactive approach (Demessie & Shukla, 2024) and a stabilised current situation of the organisation (with a simultaneous avoidance of communicating a difficult situation in the environment). The symbolic value created as a result of interactions may shape the symbolic dimension of legitimate work activities (at the message level) and the substantive dimension of legitimate work activities (at the process level). Messages aimed at indicating continuity of legitimate work activities sustaining the conviction among audiences about the credibility of the organisation (although undertaken adaptation activities are still not reflected in the financial performance) should, every now and again, provide audiences with reassurance that business is conducted as usual (Ashforth & Gibbs, 1990; Pfeffer, 1981; Suchman, 1995; Suddaby et al., 2017). In such a situation, prosocial activities are part of day-to-day operations, whereas communicating them reinforces the organisation's conviction about the need to undertake them, thus shaping the substantive dimension of the legitimacy context. The value can be reinforced as a consequence of a simultaneous use of quantitative symbols (presented or not in the comparative context) and ideological symbols of an inspirational nature emphasising the feasibility of tasks and shaping the symbolic dimension of legitimate work activities. From the point of view of organisational learning, it can be assumed that activities of an exploitative nature relating to organisational learning are essential for highlighting the communication manner in question (Gupta et al., 2006; March, 1991; Ugur et al., 2024). A high degree of activity is accompanied by detailed communication that primarily makes it possible to agree on interpretations on the basis of existing knowledge (sense-making).

The above analysis of the messages about corporate legitimate work activities grouped according to changes in financial performance (the main factor), and the appearance of greater and lesser customer proximity, and operating in more or less complex industries (complementary factors), made it possible to formulate a research proposal according to which *symbolic values, generated by various types of symbols embedded in the messages about legitimate work activities and interacting with the legitimacy context, shape it in the substantive and symbolic dimensions constituting (next to the nature of organisational learning relating to uncertainty in the environment) an element of their coevolution and a source of value for the organisation.*

Conclusions

The objective of this paper was to check whether and, if so, how the approach towards the use of symbols has changed in communication tools by senior corporate executives in the era of a sudden change in the environment related to the outbreak of the COVID-19 pandemic. The researchers intended to determine whether there are noteworthy interactions between the used messages about legitimate work activities and diverse types of symbols embedded in them as a result of which symbolic values shaping the legitimacy context and thus constituting a value for the organisation could be created. The objective of this paper was realised since four distinct legitimacy strategies for communicating corporate activities were recognised and described. To the researchers' best knowledge, the proposal included in the paper to link deliberations on corporate legitimacy with a broad view of symbols and symbolic values generated by them constitutes an extension of the approaches to corporate legitimacy management presented in the literature to date (Edgar et al., 2018; Hahn & Lulfs, 2014; Spear, 2017). This gives the proposal an originality value. The authors' approach to analysing corporate legitimacy management as a strategic process through the prism of learning is significant here as well. It corresponds to the modern view of legitimacy as a process (Suddaby et al., 2017) as well as incorporates the analysis of symbolic management outcomes (Schnackenberg et al., 2019). The communication tool taken into consideration in the research (a CEO letter) caused the analysis of the messages to provide a precise view of the nature of activities undertaken, and thus of the actual degree of corporate activity. The literature frequently presents the view of legitimacy strategies according to which, in the substantive dimension, they are

associated with the activities undertaken and, in the symbolic dimension, involve the preparation of messages that can communicate the significance of certain initiatives, which are then partially implemented (or not implemented at all) (Fiss & Zajac, 2006). Nevertheless, the issue of the relevant information nature of the messages is also raised, and against this background, paying attention to the CEO letter, in particular, provides grounds for searching for links between the image presented in the letter and the nature and significance of the activities actually undertaken together constituting the legitimacy context.

The perspective emphasised in the paper assumes that the legitimacy management process can be viewed through the prism of organisational learning. This means that on the one hand, it may be assumed that in the messages used by enterprises, knowledge about corporate activity is generated (as a result of articulation, more or less consciously, of new plans or strategic intentions by the authors of letters) may then influence the nature of activities taken in a reverse way. On the other hand, which activities are undertaken, and what effects are associated with them, cannot fail to affect the nature of the synthesis made in the prepared messages. As it has been noted, the relationship between the written word and the activities undertaken may be more or less close. Reaching for the construct of a symbol and symbolic values associated with it proposed in the literature (Schnackenberg et al., 2019), the emphasis in the analysis has been placed on taking into consideration the significance of messages about legitimate work activities in which the embedded symbols appeared for legitimacy management. It has been proved that enterprises tend to disclose data with varying degrees of detail (Bartoszewicz & Szczepankiewicz, 2022), nevertheless, the approach towards symbols adopted in this text is focused on a broader range of their possible use. It has not been assumed that their appearance in the messages used must signify that such messages become biased. It may be said that symbolic values created in CEO letters by reinforcing the information nature of the text (Kiattikulwattana, 2019) and making it possible to emphasise these aspects of the activity that are actually taking place and are truly worth being emphasised (e.g., efforts made for the benefit of employees or the environment with regard to counteracting the effects of the pandemic) can have practical meaning and not only serve the purpose of ‘pulling the wool over the eyes’ of the audiences of the texts in which the symbols are embedded. In this way, they can generate value for the organisation by influencing not only the symbolic dimension of legitimate work activities but also their substantive dimension. The way of generating value for the organisation may change under the influence of such factors as uncertainty and frequent financial problems related to it, which, as a result, makes it possible to distinguish four legitimate strategies for communicating corporate activities. What is important, these strategies can be considered as being universal. To describe them accurately, it is helpful to take into consideration additional factors differentiating enterprises in the form of customer proximity and industry complexity. The presented research results show how taking into consideration the perspective of symbols embedded in messages about legitimate work activities used in connection with the implementation of specific legitimacy strategies can enrich the analysis of legitimacy management, particularly from a process perspective, in which the authors of messages are perceived as change agents.

From the point of view of CEOs who prepare their letter each year, the current research may sensitise them as to whether in a given situation of the organisation, they should focus more on repairing organisational legitimacy (in case of the situation when some problems emerge during the year) or gaining it (if e.g. they realised that their view on their organisations as legitimate should not be present). Then, the reflection will be possible on what kind of symbolic values they should attempt to generate. It would not be a good idea to attempt to be inspirational and to potentially manoeuvre stakeholders' attention when there are environmental conditions as usual or the organisation did not achieve anything special during the year. Nevertheless, if it is actually achieved then it would not be fair to consider e.g. generated ideological value as the manifestation of bad intentions since this way of communicating organisational achievements may prompt organisational members to further explore or, conversely, to attempt to exploit more effectively previous achievements. It may appear that sometimes the use of symbols may be counterintuitive since e.g. interest in generation comparative value when the organisation has difficulties may prove their willingness to put more effort in recovery than be a sign of the next organisational failure. When making use of perspective-making CEOs may be expected to listen intently to their stakeholders, which is why the consideration of the extent to which it should be used,

may be recognised when realizing what is their approach towards building on isomorphic symbolic value.

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RELATIONSHIP BETWEEN VENTURE CAPITAL, FINANCIAL INNOVATION, AND OPERATING PERFORMANCE IN NIGERIAN FINTECH FIRMS

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Abstract

Research Purpose. The research aimed to assess the interrelationships among venture capital funding, financial innovation, and operating performance within Nigerian fintech firms. It sought to investigate both the direct associations between these variables and the potential mediating role of financial innovation on the connection between venture capital funding and operating performance, with a focus on understanding their collective impact on the Nigerian fintech landscape. This is essential because the way business is done could be transformed by encouraging fintech innovations which will increase productivity and efficiency.

Design / Methodology / Approach. To accomplish this, the study employed a primary data collection method via a questionnaire distributed to senior management personnel in two hundred FinTech companies. 220 senior management participants were purposively selected, and the gathered data underwent meticulous analysis using Partial Least Squares-Structural Equation Modeling (PLS-SEM) alongside various methodologies, including weighted mean scores, Heterotrait-Monotrait Ratio (HTMT), Fornell-Larcker square's average variance extracted, Cronbach alpha, composite reliability (CR), and percentage variance.

Findings. The findings revealed that the direct influence of venture capital funding on financial innovation yielded non-significant results ($R^2=0.220$, $\beta=0.274$, $t=1.116$, $p=0.264$). Conversely, the direct impact of financial innovation (FI) on operating performance (OP) exhibited significant results ($R^2=0.401$, $\beta=0.559$, $t=5.989$, $p=0.000$). Notably, the study discovered that venture capital funding (VC) was statistically insignificant ($\beta=0.274$, $t=0.3913$, $p=0.362$) in predicting the operating performance of fintech firms in Nigeria.

Originality / Value / Practical Implications. The research established that financial innovation plays a pivotal role in augmenting the operating performance of fintech firms in Nigeria. This study addresses a gap in the literature by investigating the impact of venture capital funding and financial innovation on Nigerian fintech firms' operational performance. It concludes that financial innovation significantly drives operational excellence, while venture capital funding has an insignificant impact, with financial innovation not substantially mediating its influence on performance. The findings underscore the significance of introducing innovative financial products and services, fostering the adoption of a cashless economy, harnessing emerging technologies such as blockchain and Artificial Intelligence, and enhancing financial literacy and awareness. These factors collectively contribute to bolstering the operating performance of fintech enterprises.

Keywords: Venture Capital; Financial innovation; Operating; Fintech companies; PLS-SEM; Nigeria.

JEL codes: O16, O30.

Introduction

Driven by technical breakthroughs and a growing desire for creative financial solutions, the financial technology (fintech) sector has brought about structural change in the financial service sector. Venture capital investments have surged in Nigeria, a developing hotspot for fintech companies, which has fuelled the rise of these firms. Through the introduction of quicker, more affordable, and more

convenient services, these technologically advanced financial services firms have completely transformed traditional banking. Fintech companies in Nigeria, despite this encouraging development trajectory, confront formidable obstacles. Their performance and scalability have been hampered by restricted access to venture capital funds and a lack of trustworthy venues for capital raising. The importance of fintech was further shown by the COVID-19 pandemic when online banking and payment systems provided financial transactions with vitality throughout lockdowns and social distancing measures. Customers embraced digital channels more and more when physical bank offices closed, reducing the risks involved in in-person transactions. In light of this, the study attempts to explore the complex interactions between financial innovation, venture capital investment, and the operational effectiveness of fintech companies in Nigeria. It specifically aims to find out how venture capital funding affects these companies' operating performance, how financial innovation affects those same companies' operating performance, and how financial innovation functions as a mediator between venture capital funding and operating performance. The study's conclusions emphasize how crucial venture capital financing and financial innovation are to the development and prosperity of fintech companies in Nigeria. The study advances knowledge of the variables influencing these companies' operating success and offers guidance to stakeholders and policymakers by addressing the difficulties these businesses confront, such as restricted access to finance and the requirement for creative financial solutions.

The motivation behind this research is multifaceted. First, it stems from the need to comprehend the dynamics of the Nigerian fintech sector and the factors that drive the growth and success of these firms. By unravelling the relationships among venture capital funding, financial innovation, and operating performance, the study hopes to provide valuable insights that can contribute to the development of the fintech industry and the broader economy (Effiom et al., 2020; Umeodinka, 2022). Moreover, in an era where financial innovation is pivotal for economic growth, fostering financial inclusion, streamlining international trade transactions, and improving overall financial efficiency, this study holds significant relevance (Abang & Ayodele, 2022; Chukwunulu, 2019). Its findings can aid in developing strategies to attract more venture capital investments, promote financial innovation, and enhance the operating performance of fintech firms, ultimately benefiting Nigeria's economy and its citizens. For academics and professionals alike, this study examined the impact of venture capital on the performance of Fintechs in Nigeria, and also, explored the mediating effect of financial innovation in the relationship between venture capital and operating performance of Fintechs in Nigeria. By contributing to the body of knowledge in this domain, this research holds the potential to inform policy decisions, guide industry practices, and foster a conducive environment for the sustainable growth of fintech firms in Nigeria and beyond. Therefore, the following hypotheses are formulated and tested:

Ho₁: Venture Capital has no significant impact on the performance of Fintechs in Nigeria

Ho₂: Financial innovations have no mediating role in the relationship between venture capital and the operating performance of Fintechs in Nigeria.

Literature Review

The intersection of venture capital funding, financial innovation, and operating performance is a critical area of focus for Nigeria's rapidly growing fintech sector. Venture capital plays a pivotal role in providing fintech firms with much-needed financial resources, operating expertise, networking opportunities, and moral support during their formative stages. However, Kolokas et al. (2022) caution that venture capitalists' established norms and practices may inadvertently restrict funding for fintech ventures in countries with limited fintech activity. This is because a global shift/shock like that of the year 2020 (COVID-19) could occur which may adversely affect the financial system, therefore, start-up firms relying solely on fintech funds may encounter serious challenges in financing their operations. Financial innovation, particularly mobile banking solutions, is widely regarded as a catalyst for increasing financial inclusion in emerging markets like Nigeria (Guild, 2017). Nonetheless, Oshora et al. (2021) emphasize the necessity of robust regulatory frameworks to fully harness the potential of such innovations. Measuring the operating performance of fintech firms presents unique challenges compared to traditional financial institutions, as they often lack publicly available financial statements. While methodologies like Data Envelopment Analysis (DEA) have been employed, there are differing

perspectives on their effectiveness and suitability for the fintech sector (Minwir & Anwar, 1998; Oral & Yolalan, 1990).

Several theoretical frameworks have been proposed to elucidate the intricate relationship between venture capital funding, financial innovation, and the operating performance of fintech firms. The Resource-Based View (RBV) theory suggests that firms possessing valuable, rare, and inimitable resources can achieve a sustainable competitive advantage (Madhani, 2010). This theoretical framework implies that venture capital funding can provide fintech firms with crucial resources, such as advanced technologies, skilled talent, and innovative products, thereby impacting their financial innovation capabilities and overall operating performance (Enrico et al., 2022; Jay, 1991). In contrast, the Network theory examines how firms leverage social networks for growth and long-term viability, shedding light on the role of networking in the fintech ecosystem (Parkhe & Ralston, 2006). The Diffusion of Innovation theory offers insights into the factors influencing the adoption rate of new technologies like fintech solutions, which is pertinent to understanding their widespread acceptance and impact (Lou & Li, 2016; Saygili, & Ercan, 2021). Additionally, the Agency theory explores the potential conflicts of interest that may arise between venture capitalists (principals) and the managers of fintech firms (agents), highlighting the need for alignment and effective governance mechanisms (Panda & Leepsa, 2017). The Institutional theory provides a complementary perspective, viewing fintech innovations as catalysts for reshaping social and economic structures, norms, and practices within the financial services industry (Ami & Irwan, 2021; Jarvis & Han, 2021).

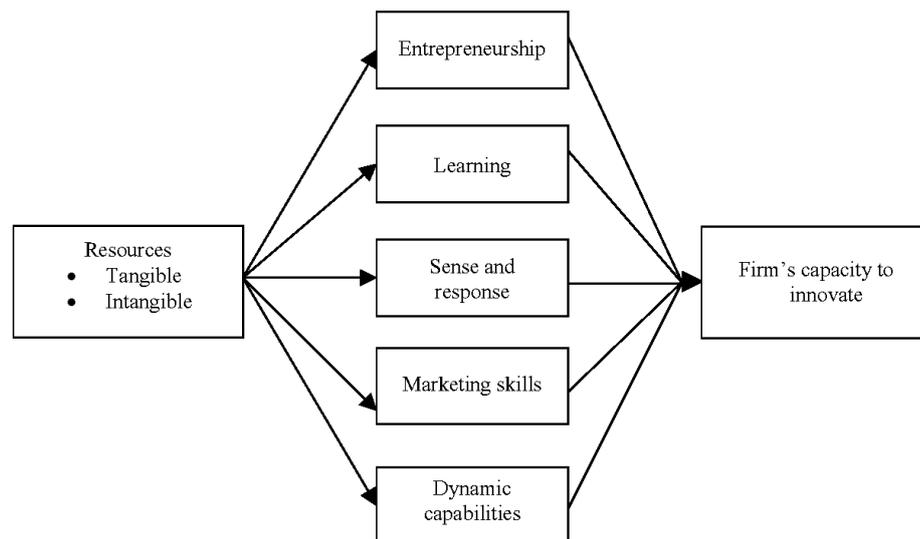


Fig. 1. The Resource-Based View of the Firm and Innovation: Identification of Critical Linkages (Source: Semantic Scholar, 2003)

Existing empirical studies have demonstrated the positive impact of venture capital funding on the growth and innovation of fintech firms. Kolokas et al. (2022) revealed a substantial and favourable influence of venture capital availability on the development of fintech entrepreneurship. Similarly, Sapienza (1992) found a consistent link between high innovation and venture capital value-added, particularly for technical ventures seeking long-term partnerships. However, Loughran and Ritter (1997) suggest that the timing of funding rounds and investments after positive developments is crucial in understanding the post-funding performance of fintech ventures. In terms of financial innovation, research has shown a favourable effect on economic growth and the performance of small and medium-scale enterprises (SMEs) in Nigeria when supported by conducive policies and regulatory environments (Effiom et al., 2020; Laeven et al., 2014; Mustapha, 2018; Ojo & Nwaokike, 2018). Nonetheless, Bollaert et al. (2021) and Puschmann (2017) highlight the need for further empirical research to understand the broader implications of fintech beyond traditional banking services. Despite the growing significance of the fintech sector in Nigeria and its potential to transform the financial services industry, there is a notable gap in the literature investigating the specific relationship between venture capital

funding, financial innovation, and the operating performance of Nigerian fintech firms. Most existing studies do not comprehensively capture the unique challenges, opportunities, and nuances present in this dynamic market. To fully understand the mechanisms driving the success and growth of Nigerian fintech firms, more indigenous empirical research is urgently needed. By conducting localized studies that delve into the distinctive characteristics of the Nigerian fintech landscape, researchers can provide invaluable insights for policymakers, investors, and industry stakeholders, fostering an environment conducive to the sustainable development of this burgeoning sector.

Research Methodology

The study employs a descriptive and confirmatory research design, utilizing a questionnaire to collect primary data from a sample of 220 top management personnel from over 200 fintech firms in Nigeria, selected through purposive sampling. The reasons for eliciting information from personnel in managerial positions is that they will be in the best position to give information on strategic questions in the questionnaire (e.g. questions bordering on funding at the inception of the firm, introduction of innovative financial products among others)The Likert 5-point scale is used to measure the independent variables of venture capital funding and financial innovation, as well as the dependent variable of operating performance. The quantitative data obtained will be analysed using PLS-SEM to establish the relationships among the variables, providing insights into the impact of venture capital funding and financial innovation on the operating performance of Nigerian fintech firms.

Table 1. Summary of Venture Capital and Fintech Companies (Source: Compilation made by the authors)

| Factor | Beneficial | Not Beneficial | Source(s) |
|-----------------------|---|--|---------------------------|
| Capital Injection | Provides significant funding for rapid growth and expansion | Can lead to dilution of ownership and control | CB Insights (2023) |
| Credibility | Enhances credibility with customers, partners, and future investors | Can create unrealistic expectations and pressure to perform | Williams et al. (2018) |
| Innovation | Provides resources for R&D and cutting-edge technology adoption | Might push for quick ROI, potentially stifling long-term innovation | McKinsey & Company (2022) |
| Regulatory Compliance | Can provide resources to navigate complex financial regulations | May underestimate the challenges and costs of regulatory compliance | World Bank (2022) |
| Market Penetration | Enables aggressive marketing and user acquisition strategies | Could lead to unsustainable growth and high customer acquisition costs | Deloitte (2023) |
| Talent Acquisition | Provides funds to attract top talent in a competitive market | High compensation packages may not be sustainable long-term | KPMG, 2023 |

The selected technique for data analysis in the study is Partial Least Squares-Structural Equation Modelling (PLS-SEM). This follows the work of Fan et al. (2016) and Ampofo and Aidoo (2022). With the use of both observable and unobserved variables, PLS-SEM is a potent statistical tool that enables the modelling of latent structures and the investigation of intricate connections. Its capacity to manage small sample sizes, non-normal data distributions, and non-linear correlations makes it appropriate for our investigation. Examining the correlation between the study's various variables is crucial for understanding the analysis of venture capital investment, financial innovation, and operating success in Nigeria. Finding out how financial innovation affects the operating performance of fintech companies in Nigeria is one goal, and evaluating the effect of venture capital on operating performance is another. The partial Least Squares-Structural Equation Model (PLS-SEM) is used to summarize the interrelationships among the variables since these objectives are interrelated. Furthermore, the use of the Likert scale from 1 to 5 to quantify the observable variables and the latent or unobservable nature of

the variables means that the PLS-SEM is utilized to investigate the mediating or moderating role of financial innovation in the relationship between venture capital and the operating performance of fintech firms.

