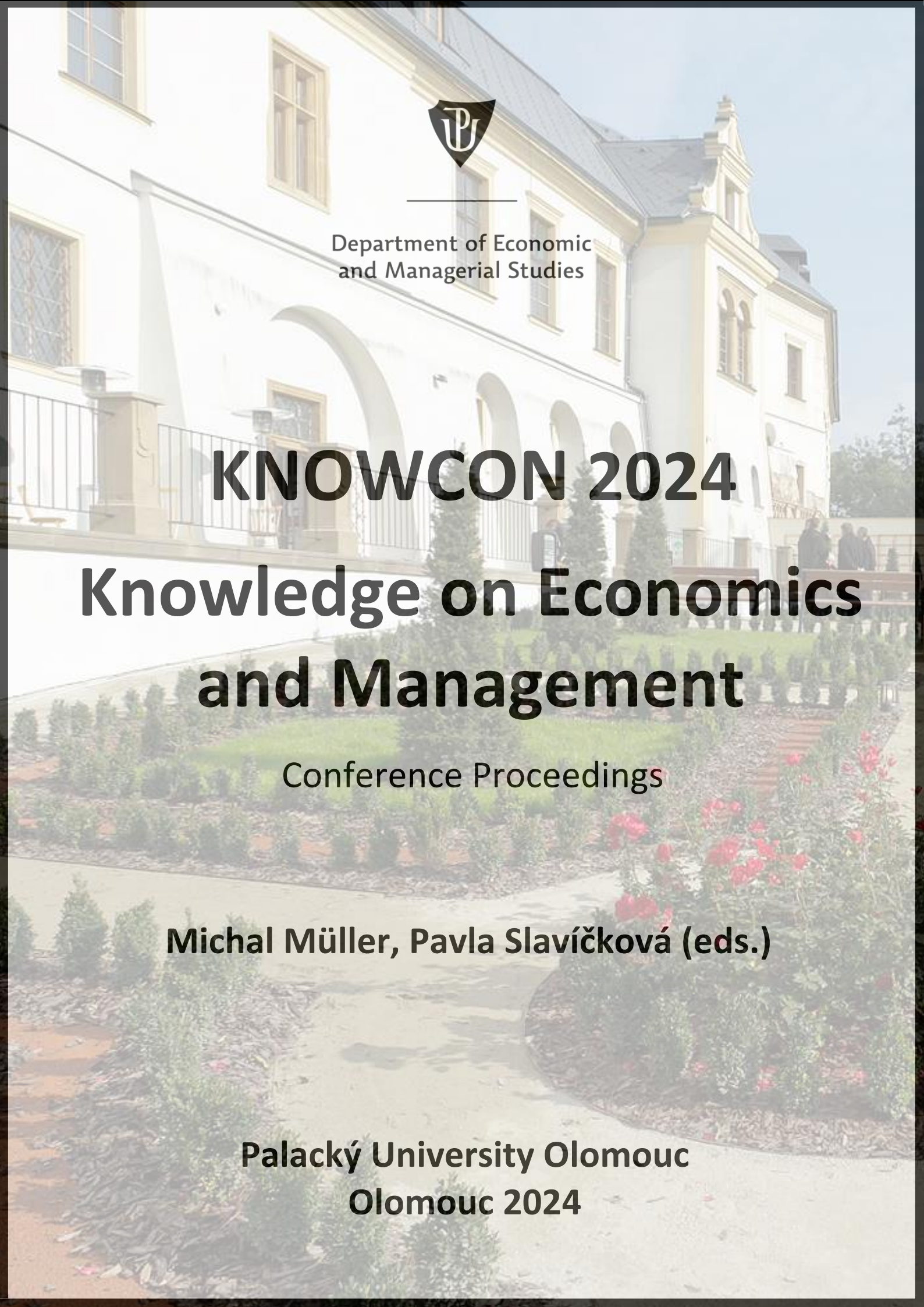


Department of Economic
and Managerial Studies

KNOWCON 2024

Knowledge on Economics and Management

Conference Proceedings

Michal Müller, Pavla Slavíčková (eds.)

Palacký University Olomouc
Olomouc 2024

Department of Economic
and Managerial Studies

KNOWCON 2024

Knowledge on Economics and Management

Conference Proceedings

Michal Müller, Pavla Slavíčková (eds.)

Palacký University Olomouc
Olomouc 2024

The conference took place on December 5–6, 2024 under the auspices of
Assoc. Prof. Mgr. Jan Stejskal, M.A., Ph.D., Dean of the Faculty of Arts, Palacký University Olomouc.

This conference proceedings contains single-blind peer-reviewed papers. Authors are responsible for the content and accuracy of their papers.

Edited by:
Mgr. Michal Müller, Ph.D. et Ph.D.
Assoc. Prof. Mgr. Pavla Slavíčková, Ph.D.

www.knowledgeconference.upol.cz
First Edition

DOI: https://doi.org/10.5507/ff.24.24465524
ISBN 978-80-244-6552-4 (online: iPDF)

Contents

Communication Skills for Effective Stakeholder Engagement in Sustainable Marketing Strategies

Samuel Bednarek

Prague University of Economics and Business, Department of Managerial Economics, Prague, Czech Republic

Abstract: Stakeholder engagement is integral to the success of marketing strategies, particularly in the context of sustainability. Efficient communication skills are essential for aligning a company's sustainable strategies with stakeholder interests, navigating the intricate landscape of engagement, and fostering collective actions towards sustainable goals. However, existing literature reveals a gap in practical implications concerning the communication of sustainable issues through marketing strategies. This research addresses this gap by conducting focus groups with specialists from German and French companies, exploring communication skills for social and environmental sustainability. While transparency, persuasive communication and empathy were anticipated to play significant roles in understanding stakeholder concerns and promoting sustainable initiatives, the findings highlight the importance of clear communications and educational messaging in establishing trust among stakeholders. This study contributes to understanding the nuanced communication skills.

Keywords: Sustainability, Marketing, Communication, Stakeholder Engagement

JEL classification: M, Q

1. Introduction

Efficient stakeholder management is well known as a crucial aspect in the development, planning and the implementation of sustainable marketing strategies. As sustainability is a crucial business factor for success, it also remains a sensible topic for companies as they are pressured to understand several perspectives and needs for a sustainable business activity and communicate that to stakeholders. This stakeholder engagement is facilitated by communication skills in order to align corporate strategies with the interests of their stakeholders in order to drive a collective progress towards the shared sustainable goals. Despite the well-known importance of both, stakeholder communication and sustainability, there remains a gap in literature that addresses exactly the specific communication skills that are needed to navigate sustainable marketing. This paper is addressing this gap by exploring the communication skills that are required for stakeholder engagement in the context of sustainable marketing strategies. This research paper answers the research question: “Which communication skills are success factors for effective stakeholder engagement in sustainable marketing strategies?”. A theoretical framework explains which role stakeholder enagement plays in the field of sustainability, how communication skills optimize said engagement and how this is set in relation to modern marketing practices. By the usage of focus groups with specialists from German and French companies, this research investigates the roles of communication skills to promote sustainable initiatives. These findings help to highlight the critical role of a clear and transparent marketing communication in order to build credibility and trust among stakeholders as well as the need to use communications for educative purposes to enhance the understanding of stakeholders and their support for sustainability.

* Corresponding author’s email: fsb13@yahoo.de

By analysing and identifying the communication skills that are necessary for the effective stakeholder engagement, this research contributes to optimize business practices and communication strategies.

2. Literature Review

2.1. Stakeholder Engagement in the Context of Sustainable Marketing Strategies

Stakeholder Engagement refers to a process that focuses on building and maintining relationships to groups of people that are affected by a companies business activities or that may affect such activities Vise versa (Kakhbod et al., 2023). Especially in the field of sustainability, these stakeholders are employees, customers, local communities, suppliers and shareholders but also the government as they are affected by the company's environmental impact, social activities and governance practices (Barko et al., 2022). Companies employ on stakeholder engagement for various reasons. Mainly it's a function to create strong relationships between different parties and to create trust in order to assure a fostered support and a long-term cooperation between the company and said parties which is crucial for the co-existence and joint development of both (Beckers et al., 2018). This trust is built up by activities that are communicated with the stakeholders which makes them more willing to engage in future activities once the outcome is benevolent or at least not harmful to the interests of specific stakeholder groups. (Chapman et al., 2022). Marketing strategies are one form of said communications – they can be supported by stakeholders or focus on stakeholders. In order to reach agreements and develop shared values and views, communication skills are needed to find common ground, understand and express needs and demands and give a suiting rationale to that explains the planned activities from several perspectives (Ferraro & Beunza, 2018). Also stakeholder engagement benefits another managerial function in terms of decision making. Stakeholders can be considered and involved into the decision-making process for activities that affect them in order to gain their support and valuable insights as they might have diverse perspectives and can provide feedback about future plans such as sustainable marketing initiatives (Yusif & Hafeez-Baig, 2024). Involving stakeholders into that benefits more efficient decisions (Gerlak et al., 2023).

Stakeholders often provide different views or fresh ideas born from their diverse backgrounds (Loureiro, 2020). This can help especially in the field of environmental innovations as different perspectives show problems that neeed a solution and where a collaboration between the company and the affected stakeholders might be beneficial (Wiesmeth, 2020). Stakeholder engagement supports the identification of potential risks and issues that comes with the planned activites. The knowledge and understaning of stakeholders might help to identifiy these early in the planning or the conception of a strategy or activitiy (Beccarini et al., 2023). Further, also the risk that is posed by stakeholders can be reduced by involving them to convince them early and find common ground with the company for which marketing communications can be used. By addressing the concerns of stakeholders proactively, organizations can mitigate risks and conflicts (Ferraro & Beunza, 2018) Especially considering marketing and communications, the involvement of stakeholders helps companies to enhance their reputation and the value of their brands. Organizations that promote transparency towards stakeholders benefit from a good image (Garcia-Sanchez et al., 2022). Considering sustainable developments and the responsibility of companies, social stakeholder management directly impacts social sustainability (Goodman et al., 2014). The engagement with stakeholders ensures that companies are aware of ethical standards. Further, social targets can be optimized by engaging communities, clients and employees (Braun & Busuioc, 2020).

2.2. The role of Communication Skills for Stakeholder Engagement

Effective stakeholder engagement is an important essential for the organizational success on sustainable efforts, especially as many different groups are involved that have different interests which needs to be understood and addressed. To do so, strong communication skills are needed to create trust, ensure transparency and pave the way for a fair and long-term collaboration (Peyrefitte, 2012). Due to that, a high importance comes to communication skills that go beyond the simple sharing of information. Rather, active listening and empathy, talking the same language and share concerns play an important role for stakeholder management to create long term value (Aakhus & Bzdak, 2015).

First and foremost, the role of communication skills for stakeholder engagement in marketing lies in the creation of trust and credibility which is, as already discussed, the main function of stakeholder engagement (Greenwood & Van Buren III, 2010). As the communication does not just go one way from the company to the stakeholder, it is also important to use incoming communications to understand the needs and expectations of stakeholders that can be reflected in marketing strategies. Skills for listening and processing the shared information helps to accurately understand and address the concerns of stakeholders which paves the way to create trust by dealing and solving their problems and fulfil their expectations (Burnside-Lawry, 2012). This shows the high importance of two way communications in the field of stakeholder engagement (Gearhart & Maben, 2021). Also, communication serves the function to negotiate and solve conflicts. Conflicts can be caused by the relationships between the stakeholders or by behaviour of individuals (Kristensen, 2021). Negotiation skills help to find the common ground and support the achievement of mutually beneficial results that once again create trust (Blok, 2014). Open communication channels help stakeholders to engage in a dialogue. The creation of a stakeholder dialogue lives from transparency and the motivation which is carried by showing respect for the stakeholders' efforts to participate (Guibert & Roloff, 2017).

3. Methodology

This study uses focus groups to explore the communication skills that are required for an efficient stakeholder engagement in the field of sustainable marketing strategies. In order to make sure that the exploration of the topic is comprehensive and that the collected data is robust and gives meaningful insights, the study involves 16 participants that are divided into two different focus groups with an environmental and social focus of the discussion each. Both focus groups consist out of 8 individuals. The participants are specialists from the field of banking, investment, financial services and insurance from German and French companies to provide views from different sectors in order to create a comprehensive understanding. Financial companies are chosen as they are deeply involved with the economically and societally transformation. The focus groups were conducted in a semi-structured version that allows a guided discussion while it also provides a certain flexibility to explore new emerging topics, views or experiences. The created data from the two focus groups are audio-recorded, transcribed and analysed by using a thematic approach to code the data and find patterns.

4. Findings

Transparency: As anticipated, transparency was the main communication skill that was highlighted by the professionals and even set in connection to the other skills. Especially in the field of sustainable marketing communications, transparency is needed as a main factor to create trust. Transparency and open disclosure of information, details about the impact of business activities and also involved partners, like suppliers, are fields where an open communication helps to show the companies

integrity and commitment. It allows a traceability and deeper understanding of the environmental and social impact and therefore also underlines the company's credibility which again improves the reputation and makes stakeholders more willing to support the brand or company as they also reduce the risk for themselves to be connected to an untransparent company. The confidence in the company from the stakeholder is crucially carried by the company's accountability which is also facilitated by the transparent communication and therefore encourages the stakeholder's participation to actively engage in the sustainable efforts of the company. Further, the transparent communication helps to reduce misunderstandings and miscommunications in marketing strategies with their stakeholders.

Empathy and fairness: In order to foster the connection with the stakeholders and understand their problems, concerns and worries – some of them, which they might not even address openly, empathy plays an important role. Empathy shows understanding and paves the way to solve a problem while acknowledging and incorporating the stakeholder's view. An empathic communication with thoughtful responses to topics, the stakeholders concern, especially in the field of sustainability, makes them feel valued and therefore improves the personal connections. Empathy allows the organization to respond efficiently to the stakeholders concerns and in the long run makes it even more likely, that they are openly addressed and shared with the organization, giving the company the chance to actively solve the problem and communicate it. As stakeholders have diverse problems stemming from different backgrounds, empathy helps to resolve the conflicts easier by addressing the underlying emotions and perspectives that come up in the field of sustainability like the concerns of safety, fairness, equality and environmental issues. By combining an empathic communication with transparency, inclusivity among stakeholders' is promoted and makes sure that they are heard and considered in the decision-making process which was anticipated earlier. Showing a genuine concern for the stakeholders worries about sustainability and their well-being, can also improve the quality of a long-term relationship.

Educational messages: As sustainability is often complex and difficult to understand and in addition to that, not a personal concern for every individual, marketing communications should also serve an educational function. These educational communications, especially in the field of marketing strategies as a major channel to share information with stakeholders, help to create awareness for the importance of sustainability and the company's role in it. The created knowledge empowers shareholders to make well informed decisions and support the company and sustainable practices for an intrinsic motivated reason. The built-up expertise makes it easier for stakeholders to create understanding, trust and appreciation for the company's transparency and credibility in marketing and makes them even adopt sustainable behaviours and practices. Further, transparency is beneficially affected by educational messages as they contribute to the explanation of complex sustainable issues.

Convincement and creation of trust: To address concerns and educate the stakeholders, still uprising conflicts needs to be solved with the convincement and the creation of trust. A persuasive marketing communication creates confidence in stakeholders if it's carried by a strong, transparent and understandable rationale that shows the competency and integrity of the company. This is essential to gain the stakeholders support for sustainable initiatives and make them back up future activities in a strong collaboration without opposing the plans if they indeed serve a sustainable goal. The loyalty that is created by convincing stakeholder needs to be carried by empathy in order to still address their worries and transparency to give them the feeling of inclusion and security in order to facilitate more collaboration. Especially for marketing strategies, creating trust is a main goal of communications.

Choice of Words and competencies: The right choice of words can show competency and create trust. Choosing the correct words and a language that is suiting for a professional communication but also on eye level with the different stakeholder groups helps to capture the stakeholder's interest and supports their engagement. A careful selection of words ensures that the companies' messages are clear and easy to be understood by stakeholders which supports the creation of professionalism. A competent communication shows that the company understands the topic with a certain expertise which enhances the company's image. Further, the risk of misunderstandings or miscommunications is reduced by a thoughtful selection of words as well as the risk of misinterpretations of stakeholders when they receive a marketing communication. This is especially important in the field of sustainability when it comes to green washing, the act of labelling an activity or product as sustainable while it's not. Further, the right choice of words also promotes a good mood among the stakeholders as they feel respected and valued, which is important when it comes to educational messages that might be perceived as trying to teach them a lesson which might be considered as inappropriately disrespectful.

Clarity: Related to the right choice of words, the display of competence and transparency is also clarity. A clear communication with a straight message avoids confusion and prevents misunderstandings in order to make stakeholder understand the message of a marketing strategy. A clear message can easily convey the companies' sustainable goals and initiatives which supports the creation of trust as the company is perceived straightforward and reliable. This leads to a more efficient decision making.

Handling objections and solve conflicts: As mentioned above, conflicts might arise. While convincing stakeholders is one way to solve them, it is important to address also the communicational soft skill of handling objections and solving conflicts where the stakeholder can't be convinced. An efficient and respectful resolution preserves the stakeholder relationships. It is important to clearly and transparently communicate the company's perspective to create awareness on the stakeholder side to get support. Finally, objections and conflicts give a good chance to be seen as constructive feedback to improve the companies communications and strategies while maintaining a good relationship with stakeholders and increase the company's reputation for listening to concerns and act upon them.

5. Discussion and Conclusion

This research paper has focused on the importance of communication skills in stakeholder engagement, particularly in the context of sustainable marketing strategies. Key communication skills were identified and the research question: "Which communication skills are success factors for effective stakeholder engagement in sustainable marketing strategies?" can be answered. Effective stakeholder engagement with the help of robust communications skills is crucial for the success of sustainable marketing strategies. Stakeholders can be involved in the planning of a marketing strategy or be addressed. Relevant skills are transparency, empathy and fairness, educational messages, convincement and creation of trust, choice of words and competency, clarity and the skill to handle objections and solve conflicts. Each skill plays an important role to foster strong relationships and trust as the main function of stakeholder engagement, promote sustainable practices and enhance the reputation of the company. With these insights, several implications for marketing strategies can be drawn. Communication skills that focus on sustainable issues help to create trust and credibility among stakeholders for long-term success and create a high participation and collaboration which makes it easier to make decisions, reduce risk, operate and drive the company's sustainable success. This can lead to innovations, as stakeholders are eager to share their perspectives and ideas which could finally

lead to a sustainable competitive advantage. However, this research is limited by the scope of the study and the industries of the focus groups. Future research can dive deeper into communicational soft skills, research on other soft skills and explore the perspectives of different industries. In the end, stakeholder engagement and sustainable developments remain crucial for all marketing activities.

References:

Aakhus, M., & Bzdak, M. (2015). Stakeholder engagement as communication design practice. *Journal of Public Affairs*, *15*(2), 188-200. https://doi.org/10.1002/pa.1569.

Barko, T., Cremers, M., & Renneboog, L. (2022). Shareholder engagement on environmental, social, and governance performance. *Journal of Business Ethics*, *180*(2), 777-812. https://doi.org/10.1007/s10551-021-04850-z.

Beccarini, I., Beunza, D., Ferraro, F., & Hoepner, A. G. (2023). The contingent role of conflict: Deliberative interaction and disagreement in shareholder engagement. *Business Ethics Quarterly*, *33*(1), 26-66. https://doi.org/10.1017/beq.2021.46.

Beckers, S. F., Van Doorn, J., & Verhoef, P. C. (2018). Good, better, engaged? The effect of company-initiated customer engagement behavior on shareholder value. *Journal of the Academy of Marketing Science*, *46*, 366-383. https://doi.org/10.1007/s11747-017-0539-4.

Blok, V. (2014). Look who's talking: responsible innovation, the paradox of dialogue and the voice of the other in communication and negotiation processes. *Journal of Responsible Innovation*, *1*(2), 171-190. https://doi.org/10.1080/23299460.2014.924239.

Braun, C., & Busuioc, M. (2020). Stakeholder engagement as a conduit for regulatory legitimacy?. *Journal of European Public Policy*, *27*(11), 1599-1611. https://doi.org/10.1080/13501763.2020.1817133.

Burnside-Lawry, J. (2012). Listening and participatory communication: A model to assess organization listening competency. *International Journal of Listening*, *26*(2), 102-121. https://doi.org/10.1080/10904018.2012.678092.

Chapman, K. L., Miller, G. S., Neilson, J. J., & White, H. D. (2022). Investor relations, engagement, and shareholder activism. *The Accounting Review*, *97*(2), 77-106. https://doi.org/10.2308/TAR-2018-0361.

Ferraro, F., & Beunza, D. (2018). Creating common ground: A communicative action model of dialogue in shareholder engagement. *Organization Science*, *29*(6), 1187-1207. https://doi.org/10.1287/orsc.2018.1226.

García-Sánchez, I. M., Raimo, N., Uribe-Bohorquez, M. V., & Vitolla, F. (2022). Corporate reputation and stakeholder engagement: Do assurance quality and assurer attributes matter?. *International Journal of Auditing*, *26*(3), 388-403. https://doi.org/10.1111/ijau.12287.

Gearhart, C. & Maben, S. (2021). Active and empathic listening in social media: What do stakeholders really expect. *International Journal of Listening*, *35*(3), 166-187. https://doi.org/10.1080/10904018.2019.1602046.

Gerlak, A. K., Guido, Z., Owen, G., McGoffin, M. S. R., Louder, E., Davies, J., & Joshi, N. (2023). Stakeholder engagement in the co-production of knowledge for environmental decision-making. *World Development*, *170*, 106336. https://doi.org/10.1016/j.worlddev.2023.106336.

Goodman, J., Louche, C., Van Cranenburgh, K. C., & Arenas, D. (2014). Social shareholder engagement: The dynamics of voice and exit. *Journal of Business Ethics*, *125*, 193-210. https://doi.org/10.1007/s10551-013-1890-0.

Greenwood, M., & Van Buren III, H. J. (2010). Trust and stakeholder theory: Trustworthiness in the organisation–stakeholder relationship. *Journal of business ethics*, *95*, 425-438. https://doi.org/10.1007/s10551-010-0414-4.

Guibert, L., & Roloff, J. (2017). Stakeholder dialogue: Strategic tool or wasted words?. *Journal of Business Strategy*, *38*(5), 3-11. https://doi.org/10.1108/JBS-07-2016-0071.

Kakhbod, A., Loginova, U., Malenko, A., & Malenko, N. (2023). Advising the management: A theory of shareholder engagement. *The Review of Financial Studies*, *36*(4), 1319-1363. https://doi.org/10.1093/rfs/hhac061.

Kristensen, C. J. (2021). Negotiating conflicts of interest: working with multiple stakeholders. *Qualitative Research Journal*, *21*(1), 65-75. https://doi.org/10.1108/QRJ-12-2019-0103.

Loureiro, S. M. C., Romero, J., & Bilro, R. G. (2020). Stakeholder engagement in co-creation processes for innovation: A systematic literature review and case study. *Journal of Business Research*, *119*, 388-409. https://doi.org/10.1016/j.jbusres.2019.09.038.

Peyrefitte, J. (2012). The relationship between stakeholder communication in mission statements and shareholder value. *Journal of Leadership, Accountability and Ethics*, *9*(3), 28-48. https://doi.org/10.1108/19348830810915505.

Wiesmeth, H. (2020). Stakeholder engagement for environmental innovations. *Journal of Business Research*, *119*, 310-320. https://doi.org/10.1016/j.jbusres.2018.12.054.

Yusif, S., & Hafeez-Baig, A. (2024). Impact of stakeholder engagement strategies on managerial cognitive decision-making: the context of CSP and CSR. *Social Responsibility Journal*, *20*(6), 1101-1121. https://doi.org/10.1108/SRJ-05-2023-0295.

Blockchain-Based Information Systems: Management Challenges in Adoption, Compliance, and Resource Usage

Edwin Binder[1], Vladimír Bolek[2*]

[1, 2] University of Economics in Bratislava, Faculty of Business Management,
Department of Information Management, 852 35 Bratislava, Slovak Republic

Abstract:
This paper explores the non-technical challenges that blockchain respectively distributed ledger-based information systems pose to a company's management, owing to the unique attributes of these technologies. Using an inductive approach and systematically categorizing the challenges, the paper examines three distinct areas: User adoption challenges, including organizational readiness, user education, and awareness, as well as usability and accessibility considerations. Regulatory and compliance issues, encompassing challenges arising from the evolving legal landscape surrounding blockchain technology and ensuring data privacy in line with regulations such as the General Data Protection Regulation (GDPR). Cost and resource challenges, examining environmental impact, i.e. energy consumption associated with specific blockchain consensus mechanisms, and the cost considerations of balancing decentralization benefits with infrastructure costs. The paper offers insights into the underlying causes of these challenges and initial recommendations for resolution. Addressing these challenges is deemed crucial for the successful development, implementation, and management of robust blockchain-based information systems. Lastly, the paper concludes with general remarks and a discussion on the limitations of this research.
Keywords: Information systems, Management, Compliance, Blockchain, Distributed Ledger Technologies (DLT's)

JEL classification: L86, M15, O32

Grant affiliation: The paper was elaborated within VEGA No. 1/0520/24 - Aspects of building an ambient enterprise ecosystem – proportion 100 %.

1. Introduction

In the rapidly evolving landscape of contemporary information technology, the concept of distributed ledger technologies (DLTs) has emerged as a transformative force, with the potential to redefine traditional systems and business models across diverse industries. DLT's encompass a range of systems designed to record and synchronize data across multiple nodes in a network, eliminating the need for a centralized authority (Rauchs, 2018). By distributing the ledger among numerous nodes, DLTs aim to establish a tamper-resistant and trustless environment where no single entity has control over the entire system. Blockchain, a subset of DLTs, gained prominence with the advent of Bitcoin. The decentralized and transparent nature of blockchain, coupled with consensus mechanisms such as Proof of Work (PoW) or Proof of Stake (PoS), ensures the integrity and security of the ledger. As the information systems field continues to evolve, the integration of DLTs promises to revolutionize the way data is stored, shared, and secured, opening avenues for innovation and efficiency across diverse research domains and industries (Berdik et al., 2021). Therefore, this paper aims to explore the intricate interplay between blockchain technology and corporate information systems, offering insights into the specific challenges blockchain technology presents for a company's information systems.

2. Theoretical backgrounds

The primary objective was to create a decentralized and tamper-resistant ledger to facilitate secure and transparent transactions without the need for a trusted intermediary. The implementation of blockchain in Bitcoin marked the inception of a groundbreaking technology with far-reaching implications. At its core, blockchain is a distributed ledger comprising a chain of blocks, each containing a list of transactions. These blocks are linked in chronological order, forming an immutable and

* Corresponding author's email: vladimir.bolek@euba.sk

transparent record of all transactions across a network of computers. The decentralized nature of blockchain ensures that no single entity has control over the entire network, fostering trust and eliminating the need for intermediaries. The security of blockchain is additionally supported by cryptographic techniques that ensure the integrity and confidentiality of transactions. Each block contains a cryptographic hash of the previous block, creating an unbroken chain. Additionally, public and private keys are employed to secure transactions, providing a robust level of security against unauthorized access and fraud. Beyond its application in cryptocurrencies, blockchain introduces the concept of smart contracts – self-executing contracts with the terms directly written into code. This extends the utility of blockchain to automate and enforce contractual agreements, opening new avenues for efficiency in various industries.

In the area of blockchain technology, architectures are differentiated along the line of their respective permissions and participation structures, leading to distinct paradigms. In the following, the dual dichotomies of permissioned and permissionless blockchains, alongside the differentiation of public, private, and federated blockchains will be described. It is important to note, that there is a wide range of available architectures. And decisions of what type of blockchain to implement have a profound impact on the respective challenges that companies' information systems will face, and management decisions will be about. One distinct aspect is if a implementation is based on a permissioned or an permissionless blockchains technology. Permissionless blockchains, often synonymous with public blockchains, (Agrawal et al., 2020), embody an open-access philosophy. In such, individuals are empowered to join, engage in consensus processes, and validate transactions. These networks welcome all participants, referred to as nodes or miners, who contribute computational power to safeguard the network and uphold the integrity of the distributed ledger.

Key Features:

- Decentralization: Distributing control across a global network of nodes
- Open Participation: Permitting anyone to join without requiring explicit approval
- Transparency: Transactions on the blockchain are transparent and verifiable by any participant
- Resistance to Censorship: Preventing central authorities from controlling access

Challenges:

- Scalability: Its openness poses scalability challenges as the network accommodates a potentially vast number of participants
- Resource Intensity: Consensus mechanisms like Proof of Work (PoW) can be resource-intensive, demanding significant computational power

Permissioned blockchains impose access restrictions, permitting solely authorized entities to function as nodes. These blockchains are composed of a defined set of identified nodes that still might not fully trust each other (Agrawal et al., 2020).

Key Features:

- Restricted Access: Participation is limited to entities with explicit permission, enhancing the privacy and security of the network
- Efficiency: With a predefined set of participants, such blockchains achieve higher transaction throughput and efficiency
- Compliance: Adherence to regulatory and compliance requirements is facilitated, as participants are known and can be vetted

Challenges:

- Reduced Decentralization: Controlled access may lead to a more centralized structure, potentially compromising the very attributes making blockchain based solutions attractive (immutability, etc.)
- Trust Dependency: Participants must trust the entity granting permissions, by accepting a certain level of centralization and dependency.

3. Research Design

The fundamental objective of this study is to present a comprehensive overview of the challenges represented by blockchain technology to management decisions about companies' information systems, within the broader context of the evolution of the Internet of Value (IoV).

In this study, particular attention is directed on exploring the specific challenges private, public, federated, permissionless implementations of blockchain based information systems pose to management. Notably, it seeks to limit the technological details to the necessary minimum. This article summarizes the findings from a predominantly theoretical study, employing an inductive approach. The primary research method encompassed systematic literature research utilizing both primary and secondary sources, with an emphasis on conceptual research papers from peer-reviewed sources, scholarly articles, and publications from research communities (priority oriented to Web of Science, Scopus, Springer databases) and leading market research organizations. In the initial phase of the literature review, the focus has been on establishing a foundational understanding of the various blockchain architectures and their specific features. Based on this, the principal types of challenges associated with the adoption of blockchain technology in companies' information systems for management have been identified and in a follow-on step clustered around three distinct areas: Regulatory and compliance challenges, User adoption challenges, Cost and resource challenges. The culmination of above methodology involved synthesizing findings from the literature review and database searches with practical insights. This holistic approach substantiated theoretical perspectives and facilitated the formulation of a conclusion section with a specific focus on the evolving value propositions of companies enabled by blockchain technologies.

The resulting overall methodology ensures a comprehensive and multidimensional understanding of the multifaceted impact of blockchain technology within the broader context of the evolving Internet of Value.

4. Results

As the blockchain technology continues to gain traction across various industries, at the same time it also introduces a set of unique challenges that organizations must address to effectively integrate this technology into their existing information systems (Berdik et al., 2021). The following categorizes these management related challenges into three main categories.

1. Regulatory and compliance challenges

- **Legal frameworks:** Challenges due to the evolving legal landscape surrounding blockchain technology and the implications for compliance. I.e. given the distributed nature and lack of central control
- **Data privacy and GDPR compliance:** Challenges related to ensuring data privacy and complying with regulations such as the General Data Protection Regulation (GDPR).

2. User adoption challenges

- **Organizational readiness, including user education and awareness:** Challenges in educating users and stakeholders about blockchain technology and its benefits, and organizational preparation in general.
- **Usability and accessibility:** Barriers to entry for users and businesses unfamiliar with blockchain, including user-friendly interfaces and accessibility concerns.

3. Cost and resource challenges

- **Energy consumption:** Environmental impact and energy consumption associated with certain blockchain consensus mechanisms.
- **Infrastructure costs:** Costs involved in establishing and maintaining blockchain infrastructure.