Process innovation (PI1), product innovation (PI2), and business model innovation (BMI) are the three unique aspects into which financial innovation is divided by the study in order to improve clarity and decrease confusion regarding the causes driving it. OPE (Operating Performance), VCF (Venture Capital Funding), and FIN (Financial Innovation) are the model's latent variables. Y1 - Y5 and X1 - X5 represent the reflecting components that are utilized to calculate the impact of operating performance and venture capital financing, respectively. Zs stand for the stochastic error terms, which explain correlation and unexplained variance. The dependent variable, operating performance, and the independent variables, financial innovation, and venture capital investment are measured reflectively by these words based on their respective endogenous constructions. A closed-ended questionnaire containing sections on financial innovation, operating performance, venture capital investment, and demographics is used in the study. SPSS and PLS-SEM are used for data analysis. The questionnaire is created using professional comments and a review of the literature to guarantee validity. Standardized answers, clear directions, and appropriate question formats all contribute to maintaining reliability.

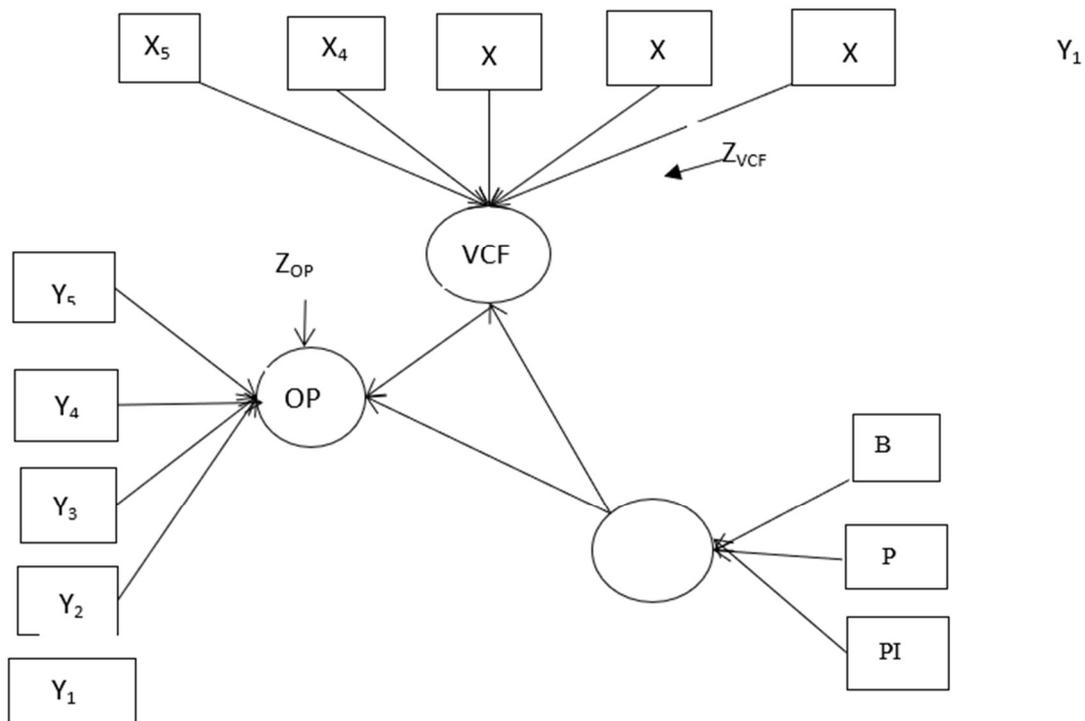


Fig 2. Pathway Structural Framework illustrating the Mediation of Financial Innovation in the Link Between Venture Capital Funding and Operating Performance (OPE) (Source: designed by the authors)

The following hypotheses are formulated and tested:

Ho₁: Venture Capital has no significant impact on the performance of Fintechs in Nigeria

Ho₂: Financial innovations have no mediating role in the relationship between venture capital and the operating performance of Fintechs in Nigeria.

Research Results

Demographic attributes of respondents

Table 2 describes the demographic attributes of the respondents. The table shows that both male (47.7%) and female (52.3%) genders are equally represented among the fintech respondents. The modal age group was 18-28 years, accounting for 49.5% of the respondents. Additionally, 33.2% were in the 29-39 years age bracket, and another 15.5% fell within the 40-50 years age group, indicating a noticeable tilt toward the youth population. Approximately 57.7% of the respondents were single, while 40.5% were married. The modal educational qualification was a university first degree, encompassing 51.4% of the respondents. Moreover, 28.6% held master's degrees, and 8.6% possessed OND/HND degrees. These findings suggest that fintech firms provide substantial job access to highly educated individuals who are more likely to comprehend the subject matter. Regarding working experience, Table 1 reveals that the modal working experience was less than 5 years (56.4%). About 34% had between 5-10 years of fintech experience, while only 10% had more than 10 years of experience in fintech activities.

Table 2. Demographic attributes of respondents in the fintech firms (Source: designed by the authors)

| S/N | Feature | Option | Frequency | Per cent | Cumulative per cent |
|-----|----------------|------------------|-----------|----------|---------------------|
| 1 | Gender | Male | 105 | 47.7 | 47.7 |
| | | Female | 115 | 52.3 | 100.0 |
| 2 | Age | 18 – 28 | 109 | 49.5 | 49.5 |
| | | 29 – 39 | 73 | 33.2 | 82.7 |
| | | 40 – 50 | 34 | 15.5 | 98.2 |
| | | 51 and Above | 3 | 1.4 | 99.5 |
| | | Below 18 | 1 | .5 | 100.0 |
| 3 | Marital status | Single | 127 | 57.7 | 57.7 |
| | | Married | 89 | 40.5 | 98.2 |
| | | Divorced | 4 | 1.8 | 100.0 |
| 4 | Education | Secondary School | 11 | 5.0 | 5.0 |
| | | OND/HND | 19 | 8.6 | 13.6 |
| | | University | 113 | 51.4 | 65.0 |
| | | MBA/MSc | 63 | 28.6 | 93.6 |
| | | PhD | 14 | 6.4 | 100.0 |
| 5 | Experience | Less than 5 | 124 | 56.4 | 56.8 |
| | | 5-10 years | 75 | 34.1 | 90.9 |
| | | Above 10 years | 21 | 9.6 | 100.0 |

Elements of Venture capital funding in fintech firms

Table 2 shows the distribution of respondents' opinions with respect to Venture Capital Funding (VC). Table 3 also shows that the 6 items of venture capital had significant ($t > 1.96$) weighted means score (WMS) greater than 3.00. For the six items, readily available at startups, clear path to profitability, challenges in attracting foreign venture capital investors, lack of access to venture capital, Local venture capital firms adequately meet the funding needs of fintech startups and Government policies and business regulatory environment affects Availability, the WMS and standard deviation ranged from 3.23 ± 0.833 to 3.97 ± 1.187 . Item 1 had 48.2% agreement that Venture capital funding was readily

available at startups. Similarly, about 76.9% cumulatively agreed that a fintech firm demonstrates a clear path to profitability to attract venture capital funding. Also, 72.7% generally agreed that fintech firm faces challenges in attracting foreign venture capital investors and 73.2% believed that the lack of access to venture capital is a major obstacle to the growth of fintech firms. Furthermore, 53.2% of the respondents affirmed that local venture capital firms adequately meet the funding needs of fintech startups while 75.5% agreed that Government policies and business regulatory environment affect the availability of venture capital for fintech firms. The internal reliability and the resulting Cronbach's alpha ($\alpha=0.608$) for the four dimensions of VC as given in Table 3 was satisfactory. Kendall's coefficient of concordance (Kw) indicated that 8.1% of the respondents had similar opinions about the elements of venture capital funding in fintech firms in Nigeria.

Table 3. Element of Venture capital funding of fintech firms in Nigeria (Source: designed by the authors)

| Venture capital funding in fintech firms | SA (5) | A (4) | N (3) | D (2) | SD (1) | WMS | <u>S.D</u> | T-value | Remark |
|--|--------------------------------------|---------------|--------------|--------------|--------------|------|------------|---------|--------|
| 1 Venture capital funding was readily available at startups | 28 (12.7) | 78 (35.5) | 53 (24.1) | 38 (17.3) | 23 (10.5) | 3.23 | 1.187 | 9.087 | A |
| 2 Fintech firm demonstrates a clear path to profitability to attract venture capital funding | 56 (25.5) | 113 (51.4) | 36 (16.4) | 7 (3.2) | 8 (3.6) | 3.92 | .933 | 22.552 | A |
| 3 Fintech firm faces challenges in attracting foreign venture capital investors | 62 (28.2) | 98 (44.5) | 40 (17.7) | 13 (5.9) | 7 (3.2) | 3.89 | .989 | 20.794 | A |
| 4 The lack of access to venture capital is a major obstacle to the growth of fintech firm | 67 (30.5) | 94 (42.7) | 32 (14.6) | 22 (10.0) | 5 (2.3) | 3.89 | 1.023 | 20.158 | A |
| 5 Local venture capital firms adequately meet the funding needs of fintech startups | 45 (20.5) | 72 (32.7) | 63 (28.7) | 22 (10.0) | 18 (8.2) | 3.47 | 1.164 | 12.393 | A |
| 6 Government policies and business regulatory environment affect the availability of venture capital for fintech firm | 60 (27.3) | 106 (48.2) | 43 (19.5) | 10 (4.5) | 1 (0.5) | 3.97 | .833 | 26.234 | A |
| Cronbach alpha=0.608 | Kendall's coefficient of concordance | | | | | | 0.081 | | |

Constituents of financial innovation (FI) in the fintech firms in Nigeria

The results as presented in Table 4 revealed a remarkable cumulative agreement among respondents for the six items representing financial innovation. Notably, the respondents overwhelmingly agreed that "financial innovation advances fintech firms' operations" (mean score of 4.23 ± 0.756 , $t = 33.976$) and "financial innovation prioritizes customer-centricity" (mean score of 4.26 ± 0.806 , $t = 32.376$). Furthermore, the survey highlighted the instrumental role of financial innovation in introducing innovative financial products and services (mean score of 4.13 ± 0.863 , $t = 28.040$) and promoting a cashless economy (mean score of 4.13 ± 0.947 , $t = 25.485$). Respondents also acknowledged the significance of leveraging emerging technologies like blockchain and artificial intelligence (mean score of 4.05 ± 0.861 , $t = 26.693$) as well as improving financial literacy and awareness (mean score of 4.06 ± 0.944 , $t = 24.571$). The survey items underwent rigorous testing for internal reliability, yielding a Cronbach's alpha of 0.706, indicating a satisfactory level of consistency. Additionally, Kendall's coefficient of concordance revealed a significant coefficient of 0.013, suggesting that approximately 1.3% of respondents held similar opinions regarding the constituents of financial innovation in fintech firms in Nigeria. While the majority of respondents expressed diverse perspectives on the components of financial innovation in fintech firms, their opinions leaned more towards agreement than disagreement for the items included in the survey. The findings underscore the pivotal role of financial innovation in driving the growth and success of fintech firms in Nigeria, emphasizing the need to embrace innovation, leverage emerging technologies, and prioritize customer-centric solutions in the dynamic fintech landscape.

Table 4. Constituents of financial innovation of fintech firms in Nigeria (Source: designed by the authors)

| Financial Innovation in Fintech | SA (5) | A (4) | N (3) | D (2) | SD (1) | WMS | <u>S.D</u> | T-value | Remark |
|---|--------------------------------------|---------------|--------------|-------------|------------|-------|------------|---------|--------|
| 1 Advancing fintech firm's operation | 84 (38.2) | 111 (50.5) | 19 (8.6) | 4 (1.8) | 2 (0.9) | 4.23 | .756 | 33.976 | A |
| 2 Introduced innovative financial products and services | 78 (35.5) | 107 (48.6) | 27 (12.3) | 2 (0.9) | 6 (2.7) | 4.13 | .863 | 28.040 | A |
| 3 Promotes a cashless economy | 88 (40.0) | 92 (41.8) | 26 (11.8) | 8 (3.6) | 6 (2.7) | 4.13 | .947 | 25.485 | A |
| 4 Leverage emerging technologies like blockchain and AI | 69 (31.4) | 109 (49.5) | 28 (12.7) | 12 (5.5) | 2 (0.9) | 4.05 | .861 | 26.693 | A |
| 5 Prioritizes customer-eccentricity | 98 (44.5) | 88 (40.0) | 29 (13.2) | 3 (1.4) | 2 (0.9) | 4.26 | .806 | 32.376 | A |
| 6 Improved financial literacy and awareness | 82 (37.3) | 87 (39.5) | 40 (18.2) | 5 (2.3) | 6 (2.7) | 4.06 | .944 | 24.571 | A |
| Cronbach alpha=0.706 | Kendall's coefficient of concordance | | | | | 0.013 | | | |

Indicators of operating performance in fintech firms in Nigeria

Table 5 presents the items that constitute the operating performance construct for fintech firms in Nigeria, based on a survey conducted among respondents. The results reveal a cumulative agreement percentage of above 70% among respondents for all six items, and the agreement was statistically significant. The respondents overwhelmingly agreed that the following six items are crucial indicators of operating performance: a. More than 20% annual revenue growth (mean score of 3.81 ± 0.926 , $t = -20.958$), b. new markets entrance and customer base expansion (mean score of 3.93 ± 0.881 , $t = -24.106$), c. Improved adaptation to changing market conditions (mean score of 4.11 ± 0.831 , $t = 28.706$), d. Streamlined operating processes and customer user-friendliness (mean score of 4.26 ± 0.777 , $t = -33.578$), e. Increased customer retention and loyalty (mean score of 4.21 ± 0.725 , $t = 35.082$) and, e. Better performance in cybersecurity and protection of customer information data privacy (mean score of 4.21 ± 0.818 , $t = 31.007$). The survey items were tested for internal reliability, and Cronbach's alpha coefficient was 0.746, indicating a satisfactory construct. Furthermore, Kendall's coefficient of concordance was 0.071 and significant at $p < 0.05$, implying that only 7% of the respondents had similar opinions about the indicators of operating performance in fintech firms in Nigeria. The findings highlight the importance of achieving substantial annual revenue growth, expanding into new markets and customer bases, adapting to changing market conditions, streamlining processes for customer convenience, fostering customer retention and loyalty, and maintaining robust cybersecurity measures to protect customer data privacy. These factors are crucial for fintech firms in Nigeria to enhance their operating performance and remain competitive in the dynamic fintech landscape.

Table 5. Operating performance of fintech firms in Nigeria (Source: designed by the authors)

| Operating Performance of Fintech Firm | SA (5) | A (4) | N (3) | D (2) | SD (1) | WMS | <u>S.D</u> | T-value | Remark |
|--|--------------------------------------|---------------|--------------|-------------|------------|-------|------------|---------|--------|
| 1 Significant (>20%) annual revenue growth | 47 (21.4) | 109 (49.5) | 44 (20.0) | 15 (6.8) | 5 (2.3) | 3.81 | .926 | 20.958 | A |
| 2 New market entrance and customer base expansion | 58 (26.4) | 106 (48.2) | 32 (19.1) | 11 (5.0) | 3 (1.4) | 3.93 | .881 | 24.106 | A |
| 3 Improved adaptation to changing market conditions | 77 (35.0) | 99 (45.0) | 36 (17.3) | 3 (1.4) | 3 (1.4) | 4.11 | .831 | 28.706 | A |
| 4 Streamlined operating processes and customer user-friendliness | 94 (42.7) | 96 (43.6) | 24 (10.9) | 5 (2.3) | 1 (0.5) | 4.26 | .777 | 33.578 | A |
| 5 Increased customer retention and loyalty | 84 (38.2) | 101 (45.1) | 33 (15.0) | 2 (0.9) | | 4.21 | .725 | 35.082 | A |
| 6 Better performance in cybersecurity & protection of customer information data privacy | 89 (40.5) | 98 (44.5) | 25 (11.4) | 6 (2.7) | 2 (0.9) | 4.21 | .818 | 31.007 | A |
| Cronbach alpha=0.746 | Kendall's coefficient of concordance | | | | | 0.071 | | | |

Model evaluation showing direct effect (pathway analysis) of VC and FI on OP

Table 6 outlines the examination of the initial constructs for Financial Innovation (FI), Operating Performance (OP), and Venture Capital Funding (VC) in order to formulate the study's assumptions. We talk about the factor loadings, average variance extracted (AVE), percentage variance, composite reliability (CR), Cronbach's alpha, and composite reliability (CR). For the factor loading of every VC, FI, and OP item, the vector inflation factor (VIF) fell within an acceptable range. The composite reliability and Cronbach's alpha values in the exploratory and confirmatory factor analyses were both above acceptable levels, at 0.7 and 0.6, respectively. Furthermore, there was more than 50% attraction success shown by the AVE, which was above the minimum acceptable threshold of 0.5 for VC, FI, and OP.

The model fitness for the direct influence of VC and FI on OP showed substantial appropriateness and consistency of the outer and inner model specifications, with chi-square test values of 347.656, NFI = 0.439, SRMR = 0.125, and RMS Theta = 0.189. Between 0.764 and 0.850 were the reliability coefficients ($\rho\{A\sim}$), and the discriminant method was less than 0.9. A legitimate discriminant result was shown by the Fornell-Larcker square's AVE root being higher than the inter-construct correlations. The findings of the Heterotrait-Monotrait Ratio (HTMT) further supported the validity of the discriminant result by falling below the 0.85 threshold value. We checked the HTMT ratios for noteworthy deviations from 1.0. Table 5's bias-corrected confidence interval demonstrates that both the top (95% confidence interval) and lower (2.5% confidence interval) boundaries were below 1.0. For instance, the upper limits of the HTMT confidence interval for the association between VC and OP were, respectively, -0.432 and 0.469. The findings of the PLS algorithm for the HTMT criteria accept the discriminant validity of the constructs, given that a conservative HTMT threshold of 0.456 proved discriminant validity. Every model evaluation criterion has been satisfied, according to the evaluation.

Impact of venture capital funding (VC) on the operating performance (OP) of fintech firms in Nigeria.

The influence of venture capital funding on the operating performance of fintech companies in Nigeria was investigated using partial least squares structural equation modelling. Operating performance, the endogenous construct, was evaluated for predictive power using its R-square value of 0.401. This indicates that almost 40% of the variances in operating performance might be explained by the inter-construct coefficient and the primary model for venture capital funding in fintech businesses' results. Bootstrapping was done in order to assess the endogenous construct's predictive capacity further; the outcome was an operational performance (OP) Q-square value of 0.167. The cross-validated redundancy values gave good support to the model's predictive ability, and the omission distance was chosen at

seven. Even with an increased sample size, the pathway structural framework and bootstrapping result showed that there was no meaningful correlation between operating performance (OP) and venture capital funding (VC) in the research domain. In particular, the results in Table 2 revealed that operating performance in Nigerian fintech businesses was not significantly predicted by Venture Capital Funding (VC) ($\beta = 0.274$, $t = 0.3913$, $p = 0.362$). As a result, Table 7's null hypothesis, which claims that venture capital funding has no appreciable effect on the operational success of fintech companies in Nigeria, cannot be disproved. Consequently, the data did not support the alternative hypothesis (Ha1). Thus, even though the model had a good degree of predictive power, the results did not, at least not for the purposes of this study, show a causal link between venture capital funding and the operational success of fintech companies in Nigeria.

Table 6. Direct paths bootstrap coefficients and 95% confidence interval (CI) for VC and OP

| Path relation | Beta | Stand error | T-value | P-value | Confidence interval (bias-corrected) | | R-square | Q Square |
|---------------|-------|-------------|---------|---------|--------------------------------------|-------|----------|----------|
| | | | | | 2.5% | 97.5% | | |
| VC->OP | 0.274 | 0.085 | 0.913 | 0.362 | -0.432 | 0.469 | | 0.167 |

Note: After varying the bootstrap replications between 500 and 2,000 without experiencing any appreciable changes, the data utilized 1,000 replications to bootstrap the standard errors.