By organizing these challenges in a consistent structure, the following chapter provides a cohesive and systematic examination of the multifaceted obstacles associated with the adoption of blockchain

technology in companies' information systems from above perspective. Each category is separately explored, offering a basic understanding of the underlying reasons for the respective challenge, deeper insights into their specific nature plus providing initial recommendations for addressing these challenges. The challenges introduced by blockchain technology to companies' information systems are multifaceted. Infrastructure costs, and sustainability considerations are necessitating architectural decisions in finding a balance between the robustness of a block-chain and corresponding energy and resource consumption. Usability issues and user adoption represent additional challenges. Finally, profound regulatory and compliance challenges are discussed.

By discussing each challenge, the objective is to provide insights into the nature of each challenge and hence outlaying the base for developing, implementing, and managing robust blockchain-based information systems. Ultimately, an ongoing collaboration among researchers, developers, and industry stakeholders is fundamental to navigating this transformative landscape effectively.

4.1. Regulatory and compliance challenges in blockchain technology

The adoption of blockchain presents significant regulatory and compliance challenges that require careful consideration. In this section, we will look into two critical regulatory and compliance challenges: legal frameworks and data privacy and GDPR compliance.

Legal frameworks

Challenges arise due to the evolving legal landscape surrounding blockchain technology and the implications for compliance. The underlying problems partly stem from the distributed nature of blockchain and the lack of central control, leading to varying and possibly conflicting legal interpretations in different jurisdictions. The other and probably even more profound challenge is due to the reactive nature of law-making in general. This is true on the national level, but even more so for international bodies required to agree on joint rules defined by an international legislative, respective regulatory regime. Hence making such – no matter how desirable- highly unlikely for the time being. Therefore, the nature of the challenge involves navigating the complexities of evolving legal frameworks that may conflict or be ambiguous in the context of public or transnational private blockchains. Approaches to address legal framework challenges include active engagement with regulatory authorities, advocating for blockchain-friendly regulations, and developing and supporting self-regulatory initiatives within the blockchain community.

Data privacy and GDPR compliance

To ensure compliance with data privacy regulations such as the General Data Protection Regulation (GDPR), presents substantial challenges for the application of blockchain technology. The root cause for this is the transparent and immutable nature of blockchain, which therefore seems to be in contradiction with the principles of data erasure and user consent outlined in GDPR. Several provisions of its regulation are inherently incompatible with current permissionless immutable blockchain proposals (Deuber, D., Magri, B., & Thyagarajan, S. A. K., 2019). One specific challenge is in reconciling the transparency of blockchain with privacy requirements stipulated by regulations like GDPR. Approaches to address data privacy and GDPR compliance involves implementing privacy-focused technologies, developing consensus mechanisms that adequately incorporate privacy features, and establishing industry standards for compliance within blockchain networks. It's obvious, that the above is especially challenging in the context of public blockchains, which need to adhere to diverse regulations, as participants from different jurisdictions may have conflicting legal requirements. Whereas private blockchains, often operating within a known legal framework, provide participants with more control over compliance and regulatory adherence. Federated blockchains offer a balance, as the consortium can establish a common understanding of regulatory requirements, simplifying compliance efforts.

4.2. User adoption challenges in blockchain technology

The transformative impact of blockchain technology across diverse industries is undeniable. However, achieving widespread adoption encounters significant challenges, often related to user education, awareness, usability, and accessibility.

Organizational readiness, including user education and awareness

Organizational readiness is conceptualized as the availability of specific organizational resources to adopt new IT innovations. So it's no surprise that insufficient organizational readiness in terms of the availability of financial and human capital resources and knowledge is a challenge to blockchain adoption (Toufaily, E., Zalan, T., & Dhaou, S. B., 2021). As far as public blockchains are concerned, educating a diverse and global user base about the use of specific blockchain based applications is a challenging task. This is partly due to varying levels of technological literacy, as with any other new application. However, the very different way of looking at the "transfer of value" for example, especially in a trustless type of setting, requires a fundamentally new perspective. Instead of regulated institutions, there needs to be trust put into technology. Something regularly representing a big hurdle, both on the personal but often also on a cultural level. Consequently, it's not only necessary to bridge the knowledge gap, but furthermore to ensure users comprehend the intricacies and advantages of blockchain to develop "trust" into such applications. Technological literacy is a key stumbling block, with many decision makers within organizations and potential end-users lacking a foundational understanding of blockchain. To address this, tailored educational programs can be developed to cater to different levels of technological literacy and diverse cultural backgrounds. Additionally, illustrating real-world use cases and success stories can make blockchain applications more tangible and relatable, fostering a positive attitude toward adoption.

Usability and accessibility

Barriers to entry for users unfamiliar with blockchain technology often stem from issues of complex interfaces and general accessibility concerns. The challenge lies in enhancing the overall user experience and ensuring that blockchain technology is easily accessible to a broader audience. Complex interfaces often deter users unfamiliar with the technology. To tackle this, implementing user-friendly interfaces and designs that simplify interactions with blockchain applications is crucial. Moreover, addressing accessibility barriers through educational programs including easily accessible first-line support, can contribute to a more inclusive adoption. Educating a diverse and global user base in public blockchains is challenging due to varying levels of technological literacy and cultural differences. To overcome this, tailored educational programs and engagement through real-world use cases are required. In the setting of a private or federated blockchain, user education and adoption efforts can be more targeted and streamlined. Closer relationships among participants provide an opportunity to focus on specific needs, enhancing adoption strategies. Leveraging established relationships can enhance the effectiveness of educational initiatives. Understanding and addressing user adoption challenges in blockchain technology is pivotal for realizing its full potential.

4.3. Cost and resource challenges in blockchain technology

In this section, we look into two key challenges of blockchain technology application: energy consumption and infrastructure costs.

Energy consumption

One prominent challenge is the environmental impact and energy consumption associated with certain blockchain consensus mechanisms. One root cause lies in the energy-intensive nature of Proof of Work (PoW) consensus algorithms, which play a vital role in securing public blockchains. In addition, the redundancy underlying all types of blockchain technology can make blockchain-based IT solutions considerably more energy-intensive than a non-blockchain, centralized alternative (Sedlmeir et al., 2020). The challenge revolves around finding sustainable alternatives to consensus mechanisms that demand substantial energy. Potential approaches include transitioning to more energy-efficient consensus algorithms, exploring hybrid models, and implementing eco-friendly practices.

Infrastructure costs

Another significant challenge is due to the costs involved in establishing and maintaining blockchain infrastructure. The root causes include the need for robust computing power, storage, and network resources to support the decentralized nature of blockchain networks. The nature of this challenge involves balancing the benefits of decentralization with the associated infrastructure costs. In order of evaluating the economic feasibility (i.e., costs and monetary benefits) of an application based on a private or public blockchain during its entire life cycle, Pincheira et. al. proposes a taxonomy and infrastructure cost model based on application specific system parameters (Pincheira et al., 2023) Possible approaches include advancements in scalability solutions, optimizing network protocols, and leveraging cloud-based services for more cost-effective infrastructure deployment. Research also advocates for exploring modular and adaptive infrastructure designs to accommodate evolving demands. In public blockchains, the decentralized and open nature often requires extensive computational resources and a high energy consumption, both leading to high costs. Finding sustainable consensus mechanisms and raising awareness about responsible energy practices are crucial in reducing this. Sharing cost among user communities or asking for adequate transaction fees, to influence behavior and driving the evolution of resource optimized blockchain-systems seems equally important. This is less an issue for private blockchains, operating within a more controlled set of participants as such set-up inherently supports infrastructure and energy efficiency measurements. Cost optimization can be achieved by tailoring the infrastructure to the specific needs of the consortium.

5. Discussion and conclusion

In summary, blockchain respectively distributed ledger technologies (DLTs) are anticipated to have a substantial impact on the way information systems are developed, managed and secured in the years to come. This impact will extend to virtually all types of organizations worldwide that rely on information systems for their business processes and beyond. Their necessary evolution will be additionally driven by anticipated applications within Web 3.0, the potential metaverse, and the advancement of IoT and AI, indicating even more significant shifts in the future landscape of companies' information systems. However, a major barrier to widespread adoption is the limited performance, the lack of scalability and high energy consumption of current public blockchain systems. While newer blockchain-based systems like Ethereum show notable improvements, achieving truly scalable systems with a much higher throughput remains a very significant challenge. Another significant barrier arises from the complexities surrounding the integration of legal frameworks in distributed environments, requiring a dual focus on technological innovation and regulatory compliance measures. Organizations face the challenge of implementing information systems providing robust data security protocols based on streamlined interoperability standards, but additionally navigating intricate legal landscapes to ensure adherence to regulations and contractual obligations. Given the rapid pace of innovation, the future architectural landscape of blockchain-based systems and applications remains uncertain. Nevertheless, it is evident that this technology offers both substantial challenges and opportunities. The anticipated disruption within various industries poses profound challenges for both commercial and non-commercial organizations, necessitating a reevaluation of their value propositions and operational strategies. Current implementations of blockchain technology outside the realm of cryptocurrencies and research, primarily lean towards private blockchains. This preference is unsurprising for two main reasons: Firstly, confederated and particularly private blockchains provide a substantially higher level of control and scalability compared to their public counterparts. Secondly, it is predominately individual market players who finance the development and implementation of these private blockchains. And as companies are primarily motivated by short to medium-term ROI considerations, or at least, a strategic interest in gaining insights within clearly defined application areas that promise sustainable competitive advantages, it is unlikely that this trend will change in the foreseeable future. At the same time, there is a general trend towards addressing public and governmental scrutiny, ensuring regulatory compliance, and prioritizing environmental, social, and governance (ESG)-focused transparency to enhance brand reputation and

avoid penalties. While the need for international blockchain regulation and governance, along with an applicable legislative framework, is recognized, reaching consensus among diverse stakeholders with fundamentally different agendas remains a significant hurdle. The reactive nature of law-making and the formidable challenges faced by international bodies in agreeing on unified regulations make significant progress in this area unlikely in the foreseeable future. Future technological research should focus on the scalability and manageability of multi-layered distributed-ledger architectures. The challenge is in effectively combining the advantages of a distributed and immutable technology with the requirements of large-scale, transaction-based applications that remain open to unforeseen future developments. Additionally, understanding the interplay between blockchain and other digital technologies, such as digital twins and NFTs, represents another crucial area requiring exploration, particularly within the context of megatrends like IoT, the metaverse, and AI. Ultimately, it will not be the technologies but their application—with the potential to fundamentally alter value propositions, relationships, and market dynamics between players—that will be decisive. Thus, gaining a comprehensive understanding of how businesses and organizations can navigate these transformative implications for their information systems and proactively adapting their strategies and managing the respective change processes, will be critical.

In conclusion, it is evident that substantial efforts are required to thoroughly comprehend and systematically explore the potential of blockchain and DLT technologies through an interdisciplinary and multifaceted approach. This undertaking will not only facilitate the development of a wide range of diverse applications but is also imperative for the successful integration of blockchain technologies into our economy.

References

Agrawal, D., El Abbadi, A., Amiri, M. J., Maiyya, S., & Zakhary, V. (2020). Blockchains and Databases: Opportunities and Challenges for the Permissioned and the Permissionless. In *Advances in Databases and Information Systems: 24th European Conference, ADBIS 2020, Lyon, France, August 25–27, 2020, Proceedings 24* (pp. 3-7). Springer International Publishing. Available online at https://link-springer-com.ezproxy.hs-augsburg.de/chapter/10.1007/978-3-030-54832-2_1

Berdik, D., Otoum, S., Schmidt, N., Porter, D., & Jararweh, Y. (2021). A survey on blockchain for information systems management and security. *Information Processing & Management*, *58*(1), 102397. http://dx.doi.org/10.1016/j.ipm.2020.102397

Deuber, D., Magri, B., & Thyagarajan, S. A. K. (2019). Redactable blockchain in the permissionless setting. In *2019 IEEE Symposium on Security and Privacy (SP)* (pp. 124-138). IEEE. Available online at https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8835372

Pincheira, M., Donini, E., Vecchio, M., & Giaffreda, R. (2022, July). Towards an Infrastructure Cost Model for Blockchain-Based Applications. In *International Congress on Blockchain and Applications* (pp. 345-355). Cham: Springer International Publishing. Available online at https://link.springer.com/chapter/10.1007/978-3-031-21229-1_32

Rauchs, M., Glidden, A., Gordon, B., Pieters, G. C., Recanatini, M., Rostand, F., Vagneur, K. & Zhang, B. Z. (2018). Distributed ledger technology systems: A conceptual framework. *Available at SSRN 3230013*. http://dx.doi.org/10.2139/ssrn.3230013

Sedlmeir, J., Buhl, H. U., Fridgen, G., & Keller, R. (2020). The energy consumption of blockchain technology: Beyond myth. *Business & Information Systems Engineering*, *62*(6), 599-608. http://dx.doi.org/10.1007/s12599-020-00656-x

Toufaily, E., Zalan, T., & Dhaou, S. B. (2021). A framework of blockchain technology adoption: An investigation of challenges and expected value. *Information & Management*, *58*(3), 103444. https://doi.org/10.1016/j.im.2021.103444

MICE potential of selected Czech cities

Kateřina Chvátalová*

Prague University of Economics and Business, Faculty of International Relations,
Department of International Business, Prague, Czech Republic

Abstract: The article aims to describe and analyse the situation in the MICE (Meetings, Incentives, Conventions and Exhibitions) segment of the tourism and events industry in the largest cities of the Czech Republic (Prague, Brno, Ostrava, Pilsen, Olomouc and Liberec) based on selected relevant criteria and factors (existing logistics and infrastructure system and support of professional supplier chain). Prague has been a member of the top 10 global meeting destinations for a long time (in 2023 even entered the top 5 for the first time). The research presented in the article shows that the Czech Republic is by far the most concentrated congress and business destination with only one city (Prague). The aim of this article is therefore to present the current state of the MICE potential of selected Czech cities and to contribute to the clarification of the necessary features and equipment of a successful international MICE city destination.

Keywords: MICE, destination, business events, incoming, meetings industry

JEL classification: L83

1. Introduction

The Czech Republic is one of Europe's smaller countries. The so-called heart of Europe has always been a real crossroads of European history, politics, culture and economy. Influenced by many cultural factors, different languages and religions, this state can serve as a mirror of the Central European region. Immediately after the Velvet Revolution of 1989 and the end of communism, first Czechoslovakia (until 31 December 1992) and then the Czech Republic (from 1 January 1993) became interesting places for tourists and business travellers from all over the world. The article deals mainly with the status of the well-established MICE in Prague compared to the situation in other regions and big cities of the Czech Republic.

2. Literature review

The MICE industry is analysed by Korean authors Oh et al. (2021). The topic of MICE in South Korea is very interesting as the whole industry in the country is doing well in worldwide comparison as presented below (Table 1). The impact of meetings industry in Busan is examined from economic perspective. Situation in MICE industry after covid pandemics in other countries is elaborated by Walas et al. (2021). Role and impact of tourism in central European area is analysed in the article by Będzik and Gołąb (2020). Their article is comparing many relevant resources, facts and figures comparing two central European countries (the Czech Republic and Poland). Authors see potential in tourist segment in both countries while suggesting promoting both countries online to make them more attractive and widely accepted as well-established worth visit places of interest. This is one of key aspects to strengthen also MICE industry. Tourism business is analysed in detail in text of Czech authors Tyslová et al. (2020). Article is focused on the topic of destination identity and resident identity. Their research can be potentially interesting as an inspiration for other Czech regions and places of interest. One of the most important texts examining economic importance of meetings industry for concrete city was presented by Borodako et al. (2019). Authors even claim that this is the first assessment of economic impact of meetings industry on the city within Central Europe. This article is a very important inspiration for this article as it proves the economic importance and impact of MICE industry on regional city like Krakow. Moreover, it emphasises the findings of conducted research that show the

* Corresponding author's email: chvk02@vse.cz

contribution of MICE industry to the perception and attractiveness of the whole destination towards foreign as well as domestic visitors. Another important text examining the role of meetings industry was published by Cieślikowski (2018). This text is very relevant to the topic of this article as it examines MICE potential of other cities within country – "second tier" cities. This article examines also the role of local governments in their support of this industry as well as the key role of destination management as such. Important topic of needed and productive cooperation between international cities from the same region is presented in the article by Kézai and Páthy (2023). Potential international cooperation within MICE industry can be seen already for example in alliances of different national convention bureaus. The key impact on the research-based selection of relevant criteria and factors of successful MICE destination is connected to the article by Jo et al. (2019). This text brought important new findings about the crucial aspects of destination image and marketing as well as other significant factors that influence the choice of destination for their events by international MICE planners and event organizers. The importance of MICE industry in Prague was presented by Chvátalová (2021) and also PCB (2022).

3. The objective

The aim of this paper is to present and elaborate the potential for the functioning of the MICE sector and its development in the largest Czech cities. This is a very complex topic. The example of Prague, which is a TOP 5/TOP 6 global MICE destination, can be described as a huge difference compared to other Czech regional cities. It is though very important to emphasise that the Czech Republic is a member of TOP 20 most successful MICE countries worldwide (Table 1). The focus of this article is therefore mainly on the main reasons for the existing gap between Prague and other cities, emphasising the existing/lack of hospitality infrastructure in the cities studied.

The following questions will be examined: 1) Which factors related to MICE are considered the most relevant and important by MICE planners and organisers? 2) What are the biggest problems and challenges hindering the development of MICE business in large Czech cities?

4. Methodology

The author uses the desk research method to describe the current situation in the MICE sector related to the Czech regional big cities. The examples of cities were chosen based on the criteria of having at least 100,000 inhabitants (Olomouc is included as the city has more than 99 000 inhabitants). Moreover, author has identified key factors and criteria necessary for success of any international MICE destination based on detailed literature review and 17 years of personal experience within the international MICE industry based on detailed multicriteria analysis. These factors and criteria of the analysis were consulted with 9 international MICE organizers (5 Czech natives, 3 Slovakian natives and 1 Portugal native), who were asked to assign 100 points to these 10 criteria and factors. The weight of each factor was then calculated and ranking of those 10 criteria was established. The multicriteria analysis was finally accomplished by assigning either 2 points, 1 point or 0 point to the positive/limited/negative confirmation of existence of each factor in the pre-selected Czech city. These points were then multiplied by the weight of each factor. These results are presented in Table 2 and Table 3. The analysis and comparison of case studies from TOP meeting destinations as well as Czech cities have significantly helped in defining the unique status of Czech MICE. The article concludes with a synthesis of the findings and a description of the current issues, challenges but also potential in the MICE industry in regional Czech cities.

5. Czech MICE industry

The tourist segment defined as MICE (Meetings, Incentives, Conventions and Expositions/Events) or business events does not focus in detail on the share of leisure groups and similarly, individual, unorganised tourist visits. It can be summarised that MICE industry is always defined by the purpose for which the event is organised: be it business, motivational, communication, educational,

entertainment, etc. Business events consist of larger groups of people (at least 10, but mostly tens, hundreds or thousands of participants) attending conferences, congresses, training sessions, incentive stays, motivational programs, gala dinners, teambuilding, networking, exhibitions, etc.

5.1. Position of Prague and the Czech Republic within the global MICE industry

Prague is without exaggerating the top international leading MICE destination not just within Central Europe but also whole Europe and even worldwide. This fact is supported by respected ICCA (The International Congress and Convention Association) review from 2023[1] (Table 1). Prague is ranked 5th in the world and more importantly, Prague is the best congress meeting solution from all post-soviet countries: we do not see Budapest, Warsaw, Bratislava among top 20 cities. There is another very important positive trend present within the table (Table 1): not only Prague is ranked 4 places higher in 2022 compared to the last pre-covid year 2019, but this success is even more visible knowing the competition within whole Europe in the meetings industry – first non-European city is on 13th position and there are only 3 non-European cities within world top 20 meetings cities. Prague was hit hard by all covid-related restrictions. The event industry as well as MICE segment of tourism that is fully based on larger congresses and meetings suffered significant economic losses. Years 2020 and 2021 were especially difficult for all businesses connected to MICE/business events industry as the number of delegates dropped dramatically. The positive development in the industry starting from 2022 is much needed.

Table 1: Comparative Analysis of MICE industry 2019 vs. 2022 (ICCA, 2022, p. 5)

Rank 2022	↑↓ 2019	Country	# Meetings 2022	Rank 2022	↑↓ 2019	City	# Meetings 2022
1	(0)	U.S.A.	690	1	+5	Vienna	162
2	(+2)	Spain	528	2	0	Lisbon	144
3	(+3)	Italy	522	3	-2	Paris	134
4	(-2)	Germany	484	4	0	Barcelona	133
5	(-2)	France	472	5	+4	Prague	129
6	(-1)	United Kingdom	449	6	-1	Madrid	128
7	(+3)	Portugal	294	7	-4	Berlin	113
8	(+1)	Netherlands	253	8	+9	Athens	109
9	(+5)	Belgium	234	9	+19	Brussels	108
10	(+1)	Canada	233	10	-2	London	106
11	(+5)	Austria	232	11	+5	Dublin	105
12	(-4)	Japan	228	12	0	Copenhagen	102
13	(+8)	Greece	185	13	-6	Singapore	101
14	(0)	Sweden	179	14	+4	Rome	79
15	(+2)	Switzerland	175	15	-1	Amsterdam	73
16	(+5)	Denmark	169	16	+13	Helsinki	69
17	(-4)	Republic of Korea	162	17	+18	Oslo	67
18	(+14)	Ireland	152	18	-7	Buenos Aires	66
19	(+11)	Norway	148	18	-3	Seoul	66
20	(+4)	Czech Republic	146	18	+4	Stockholm	66
20	(+5)	Finland	146	18	+14	Milan	66

But the Czech Republic is not about Prague only (even though from the MICE perspective it may look so). The first column of Table 1 is comparing the most successful MICE countries, and the second column is comparing meetings destinations from the global MICE cities perspective: the Czech Republic occupies the 20th position worldwide, this time also doing better by 4 ranks compared to 2019. The important question then is whether there is a potential for the Czech Republic to raise even higher within the countries index. If we compare the number of organized meetings within the whole Czech Republic and Prague only, it is clear, that other cities will have a very long way to go: Prague has contributed with 129 events from total of 146 events. The situation within countries that have only

[1] The review of the year 2023 numbers was presented by ICCA only after the key findings of this article had been already analysed by the author.

one representative city within the chart (the same situation as the Czech Republic with Prague) is as follows: Germany 484 meetings, out of which 113 Berlin. France 472 meetings, out of which 134 Paris. UK 449 meetings, out of which London 106. Portugal 294 meetings, out of which 144 Lisbon. Netherlands 253 meetings, out of which 73 Amsterdam. Belgium 234 meetings, out of which 108 Brussels. Austria 232 meetings, out of which 162 Vienna. Greece 185 meetings, out of which 109 Athens. Sweden 179 meetings, out of which 66 Stockholm. Denmark 169 meetings, out of which 102 Copenhagen. Republic of Korea 162 meetings, out of which Seoul 66. Ireland 152 meetings, out of which Dublin 105. Norway 148 meetings, out of which Oslo 67. Finland 146 meetings, out of which Helsinki 69. **The Czech Republic is by far the most 1 city concentrated congress and business destination out of the whole chart. The second place among MICE cities in the Czech Republic belongs to Brno that occupies 292nd position with 6 international MICE meetings organized in 2022 (ICCA, 2022, p. 7).**

6. Results

In the second part of this article the author explores the necessary structure, infrastructure and other important factors of a complicated system supporting successful MICE and business events destination. It is necessary to understand that the organizers of MICE events have a great level of responsibility. They must be sure of the choice of the destination as a safe place for an international event. The chosen destination should have quality logistical and infrastructural facilities guaranteeing the smooth running of the event. There are many other aspects and criteria but for the purpose of this article following 10 factors and criteria were examined (Table 2): convention hotel able to accommodate at least 300 guests in single rooms and a minimum 4* rating (F1), convention centre for at least 500 guests in the main plenary room in theatre style (F2), presence of international airport within a maximum of 45 min. drive of the venue (F3), active DMO (Destination Marketing Organization) capable of assisting with the promotion of the international event (F4), sustainability of convention centre (F5), possibility of unique social programme in destination (F6), UNESCO monument to visit (F7), destination is located in a country that is internationally recognised as safe (F8), destination is directly accessible by car, bus or train (both motorway and rail) (F9) and catering company in town that can cater for 300 people for a gala dinner in an atypical local venue (castle, palace, gallery, museum, etc.) (F10). Author has identified these key factors and criteria inspired mostly by Jo et al. (2019) and based on MICE industry experience of author[2] and concrete requests coming from variety of different countries and considering Prague as a potential MICE destination for their international event.

6.1 Multicriteria analysis defining and prioritizing these factors and criteria

These factors and criteria were consulted with 9 international MICE organizers (5 Czech natives, 3 Slovakian natives and 1 Portugal native). These 9 experts were asked to assign 100 points to these 10 criteria necessary for success of any international MICE destination based on detailed multicriteria analysis.

Table 2: Importance of factors by MICE experts (Own research, 2024)

Factors and criteria affecting the success of MICE international destination		Points/ Out of 900	Weight in %	Rank
F1	Convention hotel	129	0.1433	2.
F2	Convention centre	104	0.1156	3.
F3	International airport	101	0.1122	4.
F4	Active DMO	49	0.0544	9.

[2] Author worked for different MICE companies like Liberty Incentives and Congresses, AIM Group International and Lobkowicz Events Management.

F5	Sustainability of convention centre	48	0.0533	10.
F6	Unique social programme	73	0.0811	7.
F7	UNESCO site	52	0.0578	8.
F8	Safe destination	165	0.1833	1.
F9	Accessibility by car, bus, train	87	0.0967	6.
F10	Operating catering company	92	0.1022	5.

The weight numbers show priorities for international MICE meeting planners: the destination has to be safe, it needs to have big conference hotel and meeting centre and to not be far away from international airport. The safety and presence of big hotel stand out of the selection of these factors. On the other hand, of the low priorities list we can find existence of DMO agency and sustainable meeting centre. The following chapter is analysing preselected Czech cities based on these criteria and factors.

6.2 MICE potential of preselected Czech cities

The Czech Republic has 6 big cities (CZSO, 2022) that can potentially aim to attract local and international business events audience: Prague (1 280 000 inhabitants), Brno (379 000 inhabitants, Ostrava (280 000 inhabitants), Pilsen (169 000 inhabitants), Liberec (103 000 inhabitants) and Olomouc (99 000 inhabitants). The table below shows the existing or missing key factors of potential MICE development in these cities as per 1st half of year 2024.

For every positive answer YES 2 points are attributed, for limited positive answer 1 point and for negative answer 0 points. These points are then multiplied by weight of each factor calculated in Table 2 and the sum of all ten factors is presented in the column Total representing the result of the potential of MICE development of each chosen city:

Table 3: The existing or missing key factors of potential MICE development in prechosen cities as per 1st half of year 2024 (Own research, 2024)

City	Prague	Brno	Ostrava	Pilsen	Liberec	Olomouc
F1	Yes 0,2866	Yes 0,2866	No (0 p.)	No (0 p.)	Yes 0,2866	No (0 p.)
F2	Yes 0,2312	Yes 0,2312	Limited 0,1156	Limited 0,1156	Yes 0,2312	Limited 0,1156
F3	Yes 0,2244	Limited 0,1122	Limited 0,1122	No (0 p.)	No (0 p.)	No (0 p.)
F4	Yes 0,1088	Yes 0,1088	Limited 0,0544	No (0 p.)	No (0 p.)	Limited 0,0544
F5	Yes 0,1066	No (0 p.)	No (0 p.)	No (0 p.)	No (0 p.)	No (0 p.)
F6	Yes 0,1622	Yes 0,1622	Limited 0,0811	Limited 0,0811	Limited 0,0811	Limited 0,0811
F7	Yes 0,1156	Yes 0,1156	No (0 p.)	No (0 p.)	No (0 p.)	Yes 0,1156
F8	Yes 0,3666	Yes 0,3666	Yes 0,3666	Yes 0,3666	Yes 0,3666	Yes 0,3666
F9	Yes 0,1934	Yes 0,1934	Yes 0,1934	Yes 0,1934	Yes 0,1934	Yes 0,1934
F10	Yes 0,2044	Limited 0,1022	Limited 0,1022	Limited 0,1022	Limited 0,1022	Limited 0,1022
Total	**1,9998**	**1,6788**	**1,0255**	**0,8589**	**1,2611**	**1,0289**
Rank	**1.**	**2.**	**5.**	**6.**	**3.**	**4.**

The results show that the fulfilment and existence of as many key factors as possible is the absolute necessity and must for international MICE meeting planners. Therefore only MICE destinations that have 7 x „Yes“ answer can be taken into consideration and this condition is fulfilled only in the cases of Prague (1.) and Brno (2.).

Liberec (3.), Olomouc (4.), Ostrava (5.) and Pilsen (6.) have maximum 4 x "Yes" answer or less. Ostrava does not have sufficiently big conference hotel, which was identified as a key priority for meeting planners, Pilsen does not have international airport and big hotel, Liberec does not have airport access and Olomouc does not have airport and hotel. On the other hand, the positive outcome is that all cities can offer meeting capacity for more than 500 delegates (some of them only in hotel). Liberec does not have airport but can be potentially interesting for German or Polish guests who could be willing to arrive by bus, car or train. The willingness to reach the destination by train, bus or car can be seen as an opportunity for all studied cities as they are all located close to the other countries (this factor was classified as the 6th most important in the analysis): Brno (Austria, Slovakia), Ostrava (Slovakia, Poland), Pilsen (Germany, Austria), Liberec (Germany, Poland) and Olomouc (Slovakia, Poland). The results show that after Prague (1), Brno (2) has the highest potential, standing out from the crowd of other cities. Considering these other cities in the study, there are several limitations to potential development, most of which are related to the lack of key infrastructure.

7. Discussion and Conclusion

The aim of this article was to define and analyse the main success factors of international MICE meeting destinations and to examine the potential of pre-selected Czech regional cities. The research has confirmed that the safety of the destination and well-equipped large conference hotel and meeting centre are a must for any MICE meeting destination. The author has presented the potential of preselected Czech cities, of which only Prague (already a TOP global MICE destination) and Brno have full potential and perspective (Prague to keep its position and Brno to gain the status of a relevant international MICE destination). Other cities (Ostrava, Pilsen, Liberec and Olomouc) will have to prepare concrete strategies and plans for the potential development of the MICE industry, as some (or more important) parts of the basic MICE infrastructure and key factors and criteria are missing. On the other hand, it is important that these cities are motivated to succeed and can define their own limits and problems. The discussion and future research should focus on the interest and willingness of the cities surveyed to invest and explore new opportunities for the MICE industry. One of the main motivating aspects for cities considering investing in the MICE industry should be the economic benefits of the sector. The example of Prague shows the difference between a traditional tourist and a MICE event participant, who spends on average 2-3 times more money (TTG, 2024).

References:

Będzik B. & Gołąb S. (2020). A comparison of the tourism sector in Poland and the Czech Republic. *Studia Periegetica*, 1(29): 73–86, https://doi.org/10.26349/st.per.0029.04.

Borodako, K., Seweryn, R., Berbeka, J., Niemczyk, A., Davidson, A. & Jakóbik, K. (2019). Assessment of the meetings industry's economic impact on the city of Krakow. *Argumenta Oeconomica*, 2(43), 191–211. https://doi.org/10.15611/aoe.2019.2.08.

Cieślikowski, K. (2018). Meetings industry in second tier cities. In *Innovative (Eco-) Technology, Entrepreneurship and Regional Development.* Conference proceedings, Nr. 2, ISSN 2538-7936. Retrieved December 10, 2023, from https://www.researchgate.net/publication/329841902_Meetings_Industry_in_Second_Tier_Cities.

Czech Statistical Office. (2022). *Počet stotisícových měst v Česku se snížil*. Retrieved December 17, 2023, from https://www.czso.cz/csu/czso/pocet-stotisicovych-mest-v-cesku-se-snizil.