Table 7. Summary of hypothesis testing of direct analysis between VC and OP

| Hypothesis | Path relations | Beta | Standard error | T-value | P-value | Remark |
|-----------------|----------------|-------|----------------|---------|---------|---------------|
| H ₀₁ | VC->OP | 0.274 | 0.085 | 0.913 | 0.362 | Not supported |

Impact of Financial Innovation (FI) on the Operating Performance (OP) of fintech firms in Nigeria.

Table 6 presents the direct effect of Financial Innovation (FI) on Operating Performance (OP) in the bootstrap outcome for predicting OP. The results show that FI was statistically significant ($\beta = 0.523$, $t = 5.862$, $p = 0.005$) and positively correlated with OP. The predictive value of the model, as indicated by the R-square, was 0.401, implying that the construct for Financial Innovation and Venture Capital Funding accounted for 40.1% of the variations in the operating performance of fintech firms in Nigeria. Furthermore, the blindfolding result, estimated using the same procedure, revealed a Q-square value of 0.167 for OP, which was above zero, providing additional evidence for the significance of the model. The bootstrapping procedure also validated the significance of the relationship between Financial Innovation (FI) and Operating Performance (OP) when expanded in scope and scaled up for wider coverage.

The results in Table 8 and Figure 3a demonstrate that a unit increase in FI will lead to a 52.3% corresponding increase in operating performance. Given these criteria, the null hypothesis (H₀₂) stating that there is no significant relationship between Financial Innovation and the operating performance of fintech firms in Nigeria is rejected. Conversely, the alternative hypothesis (Ha2) given in Table 8, which states that Financial Innovation statistically impacted the operating performance of fintech firms in Nigeria significantly, is accepted. The model establishes that FI has a positive direct pathway for the relationship between Venture Capital Funding (VC) and Operating Performance (OP). However, there are mixed signals in the correlation between the elements of Financial Innovation and operating performance, as detailed in Figures 3a and 3b.

Figure 3b reveals that five items of VC had a significantly strong correlation ($r > 0.40$, $p < 0.01$) with OP. In order of importance, ISLA ($r = 0.601$), PCEs ($r = 0.716$), LET ($r = 0.690$), PCE ($r = 0.787$), and IFPS ($r = 0.734$) had a strong influence on operating performance. Thus, financial innovation's role in advancing fintech firms' operations, introducing innovative financial products and services, promoting

a cashless economy, leveraging emerging technologies like blockchain and AI, and improving financial literacy and awareness boost operating performance among fintech firms. The implication is that well-strategized financial innovations could be a useful tool to boost the operating performance of fintech firms in Nigeria. The result suggests that fintech firms should pay close attention to the activities that promote Financial Innovation within their organizations.

Table 8. Direct paths bootstrap coefficients and 95% confidence interval (CI) for FI and OP

| Path relation | Beta | Stand error | T-value | P-value | Confidence interval (bias-corrected) | | R-square | Q Square |
|---------------|-------|-------------|---------|---------|--------------------------------------|-------|----------|----------|
| | | | | | 2.5% | 97.5% | | |
| FI->OP | 0.523 | 0.539 | 5.862 | 0.000 | 0.323 | 0.678 | | 0.167 |

Notice: After varying the number of bootstrap replications from 500 to 2,000 without experiencing any appreciable changes, the data was bootstrapped using 1,000 replications to determine the standard errors.

Table 9. Summary of hypothesis testing of direct analysis between FI and OP

| Hypothesis | Path relations | Beta | Standard error | T-value | P-value | Remark |
|-----------------|----------------|-------|----------------|---------|---------|-----------|
| H ₀₂ | FI->OP | 0.523 | 0.539 | 5.862 | 0.000 | Supported |

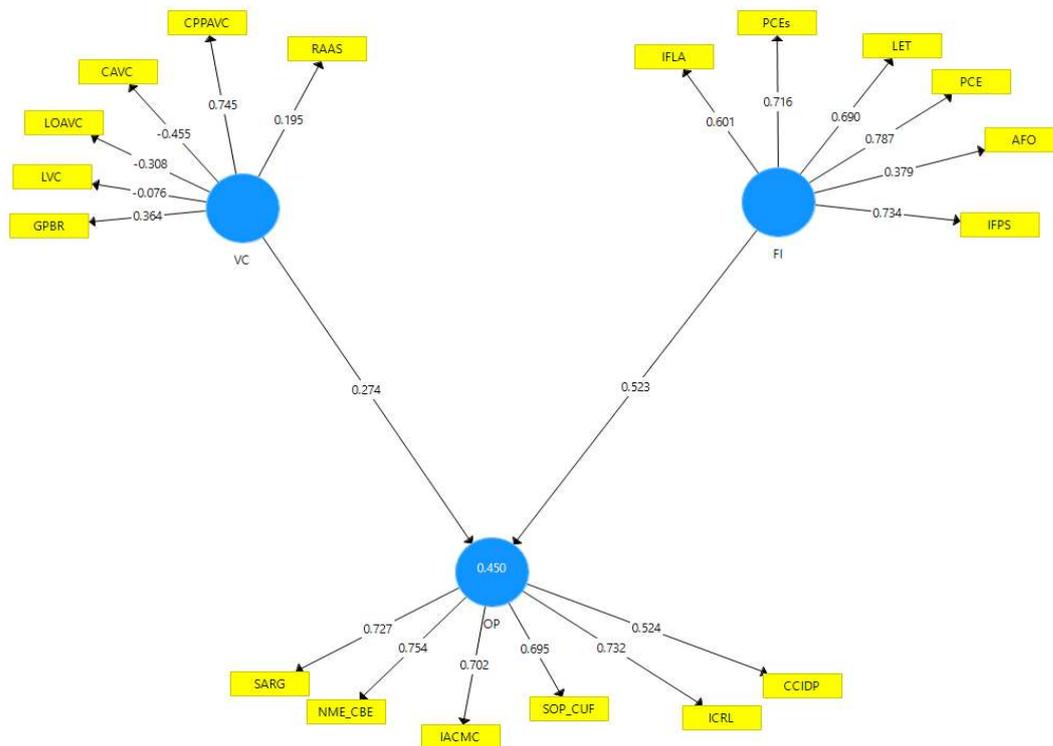


Fig. 3a. Structural pathway showing a direct relationship between Venture Capital Funding, Financial Innovation and operating performance in Nigeria (R-square and Correlations)

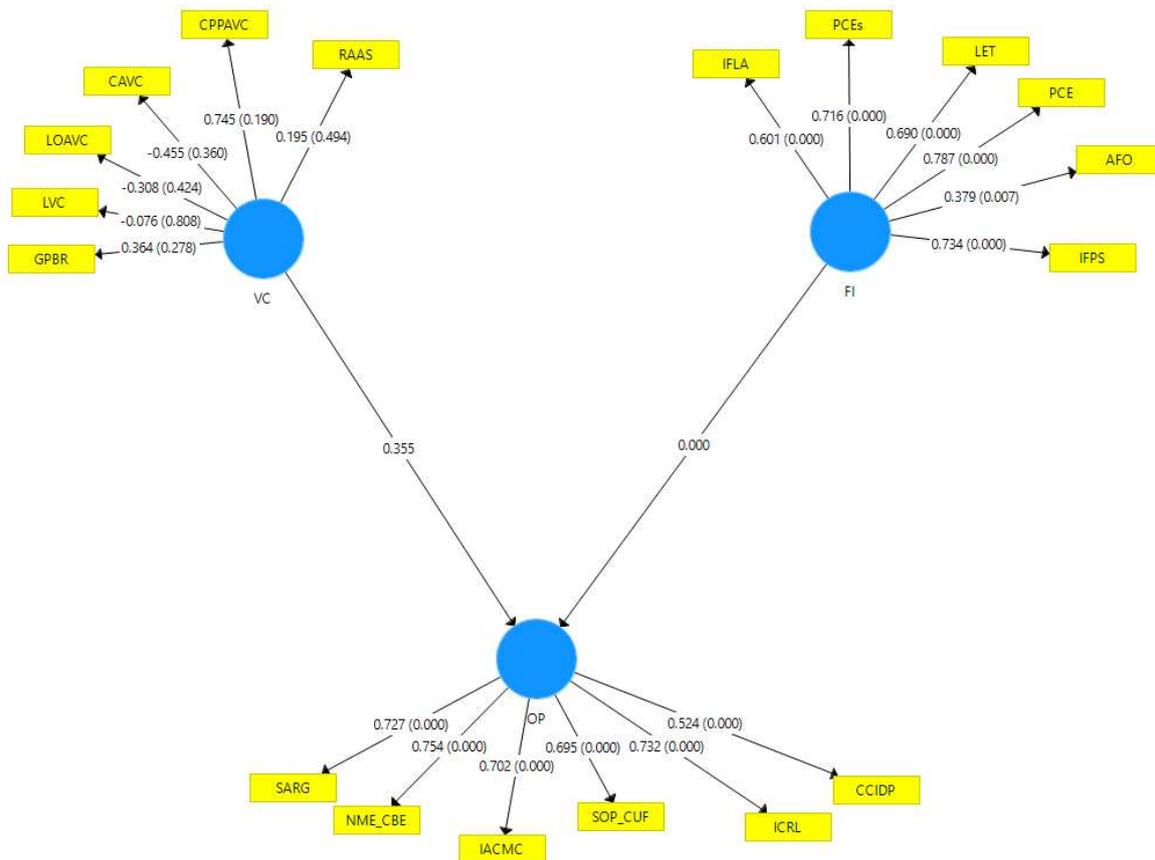


Fig. 3b. Structural pathway showing a direct relationship between Venture Capital Funding, Financial Innovation and operating performance in Nigeria (P-values and Correlations)

The mediating role of Financial Innovation in the relationship between Venture Capital Funding and operating performance.

Figure 2 pictures the mediating role of Financial Innovation (FI) in the relationship between Venture Capital Funding (VC) and Operating Performance (OP) within the PLS-SEM (Partial Least Squares Structural Equation Modelling) analysis. The graphical structural framework, as depicted in Figure 4.2, illustrates this mediating relationship. According to the rule of thumb in PLS-SEM analysis, (that is, the basic principle guiding the use of PLS-SEM), the predictor construct/exogenous variable (VC) must have a significant direct effect on the dependent/endogenous variable (OP) and other independent variables without the mediator in the direct effect model (Figure 3). Subsequently, the contribution of the mediating variable will be measured. From the bootstrap results in Tables 5 and 7, the direct impact of Venture Capital (VC) on Operating Performance (OP) was insignificant. Furthermore, the direct effect of Venture Capital Funding on Financial Innovation was also insignificant ($R^2 = 0.220$, $\beta = 0.274$, $t = 1.116$, $p = 0.264$). However, the direct impact of Financial Innovation (FI) on Operating Performance (OP) was significant ($R^2 = 0.401$, $\beta = 0.559$, $t = 5.989$, $p = 0.000$).

The bootstrapping result in Table 9 revealed that the indirect effect of Venture Capital Funding on Operating Performance was insignificant ($R^2 = 0.401$, $\beta = 0.141$, $t = 1.027$, $p = 0.305$). Consequently, the alternative hypothesis (Ha3) stating that Financial Innovation plays a significant mediating role in the relationship between Venture Capital Funding and Operating Performance (VC->FI->OP) was not supported. Therefore, the null hypothesis (Ho5) could not be rejected. To further elaborate on these findings, Table 11 clearly shows that Financial Innovation (the mediating factor) presents an insignificant mediating relationship with Venture Capital Funding (VC) on Operating Performance (OP). The variance range (VAR) in Table 12 accounted for 33.9% of the total effect, indicating a partial,

weak, and insignificant mediating role. The null hypothesis (H0 5) that Financial Innovation plays an active mediation role in the relationship between Venture Capital Funding and Operating Performance cannot be rejected. Therefore, it is affirmed that although Financial Innovation influences the role in the impact of Venture Capital on Operating Performance, this mediation is weak, partial, and insignificant.

Table 10. Specific indirect paths effect (bootstrap coefficients and 95% CI) for mediating role of FI on VC and OP

| Path relation | Beta | Stand error | T-value | P-value | Confidence interval (bias-corrected) | | R-square | Q Square |
|---------------|-------|-------------|---------|---------|--------------------------------------|-------|----------|----------|
| | | | | | 2.5% | 97.5% | | |
| VA->FI->OP | 0.141 | 0.240 | 1.056 | 0.291 | -0.330 | 0.403 | 0.401 | 0.167 |

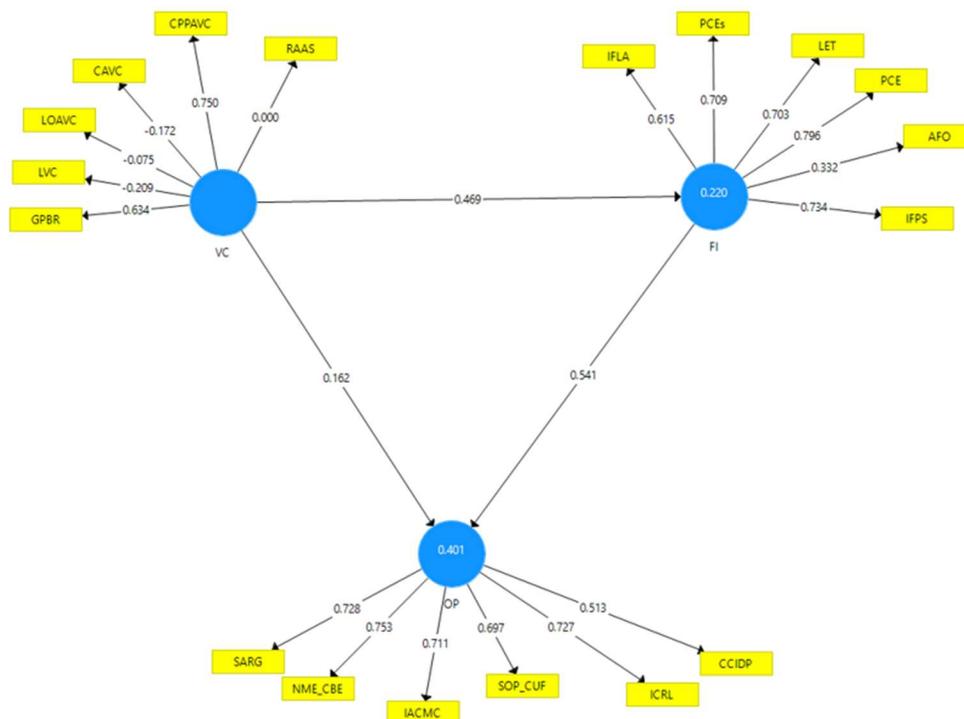
Note: Once the bootstrap replications were adjusted from 500 to 2,000 without any notable changes, the data was retested 1,000 times to determine the standard errors.

Table 11. Mediation analysis: Financial Innovation (FI) as a mediator

| Independent var | Direct effect | Indirect effect | Total effect | Var range | Mediation |
|----------------------|---------------|-----------------|--------------|-----------|-------------------|
| Financial Innovation | 0.274 | 0.141 | 0.416 | 0.339 | Partial mediation |

Table 12. Summary of hypothesis testing of indirect analysis of FI on VC and OP.

| Hypothesis | Path relations | Beta | Standard deviation | T-value | P-value | Remark |
|------------|----------------|-------|--------------------|---------|---------|---------------|
| H5 | VC->IF->OP | 0.141 | 0.240 | 1.056 | 0.291 | Not supported |



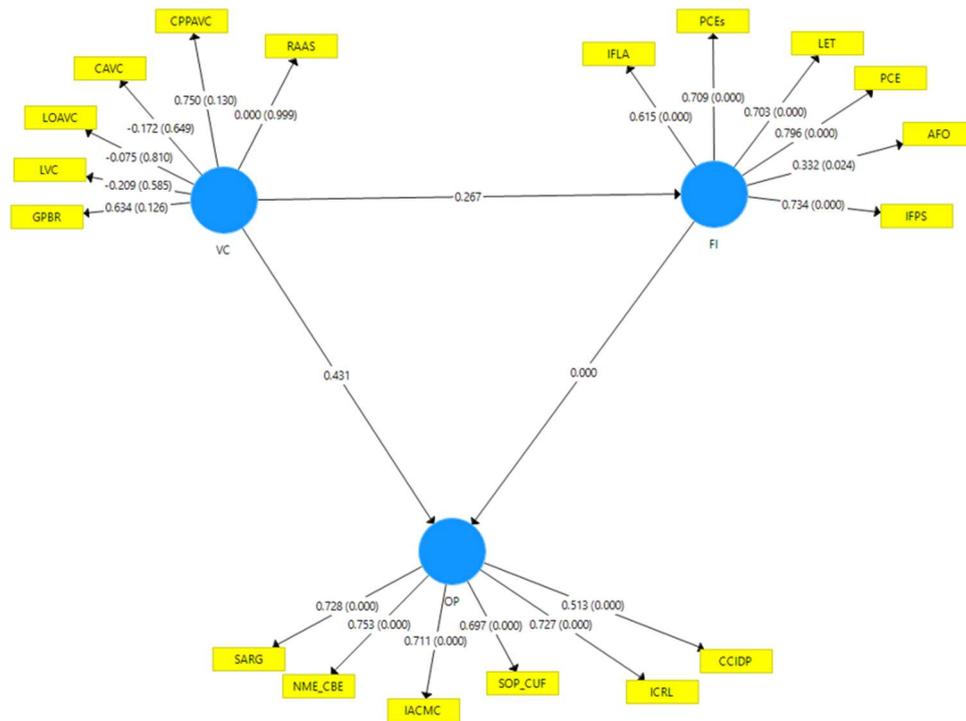


Fig. 4a. Structural pathway showing indirect mediation between Venture Capital Funding, Financial Innovation and operating performance in Nigeria (R-square and Correlations)

Conclusions

Investigation reveals that the influence of venture capital funding on the performance of fintech firms lacks significance. Based on the comprehensive analyses conducted in the preceding sections, it becomes evident that financial innovation holds a pivotal role in driving the overall success of firms. The findings underscore the significance of introducing innovative financial products and services, fostering the adoption of a cashless economy, harnessing emerging technologies such as blockchain and Artificial Intelligence, and enhancing financial literacy and awareness. These factors collectively contribute to bolstering the operating performance of fintech enterprises. It is noteworthy that financial innovation emerges as the primary catalyst for the sector's growth, underscoring its crucial impact. The correlation between financial innovation and the operating performance of fintech firms demonstrates a positive association. This implies that as the emphasis on financial innovation intensifies, there is a corresponding improvement in operating performance. In essence, a heightened focus on advancing financial innovation strategies leads to enhanced operational outcomes within the fintech realm. In contrast, the role played by venture capital funding in shaping the operating performance of fintech enterprises is relatively modest. The outcome of the analysis highlights that the impact of venture capital funding on the sector's operational performance does not reach a level of statistical significance. Furthermore, the examination of the mediating effect of financial innovation in the relationship between venture capital funding and operating performance yields non-significant results. This implies that financial innovation does not substantially mediate or modify the influence of venture capital funding on the operational outcomes of fintech firms.

In conclusion, the study's hypotheses regarding venture capital (VC) funding, financial innovation (FI), and operating performance (OP) of Nigerian fintech firms were examined, yielding insightful outcomes. Firstly, Hypothesis 1 posited that VC funding has no significant impact on fintech firms' operating performance in Nigeria. This hypothesis was supported, as the results revealed that the influence of VC on OP was statistically insignificant. Despite the essential role VC funding plays in supporting startups,

this study suggests that its impact on day-to-day operational performance is limited within the context of Nigerian fintech. This implies that VC funding alone may not be sufficient to drive operational success and growth, highlighting the importance of other resources or factors in determining performance. In contrast, Hypothesis 2 proposed that FI would positively impact OP, suggesting that financial innovation significantly enhances fintech firms' performance. The study confirmed this hypothesis, indicating that FI exerts a strong positive influence on OP. This underscores the role of innovative financial products and services, which likely improve operational efficiency, customer satisfaction, and market reach. Nigerian fintech firms that prioritize financial innovation, such as adopting new technologies and fostering a cashless economy, can thus expect substantial operational improvements. Finally, Hypothesis 3 tested the mediating role of FI in the relationship between VC funding and OP, proposing that FI would enhance the influence of VC on OP. However, this hypothesis was not supported, as the study found the mediating role of FI to be statistically insignificant. This outcome implies that, while FI is crucial for operational performance, it does not significantly alter or amplify the impact of VC funding on OP. Hence, the findings highlight financial innovation as a vital driver of fintech firms' operating success, while venture capital funding alone may have a limited effect on their performance. These insights provide a valuable foundation for policymakers and fintech leaders to emphasize financial innovation to enhance operational efficiency in the Nigerian fintech landscape.