Chvátalová, K. (2021). MICE business in the (post)Covid times: state of transition or a complete redefinition of this industry? *Trendy v podnikání - Business Trends,* 11(3), 43–55. https://doi.org/10.24132/jbt.2021.11.3.43_55.

ICCA. (2022). *ICCA Business Analytics 2022. Country & City Rankings*. Retrieved April 30, 2024, from https://assets.simpleviewinc.com/simpleview/image/upload/v1/clients/iccaweb/ICCA_Rankings_2023_230707_795d8dd3-147a-45e2-b97f-075234e8f0f6.pdf.

Jo, D., Park, H., Choe, Y. & Kim, D. (2019). Destination-selection attributes for international association meetings: A mixed-methods study. *Journal of Destination Marketing & Management*, 13, 61-72. https://doi.org/10.1016/j.jdmm.2019.05.005.

Kézai, P. K. & Páthy, Á. (2023). Sister City Network's Development In Central-Eastern European Regional Centres. *Theoretical and Empirical Researches in Urban Management*, 18(3), 5–26. https://www.jstor.org/stable/10.2307/27232312.

Oh, C., Kyunghwa Nam-Jo & Kim, Kwi-Baek. (2021). Convergence and Integration of the MICE and Maritime Industries: An Analysis of the MICE Industry of Busan. *Journal of Coastal Research*, 114(1), 365–369. https://doi.org/10.2112/JCR-SI114-074.1.

PCB. (2022). Innovation and flexibility continue to secure Prague´s place among the top 10 world meeting destinations. Retrieved on December 10, 2023 from https://www.pragueconvention.cz/hot-news/innovation-and-flexibility-continue-to-secure-pragues-place-among-the-top-10-world-meeting-destinations.

TTG. (2024). Pražský magistrát vloží do podpory kongresového turismu 30 milionů Kč. Retrieved on August 30th, 2024, from https://www.ttg.cz/prazsky-magistrat-vlozi-do-podpory-kongresoveho-turismu-30-milionu-kc/2024/02/.

Tyslová, I., Abrhám, J., Horváthová, Z. & Rubáček, F. (2020). Economic benefits of tourism: Cultural identity and tourism destinations in the Czech Republic. *Terra Economicus*, 18(2), 139–154. https://doi.org/10.18522/2073-6606-2020-18-2-139-154.

Walas, B., Nocoń, M., Nemethy, S., Petrovič, F. & Oleksa-Kaźmierczak, A. (2021). Diagnosis of competencies in the meetings industry in Poland, Hungary and Ireland in post-COVID-19 period. *Problems and Perspectives in Management*, 19(4), 198-212. https://doi.org/10.21511/ppm.19(4).2021.17.

Russian Crisis of 1998

Dittrich Adam*

Prague University of Economics and Business, Faculty of Economics, Department of Economic History

Abstract: The chief objective of this text is to provide a brief and concise introduction to events preceding and events during the financial crisis in 1998 in the Russian Federation. The primary hypothesis upon which the text is bulit upon is the claim that the cause of the 1998 crisis in the Russian Federation lies with inherited problems of the Soviet Union and that the 1998 crisis is a systemic crisis (currency crisis, referring to the inability to maintain the ruble within the predetermined range, leading to the depletion of reserves; debt crisis, involving Russia's default on its debt; and banking crisis, characterized by runs on banks and the collapse of various banking institutions). Naturally, there are a plethora of problems during the 1990s in the Russian Federation but when compared with inherited problems from the second half of the 1980s, they seem marginal. Towards the end of the text, there is also an argument presented that the 1998 crisis had a positive effect on the Russian economy, i.e. it brought with itself many positive implications, such is the Schumpeterian creative destruction or the necessary push for finishing and implementing the major structural reforms in order to complete the transition from the centrally planned economy to a market-capitalistic economy.

Keywords: Shock therapy, Oil, Macroeconomic Stability, Financial Crisis, Fiscal Deficit

JEL classification: E42, E63, N14

1. Introduction

Any financial crisis is inherently a unique event, which may exhibit certain similarities to past crises. Consequently, many historians and economists endeavour to study these crises to derive conclusions and lessons for the future. Nevertheless, the crisis in the post-Soviet Russian Federation is a crisis sui generis—an event that has had and will have no parallel due to the specific historical and economic conditions that preceded it. While it is not a crisis of global impact like the Great Depression or the crisis of 2008, it nevertheless had far-reaching historical implications, particularly within the Russian Federation itself.

The 1998 crisis is viewed in the following text in a relatively positive light, whereas the events post-2000 are regarded negatively, as they appear to have steered the Russian Federation's economy away from purely market-based foundations. It is true that the 1990s in the Russian Federation, along with the 1998 crisis, are perceived by most Russians as a dark period or a time of hardships, often attributed to Western interventions. They do not acknowledge that the problems of the 1990s are more inherent defects of the terminal Soviet central planning economic system rather than the consequences of external forces. Conversely, it is also true that the 1990s in post-Soviet Russia were indeed a period of significant positivity, marked by new opportunities and, above all, liberation from the yoke of communism. Unfortunately, how history is retrospectively perceived, though often erroneously, remains crucial and can explain much about future developments.

2. Russian Federation Before the Crisis

To simplify the explanation of the Russian economy's issues during its transition from a planned to a market economy, we can reduce them to six fundamental problems that the Russian Federation

* E-mail: dita01@vse.cz

experienced, which complicated market reforms and the smooth shift from a centrally planned economy to a market capitalist economy. It is worth noting that the vast majority of these issues, particularly in fiscal policy, were inherited from the Soviet Union, and many of these problems originated or existed during that period, as is pointed out by Sachs in Åslund (1997, p. 130).

A fundamental problem was the lack of coordination between monetary policy and fiscal policy under the leadership of B. Yeltsin and Y. Gaidar. While fiscal policy was implemented in a shock manner, monetary stabilization proceeded gradually. One reason for this was that B. Fedorov, B. Yeltsin's candidate for the head of the central bank, was not appointed. Instead, the parliament's candidate, G. Matiukhin, was chosen. Despite being competent, Matiukhin was an advocate of gradual monetary stabilization rather than a shock approach, see Åslund and Djankov (2014, pp. 96-97).

Another issue was the monetary union of post-Soviet republics, which spontaneously emerged from the ruins of the Soviet Union and effectively prevented the Russian central bank from controlling the money supply within its economy, leading to frequent inflationary waves, see Åslund (2007, p. 113). The problem was not only the existence of the ruble zone but also the reluctance to address this issue. Even hawkish politicians like Y. Gaidar (1993, p. 84) insisted that the zone could not be dismantled abruptly but only gradually.

The third problem of the Russian economy's transition was the inability to deregulate domestic energy prices, specifically the export of oil and gasoline. One striking example is that international oil prices in December 1991 were 200 times higher than regulated oil prices in the Russian Federation. Later, in 1994, Aven cited in Åslund (1997, p. 60) that domestic oil prices were only 30% of foreign prices. A related obstacle was the declining oil rent, which also burdened the state treasury (resulting in reduced federal budget revenues due to lower profits from oil sales) until it slowly began to rise in 2000, as noted by Gaddy and Ickes (2010, pp. 282-283). Similarly, oil production declined throughout the 1990s, mainly due to a drop in domestic demand, although this was partially offset by an increase in foreign demand, which later played an increasingly important role, see International Energy Agency (2000, p. 180).

The fourth, and perhaps the least critical, obstacle was the initial absence of foreign financial assistance. It was not until April 1992 that the first official financial aid was announced, primarily in the form of export credits contingent on the continuation of market reforms, as noted by Åslund and Djankov (2014, p. 98). Furthermore, Gilman (2010, p. 24) points out that the International Monetary Fund (IMF) and the World Bank could not respond quickly and flexibly to Russia's problems because they needed to create a new facility that met legal requirements (the Systemic Transformation Facility, or STF).

The fifth problem was the political system in the Russian Federation, particularly the division of power. On one side stood the government led by B. Yeltsin, who, at least initially, supported shock therapy, see Åslund and Djankov (2014, pp. 98-99). On the other side was the parliament, often in opposition to the government. Consequently, the government resorted to an unconventional method of implementing reforms through decrees, which often lacked a democratic element. The underlying issue was the lack of coordination between the government and the parliament, resulting in a political impasse.

The sixth problem was the flawed fiscal policy, primarily due to a poorly designed revenue system. While most modern states rely on tax revenues, Russia's treasury relied on income from state-owned enterprises, as indicated by Åslund and Djankov (2014, p. 101). The absence of tax reform was a significant issue for Russia's fiscal policy, but not the only one. The main structural problem on the expenditure side was public spending directed toward state enterprises through subsidies.

Other obstacles included the inherited debt following the dissolution of the USSR, which only the Russian Federation assumed (approximately $120 billion), leading to a downgraded state credit rating, as mentioned by Gilman (2010, p. 21). There was also a lack of experience in monitoring oil and non-oil deficits, crucial for economies dependent on oil exports as is pointed again by Gilman (2010, p. x). This was one reason why the Russian Federation did not respond more swiftly to the deteriorating situation during the Asian crisis in 1997. Another inherited issue was the existence of a rent-seeking system, utilizing informational asymmetry. Åslund (2007, pp. 47-53) argues that the period from the fall of communism in Russia to the financial crisis of 1998 was marked by rent-seeking behaviour, a struggle between rent-seekers and reformers.

3. The Russian Federation on the Eve of the Crisis

In 1997, just before the outbreak of the crisis, it might have seemed that the Russian Federation was on the right path to prosperity. For instance, inflation had been successfully stabilized after a long period and began to gradually decelerate, see World Bank (2023a). Similarly, foreign perceptions of the Russian Federation were marked by increasing confidence, both economically and politically (see fig. 1), where political and economic uncertainty systematically declined from the end of 1996. However, by the end of 1997, structural problems of the Russian economy began to reemerge, as reflected in the political uncertainty index, while economic uncertainty did not yet show signs of change during this period. By July 1998, the situation of the Russian economy appeared untenable, as the Russian Federation lacked the means to service its debt, and the markets began to realize this—the government debt had reached 143.95% of GDP, according to FRED (2023a). There was a significant increase in interest rates on domestic government bonds (GKOs) to compensate for the associated uncertainty and prevent a massive investor flight to foreign, safer assets. Concurrently, the central bank responded with a drastic increase in the key interest rate all the way to 150%, see FRED (2023e).

In the monetary sphere, the primary cause of the problems culminating in the crisis seems to have been the support for the ruble in the form of a narrow band system (a so-called Floating peg system with a narrow band) within which the central bank was to maintain the ruble, as Zubov (2015, p. 574) argues, the ruble, during 1995–1998, was significantly overvalued, and the band was set unnecessarily low. Initially, to keep the exchange rate within the band, the central bank raised interest rates, up to 150%, as pointed out above. This increase in interest rates automatically widened the interest rate differential between the Russian Federation and other countries, attracting foreign investors and speculators. Zubov (2015, pp. 574-575) thus speaks of a rise in speculative capital, which is highly volatile in the face of a state's economic problems. The band within which the ruble could move against the US dollar was set at 5.3–7.1 RUB/USD. The problem with this measure was that it exposed the central bank to the risk of losing all its reserves to maintain the ruble within this band, or setting interest rates absurdly high as was the case in May 1998.

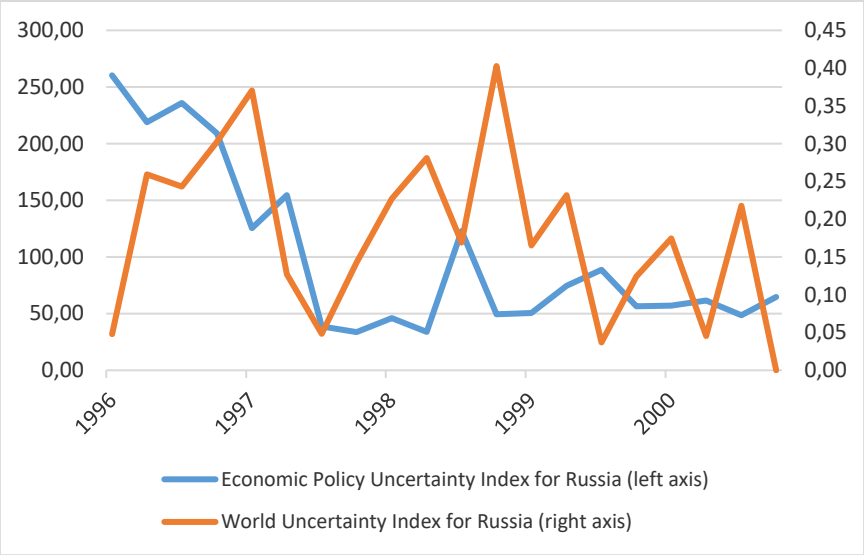


Figure 1: Development of the Economic and Political Uncertainty Index for the Russian Federation (1996-2000)

Source: FRED (2023b, 2023c)

The aforementioned problem began to manifest as early as 1997, when investment confidence in the Russian economy plummeted, as illustrated in fig. 1. This significant drop in investment confidence exerted depreciation pressure on the ruble's exchange rate against the dollar (see fig. 2). The Russian central bank, within its mandate, had to respond by purchasing rubles from its reserves to maintain the exchange rate within the prescribed band. The problem, however, was that the central bank gradually exhausted all its reserves, exacerbating the loss of investor confidence.

Among the external causes of the crisis was the outbreak of the Asian financial crisis in 1997, which led to a significant decline in foreign demand for raw materials, a critical dependency of the Russian economy. Oil prices in 1998 fell to as low as $9.82 per barrel. This was a severe blow to the Russian economy at the time, plunging the state treasury into deep trouble due to its reliance on revenues from this sector, see Åslund and Djankov (2014, p. 242). The Russian economy had already been characterized by chronic deficits before 1998, but this decline in prices led to even deeper deficits (see fig. 3). Zubov (2015, p. 574) argues that in 1998, the government's intent (i.e., strict monetary policy aimed at achieving macroeconomic stability in the form of low inflation and a strong exchange rate) conflicted with economic reality. The problem was that the accumulation of debt was partially obscured from both foreign and domestic investors' view by a relatively large trade balance surplus. What experts, including investors and other governments, should have focused on were the rising costs of servicing the existing debt and the short-term structure of the Russian Federation's debt. In relative terms, the debt seemed manageable, but its absolute value was not, see fig. 3. When the Asian crisis hit in 1997, it gradually began to expose this fundamental problem of the Russian economy. The decline in global demand started to gradually undermine the Russian state treasury, which eventually ran out of funds not only to service its debt but also to maintain the state's basic functions. Consequently, investor confidence began to decline (see fig. 1), and investors started to flee Russian assets.

In August 1998, all efforts to transition to a market-capitalist economy in the Russian Federation collapsed, leading to a crisis and, effectively, a state bankruptcy. On the very day of the crisis, August 17, 1998, three fundamental measures were announced: the restructuring of Russian debt, the

implementation of a three-month moratorium on payments to foreign banks, and the expansion of the RUB/USD exchange rate band to 6.0 – 9.5 (i.e., devaluation of the currency), see Gilman (2010, p. 193).