This study addresses a gap in the literature by investigating the impact of venture capital funding and financial innovation on Nigerian fintech firms' operational performance. It concludes that financial innovation significantly drives operational excellence, while venture capital funding had a non-significant impact, with financial innovation not substantially mediating its influence on performance. Based on the findings of this study the following recommendations are made:

- Given that the research findings indicate a substantial influence of financial innovation on the operational performance of fintech firms, it is imperative for these firms to give precedence to crafting inclusive financial solutions tailored to the requirements of underserved and unbanked segments in Nigeria. This strategic approach not only tackles societal challenges but also extends the potential customer pool and widens market outreach.
- Allocate resources to continuous research and development to stay ahead of market trends and evolving customer needs. Innovation should be an ongoing process to maintain competitiveness.
- Fintech firms should actively collaborate with regulatory authorities to champion supportive policies and frameworks that nurture innovation and cultivate a favourable environment for growth. Through joint endeavours, these collaborative initiatives can result in regulatory structures that promote responsible innovation, prioritize consumer safeguarding, and uphold market integrity, all in alignment with the research's insights on the impact of government policies.
- Fintech firms should play an active role in enhancing financial literacy and awareness among the Nigerian population. Investing in educational campaigns, workshops, and online resources can empower consumers to make informed decisions about using fintech products and services.

It is important to acknowledge the limitations of this study. The research is based on cross-sectional data, which limits the ability to infer causal relationships definitively. Longitudinal studies could provide a more comprehensive understanding of the dynamics between venture capital funding, financial innovation, and operational performance over time. The study's reliance on self-reported data from senior management introduces potential response bias and subjectivity. Future research could incorporate multiple data sources, such as financial statements and objective performance metrics, to enhance the robustness of the findings.

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Appendix 1: PLS-SEM analysis of impact of VC and FI on OP

Appendix 1a. Model fit for direct effect analysis of VC and FI on PM

| Model | SRMR | d_ ULS | d_ G | Chi-square | NFI | RMS Theta |
|-----------------|-------|--------|-------|------------|-------|-----------|
| Saturated model | 0.125 | 2.652 | 0.684 | 347.656 | 0.429 | 0.189 |

Appendix 1b: Construct Reliability and validity test for direct effect of VC and FI on OP

| | Cronbach's Alpha | Rho A | Composite reliability | Average Variance |
|----------------------|------------------|--------|-----------------------|------------------|
| Financial innovation | 0.735* | 0.764* | 0.820* | 0.842* |
| Performance | 784* | 0.796* | 0.846* | 0.881* |
| Venture Capital | 0.565* | 0.850* | 0.042* | 0.872* |

Appendix 1c: Fornell–Larcker criterion for discriminant validity for direct effect of VC and FI on OP

| Construct | VC | OP | FI |
|-----------|--------------|--------------|--------------|
| VC | 0.665 | | |
| OP | 0.620 | 0.693 | |
| FI | 0.352 | 0.458 | 0.415 |

Appendix 1d.: Heterotrait–Monotrait Ratio (HTMT) for direct effect of VC on OP

| Construct | VC | OP |
|-----------|-------|-------|
| OP | 0.790 | |
| VC | 0.513 | 0.456 |

Appendix 1e: multicollinearity statistics (VIF) for all variables

| VARIABLE | Outer VIF | | Inner VIF |
|----------|-----------|----|-----------|
| IFPS | 1.972 | FI | 1.142 |
| CPCIDC | 1.597 | VC | 1.142 |
| CAVC | 1.397 | | |
| PAVC | 1.163 | | |
| GP_BR | 1.068 | | |
| IFLA | 1.478 | | |
| ACMC | 1530 | | |
| ICRL | 1.994 | | |
| LET | 1.432 | | |
| LAVC | 1.389 | | |
| LVC | 1.311 | | |
| PCE | 2.139 | | |
| PCEs | 1.709 | | |
| RAS | 1.416 | | |

| | | | |
|-------|-------|--|--|
| SARG | 1.536 | | |
| OP_CU | 1.476 | | |

Appendix 2: Mediation analysis of impact of VC on OP with FI as a mediating factor

Appendix 2a: Model fit for mediation analysis of CA on OP with TQM

| Model | SRMR | d_ULS | d_G | Chi-square | NFI |
|-----------------|-------|-------|-------|------------|-------|
| Saturated model | 0.119 | 2.433 | 0.685 | 341.406 | 0.440 |

SYSTEMATIZATION OF PROCESSES OF VALUE-CREATING ACTIVITIES OF OPERATIONAL SUSTAINABILITY AND SOCIAL RESPONSIBILITY

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Abstract

Research purpose. The primary objective is to create a proposal for a project on the implementation of GDPR into the process management of an organization. The secondary goals include an assessment of compliance with obligations under GDPR for the benefit of the analysed institution, as well as the identification of individual processes involving personal data processing across the organization.

Design / Methodology / Approach. In the theoretical-methodological part of the paper, literary research was done through a comparison of expert texts by both domestic and foreign authors, including legal regulations, directives, internal resources, and data, etc. Empirical data and results were obtained from internal sources per the formulation of research questions and objectives, as well as applied scientific research analyses. In the analytical part, the qualitative and quantitative research methods, semi-structured interviews, questionnaire surveys, analysis of internal documents, data and results comparison, synthesis and deduction method, data audit, and GAP analysis were used. The significance and contribution of GAP analysis enabled the delineation of project scope and prediction of individual project activities for implementation of the project proposal.

Findings. The semi-structured interview highlighted shortcomings in meeting requirements under GDPR. This finding was confirmed by analysis of internal documents and their comparison with information obtained in the theoretical part of the paper, which confirmed the absence of internal regulations for personal data protection and employee training. A questionnaire survey among employees revealed gaps in security and legal processes. Through data auditing and GAP analysis, weak points were identified between the planned and actual state of GDPR compliance within the organization's established processes. The weaknesses revealed incomplete records of personal data processing activities, absence of data processing agreements, employee training, establishment of internal data protection processes, low level of implementation of legal and legislative regulations, and inadequate performance of the role of Data Protection Officer. The scope of the project proposal for achieving GDPR compliance was defined in 16 activities, including ensuring an adequate Data Protection Officer, avoiding excessive collection of unlawful and unnecessary personal data, and reviewing internal regulations. The project duration was planned for 72 days, or 52 working days in a calendar year, with a total cost of 1933,33 EUR. Based on obtained results, it can be concluded that the project is feasible, and the objective of the project was achieved.

Originality / Value / Practical implications. In conclusion, it is ascertained that the objective of the paper has been achieved: the project proposal has been implemented into the internal regulations of the organization. This ensures that the Data Protection Officer is adequately positioned and that processes and internal regulations for the security and protection of personal data are in place. The economic added value of the project is a return on invested costs of training, while social value is in societal benefits for people, and efficiency of spent resources is ensured by the sustainability of the project beyond established processes, allowing for new inputs in future. The potential of the paper lies in focusing on the effectiveness of costs allocated to the project and the effectiveness of established processes in terms of resource use in personal data processing.

Keywords: system process management; General Data Protection Regulation; personal data; data audit; GAP analysis.

JEL-Codes: K00; K19; K39.

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Personal data protection concerns any individual, natural, or legal persons and organizations all over the world, as it is part of human rights and freedoms, with the primary aim of protecting and preventing misuse. Personal data is provided to various institutions, e.g., when opening a customer loyalty card in a brick-and-mortar store, collecting a shipment from a carrier, sending a resume to a posted job offer, or filling in a complaint form for a purchased product.

Personal data includes basic identification and contact data of individuals, including photographs and audiovisual records, IP addresses, information on political opinions, as well as genetic and biometric data (Purificato et al., 2021). Some data can be sensitive to such an extent that its misuse may harm individuals in public and is thus protected by legislation. Personal data protection is integrated with the General Data Protection Regulation (GDPR) with effect from May 2018 for all EU Member states. One of the reasons for GDPR is human rights advocacy in event of unauthorized handling of personal data, with reference to Charter of Fundamental Rights and Freedoms and Act No. 101/2000 Coll., on personal data protection, which enables public and private organizations to process personal data beyond a set limit, provided that legal regulations and conditions for processing personal data are complied with and with consent of authorized person (Bellringer, 2022; Migeon & Bobbert, 2022). With the update of GDPR, the list of obligations has been extended; the change has resulted in the threat of non-compliance with the protection of legal regulations (Kunnapas, 2021). The added value of procedural management is the provision of a data protection officer with a record of processing activities. To comply with GDPR, organizations must accept and adhere to principles that arise from regulations, i.e., the data controller is only allowed to process selected personal data for a defined period (Pedrosa et al., 2020).

If the volume of personal data to process is too large and diverse, organizations do not have to deal with GDPR issues themselves. An example can be educational institutions processing the personal data of their employees, students/pupils, or legal representatives. As an extended service in the provision of advisory and consultancy services, such institutions offer the possibility to delegate (outsource) some of their responsibilities to (in compliance with GDPR) external entities (Barati & Rana, 2021; Cambronero et al., 2022). Some organizations may unintentionally violate GDPR by underestimating the importance of regulation, having a low portfolio of available knowledge, or insufficient monitoring of the scope of their obligations.

Literature Review

The constant development of technologies processing personal data may be a source of risk arising from a potential lack of security and misuse of data. An example is an intrusion into a school's internal system to change data (Eva et al., 2022; Qin & Jiang, 2023). Regular assessment of management systemization and process improvement in line with GDPR and ESG principles is gaining importance and synergy in the potential benefits of shared processes (Peyrone & Wichadakul, 2023).

System process management

As mentioned by Bohmer (2023), any information on identified or non-identified natural person represents personal data, basic marking of which are e.g., names, surnames, date of birth, birth numbers, etc. Diamantopoulou et al. (2020) state that disclosure of birth numbers contradicts identification of persons, as it is considered specific data listed in Act No. 133/2000 Coll. and takes precedence in the processing of birth numbers; however, it does not exclude limited treatment of data in accordance with legislation. According to Beresecka et al. (2023), in some cases, the data controller does not consider the data they are processing, e.g., phone number, email or IP address, etc. as it is not purposed to raise doubts about the acquisition of the data. Hermanto et al. (2024) extended the list of personal data by other data, such as permanent address, contact address, bank account number, payment record, as well as data on previous purchases. Both Beresecka et al. (2023) and Hermanto et al. (2024) point to the category of special personal data, as its processing affects the privacy of the person concerned and thus requires more attention (Harper et al., 2022). An example of data processing can be found in the

education sector, which processes a considerable volume of personal data of pupils/students, their legal representatives, employees, and other persons in accordance with Act No. 561/2004 Coll. Educational institutions/schools are controllers designated by law, processing personal data themselves or through a processor, e.g., in the case of creating an external archive, payroll accounting, or security.

Personal data of entrepreneurs – natural persons are considered records subject to GDPR protection (Ketmaneechairat et al., 2024). Personal data processing is an act, or a set of operations or sub-activities performed systematically by a controller to retrieve, collect, record, organize, store, consult, use, disseminate, combine, align, restrict, erase, and shred it. Lachaud (2020) argues that the EU has created a public data protection system based on Directive No. 95/46/EC of the European Parliament and of the Council on protection of individuals concerning processing of personal data and on free movement of data (hereinafter referred to as “Directive No. 95/46/EC”), as the EU responded to increasing number of data generated about individuals who did not have access to information (Lapwattanaworakul et al., 2023).

GDPR is not the only document associated with personal data protection, as stipulated in Act No. 110/2019 Coll., On Processing of Personal Data and Act No. 89/2012 Coll. of Civil Code, § 84 - § 90 (Vanickova & Bilek, 2021). Compliance with GDPR in the Czech Republic is ensured by the Office for Personal Data Protection (OPDP) (Yuan et al., 2021). Article 58 of GDPR specifies remedial powers of supervisory authority beyond administrative fines with a warning of violation of regulation or issuance of a warning without sanctions (Lisiak-Felicka et al., 2020). According to Article 83 of GDPR, the EU member states can set their own rules for imposing administrative fines on public authorities and public bodies per Section 62 of Act No. 110/2019 Coll. on Processing of Personal Data. According to Kurtz et al. (2018) and Sanz (2019), GDPR has contributed to making even laypersons become aware of the fact that handling of personal data cannot be arbitrary and therefore, it is necessary to introduce measures to prevent public handling and processing (Fieiras-Ceide et al., 2023). The right to information states that a data subject has the right to be informed of the processing of personal data at the time of their collection by the controller within a reasonable period depending on circumstances (Menges et al., 2021). The fulfilment of obligations is mostly implemented through notifications, mostly on organizations’ websites (Gumilar et al., 2023). Exceptions when it is not necessary to inform the data subject of disclosure are specified in legislation (Garg et al., 2019). The right to the erasure of data cannot be considered an absolute right. Article 17 of GDPR defines strict conditions and exceptions under which this right can be exercised or denied even though the processing of personal data is suspended, i.e., the controller is allowed to handle personal data but not to process it (Pandit, 2023). The restriction of personal data lasts until particularity, overriding interest, or impossibility of further use by the data subject is assessed. The issue of erasure is not further specified; most often, personal data is anonymised in automated data processing (Di Cerbo et al., 2019; Fantoni et al., 2021). If the outcome affects an individual’s decision-making, it is not an automated decision. For example, in the case of schools and educational institutions, the automated decision is not required (Slawicki, 2020). Data subject reports imply obligations for entities, or personal data controllers, which they must incorporate into their internal processes to ensure that conditions are also in place for electronic submission of requests to identify individuals. The obligations imposed on data controllers by GDPR must be implemented in processes of value-creation activities, the management of which is most often carried out through project activities (Matulevicius et al., 2020).

Implementation of GDPR into system process management

The first step before implementing GDPR obligations into systemic process management is a risk analysis conducted to identify bottlenecks. Although it is not directly imposed by GDPR, Article 32 of GDPR considers the assessment of project risks’ effect on the effectiveness of sub-processes to be essential. Machova et al. (2022) suggest processes should be mapped beyond legally required documentation of contracts with suppliers. Other researchers such as Hatzivasilis et al. (2019) recommend applying a GAP analysis of personal data protection along with process mapping. The tools specified below are recommended for personal data processing in accordance with GDPR implemented

in business processes with data subject risks reflecting proportionality principles (Barati & Rana, 2021; Merlec et al., 2021).

Data audit and GAP analysis

As reported by Rosmawati et al. (2023), compliance audit and GAP analysis enable entities to set up methodological procedures and guidelines so that they consider data security (Orescanin et al., 2024). The synergistic effect occurs in saving time and reducing the amount of money invested in internal processes of value-creating activities, with emphasis on eliminating resource wasting, node analysis, data flows, personal data collection, input forms and contractual links with verifying data security in paper and digital form in integration with analysis of internal regulations and GAP analysis. In process mapping, Shabalina et al. (2020) suggest finding answers to questions “Who, What, Why, Who, Whom, When, and Where, how to collect personal data so that access is structurally identified and contractually secured to third parties including incident management?”. The optimal output is to prepare an inventory of personal data for each activity linked to obligations and policies in accordance with GDPR and project risk (Goncalves et al., 2020). Project risk evaluation is addressed by Bloemendal (2022), who recommends identifying risks in GAP analysis with the aim of proposing standards, methodologies, and guidelines referring to research gaps and inconsistencies in the expected and planned state of project management.

Data protection impact assessment (DPIA)

Bellringer (2022) and Dewangan & Chandrakar (2023) argue that the necessity to assess Data Protection Impact Assessment (hereinafter referred to as “DPIA”) arises with assumptions of high risk to rights and freedoms of natural persons, e.g., in systematic monitoring of public spaces in schools and educational institutions. During an inspection, the supervisory authority may request a justification as to why the identified risk has been evaluated as low or medium, and in case of a reduced validity value or biased classification, any difference can be evaluated as a breach of GDPR (Lubis et al., 2024). The Guidelines on Data Protection Impact Assessment outlines the application of DPIA by dividing it into individual stages, i.e., collecting information on the processing of personal data with DPIA analysis in monitoring compliance with principles and measures of GDPR with periodic review of data (Georgiou & Lambrinoudakis, 2021; Vazao et al., 2023). To determine whether DPIA is necessary, a list of types of data processing operations is created. The DPIA process monitors data coming in and out of subjects with the identification of risks and proposing possible solutions (Portillo-Dominguez & Ayala-Rivera, 2019; Raycheva et al., 2023; Veinhardt et al., 2023). Gobniece & Titko (2024) recommend primarily to perform DPIA in compliance with WP248 guidelines with the aim of verifying the relevance of data. Other authors state that if even one significant risk is identified, the controller is obliged to consult OPDP on the severity of findings and in accordance with the Prevention of Major Accidents (PMA) method, to assess consequences with the opinions of assessors (Georgiou & Lambrinoudakis, 2023; Hariyani et al., 2024;). Analysis of risk resources and assessment of accident risk aimed at preventing major accidents have a synergistic effect in the systemisation of management of the assessment process with a view to the future. The resulting score highlights the severity of the risk and appeals for urgency in taking rationalisation measures to eliminate risks and research gaps. Per the DPIA regulation that came into effect on 1 April 2023, assessment of consequences in the adoption of legislation is not mandatory, if it has already been assessed (Vanickova & Bilek, 2022).

Proportionality balancing test

Zieni & Heckel (2021) recommend using a proportionality balancing test in cases where the controller is authorised to process legal requirements. Rawindaran et al. (2021) refer to the application of a proportionality balancing test when using CCTV cameras in schools and suggest creating internal documents that will provide information on the retention period of CCTV footage and authorised access to footage. In relation to CCTV footage, Li (2024) advises that any viewing of footage should be regarding information obligation through information signs that warn about CCTV footage, e.g., who the data controller and processor are, what purpose of monitoring, what are subjects’ rights concerning disclosure of data to third parties, how long is retention period, etc. A debated topic in public is the

retention period of CCTV footage. Molina et al. (2023) believe that a reasonable retention period is three days, i.e., 72 hours. This is confirmed by Ahmed et al. (2020), who add that the retention period can be even longer if the organization has a compelling reason. Logachev et al. (2022) emphasize the archiving of written documentation as well as the marking of monitored areas. Other authors such as Di Sabato & Kozakova (2023) point to the necessity of integrating GDPR into operational activities, work processes, and guidelines, as well as business and technological changes throughout organizations while complying with GDPR (Merzeh et al., 2022). Lyulyov et al. (2024) admit that changing established processes and project activities of non-value-creating character are related to change management. If processes are to be managed more effectively, they need to be mapped so that sub-activities with a higher added value best meet corporate objectives and social benefits and contribute to business sustainability and accountability (Chochia et al., 2023).

Added value of systemic process management

Process management is an activity building on knowledge, skills, methods, practices, and tools of management identification and improvement (Capodiecì & Mainetti, 2019). Establishing roles and responsibilities, process flow management, process efficiency evaluation, and identification of problems and causes are aimed at improving and supporting systemic management and application of communication tools and social channels for transmitting information and data and document digitalization and archiving.

The adaptation to constantly changing conditions influencing the development of the business while eliminating errors and risks, as well as identification of innovation opportunities meeting the requirements of stakeholders, creates values in systemic process management, the development potential of which has a positive impact on efficiency, which can then be measured, evaluated, and improved (Anywar et al., 2022).

Appropriately set established processes with monitoring, control audit, and specific changes in the company's strategy appealing to increase in operational and financial performance are the motto of systemic improvement of a process-managed organization responding to market dynamics and growth rate, as well as to the development of substitutes and entry of new technologies with the transformation of organizational structure and changes in corporate culture and legislative restrictions in the field of resources (Barati et al., 2020; Sadigov, 2020).

Research Methodology

The primary goal of the paper is to create a project design for GDPR implementation into systemic process management. The secondary goals include the assessment of the current state of compliance with GDPR obligations in selected entities and the identification of personal data processing activities. To achieve goals, the following research questions were formulated:

- Is compliance with GDPR obligations transparent?
- Is the use of an external Data Protection Officer (DPO) more effective compared to delegating this task to a permanent employee?
- What is the relationship between data systems and employee attitudes towards personal data protection?
- Do employees have relevant information to ensure personal data protection and data security?
- Is personal data systemically protected from misuse by unauthorised persons?
- Is it necessary to revise all data in the personal data protection system?

Based on theoretical background and research findings, the following scientific assumptions were pronounced:

- If an organization does not carry out regular audits of outsourced services, it cannot ensure through compliance with GDPR obligations.
- In case of non-compliance with GDPR obligations, the organization lacks the capacity to independently ensure remediation.

The theoretical and methodological part of the paper builds on literary research, a comparison of domestic and foreign authors and legal regulations, legislation and directives, internal resources, and data analysis integrated with research questions and scientific assumptions. Due to the sensitivity of the data, an affidavit of confidentiality was signed, concerning misuse of personal data and information acquired by consulting internal documentation in the presence of an authorised person from management. The analytical part of the research includes qualitative research, semi-structured interviews, questionnaire survey, internal document analysis, comparison of data and results, methods of synthesis and deduction, data audit, and GAP analysis. The benefits, effects, and potential of GAP analysis enabled specifying the extent and quality of selected project activities with higher added value of project management applicable soon.

The primary step was conducting semi-structured interviews with a manager of the institution under study. The selected form of interview enabled a flexible response to information obtained during the interview. The analysis of internal documents allowed for the identification of GDPR obligations (see response to research question 1: *“Is compliance with GDPR obligations transparent?”*) Based on the results acquired, a control checklist was prepared to assess compliance with GDPR requirements in terms of identifying matches, similarities, and differences. The semi-structured interview identified shortcomings in internal processes and analysis of internal documentation enabled specifying individual activities of the entity addressed. The control checklist included the basic obligations of an educational institution, for which assessment of the extent and quality of personal data obtained was necessary for the purpose of data processing, with emphasis on risk management and legislative measures. The research also showed non-compliance with GDPR obligations. The results confirm the first scientific assumption *“If an organization does not carry out regular audits of outsourced services, it cannot ensure through compliance with GDPR obligations.”*

The second research question was formulated as follows: *“Is the use of an external Data Protection Officer (DPO) more effective compared to delegating this task to a permanent employee?”* The question was answered by comparing results in accordance with the scoring method. The obtained results showed whether it is more advantageous for an educational institution to use external or internal employees as a data protection officer. The identified advantages and disadvantages were scored in the interval 1 – 5 and ranked in order of importance. The highest score for advantages was 5, while in the case of disadvantages, it was 1. After the product of score values and the sum of cumulative advantage and disadvantage values, the weighting of criteria was set, the contribution of which consisted in independent assessment of eligibility of choice of alternative solutions. The findings from the semi-structured interview were used for the specification of a questionnaire survey among employees of the entity analysed for the purpose of personal data protection and data security. The respondents were asked 12 questions aimed at identifying the extent and quality of awareness of data protection and security. The questionnaire survey was distributed online (docs.google.com) between 24 April 2023 and 5 May 2023, with the participation of 83 % of employees. The results obtained were topics of responses to research questions 3a and 3b: *“Do employees have relevant information to ensure personal data protection and security?”*, *“Is personal data protected systematically against unauthorised misuse by outsiders?”* As part of the so-called clean desk policy, an internal audit of handling personal data was performed on 5 May 2023 after working hours in cooperation with the management of educational institutions aimed at identifying risks and shortcomings. The audit confirmed a responsible approach of employees towards personal data protection. A secondary objective was an evaluation of the current state of compliance with GDPR obligations. To identify discrepancies between the planned and desired state, a GAP analysis was performed, preceded by a data audit. By analysing data, personal data collection nodes were created with the support of the management of the institution under study and authorised persons were assigned

to them. The data audit assessed selected activities carried out within data processing, with the definition of accesses, internal systems, contractual relationships, and security measures. Selected employees were tasked with detailed mapping of 51 activities in which personal data processing is conducted, in the period between 1 March 2023 and 31 March 2023. The output of the data audit was an analysis of personal data collection and a comparison of data resulting from GDPR. The GAP analysis identified gaps in the planned and future state of resulting values. Based on the interpretation of GAP analysis and data audit results, recommendations for changes integrated with rationalisation measures were proposed to systematically eliminate risks and strategically manage, measure, evaluate and develop processes in the setting of supporting activities and preventive measures in 18 selected areas, the development potential of which has higher added value. By answering 4th research question: “*Is it necessary to revise all data listed in the data protection system?*”, it was possible to formulate recommendations presented to the management of the institution under study with the aim of improving the current state and supporting the development of the future state in systemization of management processes integrated with GDPR.

Based on the results of the GAP analysis, it was possible to specify the extent and quality of 16 selected activities. For determining the significance of sub-activities, formulating methodological procedures, and time options, the Critical Path Method was applied to the network diagram through chains and nodes integrated with the date of project finalization, i.e., the shortest possible duration of the project and Gantt chart. The duration of the project was set at 52 working days in a calendar year. Risk analysis and method of Prevention of Serious Accidents (PSA) were used to determine risks and severity of consequences in conjunction with assessors’ opinions. Evaluation of project design with cost calculation, including selected project activities and real project duration, concludes the analytical part of the paper. The formulation of the overall conclusion and sub-conclusions based on the theoretical background, empirical data and scientific assumptions were carried out using the method of deduction.

The application of qualitative methods and practical results helped to fulfil the primary objective of the paper, i.e., creating the design of a project on the transformation of GDPR in internal processes, see the second scientific assumption “*In case of non-compliance with GDPR obligations, the organization lacks the capacity to independently ensure remediation.*”

Research Results

At the beginning of the analytical part of the paper, a selected organization is introduced, which remains anonymous due to data sensitivity. The first part is aimed at evaluating the real state of GDPR implemented in the process management of the selected entity. The obtained results represent the basis for creating the design of the project on the transformation of management in the systemization of processes within value-creating activities, potential and contribution of which is primary.

GDPR in system process management

To ensure a holistic approach in the assessment of personal data protection and data security, internal documents, expert, and practical studies, as well as domestic and foreign published papers, were applied. To ensure data anonymisation, the identity of the analysed entity, which is a contributory organisation with up to 50 employees operating in education, was concealed. Therefore, the appointment of a data protection officer is a legal obligation (see Fig. 1).

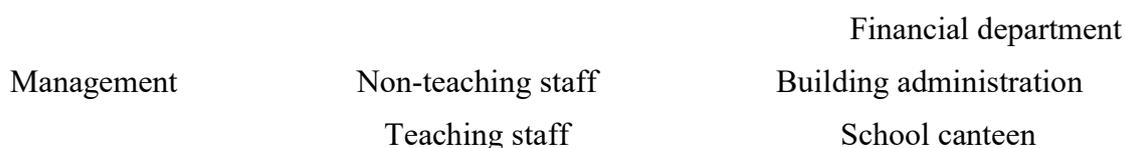


Fig. 1. Organization structure of selected educational institution (Source: Created by the author, 2024)

As seen in Figure 1, the management of the analysed entity is divided into two categories, teaching, and non-teaching staff, according to the specialization of individual departments dealing with economic, administration, and other activities. The building administration and school canteen staff have direct access to personal data, although to a limited extent.

Table 1. Evaluation of planned and performed activities (Source: Created by the author, 2024)

| Ranking | Responsibilities | Ensured by | Value |
|---------|--------------------------------------|---------------------|-------|
| 1. | Data protection officer | Third-party company | √/x |
| 2. | Records of processing activities | Third-party company | x |
| 3. | Verification of contract processor | No record kept | x |
| 4. | Reporting of personal data breach | No record kept | - |
| 5. | Internal processes and documentation | Third-party company | √ |

The data protection officer performs the function of sourcing data and information published on the websites of analysed organisations and provides consultancy. As confirmed by the head of the interviewed entity (through a semi-structured interview) and documented in internal materials, the function is performed only partially, not comprehensively (see formulated research questions and scientific assumptions).

Records of processing activities are managed by a third-party company collecting information on training, OHS, accounting, and HR. The selected education institution states that it performs other activities beyond core and supporting activities, such as school canteen meals provided to staff and the public concerning social responsibility.

In contract processor verification, there is no record of personal data processors undergoing a process of verification of their competence in control and audit activities before signing a contract, as no record of processing contracts is available. Due to detected misconduct, contracts with external accounting and IT systems management companies were consulted, as revealed by a semi-structured interview with the Head, who stated that none of the contracts contained provisions for processing personal data.

The report on the breach of personal data security does not contain any record of incidents, as there was no incident in the monitored period. The internal data protection directive requires staff to report any breach of personal data security to the Data Protection Officer and report serious offences to the Office for Personal Data Protection (OPDP).

For purposes of mapping the current state of fulfilling GDP obligations, the above facts were considered (see Table 1). Employee training on personal data protection was not carried out, as confirmed in an interview with the director of the institution under study and by questionnaire survey. Although it is the responsibility of an external company to organize training for employees and managers under a mediation agreement, findings showed that the actual situation is different.

The process of submitting requests by data subjects shall be specified in the Information Memorandum, which, however, is not available. Data controllers are obliged to facilitate the exercise of rights of data subjects, e.g., through creating accessible forms to share consultative advice with DPOs and OPDP, producing a record of complaints and requests with the exercise of rights and consent to processing of personal data and submission of a list of internal regulations on processing of personal data and a list of personal data transmitted and processed by processors, concerning fact that management of analysed organization recommends, not mandates, written evidence of implementation of each activity.

Although the function of the Data Protection Officer is ensured, its performance is not effective, as the external company does not provide a comprehensive set of services resulting from the mediation

agreement. Incompleteness in records of activities concerning GDPR-compliant information under the responsibility of the data controller of the analysed entity can be considered serious misconduct.

Based on the results obtained, empirical data and conclusiveness of partial findings, it was possible to make a managerial decision on approaching an external or internal DPO in accordance with the application of a comparative method assessing the advantages and disadvantages of working with an external or internal DPO, see Table 2.

Table 2. Advantages and disadvantages of external and internal DPO (Source: Created by the author, 2024)

| Advantages | External DPO | b_i | Internal DPO | b_i |
|---------------------------------|---|----------------------|--|----------------------|
| | Continuous service | 3 (0,14) | Direct presence in organization | 5 (0,24) |
| | Knowledge of issue obtained in multiple organizations | 4 (0,19) | Knowledge of environment | 3 (0,14) |
| | Elimination of conflict of interests | 2 (0,10) | Potentially lower costs for organization | 4 (0,19) |
| Summary of advantages | | | | |
| Disadvantages | Office outside organization | 3 (0,16) | Paid holidays, sickness leave | 3 (0,16) |
| | Lack of knowledge about organization | 2 (0,11) | Training required | 4 (0,21) |
| | Higher costs | 5 (0,26) | Risk of conflict of interests | 2 (0,11) |
| Summary of disadvantages | | | | |

In the context of managerial decision-making, the advantages, and disadvantages of having an external or internal DPO were rated according to $b_i < 1$ and $5 >$ score interval and significance. The highest score in terms of advantages was 5, while in case of disadvantages, it was 1. Based on previous experience of cooperating with an external company ensuring GDPR in incomplete compliance, direct contact with a DPO is essential; therefore, the location of the office directly in the organization is evaluated with 5 points compared to 3 points allocated to an office outside the organization. The work experience of a DPO in the same or similar field means a potential to develop knowledge capital (evaluated with up to 4 points). In terms of the time availability of DPO, the initial exercise of GDPR rights and obligations is particularly advantageous in terms of the availability of an internal employee. In the case of an external DPO, possible conflict of interest is almost eliminated, which is advantageous in terms of no direct contact. However, in the case of an internal DPO communicating with at least 3 competent persons, this appears to be a disadvantage, along with the costs of training an internal DPO. Nevertheless, in the long run, a return on investment is expected quantified in lower upfront costs. For an external DPO, an increase in labour costs represents a burden for the analysed entity (score up to 5 points). In terms of comparing advantages and disadvantages, the management of the analysed entity evaluated increases in costs for advisory and consultancy activities, e.g., in the form of preparing written documentation beyond the scope of the job, keeping records of new employees, training, etc. as disadvantageous. Based on the aggregate score for internal DPO, the result was favourable, which means that the analysed organization preferred an internal employee over an external one when selecting a DPO.

Data audit

The implementation of GDPR obligations into internal processes was not performed properly since the actual state does not correspond with the reported one. To implement remediation, the core and supporting processes of the entity under study need to be transformed to provide a detailed overview of sub-activities.

Based on the analysis and data collection, GAP analysis was applied to internal processes, which enabled the identification of gaps. The process of data audit is described in the following steps:

Step 1: Identification of personal data collection nodes

A total of 10 main personal data collection nodes were identified, with each node describing an area in which one or more activities related to personal data processing take place; each of the areas has its own responsible person). Figure 2 provides an overview of four nodes, i.e., four key activities within the internal processes of selected institutions.

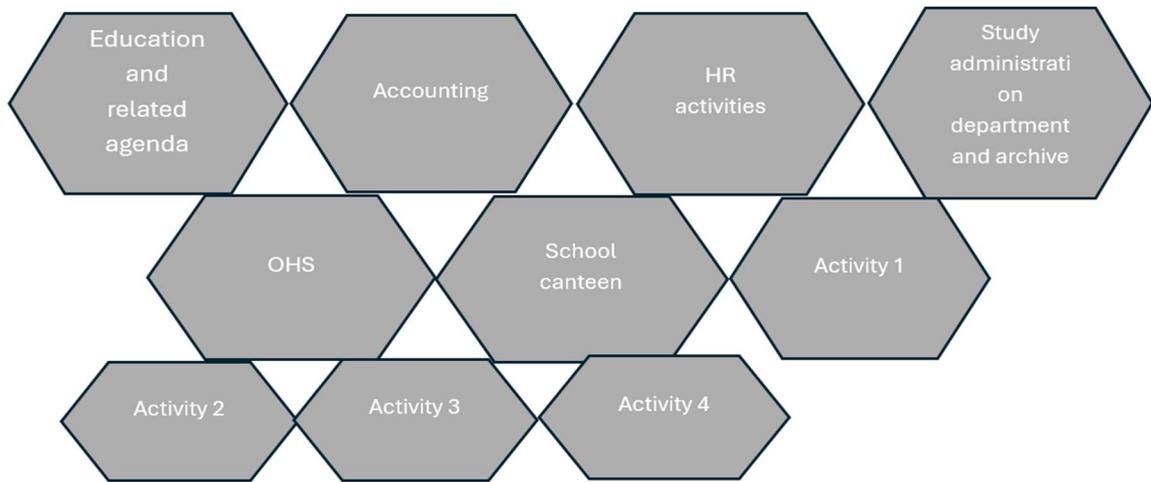


Fig. 2. Core processes – identification of nodes (Source: Created by the author, 2024)

The first row of nodes is related to the primary (core) activities of the analysed entity. The second row consists of supporting activities related to core processes. The third row presents other activities representing additional activities to internal processes. The additional services can be used by both students and employees beyond the primary target group.

Step 2: Identification of personal data processing activities

In each of the main nodes, multiple activities related to data processing can take place at the same time. The identification of individual functions was conducted using a questionnaire addressed to managers of selected areas in the analysed institution. Within 10 main nodes, a total of 51 activities related to operations within personal data processing were identified (see Fig. 3).

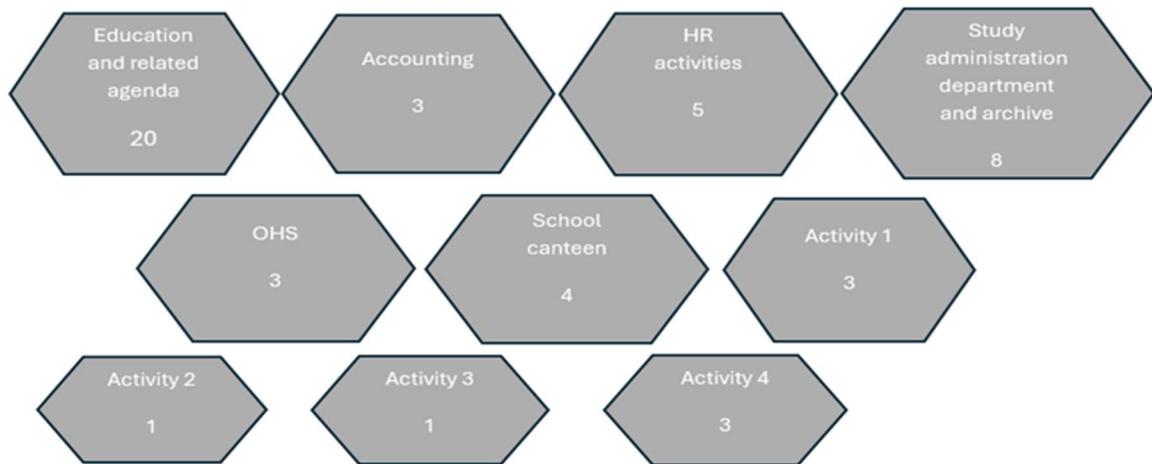


Fig. 3. Core processes with a number of activities related to personal data processing (Source: Created by the author, 2024)

For selected activities, the questionnaire survey primarily verified the purpose of personal data processing, retention period of documents, etc. Only 4 out of 10 nodes were complete. 3 out of 51 activities were identified as redundant, such as requesting the name of the health insurance company, ID card number, personal identification number, and permanent address. In 6 out of 51 activities, there was no sharing of subjects' data that were processed and distributed. Another 10 activities out of 51 identified were not included in Filing and Shredding Rules and Procedures, there was no insertion in another selected document with an indication of the deadline for archiving and shredding. For none of the 51 activities, information on security incident management was published, which means that in the event of a breach of regulation, the system of incident reporting is operational. Given the GDPR directive, which refers to the obligation to report security incidents, it can be confirmed that employees of the selected institution analysed are not familiar with internal regulations and do not have knowledge applicable to managing processes of sub-activities related to GDPR.

The obtained results were compared with internal records on activities related to personal data processing performed by an external company. The objective assessment showed that for 6 out of 10 nodes, no record is kept, and in some cases, sub-activities specification in selected areas, such as school canteen (4 activities) and other activities performed by the study administration department and archive is missing.

The last activity in Step 2 was risk assessment. In two cases, it was specified that taking of CCTV footage and shredding of documents are activities related to personal data processing in a high-risk manner. The documentation provided by the external company did not include proportionality balancing tests or a Data Protection Impact Assessment (DPIA). The process of risk assessment was not started in the analysed institution. Risk identification and assessment including proposals for risk elimination measures in data protection and data security systems were absent. According to DPIA guidelines called WP248, it is necessary to set up a functional DPIA that would consider the security of the system.

Step 3 – specification of data flows

Step 3 deals with mapping IT systems and data flows dealing with the processing of personal data available to external employees.

Each of the identified nodes is extended by information on individual activities. For nodes with multiple activities, a sub-activity is given in selected job positions. The yellow arrows show the interconnectedness of internal employee activities. Regarding the performance of obligations, the management of the analysed institution has access to all processed data, while DPOs only have access

to selected activities related to the performance of their work position. The key activities and data flows are specified below:

- Secondary education and school activities – a total of 15 activities in the “Bakaláři” system, with teachers or class teachers only having access to 13 of them. Data in the internal system are accessible to selected persons only. The remaining two activities are related to the creation of websites, where 1 activity deals with the transfer of footage from the CCTV system to the internal system. The collected data are only accessible to internal representatives of the IT department and external IT company that manages the “Bakaláři” system, including building management.
- HR activities – payment system used in 1 activity. Data are distributed to an external accounting company and representatives of the analysed subject verbally in terms of management of the attendance system and access to system management. Other data in a printed form are processed by the HR officer (no further data transfer is performed).
- Accounting – an accounting program is used for selected activities, accessible by internal accountants and representatives of specific subjects. A bank account is available for all activities and is operated by the internal accountant and the school management.
- Study administration department and Archive – the study administration department clerk is responsible for selected activities. For 3 out of 8 activities, information is accessible also to class teachers. In 4 cases, processors who hold personal data are addressed, in 2 of which they communicate with representatives of the “Bakaláři” system, e.g., representatives of Alive, a shredding company that provides ISIC cards through the National Cancer Database (NCDB) portal. Written documentation is physically transported using special security boxes designed for shredding. Through a shared drive, data are mediated between the study administration department clerk and the management of the analysed institution.
- OHS – authorisation for documentation related to OHS is the responsibility of an HR officer in charge of keeping records of accidents and training and related documentation. The building manager acts as an internal employee responsible for OHS, as they have access to training materials. In the event of an accident, the accident is reported to the health insurance company via email in accordance with Section 29 of the School Act.
- School canteen – a total of 3 activities are linked to the diners’ portal managed by the manager of the school canteen and internal accountant. The shredding process takes place at the end of each working day.
- Activity 1 – selected activities are performed in the Alpha internal portal operated by a study administration department clerk and selected teachers. The data are accessible both by Alpha representatives and data processors.
- Activity 2 – implemented under the guidance of a selected teacher. In some cases, upon request of the subject, personal data can be shared via email, although it is not a standard. The data are kept in a printed form and stored in the school office (no further data transfer takes place).
- Activity 3 – is performed in cooperation with selected teachers and management. Data processing is performed in the Beta system and data are accessible to portal representatives, system managers, and processors.
- Activity 4 – The GAMA portal is used for 2 out of 3 activities, as it has extended accessibility to study administration department officers, selected teachers, and external representatives of GAMA. Access to the website to make changes and updates to data is accessible to study administration department clerks, internal IT representatives, and external an IT company.