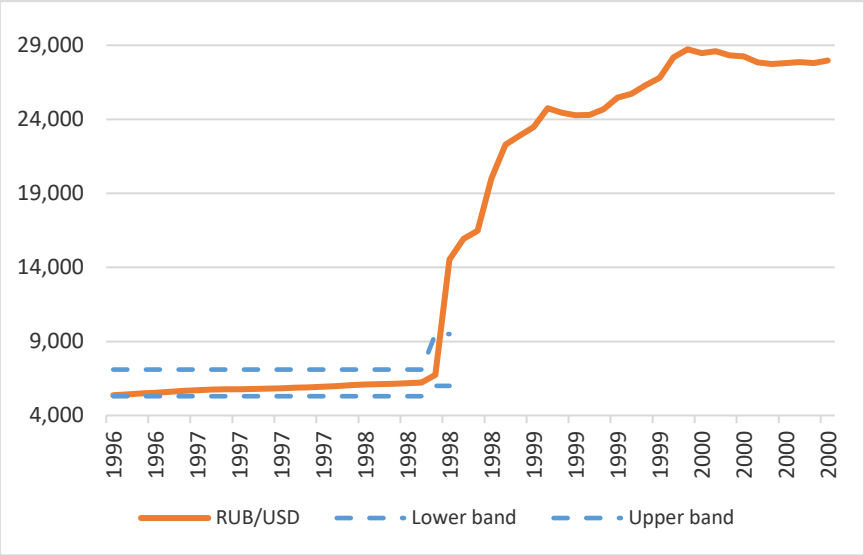


Figure 2: RUB/USD Exchange Rate (1997-2000; Monthly Frequency)
Source: FRED (2023d)

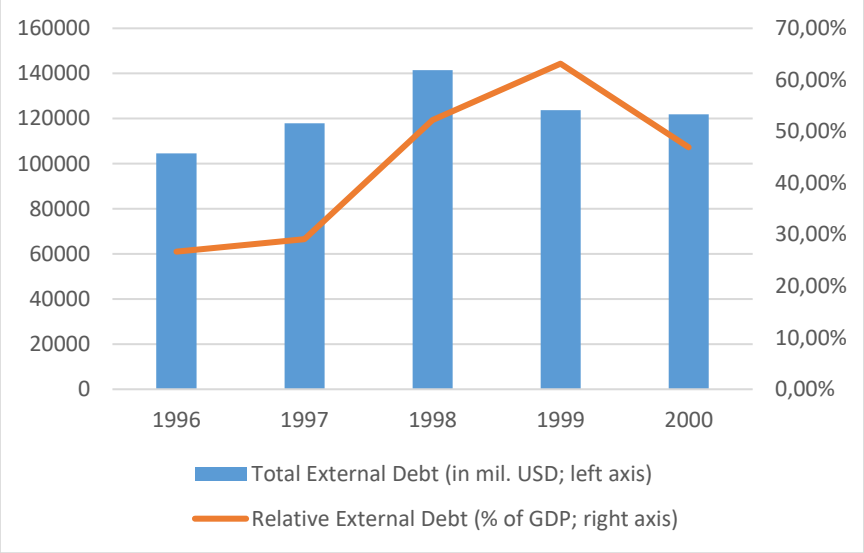


Figure 3: Total and Relative External Debt of the Russian Federation (1996-2000)
Source: OECD (1998a, p. 18), OECD (1998b, p. 22), OECD (2004, p. 143), World Bank (2023b)

In the following days, it was also announced that domestic short-term government bonds GKOs and OFZs would be converted into new securities, see Gilman (2010, p. 186). In subsequent days, the central bank continued its interventions to maintain the ruble's exchange rate within the prescribed band, although now a wider one. Despite the widening of the exchange rate band, the government eventually had to abandon the system of maintaining the exchange rate within the band, and a free-floating system was introduced. Maintaining the ruble's exchange rate within the 9.5 RUB/USD band became untenable under depreciation pressures. The exchange rate eventually stabilized at around 28 RUB/USD (see fig. 2).

In terms of GDP, there was a decline of 5.3% compared to the previous year, see World Bank (2023b). Nevertheless, the Russian Federation recovered from the crisis relatively quickly. Within a year of the crisis, it was once again experiencing GDP growth and a period of relative macroeconomic stability. It

appears that a significant role in this recovery was played by the rise in oil prices in 1999-2000, on which a large part of the Russian economy depended, see International Energy Agency (2000). The increase in oil prices led to a high trade balance surplus, which positively impacted the ruble through appreciation pressures and helped stabilize the exchange rate (see fig. 2). Another reason for the rapid recovery was the devaluation of the exchange rate, followed by depreciation when the ruble was no longer under the direct control of the central bank. Domestic exports also revived after the devaluation, which made them more competitive abroad. Exports began to grow significantly from the second quarter of 1998, and the overall trade balance moved from a deficit to a surplus by the second quarter of 1998 and remained in surplus thereafter, see FRED (2023f). Lastly, the widespread existence of barter since the fall of the Soviet Union contributed to the rapid recovery of the Russian economy after the crisis, as noted by Ould-Ahmed (2003). The post-Soviet economy operated on a barter basis much more than initially appeared, which led to a situation where the financial collapse was not as deep, as a large part of the economy functioned in the gray zone. Had this not been the case, the financial crisis would have had more far-reaching impacts. This fact was most evident in the banking sector bankruptcies, which, under usual conditions, would have led to more frequent bank runs and greater destabilization of the economy.

4. Conclusion

It can thus be argued that the financial crisis of 1998 had a positive impact on the Russian Federation. From the perspective of fundamental macroeconomic indicators, Russia emerged relatively stronger and the crisis can be seen as an inevitable event that compelled the authorities in the Russian Federation to implement necessary reforms, preventing a recurrence of such a crisis. These reforms were carried out despite significant opposition from the State Duma and the newly forming class of oligarchs. Åslund (2007, p. 1) aptly articulated this sentiment:

„In a revolution, the old institutions temporarily cease to function. For a short time, this hiatus offers political leaders much greater opportunities than in ordinary times. The drawback is that the tools of government are rudimentary.“

The financial crisis thus became a catalyst for essential reforms, notably the reform of the new tax system, the reduction of subsidies to state enterprises (which fell by 16% of GDP in 1998 alone, according to Pinto, Drebentsov, and Morozov (2000)), and the reduction of public expenditures. These experiences from the crisis were internalized and subsequently helped in situations such as the crisis of 2008. All of this can be understood as measures of fiscal policy restriction, which ultimately led to a reduction in state deficits. The second argument, closely related to the first, is the curtailment of the power of the oligarchs, or so-called rent-seekers, albeit temporarily, as can be observed particularly from the situation in the Russian Federation after the financial crisis of 2008. The third argument is the so-called Schumpeterian creative destruction, which occurred in the Russian Federation during and after the 1998 crisis. However, this phenomenon warrants more detailed investigation.

References

Åslund, A. (1997). *Russia's economic transformation in the 1990s*. London, Washington: Pinter.

Åslund, A. (2007). *Russia's Capitalist Revolution: Why Market Reform Succeeded and Democracy Failed.* Washington: Peterson Institute for International Economics.

Åslund, A. and Djankov, S. (eds.) (2014). *The great rebirth: lessons from the victory of capitalism over communism.* Washington, DC: Peterson Institute for International Economics. Russia: The Arduous Transition to a Market Economy

FRED (2023a). *Central government debt, total* [online]. FRED St. Louis FED [cited 08-11-2023]. Available at: https://fred.stlouisfed.org/series/DEBTTLRUA188A

FRED (2023b). *Economic Policy Uncertainty Index for Russia* [online]. FRED St. Louis FED [cited 08-11-2023]. Available at: https://fred.stlouisfed.org/series/RUSEPUINDXM

FRED (2023c). *World Uncertainty Index for Russia* [online]. FRED St. Louis FED [cited 08-11-2023]. Available at: https://fred.stlouisfed.org/series/WUIRUS

FRED (2023d). *Exchange Rate to U.S. Dollar for Russia* [online]. FRED St. Louis FED [cited 08-11-2023]. Available at: https://fred.stlouisfed.org/series/FXRATERUA618NUPN

FRED (2023e). *Interest Rates, Discount Rate for Russian Federation* [online]. FRED St. Louis FED [cited 08-11-2023]. Available at: https://fred.stlouisfed.org/series/INTDSRRUM193N

FRED (2023f). *Exports: Value (Goods): Total for Russia* [online]. FRED [cited 08-11-2023]. Available at: https://fred.stlouisfed.org/series/XTEXVA01RUM664S

Gaddy, C.G. and Ickes, B.W. (2010). Russia after the Global Financial Crisis, *Eurasian Geography and Economics*, 51(3), pp. 281–311. Available at: https://doi.org/10.2747/1539-7216.51.3.281

Gaidar, Y. (1993). Inflationary Pressures and Economic Reform in the Soviet Union, in P. H. Admiraal (ed.) *Economic Transition in Eastern Europe*. Oxford: Blackwell, pp. 63-90.

Gilman, M.G. (2010). *No precedent, no plan: inside Russia's 1998 default*. Cambridge, Mass: MIT Press.

International Energy Agency (2000). *World Energy Outlook 2000*. Paris: IEA.

OECD (1998a). *External Debt Statistics, 1997: the Debt of Developing Countries and CEEC - NIS at End-December, 1995 and End-December, 1996*. Washington: Organization for Economic Cooperation & Development.

OECD (1998b). *External Debt Statistics, 1998 Edition: the Debt of Developing Countries and Countries in Transition at End-1997 and End-1996*. Washington: Organization for Economic Cooperation & Development.

OECD (2004). *External Debt Statistics 1998-2002*. Washington: Organization for Economic Cooperation & Development.

Ould-Ahmed, P. (2003). Barter hysteresis in post-Soviet Russia: an institutional and Post Keynesian perspective, *Journal of Post Keynesian Economics*, 26(1), pp. 95–116. Available at: https://doi.org/10.1080/01603477.2003.11051382

Pinto, B., Drebentsov, V. and Morozov, A. (2000). *Dismantling Russia's nonpayments system: creating conditions for growth*. Washington, D.C: World Bank (World Bank technical paper, no. 471).

World Bank (2023a). *Inflation, consumer prices (annual %) - Russian Federation* [online]. Data World Bank [cited 06-11-2023]. Available at: https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?end=2000&locations=RU&start=1993

World Bank (2023b). *GDP (constant 2015 US$) - Russian Federation and GDP growth (annual %)* [online]. Data World Bank [cited 06-11-2023]. Available at: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD?locations=RU

Zubov, A. (ed.) (2015). *Dějiny Ruska 20. století - 2. díl*. Praha: Argo.

Statistical Clustering within the European Culture Industry: Grouping Countries Based on Economic Indicators

Vladimír Hojdik[1]*, Jakub Kintler[1]

[1]University of Economics in Bratislava, Faculty of Business Management, Department of Business Economy, Bratislava, Slovak Republic

Abstract: This paper employs cluster analysis to explore economic patterns in cultural industries across European countries. It aims to identify similar groups of countries based on culture industry economic data obtained from Eurostat. With hierarchical and K-means clustering techniques, the analysis processes data about number of enterprises, employment numbers, value added per employee, and net turnover from 31 European countries, specifically for year 2022. This methodological approach helps to identify regional economic disparities and possibly enhance strategic planning and policy-making. The results of the paper reveal distinct groupings of countries, offering insights into how various regions compare in their cultural industry economies. These findings are interesting for developing targeted economic policies and fostering culture sector collaborations within Europe.

Keywords: Cultural Economy, Culture Industry, European Countries, Statistical Clustering,

JEL classification: C38, Z10,

Grant affiliation: This paper was funded by research grant **VEGA 1/0582/22**, entitled "Dimensions of cross-sectoral entrepreneurship of cultural and creative industry entities in the context of sustainable development".

1. Introduction

The cultural industry is crucial to the economic and social fabric of the European Union (EU), contributing significantly to employment, innovation, and cultural diversity. These industry, including arts, media, and entertainment, drive economic growth and enrich cultural life (O`Brien et al., 2016). Understanding the dynamics of culture industry across European countries is essential for developing effective policies and strategic initiatives. Advanced clustering techniques, such as K-means and hierarchical clustering, are effective for identifying patterns and grouping countries based on cultural industry metrics. This study aims to provide insights into the similarities and differences among European countries to inform targeted policy-making and strategic planning. By analyzing data from the Eurostat database (Eurostat, 2024), focusing on relevant economic metrics allowed for identification of clusters and better understanding of the European cultural industry landscape.

2. Literature review

The body of research on CCI in Europe highlights diverse perspectives on their impact, challenges, and contributions to economic and societal development. This chapter synthesizes findings from several papers, drawing attention to the varying contexts and outcomes associated with CCIs across different European regions.

Sucháček (2023) critically examines the application of cultural industries in Central and Eastern Europe, emphasizing the distinct economic and institutional contexts that differentiate these regions from Western Europe. The study argues that developmental discontinuities pose significant challenges to

* Corresponding author's email: **vladimir.hojdik@euba.sk**

the applicability of CCIs, necessitating adaptations to local conditions. Gustafsson and Lazzaro (2021) discuss the role of CCIs in addressing major societal challenges within Europe. Their research highlights the innovative capacities of CCIs and the necessity of public support to utilize these potentials effectively. They emphasize that European policies increasingly recognize the strategic importance of CCIs for innovation and growth. Barois, Dimou, and Schaffar (2021) provide an econometric analysis of the impact of cultural and creative industries on the wealth of European regions. Their findings suggest that CCIs contribute to regional resilience, particularly evident during the 2008 economic crisis. However, authors also note disparities in the impact across different regions.

Cetină and Badin (2019) explore the performing arts sector in Romania, noting its economic and artistic significance. They argue for a new marketing mix approach tailored to the cultural industry, highlighting the need for effective audience engagement and feedback mechanisms. Suciu, Nasulea, and Florentina (2018) compare the performance of cultural industries in Romania with other Central and Eastern European countries. Their research indicates that Romanian cultural industries lag behind their neighbours, with lower levels of cultural employment and participation.

Angelova and Stoyanova (2018) analyze the implementation of the Junker plan for cultural and creative industries in the European Union. They identify a need for increased efforts to popularize CCI projects among investors and highlight the lack of collaboration among member states as a significant barrier. Chapain and Stryjakiewicz (2017) review the various definitions and challenges associated with CCIs in Europe. They emphasize the difficulties in defining CCIs and the gaps in understanding their sectoral dynamics. Their work underscores the importance of clear definitions and comprehensive data for effective policy-making.

Mickov (2022) discusses the role of the cultural sector in sustainable economic development, focusing on the contributions of culture to innovation, tourism, and urban development. The paper provides both theoretical and practical insights into the integration of culture within the broader economic framework. Popa, Dragan, Marian-Potra, and Matichescu (2022) examine the interactions and challenges faced by creative industry stakeholders. Their analysis reveals significant tensions and blockages in public sector implementation, largely due to political rivalries. Gerlitz and Prause (2021) investigate the role of CCIs in supporting sustainable transitions in the Baltic Sea Region. They highlight the potential of CCIs to foster innovation and support traditional SMEs in adopting sustainable practices, although these contributions are often underestimated.

3. Aims and Methods

The primary aim of this research is to analyze cultural industry metrics across 31 European countries using advanced clustering techniques. By employing both K-means and hierarchical clustering methods, this study aims to identify distinct groups of countries based on key cultural industry indicators, to uncover underlying patterns and regional similarities or differences.

The data for this research were obtained from the Eurostat database, specifically related to the culture industry. The dataset included various metrics (data for 2022 were used, as it was the latest year with complete data), such as the number of enterprises in the culture industry, number of persons employed, value added per employee (in thousands of euros), net turnover (in million euros), turnover per enterprise (in euros), number of enterprises per 1000 people, and the percentage of total

employment in the cultural industry. Based on this dataset, following metrics were calculated and used for clustering analysis (these metrics were standardized to ensure comparability between countries):

- persons employed per enterprise,
- value added per employee (thousands EUR),
- turnover per enterprise (EUR),
- number of enterprises per 1000 people.

For the clustering analysis, both K-means and hierarchical clustering methods were applied. To determine the optimal number of clusters for K-means, the Elbow method was used, plotting the sum of squared distances (inertia) against the number of clusters (k). K-means clustering was then applied with the identified optimal number of clusters, and countries were grouped accordingly. For hierarchical clustering, Ward's method was utilized to perform clustering, creating a linkage matrix based on the standardized data. A dendrogram was plotted to visualize the hierarchical relationships between countries and to identify the optimal number of clusters by observing the dendrogram's structure. Clusters were extracted based on the identified optimal cut-off distance, and countries were grouped subsequently. The results were visualized using Principal Component Analysis plots to display the clusters in a reduced two-dimensional space. The characteristics of each cluster were analyzed, highlighting the distinctive features and commonalities within each group.