Since the external IT company manages several internal systems simultaneously, a contractual commitment accepting the importance and benefit of data audit is primary.

Step 4 – determination of compliance with contractual obligations

As seen from the graphical illustration (see Fig. 4), 11 contractual obligations were identified, for which the effectiveness of the contract related to data protection was verified. The contract with GAMA in the “Bakaláři” program, aimed at the catering sector, can be considered optimal. The company that provides document shredding service based on an order system is confidential due to anonymisation, although a contract for receipt and disposal of documents to be shredded based on protocol issued fulfils GDPR requirements in the activity of eliminating data carriers. In the case of a company providing accounting software for a fee, the contract did not contain provisions relating to the processor’s authorization to subcontract without prior notification to the controller. In the case of external accounting and IT companies, contracts did not contain obligations relating to data protection and data security. Similarly, in the case of an external company operating a payment system in which employee personal data are processed, a cooperation agreement is lacking. The contracts with the above organizations were audited or verified in terms of contractual obligations concerning personal data protection and security. In 3 cases, it was confirmed that contractual conditions are set in accordance with GDPR, with minor misconduct.

Regarding the provision of personal data to an external accounting company and interdependence of personal data systems operated by an external IT company, feedback on the absence of the above clauses appears to be alarming, as the analysed institution is exposed to risk consequences which can have undesirable impacts on the whole organization. A proposed partial solution is to take immediate remediation or termination of contractual relationships with partner organizations.

Step 5 – data security specification

Processed data are archived in a printed or electronic form on the premises of the given institution. Printed documents are available in a limited number only, in individual departments, mostly in the Financial Department in lockers. Handling of documents is allowed for selected authorized persons. Data processed electronically are managed by an internal IT employee, while an external IT company provides software support for applications in website management. Servers and backup sources are in the server room, i.e., in a separate lockable room with limited access for data management and maintenance. Access security is ensured using passwords including numbers and characters containing upper and lower-case letters, which do not change, i.e., remain unchanged for unlimited time. At the same time, antivirus protection and automatic data updates are set.

Archiving and disposal of data in a paper form is governed by internal filing and shredding rules. Rules for archiving and disposal of email communication are not fixed. In case of termination of graduate status, students do not have access to the internal system. There is no disposal of personal data posted on the website of the institution. The installation and control of CCTV are performed by an external IT company, management of the analysed institution, and building administration. A total of 33 security cameras are installed on the premises of the institution to monitor all entrances, halls, and passages outside the building. The camera footage is without sound; the retention period is four days, considering public holidays and days off. In case of petty thefts, movement of unauthorized persons on the premises of the institution, their unauthorised entrance into the building, etc., no record is kept that could prove the application of the proportionality balancing test in the operation of CCTV recording.

The analysis of data security showed shortcomings in data archiving and disposal. The system is not updated regularly through changing passwords, there is no balancing test of camera footings, and the contribution of information boards is minor. Personal data protection and data security systems require in-depth data analysis and review.

Step 6 – summary of GAP analysis

Summarizing results of GAP analysis and specification of non-compliance with GDPR in the formulation of rationalization proposals were made with the aim of removing gaps. To ensure compliance with GDPR, it was necessary to make corrections in:

- Inadequate performance of job duties on the side of DPO: to recruit a new DPO from internal staff.
- Incomplete records of data processing activities: to identify incomplete or lacking activities of the school canteen (Activity 1–4), including activities performed by the study administration department related to archiving records of data processing activities.
- Failure to verify processors and contractual clauses: setting up processes for verifying processors before signing the contract and creating a standardized personal data protection addendum to be signed for all processing contracts (4).
- Prevention of unlawful data processing: immediately suspending data processing activities, e.g., in an indication of the name of the health insurance company, ID card number, etc.; informing concerned persons of change in the processing of personal data with additional consent for processing.
- Redundant personal data processing: ceasing performance of redundant activities; informing selected persons of changes in processing and taking corrective measures.
- Requiring consent: do not request evidence of redundant or inaccurate consent; create a form for obtaining the consent of students or their legal representatives concerning personal data processing confirmed by the signature of the persons concerned.
- Non-compliance with information obligations for selected activities (6): ensuring that subjects are informed of the processing of personal data by setting up processes to monitor compliance with information obligations.
- Absence of a retention period for personal data (10 activities): updating filing and shredding rules in accordance with retention policy, completion of missing data.
- Limitation in security incident management: obligation to report security incidents to DPO and develop a security incident management response plan.
- Inadequacies of risk analysis process: setting up processes of regular risk assessment, adding information signs on premises of the analysed institution.
- Absenting proportionality balancing test: application of balance tests on the use of CCTV.
- Absenting Data Protection Impact Assessment (DPIA): ensuring DPIA is in line with DPIA guidelines according to WP248.
- Incomplete wording of internal guidelines: completing organisational measures related to Activities 2 - 4. About the insufficient number of lockers, proposing which documents need to be archived. Accepting rules on the exercise of rights of subjects, informing employees of changes in accordance with internal regulation referring to data protection regulation. Ensuring data transparency.
- Lack of staff training on internal regulations: training of staff on protection of personal data and data security, adherence to work procedures and guidelines.
- Incomplete documentation reviewing complaints and consents with personal data processing with the exercise of the subject's rights, security incidents, and CCTV footage. Handing over records to the Data Protection Officer.
- Impossibility of setting up a system of exercise of subject's rights: providing subjects with standardized forms to facilitate the exercise of rights and obligations under GDPR.
- Implementation of inspections and control mechanisms: setting up regular inspections on the protection of personal data and data security for processors.

A total of 17 areas were mapped in which shortcomings were identified. Based on the results of the GAP analysis and data audit, recommendations for systemic changes were formulated in the internal processes of the analysed institution. The recommended measures in fulfilling GDPR obligations have a synergistic effect on the systemization of management of value-creating activities since continuous improvement and development of key activity potential is the motto of an economically sustainable and socially responsible business. Based on a comprehensive summary of GAP analysis with the definition of partial corrections, the management of the analysed institution made a managerial decision to develop a new version of the proposal of the project for transformation of process management integrated with GDPR.

Systemization of value-creation activities

The main objective of the paper is to create a proposal for a project to implement GDPR into the management of value-creating activity processes while eliminating gaps identified using GAP analysis. The intention of the project is to remedy the current situation and create a new version of a more valuable output to develop the potential of key activities within internal processes. The management of the analysed institution formulated several criteria that are crucial for the acceptance of innovative project proposals. In terms of duration, the project will be launched on 1 September 2024, which is the latest possible date in view of the beginning of the new school year. The total cost of the project is EUR 2020,20. The staff participating in the implementation of the project will be paid a remuneration of EUR 5,66/hour, with working hours being 4 hours a day for four staff members.

The aim of the project is to remedy inconsistencies with GDPR in internal processes by eliminating gaps so that project activities are continuous, not overlapping, and set up in accordance with GDPR. Table 3 specifies project activities by their scope and duration.

Table 3. Project activities (Source: Created by the author, 2024)

| Activities | Specification of project activities | Duration/days | Preceding activities |
|------------|---|---------------|----------------------|
| A | Ensure a new DPO and record-keeping activities | 5 | - |
| B | Revision of records on data processing activities | 3 | A |
| C | Setting up process of verification of processors' authorization Creation of standardized addendums to existing contracts | 6 | A, B |
| D | Elimination of redundant or unlawful personal data processing, taking relevant measures | 2 | A, B |
| E | Revision of consent forms for personal data processing, taking relevant measures | 5 | A, B |
| F | Ensuring information obligation concerning personal data processing for selected activities | 1 | A, B, C, D, E |
| G | Revision of filing and shredding rules | 1 | A, B, F |
| H | Management of security incident reporting, implementation plan | 3 | A, B, C, D |
| I | Initiation of risk analysing process | 4 | A, B, H |
| J | Revision of information signs about the CCTV system | 1 | A |
| K | Application of balancing tests of CCTV system | 3 | A, B, J |
| L | Ensuring DPIA in accordance with WP248 guidelines | 1 | A, B, I, K |

| | | | |
|---|---|---|---------------|
| M | Creation of forms for the exercise of data subjects' rights | 1 | A |
| N | Revision of internal regulations | 2 | A, C-L, N |
| O | Employee training on personal data protection and data security, information of changes and setting up of training plan | 2 | A, C-L, N |
| P | Application of control mechanisms | 2 | H, I, L, N, O |

Table 3 shows that the project includes 16 activities (GAP analysis identified 17 areas, with some of them being consolidated, e.g., in ensuring a new DPO, revision of records of personal data processing activities, review of internal guidelines, and setting up control mechanisms including staff training).

The primary project activity is ensuring a new DPO, overseeing management of the complaint process, specification of data subjects' rights, monitoring consents with personal data processing, and employee training. The status of compliance with GDPR obligations is set along with the specification of tasks of the new DPO, who will undergo GDPR training on confidentiality and signing of an addendum to the contract. The primary task of the new DPO is the termination of the contract with the external company due to non-compliance with contractual obligations and commitments, revision of records on data processing activities, data audit, and questionnaire survey with reference to legislative regulations. The revised records are forwarded to responsible persons in individual departments of the analysed institution aiming at familiarizing them with changes and updates in written documentation. The process of verifying processors and the creation of standardized and additional documents is the responsibility of managers of relevant departments. Elimination of redundant or unsolicited personal data is the responsibility of the data computerization officer and includes e.g. prevention of 2 data leaks in IT systems, 2 text edits in manually processed documents converted into electronic form, 1 edit on an online form, etc. Removing data that has been recorded without legal authorisation is a necessary act of transforming the management of internal processes. Redundantly required consent must be removed from forms no later than at the beginning of the new school year, regardless of the duration of the project. A key activity is setting up processes of processing obtained consents concerning, e.g., publication of photographs according to guidance and information obligations on personal data processing for 6 project activities. The model for data collection and analysis is information notices, e.g., Activity 1, where obligation is fulfilled. The necessary information is obtained from records on processing activities, which will ensure fulfilment of information obligation concerning disclosure of individual communications to data subjects in case of new processes and inspection of filing and shredding rules that will be supplemented by 10 absenting items, e.g., establishing procedure of archiving and disposal of data in email communication and on websites. The management of the security incident reporting process is the responsibility of IT staff. In the set process, incident reporting steps are defined together with the assignment of partial responsibilities.

The reporting of personal data security breaches to data subjects is carried out in line with currently applicable legislation, procedural risk identification and revision of information signs informing about the CCTV system on the premises of the analysed institution. The proportionality balancing test of the CCTV system, which is subject to WP248 guidelines, will facilitate the exercise of subjects' rights by creating a standardized form. The form shall contain data subjects' identification, date, and signature with the justification of the request. Based on the review of internal guidelines, it is appropriate to add measures related to Activities 2 – 4 regarding archiving documents stored in lockers. An information memorandum has been drawn up to specify the exercise of data subjects' rights and an information memorandum has been drawn, in which the above elements are listed and supplemented by information on newly introduced forms. Employee training on personal data protection and data security, information on changes and legislative provisions confirm the importance and benefits of selected activities within the internal process. The creation of a training plan, which includes dates of training

For purposes of project assessment in relation to the implementation of GDPR in process management of value-creating activities, risk analysis was performed as well as calculation of costs with identification of risk severity, resources, and time buffers aimed at setting up security measures, see Table 5.

Table 5. Risk analysis (Source: Created by the author, 2024)

| GDPR | Source of risk | Danger of risk emergence | Risk severity evaluation (PMA) | | | | Security measures |
|------|-------------------------------------|---|--------------------------------|---|---|---------------|---|
| | | | P | Z | H | Level of risk | |
| | Delay | Faulty processing of personal data | 2 | 3 | 3 | 18 | Scheduling |
| | Erroneous input data | Poor identification with GDPR | 3 | 4 | 4 | 48 | Specification and checking of project input data, setting up processes and control mechanisms in accordance with GDPR |
| | Lack of employee training | Leakage of personal data | 3 | 4 | 4 | 48 | Implementation of training |
| | Incomplete transformation | Error in understanding GDPR obligations | 3 | 4 | 4 | 48 | Familiarization with GDPR and relevant documentation |
| | Insufficient information on changes | Failure to adopt change management by employees | 3 | 3 | 3 | 27 | Appropriately selected project communication to employees |

The Prevention of Major Accidents (PMA) was selected for risk analysis calculation. PMA rates 3 risk components on a scale from 1 to 5. The risk analysis (see Table 5) identified 5 risks (the highest value of risk level reached a score of 48 for 3 risks out of 5). The first identified risk with a value of 48 is failure to detect compliance with GDPR obligations. Setting up internal processes and control mechanisms for continuous monitoring of GDPR compliance is necessary. Personal data leakage resulting from lacking employee training is another risk (48). Insufficient or faulty compliance with GDPR obligation is a cause of process management transformation; therefore, a thorough study of legislation and legislative regulations is primary.

The project was designed with a view to calculate the costs of change management considering the scope and quality of the project. Two permanent employees were selected for implementing project activities, with another employee involved in 2 tasks, and another one was assigned the role of supervisor). The project timeline is set with an implementation period in July and August 2024 due to a lower volume of work activities distributed in a ratio of 50 % of permanent employees' time and 50 % of working on project activities. By contracting a new DPO, their training, and reimbursement of travel costs, total costs were estimated at 1,93 EUR, i.e. (1 EUR = 24,75 CZK, status as of 05/20/2024), see Table 6.

Table 6. Calculation of change management cost (Source: Created by the author, 2024)

| Cost items | Duration/hours | Total costs/EUR |
|--------------------------------|----------------|-----------------|
| Working on project/Employee 1 | 96 | 543,03 |
| Working on project /Employee 2 | 52 | 294,14 |
| Working on project /Employee 3 | 20 | 105,05 |
| Working on project /supervisor | 57 | 322,42 |
| Training time | 16 | 90,51 |
| Training of a new DPO | - | 537,77 |
| Travel costs | - | 40,40 |
| Total | - | 1933,32 |

The total cost of the project is calculated at 1933,32 EUR including staff remuneration, travel costs, and training/1 employee. The total remuneration amount is 1355 EUR; the cost of meals is set at 20,20 EUR/day.

The cost calculation does not include a specific cost within the project, namely remuneration for employees in the position of DPO. Compared to the project budget, which was estimated at EUR 2020,20 by the management of the analysed institution, calculated costs are at an optimal level, with a slight reserve. The overall costs did not include remuneration for employees in the position of DPO, as it does not represent additional cost, but a more cost-effective alternative of valuing the performance of staff members compared to a lump sum payment to an external employee.

Based on the results obtained, empirical data, rational findings, and sophisticated solutions proposed, the project can be evaluated as economically feasible and socially responsible. The remuneration at the amount of EUR 60,61 per month paid to DPO should be increased after a probation period of 3 months after obtaining a certificate of competence preliminary approved by the management of the analysed institution. The increase in remuneration will be determined later.

Discussion

Based on qualitative research implemented in the form of a semi-structured interview with a director of the analysed institution and analysis of internal documentation, it was possible to answer the first research question: *“Is compliance with GDPR obligations transparent?”*

The selected institution uses an external company to ensure GDPR obligations. According to the contractual arrangement, the external company should manage the performance of responsibilities of the DPO and provide consultancy, preventive security inspections at least 1 a year, training of managers, and management of documents related to personal data protection. If needed, the external company provides standardized forms, e.g., for consent with personal data processing or addendums to employee contracts. In terms of ensuring GDPR obligations, the analysed institution relies on contractual arrangements with external companies; therefore, no regular audits are performed. Transparency is not ensured.

Through theoretical background, interpretation of results of semi-structured interviews and partial findings including an analysis of internal documents, it was possible to confirm scientific assumption 5: *“If an organization does not carry out regular audits of outsources services, it cannot ensure thorough compliance with GDPR obligations”*.

Using a comparative analysis in conjunction with a scoring method, it was possible to research question 2: *“Is the use of an external Data Protection Officer (DPO) more effective compared to delegating this task to a permanent employee?”*

In response to the research question above is the statement that the use of an external DPO is not more effective. A proposed solution is to entrust this position to a permanent employee of the institution. The findings obtained through semi-structured interviews are used to formulate questions for a questionnaire survey distributed to employees, which provides an answer to the first and second part of research question 3: *“What is the relationship between data system and employee approach to data protection?”*

A total of 83 % of employees participated in a questionnaire survey containing 12 questions. The results confirmed the non-existence of employee training on personal data protection and data security. Moreover, findings confirmed the interest of employees in this type of training in an online form (56 % of respondents and face-to-face training (44 %). The questionnaire was compiled so that it evaluates employees' knowledge of GDPR issues including explanation of acronyms and matching terminology with definitions of terms. Shortcomings were found in the recording of personal data, e.g., photographs, CCTV footage, or disclosure of email addresses containing the name and surname of contact persons, business phone numbers, etc. Shortcomings were also found in failure to secure personal data (as stated by 76 % of respondents). The respondents were also asked about security measures set and adhered to in the analysed institution. 52 % of respondents answered that they consider switching off PCs/notebooks when leaving the workplace to be a proper duty of every employee. According to the results, 24 % of respondents lock documents with personal data in lockers. Most respondents consider GDPR obligations important; however, according to 12 %, it is redundant. The respondents included representatives of the financial department (16 %), teaching staff (56 %), and other non-teaching staff (28 %). Despite a lack of employee training on personal data protection and data security, employees have a basic awareness of this issue. The results confirm the existence of knowledge gaps in reporting security incidents, which need to be prevented.

The inspection of workplaces concerning the so-called clean desk policy was conducted in the context of internal rules and regulations concerning personal data handling, according to which written documentation containing employee and student personal data should be stored in lockers in lockable offices. As for electronic records, employees must not leave their computers switched on when leaving their offices. Employees commit to the above from the start of their employment by signing a Confidential Information Agreement, according to which they must lock their desks and offices and prevent access to information in PCs and laptops to other persons.

An unannounced inspection took place in the afternoon, on a working day, after working hours. It aimed to find out whether employees adhere to established rules of personal data protection and data security, specifically, whether documentation containing employee and student personal data were freely available in offices, whether computers were switched off and data were stored and secured. A total of 3 offices, 4 teachers' offices, and 4 classrooms. The inspection found that there were freely accessible documents with names and addresses of natural persons, including a list of students in individual classes and a list of lockers with numbers and attendance in relevant calendar months. Despite this, no evidence was provided to confirm the severity of the potential misuse of personal data. The management of the analysed institution commented on the name list of students available in individual classrooms as a reminder of classroom service. The numbers on personal lockers are a reminder of students' duties, as stated by the director of the analysed institution. Considering the objectivity of information communicated and the factual reasoning of the management of the institution, it shall be stated that classrooms are also visited by other students from and outside the institution, as they regularly attend school for extracurricular and educational activities. The management of the institution stated that some rooms in the institution do not have enough lockers for storing documents containing personal data. Although inspection found documents containing personal data freely accessible in some rooms, the conclusion is that employees are concerned about data protection and security, although certain shortcomings were identified. The corrective actions taken with the aim of ensuring compliance with

GDPR standards and risk elimination have a positive impact whose scope will be determined in the future.

Based on the results of GAP analysis and data audit, it was possible to fourth research question *“Is it necessary to revise all data listed in the data protection system”* The results highlighted insufficient compliance with GDPR obligations by DPO, incomplete record-keeping on activities concerning data processing, and absence of a process for verifying data protection addendums in processing contracts. The findings confirmed unlawful processing in the case of two persons’ personal data and redundancy in administrative actions concerning requested consents for 3 activities. Non-compliance with information obligations was identified in 6 activities. The absence of a retention period for personal data was confirmed in 10 activities. There are no competent person in charge of the security incident reporting process; no procedures for reporting and handling incidents, including the identification of data subjects were found. The process of risk management is not set up, the proportionality balancing test on the use of the CCTV system is not applied, and the contribution of information signs is minor. Internal regulations do not include organizational arrangements for handling personal data. The rights of data subjects, complaints, security incidents, and conditions for the exercise of data subjects’ rights are not optimally addressed. Employees lack training on the issue of GDPR; therefore, they are not aware of internal regulations and legislative measures on this issue. The scientific assumption 6: *“In case of non-compliance with GDPR obligations, the organization lacks the capacity to independently ensure remediation”* was not confirmed, as the selected institution updated the DPR transformation project proposal in line with the systemization of management of value-creating processes independently in form of corrective measures.

The partial analyses indicate that outsourced services must be operated on a regular basis, as administrators cannot rely on comprehensive performance without verifying facts. If the analysed institution decides to choose an external or internal DPO, it is advisable to independently assess minimalist, realistic, and pessimistic scenarios of sophisticated solutions, as a choice between variables does not guarantee operational and financial efficiency and social benefits. As confirmed by results, the analysed institution can draw a GDPR transformation project proposal implemented in internal processes independently, provided that at least one employee (preferably a permanent employee) possesses knowledge of key issues at least at a basic level.

Conclusions

Benefits and opportunities

The paper has benefits for the analysed institution as well as other public institutions and non-governmental organizations operating in the same or similar sector. Through a data audit, the effectiveness of processes in the organization was verified with a concrete example. With the support of a comparative method, managerial decisions were made on using services of either an external or internal DPO in accordance with GDPR. The selected option was an internal DPO, for which a positive impact on wage and other costs and liability was confirmed.

The need for expertise in GDPR at least at the minimum level has a synergistic effect in identifying gaps in shared processes and sub-activities in planning and performing GDPR obligations that are a priority.

The creation of guidelines and proposals for rationalization measures has added value to research and innovation activities, the contribution of which is verified, tested, and evaluated as an important input capital of development projects of professional organizations listed in monitoring and research reports with an emphasis on Environmental, Social, Governance (ESG) at international and national level of bilateral cooperation.

The theoretical part of the paper can be applied to the design of professional education programs at universities, with a focus on economic, managerial, and socio-legal disciplines, e.g., in study programs like Sustainable business, Process management, Public Administration and records management, where the issue of GDPR transformation into process management has development potential.

According to the author of the paper, the benefit of the paper is in deepening professional knowledge and practical experience with the aim of a detailed understanding of the transformation process. The application of findings obtained and partial analyses with verification of theoretical knowledge, research questions and scientific assumptions connect the theoretical part of the paper with application one to achieve systemization of process-managed organization with acquisition of procedures applicable in practice.

Impacts and limitations

The essential impact is seen in anonymous data protecting the identity of the analysed organisation. Other organizations cooperating with the same external company have not been alerted to non-compliance with GDPR. The design of the project of transformation of GDPR into process management of educational institutions was limited by human resources, time, and resources. Recommendations for changes related to legislation have an impact on the transformation of internal processes, which need to be regularly monitored, systematically managed, evaluated, and strategically developed. The development of digital technologies across all industries that use machine learning and artificial intelligence brings a large volume of data, whose contribution and impact are the subject of discussions and debates on the use of CCTV systems with granting of consent with personal data processing.

The implementation of GDPR in internal processes is a methodological tool to address sub-problems comprehensively and systematically in conjunction with data auditing. Responsibility for processes across organizational structure requires the setting up of a matrix management system, which is hindered by a linear approach that requires transformation.

It is necessary to follow process management guidelines considering data digitalization and resource sharing, the added value of which has a potential for the future.

Potential of systemization of value-creating activities

The transformation of managerial tools in the public sector enables the streamlining of administrative activities by improving services provided and cost-effective use of funds considering the principles of ESG. In synergy with the return of investments in employee training, the project has both economic and social benefits in the development of employee training by deepening know-how.

The improvement of internal processes in the medium and long term and efficient and effective use of funds in the project is significant in a systemic concept, since comparison of employee performance management with the ability to identify gaps or critical points with the aim of ensuring remedy in terms of effectiveness and productivity of work, while considering decentralization of powers and responsibilities is added value of a process-managed organization. The competency responsibilities of current and future management systems in providing digital services are key from a factual and technological point of view, about purpose, goal, and external incentives in integrating management quality and process performance according to Data Quality Analysis, Data Lineage, machine learning, and automated decision-making.

The use of ChatGPT technologies in a real environment with an impact on the effectiveness of work performance management, customer satisfaction with the help of artificial intelligence in the communication of queries related to problems and shared alternatives of individual solutions to problems and causes, automation of tasks and analysis of text data is evidence of development of digital technologies and e-platforms providing online services, whose offer is related to backup of personal data and data storage from legal, ethical, and security point of view. Limitations can be seen in understanding complex tasks and work operations that require the presence of a rational person who is able to objectively assess the current situation and predict future states to make sophisticated decisions on the development of key activities with the aim of increasing the added value of production and operation processes within business, investment, strategic, and work activities. The sustainability of standardized designs and key actions in improvement, refinement, simplification, acceleration, waste reduction, adaptability, flexibility, agility, and other reengineering activities represent the development potential of expected results in corporate sustainability and accountability.

Methods, practices, systems, and tools for continuous improvement of corporate and inter-company processes integrated with strategies and objectives are subject to activities that have a positive impact on eliminating redundant or faulty activities within supporting processes of shared services, optimization of performance, and labour efficiency with a higher added value of transformed processes. Systemization of process management of internal activities has the potential to achieve the value of planned results considering continuous improvement of operational and economic efficiency more easily in saving costs, time, and resources with verification of effectiveness of set processes and sub-activities of a socially responsible organization.

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DIGITAL TOOLS IN STRATEGIC GLOBAL SPORTS BRAND MANAGEMENT

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Abstract

Research Purpose. The purpose of this research is to examine the strategic use of digital tools in global sports brand management, with a focus on how these tools, including the Strategic Colour-Coded System (SCCS), can enhance global fan engagement.

Research Methodology. This study employs a mixed-methods approach, combining qualitative analyses of sports marketing strategies with quantitative data on fan engagement and market penetration. It specifically investigates the implementation and impact of the SCCS in translating and distributing content to international audiences, evaluating its effectiveness in the context of global sports.

Findings. The findings will display how the SCCS can enhance the global management of sports brands, facilitating deeper engagement with diverse audiences and enabling sports entities to effectively penetrate new markets. The study highlights how to connect with spectators in Europe and Asia utilizing SCCS and digital platforms.

Originality and Practical Implications. This study introduces the Strategic Colour-Coded System (SCCS) for sports brand management, a digital tool that enhances global audience engagement by facilitating cross-cultural fan interaction and strengthening connections in a global sports context. It offers valuable insights for sports federations, clubs and marketers aiming to expand internationally.

Keywords: Global sports; Brand management; Digital tools; Strategic Colour Coding System SCCS.

JEL codes: M31, O32.

Introduction

Current societal and economic changes are fuelled by human creativity, innovation, and digital transformation, enabling rapid idea adaptation. Digital transformation is crucial for both global entities and individuals, enhancing business operations (Mahraz et al., 2019). This transformation is driven by innovative management and new digital tools, which provide growth opportunities. Technological advancements also redefine how business entities serve both local and global spectators (Varriale et al., 2023). Many digital platforms now use advanced tools to provide subtitles, aiming to capture viewer attention, including in the sports industry (Raedts & Roozen, 2024). Platforms like Netflix and YouTube offer double subtitles that link visual and auditory elements effectively. While studies show subtitles do not change viewer attitudes towards commercials, they do improve content understanding across entertainment and education levels (Raedts & Roozen, 2024). The authors of this paper seek to address the gap in complete comprehension for non-native speakers at beginner and intermediate levels of the originally distributed language by utilizing the Strategic Colour-Coded System (SCCS).

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According to Kulikov and Kulikov (2024), implementing the Strategic Color-Coded System (SCCS) in subtitle distribution enhances viewer engagement by improving text comprehension. This method utilizes colour coding to highlight key information, making content more accessible and engaging for diverse audiences. By facilitating better understanding, SCCS contributes to more effective communication and audience interaction. According to the authors' research, the Strategic Colour-Coded System (SCCS) is defined as a translation method where each word in the original language is assigned a specific colour. This same colour is used for the corresponding word in the translated language, creating a direct visual link between the two languages. In cases where words cannot be directly translated due to language differences, these words are marked in black colour in both the original and translated texts. Additionally, phrasal verbs and expressions requiring non-literal translation are coloured identically in both the original and translated languages to preserve the text's essence. Furthermore, the authors of this research suggest that subtitles have become a key tool in content distribution and global audience engagement. If certain subtitles are unclear or alter the word order from the original to the translated language, they can complicate comprehension and increase cognitive load. Several digital platforms address this issue by allowing users to hover over words for translations, but this approach can be time-consuming and overwhelming with frequent use. In November 2015, the UN General Assembly (2015) adopted Resolution 70/1, setting the 2030 Agenda for Sustainable Development. This introduced 17 Sustainable Development Goals (SDGs) to build on previous goals. The agenda emphasized sports' role in promoting development, peace, and empowerment, highlighting its benefits in health, education, and social integration (UNGA, 2015: 10). Esports have rapidly grown in popularity, challenging traditional sports like ice hockey and football. Despite traditional sports leading in revenue, esports events like the League of Legends World Championship draw more viewers than major events such as the FIFA World Cup and NFL Super Bowl (Campbell et al., 2021).

This research investigates whether the Strategic Colour-Coded System (SCCS) can enhance engagement by making sports content more accessible, thereby retaining viewers who may not understand the language of distribution. The study combines elements of strategic global sports management to explore potential synergies in global brand management and cross-industry benefits. The purpose of this research is to examine the strategic use of digital tools in global sports brand management, with a focus on how these tools, including the Strategic Colour-Coded System (SCCS), can enhance global fan engagement. The authors established the following research questions:

RQ1: How effective is the Strategic Colour-Coded System (SCCS) in attracting and engaging a diverse global audience for sports content, and does it significantly enhance their engagement compared to traditional translation methods?

RQ2: Can the use of the SCCS in sports content translation and distribution lead to a measurable increase in the long-term retention of newly acquired viewers, especially those with limited proficiency in the content's original language?

RQ3: How do international audiences find it different to understand and enjoy sports content when using the SCCS compared to regular translation? Specifically, how does it affect ease of access and understanding for non-native speakers of the language?

Literature Review

Digital tools in global sports brand management

In today's economy, sports play a crucial role, with each sport aiming to attract and captivate audiences through unique player and club branding. Each sport, including football, volleyball, basketball, hockey, and e-sports, is in intense competition with each other for fan engagement (Jankovic & Stojanovic, 2019; Romero-Jara et al., 2023). According to Mullin et al. (2013), the task of sports marketing is to satisfy the needs of consumers by offering a wide range of activities. The focus of all sports marketing actions is the acquisition and retention of these viewers (Abeza et al., 2020; Mullin et al., 2013). A variety of global charity strategies are implemented to attract diverse audiences and address domestic issues. Due to the expanding influence of media communications on sports in society, sports clubs are turning into communication channels focused on global markets and business management (Kulikov et al., 2024).

Global events like the Olympics not only boost the host venue's image and economy but also elevate the country's global status and foster long-term benefits. In the sports world, the integration of social media is crucial, with athletes and teams using these platforms to connect with spectators globally. Yet, there is no dedicated theory of glocalization (Roudometof, 2016). The principle of glocalization suggests that it shapes global trends starting locally (Holton, 2007). Sports clubs widely use social media to promote their athletes, with platforms like Facebook being used for updates, discussions, etc. (Smith & Sanderson, 2015). Identifying effective fan engagement strategies is complex, with much research centred on social media marketing's impact on sports fans. The ability for spectators to interact with each other and athletes fosters community and participation, while avoiding any incitement of violence (Hussain et al., 2022). Social media platforms employ modern digital tools and advertising strategies to engage consumers (Zhang, 2023). Audiovisual Translation (AVT) enhances viewer engagement on social media through subtitles and dubbing, enhancing its accessibility (Violita & Cholsy, 2023). Orero (2009) notes that AVT research largely focuses on dubbing and subtitling, underlining their importance in boosting audience engagement. However, there is no scientific evidence that Strategic Colour-coded translation enhances product distribution or comprehension for digital consumers. This rapid spread of information resembles the historical Silk Road, turning information into a profitable commodity shared globally (Steenkamp, 2021). Social media platforms are vital for athletes and clubs to engage global audiences. These platforms are crucial for branding and sharing content to provide spectators exclusive insights. The NHL's Global Series in Europe attracts European spectators. Connecting North American hockey with Europe and Asia requires substantial investment in scouting, coaching, and advertising. Spectators worldwide seek closer connections with their favourite athletes and teams (Su, Baker, Doyle, & Yan, 2020). According to Bouchet et al. (2013), although brands are mainly intangible, they also take form in tangible aspects such as names and marketing materials. Nike and Adidas thrive by effectively branding their symbols and slogans through unique player and club identities (Romero-Jara et al., 2023). Many sports entities strive to find a more connective path for their consumer engagement through signals such as images, songs, colours, or a combination of colours. According to Pavlov's research, 'Pavlov's dog,' dedicated to conditioned reflexes, shows how a neutral signal (the sound of a bell) can be associated with a meaningful one (presentation of food), therefore demonstrating the fundamental principle of learning through associative signals (Boakes, 2023). In this study, culture refers specifically to the national and regional levels that influence fans' perception of global sports brands. This allows us to explore how SCCS (Strategic Colour-Coded System) can strategically bridge linguistic gaps through direct colour translation signals for sports fans from different countries, improving global brand management strategies in sports.

Colours in SCCS activate brain attention towards their corresponding translations, thereby facilitating learning and comprehension outcomes. This enhances content accessibility for global brand engagement, making it more competitive and distinctive among its competitors. Pavlov's approach underscores its connection, as the dog associates the bell with food, whereas Fortunato et al.'s (2014) research highlights its connection in neuromarketing between learned associations and consumer behaviour. For example, just as the dog associates the bell with food, modern neuromarketing consumers associate certain brand elements (colours or slogans) with emotional states, influencing purchasing and engagement decisions. Additionally, the brain processes emotional responses to products using the subconscious mind, which can activate certain brain regions responsible for decision-making through a variety of visual and auditory signals, similar to Pavlov's dogs responding to the sound of the bell. Additionally, understanding the cultural and demographic influences on sports consumers can lead to strategies like the Strategic Colour-Coded System (SCCS). SCCS facilitates content understanding and distribution in the target language, expanding market reach and promoting long-term consumer engagement through digital streaming platforms such as YouTube and Netflix.

Modern history of engaging new consumers through digital streaming platforms such as Netflix and YouTube and its perspectives

Streaming platforms have enhanced global audience accessibility with subtitles, making content more comprehensible and engaging for diverse viewers (Alm, 2021). They have shifted education from traditional classrooms to media-rich environments, simultaneously revolutionizing digital education and entertainment (Webb, 2015). Research indicates that subtitles can reduce cognitive load, making foreign

language content more accessible (Frumuselu et al., 2015). Furthermore, a study by Winke et al. (2010)

shows that subtitles can improve engagement and comprehension for viewers. This aligns with findings that platforms like Netflix merge entertainment with accessibility for diverse audiences, serving both entertainment needs and enhancing comprehension across different viewer groups. These platforms, including YouTube, have proven effective for both education and entertainment (Kohler, 2015). Their accessibility enhances viewer engagement by stimulating both auditory and visual channels, allowing the brain's hippocampus and amygdala to process information more effectively through enhanced emotional and imaginative engagement while watching TV series (Simic et al., 2021). Subtitles on platforms like Netflix attract subscribers by offering both original and translated language options. However, this method of information distribution has revealed gaps that the author aims to address. Consider a scenario where a viewer struggles to understand two or three words in a ten-word sentence, displayed with its translation below. The word order in the translation may not correspond directly to the original, potentially confusing the viewer. The authors suggest that the SCCS method could be recognized as an approach, which enables direct comprehension through colour coding, thereby enhancing viewer engagement. In summary, social media platforms like Facebook and Instagram play a key role in engaging global sports audiences and building fan communities, while streaming services like Netflix and YouTube enhance engagement through subtitles, making content more accessible for entertainment and educational purposes.

Research Methodology

Based on the literature review, a survey was developed in which the SCCS method was examined as a digital tool for better brand governance and more sustainable fan engagement. This study explored how SCCS could influence brand governance by enhancing brand reach and interaction through visually engaging, language-accessible content. The literature review identified theoretical gaps and potential in global content distribution. Notably, no information was found on the use of the SCCS for global brand distribution and audience engagement. This review was crucial to developing a survey aimed at determining if SCCS can attract global audiences to sports, brands, or athletes, retaining viewers initially through accessible, visually engaging content and potentially converting them into long-term consumers or loyal spectators. The authors used a two-step approach: first analysing existing research in global brand management, social media, and linguistics, and then conducting a survey. This study manually analysed a total of 117 scientific publications from Scopus, ResearchGate, Google Scholar, Springer, and HAL, covering topics such as sports social media marketing, digital transformation in sports, fan engagement, subtitles, audiovisual translation, multilingual content distribution, cognitive science, commercialization, and global sports branding. In the first stage of analysis, 18 scientific papers were excluded, followed by an additional 50 papers in the second stage due to irrelevance. The remaining 50 sources were meticulously reviewed and analysed by the authors, forming the basis for developing interview questions tailored to each group.

The literature review shaped surveys and interviews for three groups using the SCCS concept: language experts (linguistic scientists, English teachers, multilingual, and cognitive science researchers), international spectators, and sports general managers. Each group of respondents as well as each participant of the survey was well-aquainted with the concept of SCCS and its utilization. A sports story episode about soccer and hockey which contained 645 words was translated with SCCS (Strategic Colour-Coded System) from English into 12 languages (Russian, Latvian, French, Spanish, Chinese, Sindhi, Hindi, Georgian, Armenian, Japanese, Modern Standard Arabic, and German) (SCCS, 2024a, 2024b, 2024c, 2024d, 2024e, 2024f, 2024g, 2024h, 2024i, 2024j, 2024k, 2024l) using SCCS. This episode was distributed to participants via a YouTube link which was presented through a 6-minute cartoon animated video using its SCCS subtitles for each language. Each participant was required to watch the story at least once to become familiar with the SCCS approach before providing feedback through a survey.

A total of 510 questionnaires were distributed personally, resulting in 379 responses from 379 respondents, with each participant completing one survey. The study aimed to target at least 10 respondents per group and received responses from 40 hockey club general managers, all of whom are fluent in both English and one of the 12 target languages into which the story was translated. This

research involved 37 language experts all of whom are qualified scientists who hold either some research experience or high H-indices in the areas of English language teaching and cognitive science. Each language expert received a story with the SCCS content, which was translated from English into one of the 12 languages in which they professionally operate. Additionally, 302 international spectators were arbitrarily selected, each of whom received a story with the SCCS content translated from English into one of the 12 languages corresponding to their native language. The research aimed to assess whether the SCCS approach could attract a diverse global audience to sports content by providing an opportunity to comprehend new words in the original language and gauge interest in its further implementation by sports managers.

For the interpretation of the results of the survey, a graphical method was applied; all figures included in this article were prepared by the authors and reflect the findings of their research. The study presents a strategic approach for global brand governance in sports by introducing the SCCS (Strategic Colour-Coded System). Unlike previous works, its research investigates a completely novel path of consumer engagement through SCCS subtitles. The survey conducted for this study has research character in nature; the data collected is used for research purposes only. Survey participants were informed of the purpose of the study, and an informed consent statement was obtained from them.