4. Results and Discussion

In this chapter, results related to clustering countries into the groups are presented and discussed. K-means and hierarchical clustering methods are applied and explained, followed by Principal Component Analysis for visualization of identified clusters. In the first step, descriptive statistics of relevant metrics in selected European countries is presented. Boxplots for distribution, variability and potential anomalies are also visualized in Figure 1. The entry data were obtained from Eurostat.

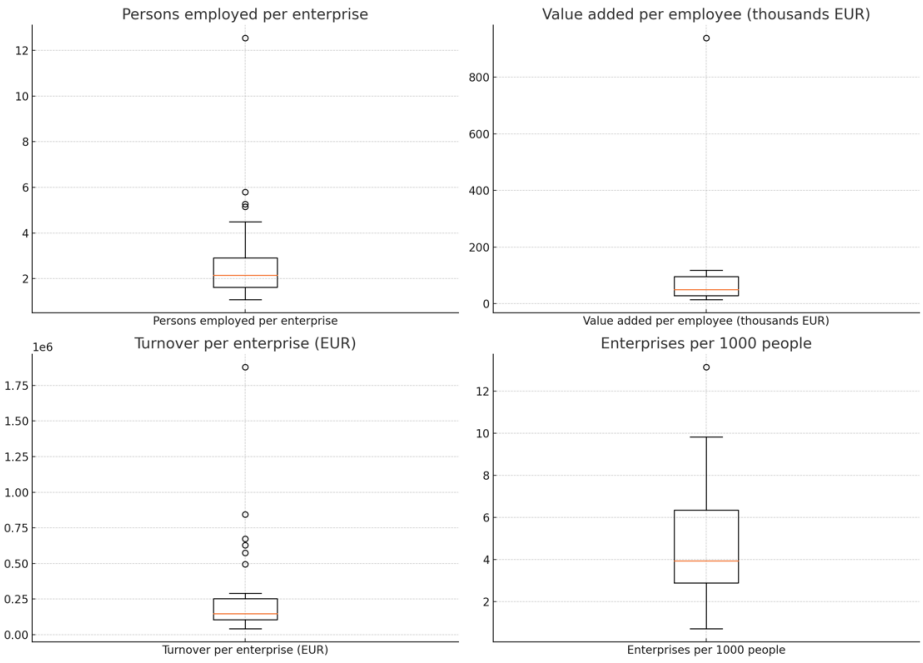


Figure 1: Boxplots representing the distribution of countries for each metric

Figure 1 illustrate the heterogeneity within the cultural industry across EU countries. The differences in the number of employees, value added, turnover, and enterprise density reflect varying economic environments and market conditions. Understanding these disparities can inform policymakers aiming to promote balanced cultural industry and economic development within the European region.

4.1. K-means clustering method

The K-means method (also known as Elbow method) helps identify the optimal number of clusters by looking for the point where the curve bends. The shape of the curve (as shown in Figure 2) indicates that the optimal number of clusters is somewhere between 3 and 4. For the purposes of this paper and for better accuracy, four clusters were considered as optimal.

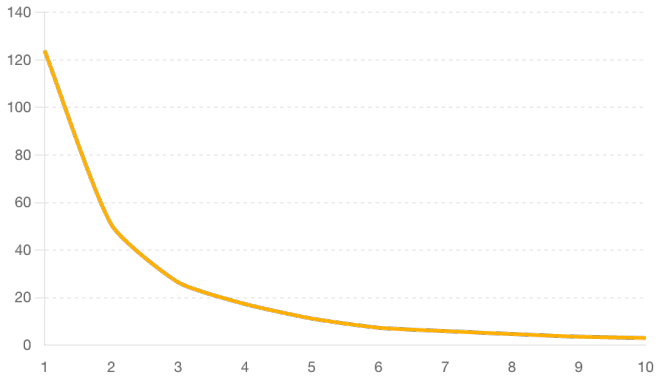


Figure 2: K-Means (Elbow) Method – curve identifying the optimal number of clusters

With the use of this method, following four clusters of countries were outlined:

- **Cluster 0**: Belgium, Czechia, Estonia, Greece, Spain, Croatia, Italy, Latvia, Hungary, Austria, Poland, Portugal, Romania, Slovakia, Finland. This cluster is characterized by relatively moderate enterprise sizes and average productivity, with turnover per enterprise and the number of cultural enterprises per 1,000 people being consistent but not extreme.
- **Cluster 1**: Switzerland. Switzerland stands out with the highest value added per employee, indicating significantly higher productivity within the cultural sector compared to other countries.
- **Cluster 2**: Bulgaria, Denmark, Germany, France, Cyprus, Luxembourg, Bosnia and Herzegovina, Albania, Serbia. Countries in this cluster show a wide range of enterprise sizes and higher turnover per enterprise, reflecting relatively greater revenue generation across diverse economies.
- **Cluster 3**: Lithuania, Malta, Netherlands, Slovenia, Sweden, Norway. This cluster has a higher density of cultural enterprises and higher value added per employee, indicating a strong economic output per worker, with turnover per enterprise on the higher side.

4.2. Hierarchical clustering using Ward Method

The dendrogram for hierarchical clustering (Figure 3) provides a visual representation of the clustering process, displaying how each country is grouped together based on the cultural industry metrics.

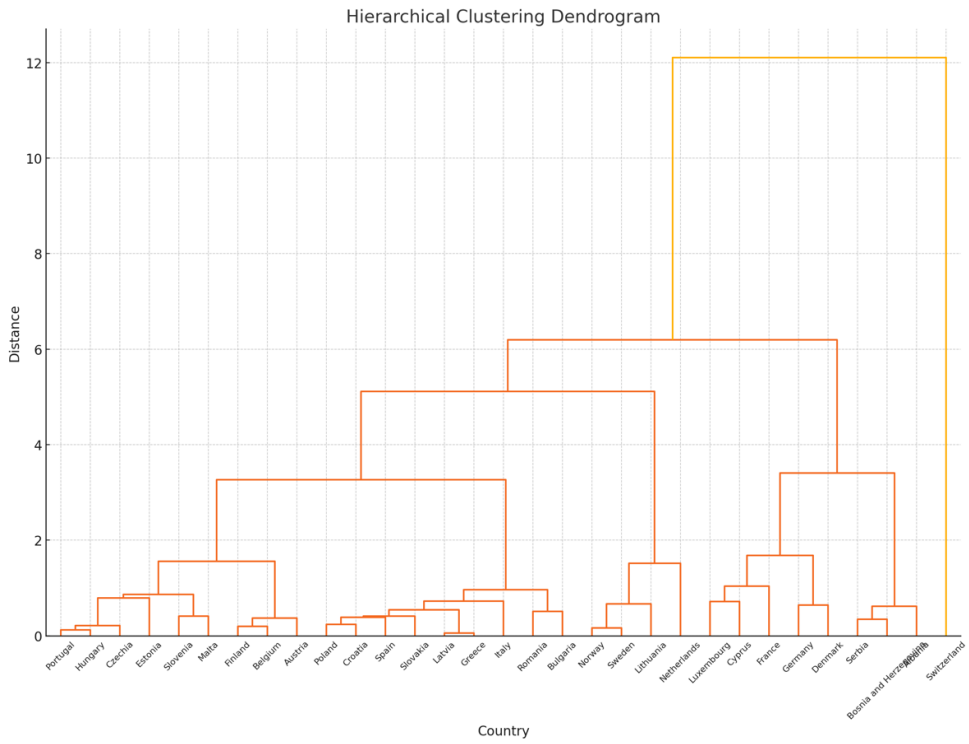


Figure 3: Dendrogram visualizing the clusters of countries

The analysis of the results provides following clusters:

- **Cluster 0**: Belgium, Bulgaria, Czechia, Estonia, Greece, Spain, Croatia, Italy, Latvia, Malta, Hungary, Austria, Poland, Portugal, Romania, Slovakia, Slovenia, Finland.
- **Cluster 1**: Switzerland.
- **Cluster 2**: Denmark, Germany, France, Cyprus, Luxembourg, Bosnia and Herzegovina, Albania, Serbia.
- **Cluster 3**: Lithuania, Netherlands, Sweden, Norway.

When compared to the K-means method, some minor differences between clusters are visible, which is caused by differences in the data processing and visualization. Clusters 1 and 3 exhibit high value added per employee, indicating that workers in the cultural sectors of these countries contribute more to economic output compared to other clusters. This suggests that cultural enterprises in these countries are operating with relatively higher productivity. Cluster 2 is notable for its high turnover per enterprise, reflecting greater revenue generation by cultural enterprises in comparison to the other clusters.

In Cluster 3, the higher density of cultural enterprises per capita suggests a relatively larger presence of cultural businesses within the population, though the specific reasons for this cannot be determined from the data alone. In contrast, Cluster 0 includes countries with moderate values across all metrics, reflecting cultural sectors with no extreme variations in enterprise size, productivity, or revenue. For better understanding of the results, Principal Component Analysis enabled visualization of clusters.

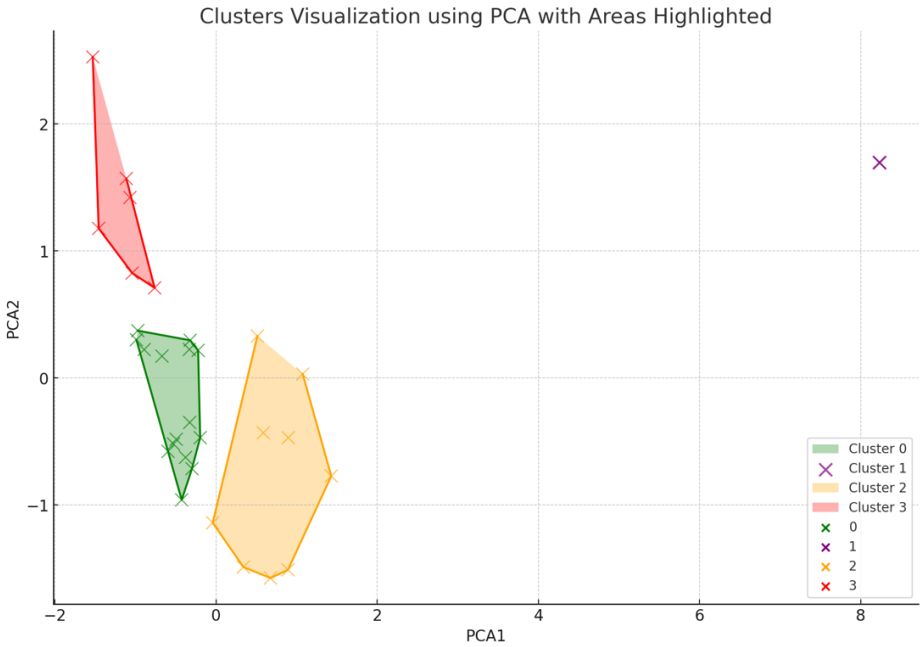


Figure 4: Principal Component Analysis - cluster visualization

This visualization provides a clear separation of the clusters in a two-dimensional space, highlighting the differences and similarities between countries based on the selected cultural industry metrics.

The clustering results provide valuable insights for policymakers to make decisions that address the specific needs and characteristics of different country clusters. For instance, countries in Cluster 0 might benefit from policies aimed at enhancing cultural enterprise productivity, while those in Cluster 2 could focus on leveraging their diverse and commercially successful cultural sectors.

Understanding the cultural industry differences between countries can help in identifying areas of strength and opportunities for development. Countries with similar profiles can collaborate on cultural initiatives, exchange best practices, and jointly invest in cultural projects. The identification of clusters with varying economic contributions highlights the need for differentiated support mechanisms to ensure balanced cultural and economic growth across the Europe.

Conclusion

The results show the diversity between culture industries in European countries. Clustering analysis encourages collaboration between countries with similar profiles, facilitating the exchange of best practices, joint initiatives, and shared investments in cultural projects. Understanding the state of cultural industry allows stakeholders to develop strategic plans that align with the strengths and opportunities identified within each cluster.

The paper acknowledges certain limitations. Future research could integrate additional data, to provide a more comprehensive analysis of the cultural industry. Examining the evolution of clusters over time through longitudinal studies would offer insights into changes on the cultural industry, helping to refine and adapt strategies for long-term success. Moreover, expanding the analysis to regional or city-level data could uncover localized trends and dynamics, offering a deeper understanding of cultural industry performance within countries.

The findings of this research provide a foundation for understanding the cultural industry landscape across the Europe. By identifying distinct clusters and their characteristics, it offers insights that can inform policy-making and strategic planning, thus contributing to a vibrant and economically robust cultural sector. This paper underscores the importance of data-driven approaches in cultural policy development, highlighting the potential for targeted strategies to foster cultural and economic growth across the European Union.

References

Angelova, M., & Stoyanova, T. (2018). Cultural and creative business through investment plan for Europe. *2018 International Conference on High Technology for Sustainable Development (HiTech*), Sofia, pp. 1-4 doi:10.1109/HITECH.2018.8566247

Barois, B., Dimou, M., & Schaffar, A. (2021). L'impact des industries culturelles et créatives sur la richesse des régions européennes. doi:10.4000/REI.9774

Chapain, C., & Stryjakiewicz, T. (2017). Introduction – Creative industries in Europe: Drivers of (new) sectoral and spatial dynamics. doi:10.1007/978-3-319-56497-5_1

Cetină, I., & Badin, A. (2019). Creative and cultural industries in Europe – case study of the performing arts in Romania. *Proceedings of the International Conference on Business Excellence*, 13, (1), pp.216-226. doi:10.2478/PICBE-2019-0020

Eurostat Database (2024). Culture, Database. Available at https://ec.europa.eu/eurostat/web/culture/database

Gerlitz, L., & Prause, G. (2021). Cultural and creative industries as innovation and sustainable transition brokers in the Baltic Sea Region: A strong tribute to sustainable macro-regional development. *Sustainability*, *13* (17), 9742. doi:10.3390/SU13179742

Gustafsson, C., & Lazzaro, E. (2021). The innovative response of cultural and creative industries to major European societal challenges: Toward a knowledge and competence base. *Sustainability*, *13* (23), 13267. doi:10.3390/SU132313267

Mickov, B. (2022). The cultural sector and sustainable economic development. doi:10.4324/9781003336648

O'Brien, D., Laurison, D., Miles, A., & Friedman, S. (2016). Are the creative industries meritocratic? An analysis of the 2014 British Labour Force Survey. *Cultural Trends*, 25, 116-131. https://doi.org/10.1080/09548963.2016.1170943

Popa, N., Dragan, A., Marian-Potra, A.-C., Lupsa, M., & Matichescu, M. (2022). Opportunities: Source of synergy, or of conflict? Positioning of creative industry actors within a European Capital of Culture project. *PLOS ONE*, *17* (9), e0274093. doi:10.1371/journal.pone.0274093

Suciu, M.-C., Nasulea, C., & Florentina, D. (2018). Developing cultural industries in Central and Eastern European countries. *Journal of Economics and Sustainable Development*, *10* (2), 51-56. doi:10.2478/MSD-2019-0008

Sucháček, J. (2023). Cultural industries and their applicability in Central and Eastern Europe: An institutional critique. *Cultural Management: Science and Education*, *7* (1) doi:10.30819/cmse.7-1.03

Opinion paper: Intersections of Organizational Management and Existential Themes: Insights from Mintzberg and Becker.

Jan Holy[1]*, Vladimir Bolek[2]

[1,2]University of Economics in Bratislava, Faculty of Business Management, Department of Information Management, Bratislava, Slovakia

Abstract: This article synthesizes the enduring contributions of Henry Mintzberg's framework on managerial roles with insights from Ernest Becker's exploration of existential themes, emphasizing their relevance amidst contemporary business landscapes shaped by technological advancements and organizational dynamics. The evolution of managerial practices in response to modern challenges, such as AI and digital communication, suggests the integration of Mintzberg's framework with contemporary perspectives for effective adaptation. Drawing parallels between Mintzberg's emphasis on organizational structures and Becker's existential insights into human behaviour, the article underscores the significance of symbolism and holistic understanding in deciphering both managerial activities and existential concerns. The article reflects on Becker's notion that confronting existential anxieties can catalyse transformative personal growth and foster genuine connections and offering profound insights for navigating complexities in managerial practice.