Research Results

This part of the paper presents the respondents' answers to four questions that were posed to 40 hockey club managers. The answer to the first question *“How effective do you believe the Strategic Colour Coded System SCCS will be in attracting diverse audience attention towards your brand, and do you think it will enhance their engagement more than traditional translation methods?”* is presented in Figure 1.

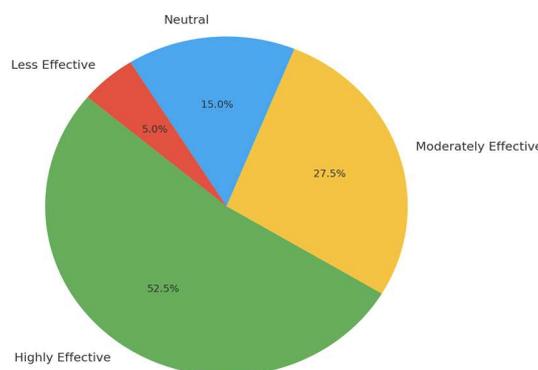


Fig. 1. Effectiveness of the Strategic Colour-Coded System (SCCS)

Fig. 1 assesses the SCCS approach for audience engagement as highly effective (52.5%), particularly for sports content. 27.5% of respondents assess this method as moderator-effective, which means it is more engaging than traditional methods. Neutral evaluation gave 15% of participants, and only 5% of respondents considered this method less effective than traditional. Overall, SCCS is seen as a promising tool for engaging international audiences and improving viewer retention by making sports content accessible.

The distribution of respondents' answers to the second research question *“Can the use of the SCCS in sports content translation and distribution result in a noticeable increase in the long-term retention of newly acquired viewers, especially those with limited proficiency in the content's original language?”* is shown in Figure 2. Figure 2 assesses the Strategic Colour-Coded System (SCCS) for viewer retention as potentially effective, according to 52.5% of respondents, SCCS could aid retention by enhancing comprehension through visual cues. Additionally, 32.5% believe SCCS is highly likely to increase retention by improving understanding and memory. Neutral evaluation was given by 12.5% of

participants, and only 2.5% of respondents considered this method unlikely to benefit viewer retention compared to traditional methods.

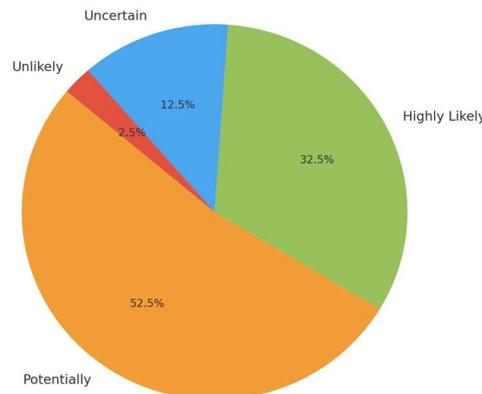


Fig. 2. Long-term Retention of Viewers Using SCCS

Overall, SCCS is viewed as a beneficial tool for enhancing viewer retention, making sports content more accessible and engaging for a broad audience.

Respondents' answers to the question about the ease of perceiving content “*How do international audiences differ in their understanding and enjoyment of sports content when using the SCCS compared to regular translation? Specifically, how does it affect ease of access and understanding for those who do not speak the language natively?*” is shown below.

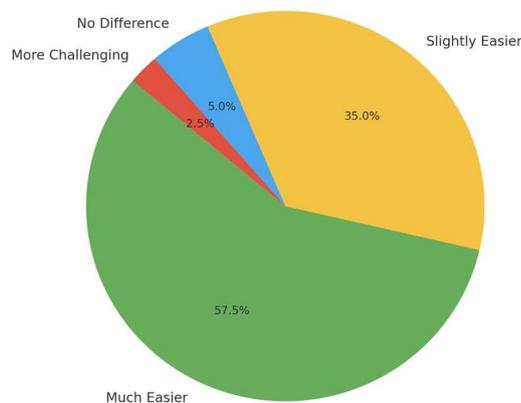


Fig. 3. Effect of SCCS on Ease of Access and Understanding for Non-Native Speakers

Fig. 3 shows how the SCCS impacts access and comprehension of sports content for non-native speakers as 57.5% of the respondents noted that SCCS significantly enhances accessibility and enjoyment, whereas 35% concluded that with SCCS understanding process is slightly easier. However, 5% of the respondents experienced no benefits compared to standard translation, and only 2.5% found the colour-coding confusing. Overall, SCCS is viewed positively for enhancing content access and enjoyment for international audiences, with most finding it easier than traditional methods.

The fourth question addressed to general managers “*Would your club be interested in implementing a pilot version of the SCCS method to assess its impact on attracting an international audience and improving global brand management?*” was aimed at gauging interest in the system for global brand management. Two-thirds of the respondents gave positive answers; 25.6% of general managers remained neutral, and 5.1% were already satisfied with the current tools and approaches which they

already utilize. Overall, most clubs are interested in SCCS, indicating a positive outlook towards using innovative methods to engage global audiences.

In general, the SCCS is perceived positively by general managers and has proven its ability to attract attention, enhance engagement, improve viewer retention, and simplify content comprehension for international audiences marking it as a valuable tool in the global sports industry. Most sports clubs recognize the potential benefits of SCCS, reflecting a forward-thinking approach to engaging and retaining global audiences. The minor criticisms and neutral perspectives provide valuable feedback for further refining the system.

For the authors of the study, it was certainly important to find out the opinion of language experts (teachers, linguistic scientists, multilinguals) on the proposed system of training. This group of respondents, which includes 37 language experts, was asked to answer seven questions. The answers to the first question “*What best describes your experience and background in language teaching, linguistics, and multilingual communication?*” indicate the diverse professional groups of language experts and give the opportunity for holistic assessment of the SCCS approach. The professional groups of the survey participants are as follows: language teacher (47.2%), scientific linguist (27.8%) who conducts linguistic research, multilingual communicator (13.9%) proficient in at least four languages, and others (11.1%).

Regarding language teaching experience (the second research question), respondents differed considerably: one-third of respondents have more than 25 years of work experience; less than 10 years - 40% of the total number of survey participants. Overall, these findings reflect a respondent base with a robust and diverse range of experiences in linguistics.

Figure 4 reflects the distribution of respondents' answers to the third question “*How effective do you believe the SCCS is in attracting the attention of a diverse audience to sports?*” 46% of respondents found the SCCS a moderately effective method in engaging a broader audience with sports content, whereas 27% believe SCCS greatly enhances the accessibility and comprehension of sports content.

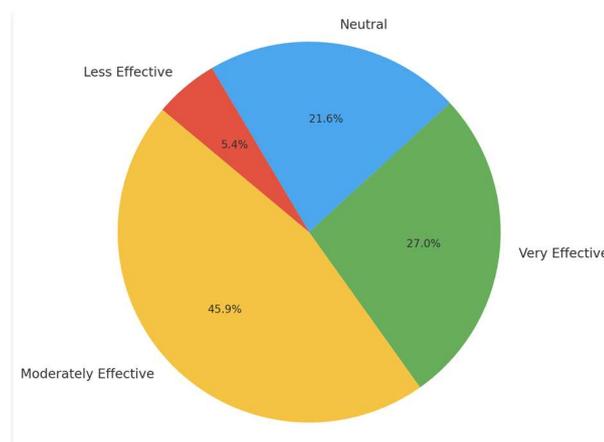


Fig. 4. Effectiveness of SCCS in Attracting a Diverse Audience to Sports

Nonetheless, 21.6% of respondents remain neutral regarding the effectiveness of SCCS in attracting a diverse audience to sports, and only 5.4% of respondents perceive SCCS as a less effective method for engaging viewers. Overall, opinions on the effectiveness of SCCS range from moderate to very effective, with a general trend towards positivity. In general, SCCS is seen as a promising tool with areas for improvement to fully realize its potential in engaging global and multilingual audiences in sports.

More than half of the respondents find the proposed SCCS more attractive than traditional methods. The fourth research question was “*Compared to traditional translation methods, does the SCCS significantly enhance viewer engagement with sports content?*” Figure 4 compares the SCCS with traditional translation methods and according to 54.1% of the respondents indicate that SCCS does offer advantages over traditional methods and can enhance engagement to some degree, whereas 29.7% find that SCCS

greatly improves viewer engagement, suggesting that for many, SCCS is a substantial upgrade on traditional approaches. Nevertheless, 13.5% report no noticeable difference in engagement levels between SCCS and traditional methods, pointing to a potential variability in effectiveness based on specific use cases or viewer preferences; and only 2.7% number of respondents suggest that engagement might decrease over time with SCCS compared to traditional methods, possibly due to factors such as novelty wearing off or complexity in usage.

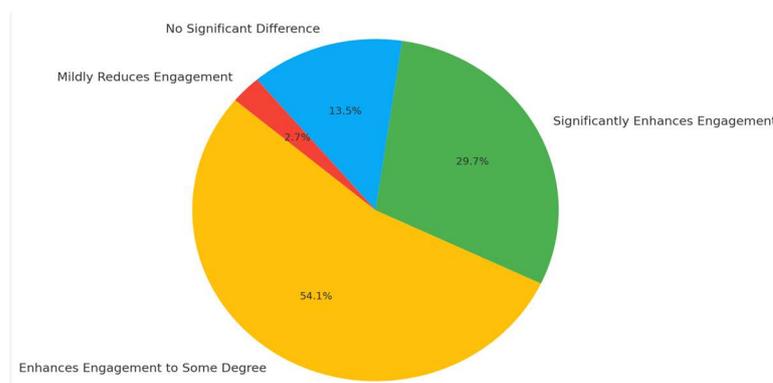


Fig. 5. SCCS Impact on Viewer Engagement Compared to Traditional Methods

Overall, SCCS is generally seen as more effective than traditional translation methods in enhancing viewer engagement with sports content. This suggests that SCCS holds significant promise as a tool for increasing viewer interaction and retention by making sports content more accessible and engaging to international audiences.

Question 5 “*Can the SCCS lead to a measurable increase in the long-term retention of newly acquired viewers, especially those with limited proficiency in the original language?*” was aimed to evaluate the impact of the SCCS on the long-term retention of viewers, particularly those with limited proficiency in the original language and according to 43.2% respondents SCCS improves retention, suggesting that it has a positive impact on maintaining viewer interest over time, while 18.9% believe that SCCS significantly enhances long-term retention, indicating that for many SCCS is a considerable improvement over traditional methods in keeping new viewers engaged. However, 35.1% remain neutral, on whether SCCS affects long-term viewer retention; and only 2.7% of respondents view SCCS as having minimal impact on long-term retention, which might indicate issues such as complexity or insufficient adaptation to SCCS.

Overall, the perception of SCCS’s effectiveness in improving long-term viewer retention is mostly positive. This indicates that SCCS is seen as a beneficial tool for attracting and retaining new audiences, especially those who may struggle with language barriers, thereby making sports content more accessible and engaging to a broader international audience.

Question 6 sought to ascertain respondents' views “*How do international audiences perceive the ease of accessing and understanding sports content when using SCCS compared to conventional translation?*” As a result, the following responses were received. 40.5% of the respondents believe that understanding distributed context has become moderately easier with SSCC, while 37.8% see SSCC as a significant improvement in context. Overall, most of the respondents believe SCCS improves the ease of accessing and understanding sports content over traditional methods.

The answers to the seventh research question “*In your expert opinion, what are the potential limitations of the SCCS in the context of sports content translation and distribution?*” allowed the authors to summarize the survey of professional linguists.

Several experts consider the SCCS an innovative tool for enhancing viewer engagement and language acquisition. However, challenges include its unsuitability for those with colour blindness or visual

impairments, a limited colour range complicating long texts, and the potential for increased cognitive load in fast-paced sports content. Implementing SCCS could be resource-intensive and challenging to scale across sports and languages. Despite its innovative approach, its effectiveness may be limited by technical and cognitive challenges.

Spectator Experience Feedback: Exploring SCCS methodology in Sports digital content

This section of the article analyses the responses of 302 international spectators. First, the mother tongue of the respondents was ascertained; thus, the geography of the respondents is shown in Figure 6.

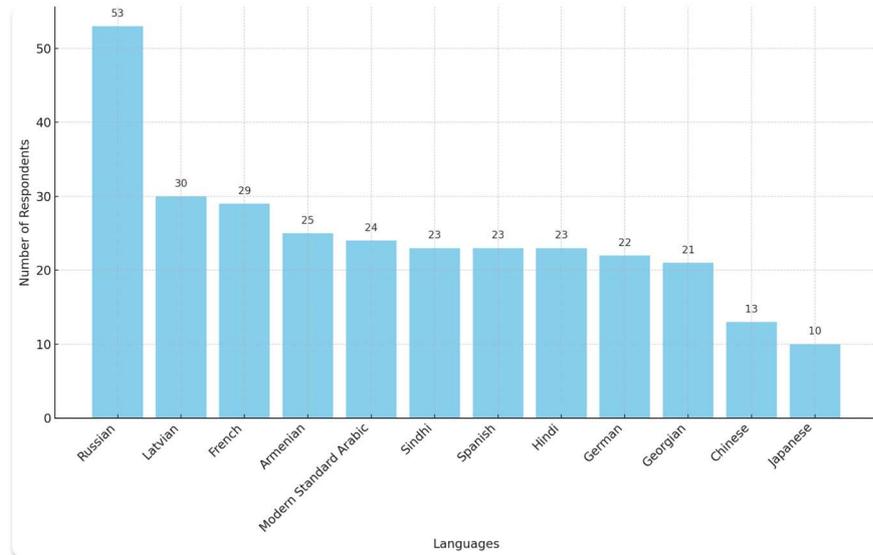


Fig. 6. Spectators by language groups

Fig. 7 shows a diverse group of spectators, providing an opportunity to holistically assess SCCS as a digital tool for global brand governance. The distribution of opinions of the respondents who answered the second question “*What is the main reason you watch Netflix or similar platforms like YouTube that offer translations from the original language to your native language?*” is shown in the figure below.

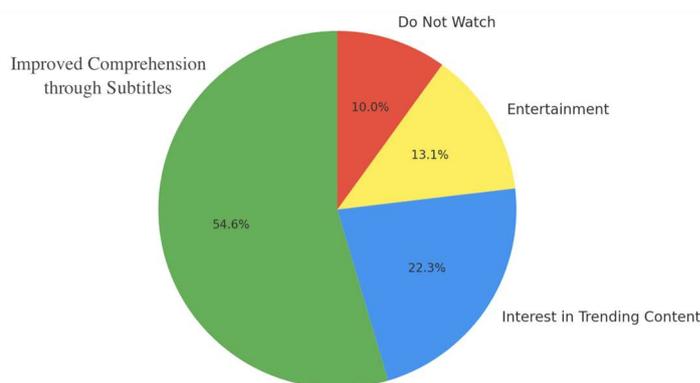


Fig.7. Reasons for Watching Platforms Like Netflix and YouTube

Figure 7 shows why people watch platforms like Netflix and YouTube. According to 54.6% of spectators, the main reason for watching Netflix with reliable subtitles is improved comprehension through subtitles, whereas 22.3% watch such platforms due to its trending content which engages their consumer attention. Only 13.1% have the purpose of entertainment while viewing platforms such as

Netflix or YouTube, and only 10% do not watch such platforms showing a lack of interest in digital content.

Overall, accessibility and effective subtitles are key drivers for usage, highlighting the importance of quality translations in engaging viewers.

An analysis of respondents' opinions on the question “*What was your first impression of the SCCS?*” revealed the following. A third of the respondents believe that SCCS is an innovative concept due to its novel approach to context distribution. However, another third of respondents found SCCS confusing during the initial stages but acknowledged its usefulness for consumers. 11.4% of the total number of participants were intrigued by the concept showing their curiosity in its SCCS approach; 7.4% of participants were not initially interested, likely due to the complexity and adaptation period required for SCCS. Other opinions were: 5.4% of respondents indicated that different colours were distracting their attention while watching the content with SCCS; 3.7% of respondents indicated that SCCS is not an interesting concept for such content distribution purposes and 3.3% were totally confused with the SCCS approach. Overall, SCCS is mostly seen as an innovative and useful approach which can aid in attracting and retaining new digital consumers due to its more comprehensible way of distributing content, though it presents some initial challenges for some participants.

The next question sought to understand the extent to which language as a means of communication can generate interest in watching sports programs. Figure 8 shows the engagement level to sports stories with SCCS indicating that 27.3% of participants find SCCS enhances engagement after initial acclimatization. Whereas 26.7% were motivated to learn English, highlighting SCCS's educational benefits, also 24.7% were interested in the interactivity of SCCS translations which differed from their experience compared to traditional translation methods, only 12.7% preferred the simplicity of traditional translation methods and 8.7% were unsure about SCCS impact on their content consumer experience.

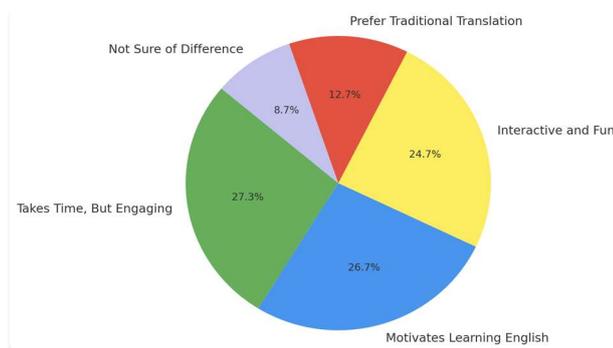


Fig. 8. Engagement with SCCS in Sports Translation

Overall, SCCS is generally well-received for sports translations and shows its potential for global content distribution, though there is a preference for traditional methods among some viewers.

“*How much did the colour-coding in SCCS help you understand and enjoy the sports stories?*” was the next question of interest to the authors. It was discovered that 37.5% report SCCS significantly improves their enjoyment and understanding of SCCS, whereas 24.4% of respondents confirm the ability to see some benefits but find the colour translation distracting probably due to its increased cognitive load. At the same time, 17.7% of respondents feel SCCS does not affect their experience; other 16.1% of respondents indicate that SCCS made them more interested in SCCS distributed content, and only 4.3% of respondents were totally confused and decided not to use SCCS while watching sports content. Overall, while many find SCCS beneficial, enjoyable, and easier to understand the original language of distributed content, a minority of respondents indicated that SCCS has no effect on their experience, or it was a totally confusing concept for them.

In conclusion, the general opinion regarding the application of the Strategic Colour-Coded System is positive, with many finding it an innovative and effective tool for enhancing viewer engagement. While

some initially found the colour-coding distracting, most grew to appreciate its utility in improving understanding and retention of content.

Conclusions

The study explores the potential of the Strategic Colour-Coded System (SCCS) as a digital strategic tool to support sports federations and clubs in establishing a long-term global presence. The result of the study shows that this method can be used by sports clubs in strategic management to attract and engage a diverse audience, significantly enhancing their engagement compared to traditional translation methods. This is provided by using colour coding to distribute content visually, making it easier for viewers to follow, understand and learn from the content.

These findings are suggestive; further research is needed to validate SCCS's impact on global strategy approaches and its long-term effect on viewer retention, learning outcomes, and brand awareness. The introduction of SCCS in sports content translation and distribution has shown a measurable interest towards the long-term retention of viewers, particularly those with limited proficiency in the original language. The study also identified potential problematic aspects of the method such as potential distractions from the colour-coding system, and also suggested further investigation to optimize its implementation in diverse settings and among different language groups. International audiences report that SCCS enhances the ease of understanding of sports content for non-native speakers breaking down language barriers that traditionally hinder viewer enjoyment and comprehension. However, further research on the length of the distributed lines and the pacing in content distribution is needed to validate the best strategy for such content distribution.

The authors of this study assert that combining listening, reading, and viewing with the SCCS approach enhances cognitive brand perception globally for viewers. The Strategic Color-Coded System can attract viewers by enhancing content accessibility while also expanding the audience and interest in sports content. The overall perception of SCCS remains positive, with sports organizations expressing interest in its adoption and language experts advocating its use in educational settings.

The results of the study showed that this approach not only broadens the appeal of sports content but also broadens the appeal of sports content, facilitating the realisation of a sports clubs' global strategy management through digital tools. Further direct research is required to fully support this conclusion and explore the long-term impact of SCCS on global strategy and brand management.

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