Keywords: managerial roles, technological advancements, existential themes, organizational dynamics, transformative growth

JEL classification: L2, M1, Z0

Grant affiliation: The paper was elaborated within VEGA No. 1/0520/24 - Aspects of building an ambient enterprise ecosystem – proportion 100 %.

1. Introduction

In his influential work "The Nature of Managerial Work," Mintzberg (1973) begins with a fundamental inquiry: "What do managers do?" He then undertakes a comprehensive exploration of this question, investigating the complexities of managerial tasks and their implications within organizational contexts:

> This is a simple question, posed to managers by their children, by the staff specialists who work for them, and by the university students who hope one day to replace them. Ask it and you are likely to be told, in Henry Fayol's words of 1916, that mangers plan, organize, coordinate and control. "Fine," you may reply, "but what managers really do?" If you are intent on getting the answer, you may burry yourself in one of America's better management libraries for a good part of one year. After having read perhaps two hundred books and articles, you will emerge and be able to cite the more recent literature. (p. 1)

Managers play a diverse role within organizations, encompassing the tasks of planning, organizing, directing, and controlling diverse resources to achieve organizational goals. They are instrumental in setting goals, establishing organizational structures, allocating resources, motivating employees, and making decisions to ensure the organization operates efficiently and effectively. Moreover, managers

* Corresponding author's email: jan.holy@euba.sk

are key to fostering a positive work environment, addressing challenges, and adapting to changes through strategic thinking and effective communication. As highlighted by Mintzberg and other scholars (Rostron, 2022; Gjerde & Alvesson, 2020; Carroll & Gillen, 1987), these managerial functions - planning, organizing, motivating, directing, and controlling – form the foundation of managerial work, enhancing foresight, coherence, purpose, and the integration of collective efforts.

Mintzberg (1973) writes:

> The manager is ostensibly trained in MBA and MPA programs through the world. He is written to in magazines such as Fortune and Business Week and written about in journals such as Administrative Science Quarterly and Journals of Management Studies. He is tempted via hundreds of courses supposedly designed to help him manage better and, if he works in any of the larger public or private organizations of America, he has probably been exposed to in-house management development programs as well. Furthermore, it is surrounded by teams of management scientists — the planners, information systems designers, operations researchers, and so on—who exist simply to make organizations and especially their managers more efficient in carrying out their work. All this and still we do not really know what managers do. (p. 2)

Despite the widespread access to managerial training programs, extensive coverage in leading business publications, and the proliferation of resources designed to improve managerial effectiveness, the true essence of managerial activities remains elusive. This paradox highlights the ongoing challenge in fully understanding the multifaceted role of managers, despite the abundance of resources available for their professional growth. Furthermore, the presence of dedicated teams of management scientists, tasked with optimizing organizational efficiency and supporting managerial endeavours, adds another layer of complexity to this inquiry.

2. Method

To analyze the challenges in project management within an industrial setting, this study utilized a semi-structured questionnaire influenced by the theoretical frameworks of Henry Mintzberg and Ernest Becker. Mintzberg's research on managerial roles and organizational structures emphasizes how management is shaped by social contexts (Mintzberg, 1973, 2020; Foss, 2022), while Becker's existential psychology focuses on the symbolic aspects of human behavior in response to existential concerns (Becker, 1973; McCabe, 2015).

The questionnaire, designed to capture both organizational dynamics and existential motivations, was administered digitally via Google Forms and through interviews within the project management department of the PL P11 product line. This approach allowed for a comprehensive collection of data on managerial practices and challenges. Data from the questionnaires were analyzed using thematic analysis (Braun & Clarke, 2006). This process involved transcribing the responses, thoroughly familiarizing oneself with the content, coding the data to identify significant patterns, and synthesizing these patterns into key themes. This method provided insights into how symbolic and socially constructed elements, as articulated by Mintzberg and Becker, influence managerial practices and challenges.

By applying these theoretical perspectives, the study offers a nuanced understanding of the complex dynamics in project management, illustrating the impact of social and symbolic factors. This analysis

contributes to practical strategies for addressing real-world challenges in industrial project management, helping project managers better navigate operational patterns, foster team synergy, and optimize project outcomes. It is also important to note that this study forms part of a larger investigation within the framework of the author's dissertation.

3. What do I have to do?

3.1. Quantity and speed

Mintzberg's study on CEOs revealed a relentless pace of activity throughout the workday, with minimal breaks observed. The study highlighted that tasks such as managing correspondence (averaging 36 pieces daily), attending to telephone calls (averaging 5 per day), and participating in meetings (averaging 8) consumed nearly every available moment from the commencement to the conclusion of their workday. Breaks were rare, and even short respites often involved work-related discussions or tasks.

Mintzberg observed that opportunities for diversions, such as observation tours or informal discussions before meetings, were rarely scheduled and typically remained focused on organizational concerns:

> The mail (average of 36 pieces a day), telephone calls (average of 5 per day), and meetings (average of 8) accounted for almost every minute from the moment these men entered their offices in the morning until they departed in the evenings. A true break seldom occurred. Coffee was taken during meetings, and lunchtime was almost always devoted to formal or informal meetings. When free time appeared, ever-present subordinates quickly usurped it. If these managers wished to have a change of pace, they had two means at their disposal – the observation tour and the light discussions that usually preceded scheduled meetings. But these were not regularly scheduled breaks, and they were seldom totally unrelated to the issue at hand – managing the organization. (p. 30)

However, it is important to acknowledge that with the proliferation of information and communication technology (ICT) since Mintzberg's study in 1973, the volume and complexity of managerial tasks, including handling mail, calls, and meetings, have likely increased significantly (Mazmanian, 2013).

Managers who participated in 2022/2023 surveys often echoed and elaborated upon these observations, recognizing the evolving landscape of managerial responsibilities amidst advancements in technology and organizational dynamics.

Q1: Which three days of the week do you find the most taxing?

Manager A	Monday	Tuesday	Thursday	Remark: Responses were selected by (A, B, C) managers who took part of this survey.
Manager B	Monday	Tuesday	Friday	
Manager C	Monday	Wednesday	Thursday	

Table 1: Managers' responses regarding the amount of their daily work duties and the working pace (own research, 2022/2023)

Manager A: "I experience each working day quite intensely, so I find practically every day of the working week challenging. I cannot provide information regarding a specific day of the week if you have any questions with anything related to a specific day."

Manager B: “I consider Monday a challenging day because I go back to work after the weekend. I see Wednesday as a "breakthrough day" because it's in the middle of the work week. On the other hand, Fridays are difficult for me because I try to get as much work done as possible before the weekend.”

Manager C: "Recently, I have been responsible for several complex projects, so I experience every day intensely. However, I understand that other colleagues often find certain days more challenging or busy based on their work or personal schedules. The perception of which days are the most demanding varies for example among my colleagues and depends on their individual circumstances.”

3.2. The relationship between action and reflection

Mintzberg's research suggests that managers tend to gravitate towards dynamic and immediate aspects of their work, favouring activities that are current, specific, and well-defined over routine tasks. This tendency towards active engagement within their managerial environment promotes a preference for hands-on problem-solving and adaptability, rather than contemplative planning, despite classical management theories advocating for a more reflective approach.

Mintzberg (1973) writes:

> To conclude, we have further indications that the manager adopts particular behaviour patterns as a result of the nature of his work. The pressure of the managerial environment does not encourage the development of reflective planners, the classical literature notwithstanding. The job breeds adaptive information-manipulators who prefer the live, concrete situation. The manager works in an environment of stimulus-response, and he develops in his work a clear preference for live action. (p. 38)

However, considering the COVID-19 pandemic and the subsequent shift to remote work and virtual collaboration, it is important to explore how this crisis has affected the balance between action and reflection among project managers in contemporary post-pandemic contexts (OpenAI, 2024).

Insights from managers who participated in the survey provide valuable perspectives on the impact of this unprecedented disruption on their operational practices and decision-making processes.

Q2: What three activities in your work can be described as current, specific, well-defined, and non-routine?

Table 2: Managers' responses to the question of the relationship between action and reflection (own research, 2022/2023)

Manager A	Customer meetings	Escalation management	Team coaching
Manager B	Participation in project meetings	Project planning	Implementation of new project methodologies
Manager C	New project management tools creation	Scripting	Management of electronic applications

Manager A: “I do not currently engage in activities that are 'current' or 'non-routine'. My current job consists of managing project escalations, team coaching and meetings with customers. As part of these

activities, I try to understand the context of the project conversation and prepare solutions that are specific and relevant for colleagues and customers."

Manager B: "My work activities are formed on the basis of the organization's short- and medium-term technological development plans. This also means that I engage in activities that are current or specific to events or situations that occur on a certain project date. My activities are created on the basis of already existing project methodologies and mainly consist of routine tasks, which, however, can be adapted to specific project situations in real time."

Manager C: “Problem solving. Although not a routine in the traditional sense, I try to help colleagues by providing information and helping with various tasks. This also includes the creation of new project management tools, scripting, and electronic application management. Problem solving is one of my strengths. Whether it's a technical problem, a conceptual challenge, or anything else. Let me know the details and I'll try to help you find a solution!”

4. Discussion and critical reflexion

In critically reflecting on the research findings through the lens of Ernest Becker’s existential psychology, it is important to examine how his exploration of the human struggle for autonomy and self-assertion relates to the behaviors and motivations observed in this study. Becker's concept of the individual who defies personal frailty and strives for self-deification resonates with the intense drive for control and achievement observed among project managers in industrial settings. These managers, akin to Becker's "self-created man," resist being mere instruments of organizational forces. Instead, they immerse themselves fully in their roles, often displaying a relentless pursuit of project goals that mirrors the existential rebellion Becker articulates.

As Becker (1973) observes in *The Denial of Death*:

> And this brings us to our final type of man: the one who asserts himself out of defiance of his own weakness, who tries to be a god unto himself, the master of his fate; a self-created man. He will not be merely the pawn of others, of society; he will not be a passive sufferer and secret dreamer, nursing his own inner flame in oblivion. On the contrary, he will plunge into life. And in the distraction of great initiatives, he will become a restless spirit […] that leaves too clear a trace of his real presence, […] a restless spirit that wants to forget. (p. 84)

While Becker's reflections illuminate the profound inner conflicts that drive these behaviors, the research findings indicate that the project managers’ focus on control and self-assertion can sometimes come at the cost of deeper self-reflection and acknowledgment of their own limitations. This neglect of existential awareness risks leading to burnout (Maslach, 1996) and a disconnection from the broader social and symbolic context (Giddens, 1991), which Becker argues is essential for true self-realization. Becker further elaborates on this existential dilemma: “But it is more than creature anxiety, it is also man’s; anxiety, the anxiety that results from the human paradox that man is an animal who is conscious of his animal limitation” (Becker, 1973).

He continues:

> Anxiety is the result of the perception of the truth of one's condition. What does it mean to be a self-conscious animal? The idea is ludicrous if it is not monstrous. It means to know that one is food for worms. This is the terror: to have emerged from nothing, to have a name, consciousness of self, deep feelings, an excruciating inner yearning for life and self-expression—and with all of it yet to die. It seems like a hoax, which is one type of cultural man who rebels openly against the idea of God. What kind of deity would create such a complex and fancy worm food? Cynical deities, said the Greeks, who use man's torment for their own amusement. (p. 87)

In contrast, Henry Mintzberg's insights into the socially constructed nature of managerial roles offer a complementary perspective. Mintzberg posits that effective management necessitates an understanding of the broader social and organizational context; a factor often overlooked in the intense focus on individual autonomy that Becker describes (Martin, 2013; Jong, 2014).

The research findings suggest that while project managers exhibit a strong drive for control, their effectiveness is frequently enhanced when they embrace the holistic and socially embedded nature of their roles, as emphasized by Mintzberg (Mintzberg, 2020). This points to the necessity of balancing Becker's emphasis on existential autonomy with Mintzberg's focus on the social context of management. The research findings further highlight both the strengths and limitations of Becker's and Mintzberg's perspectives. While Becker's existential reflections underscore the intense personal drives that can motivate managers, Mintzberg's theories provide a crucial reminder of the significance of social context and the need for a more balanced approach to management. Addressing the challenges of project management in an industrial setting thus requires not only an understanding of the individual manager's existential struggles but also a recognition of the broader organizational dynamics that shape managerial roles.

5. Conclusion

This article synthesizes the influential contributions of Mintzberg on managerial roles alongside existential themes explored by Becker, underscoring the enduring relevance of Mintzberg's framework amidst contemporary business landscapes shaped by technological advancements and organizational changes. It highlights the ongoing challenge in fully understanding the multifaceted role of managers despite abundant professional development resources, emphasizing Mintzberg's empirical investigations.

Drawing parallels between Mintzberg's and Becker's insights, the article emphasizes the importance of symbolism and holistic understanding in comprehending managerial activities and human behaviour. It suggests a convergence of both scholars' views on the influence of social and symbolic factors. Ultimately, the conclusion underscores Becker's idea that confronting existential anxieties can be transformative, fostering personal growth and genuine connections that go beyond immediate understanding, and challenging illusions of invincibility.

References

Becker, E. (1973). *The Denial of Death*. Simon & Schuster.

Braun, V., & Clarke, V., (2006). Using thematic analysis in psychology. Online. *Qualitative Research in Psychology*. 3(2), 77-101. ISSN 1478-0887. https://doi.org/10.1191/1478088706qp063oa

Carroll, S. J., & Gillen, D. J. (1987). Are the Classical Management Functions Useful in Describing Managerial Work? *The Academy of Management Review*, *12*(1). https://doi.org/10.2307/257992

Foss, N. J., McCaffrey, M. C., & Dorobat, C. -E. (2022). "When Henry Met Fritz": Rules as Organizational Frameworks for Emergent Strategy Process. *Journal of Management Inquiry*, *31*(2), 135-149. https://doi.org/10.1177/10564926211031290

Giddens, A. (1991). *Modernity and Self-Identity: Self and Society in the Late Modern Age*. Stanford University Press.

Gjerde, S., & Alvesson, M. (2020). Sandwiched: Exploring role and identity of middle managers in the genuine middle. *Human Relations*, *73*(1), 124-151. https://doi.org/10.1177/0018726718823243

Jong, J. (2014). Ernest Becker's Psychology of Religion Forty Years On: A View from Social Cognitive Psychology. *Zygon®*, *49*(4), 875-889. https://doi.org/10.1111/zygo.12127

Martin, J. (2013). Revisiting Ernest Becker's Psychology of Human Striving. *Journal of Humanistic Psychology*, *53*(2), 131-152. https://doi.org/10.1177/0022167812447135

Maslach, C., & Leiter, M. P. (2016). *Understanding the Burnout Experience: Recent Research and Its Implications for Psychiatry*. World Psychiatry, 15(2), 103-111. https://doi.org/10.1002/wps.20311

Mazmanian, M., Orlikowski, W.J., & Yates, J. (2013). *The Autonomy Paradox: The Implications of Mobile Email Devices for Knowledge Professionals*. Organization Science, 24(5), 1337-1357. https://doi.org/10.1287/orsc.1120.0806

McCabe, S., Carpenter, R. W., & Arndt, J. (2015). The role of mortality awareness in heroic enactment. *Journal of Experimental Social Psychology*, *61*, 104-109. https://doi.org/10.1016/j.jesp.2015.08.001

Mintzberg, H. (1973). *The Nature of Managerial Work* (2nd ed.). Harper & Row Publishers.

Mintzberg, H., & Laasch, O. (2020). Mintzberg on (ir)responsible management. *Research Handbook of Responsible Management*. https://doi.org/10.4337/9781788971966.00010

OpenAI. (2024). *ChatGPT* (Mar 14 version) [Large language model]. https://chat.openai.com/chat

Rostron, A. (2022). How to be a hero: How managers determine what makes a good manager through narrative identity work. *Management Learning*, *53*(3), 417-438. https://doi.org/10.1177/13505076211007275

Gender Equality in Security Forces in the Czech Republic: Opportunities and Risks

Dana Junková[1*], Iva Borská[2]

[1]Police Academy of the Czech Republic in Prague, Faculty of Security Management, Department of Management and Information Science, Prague, Czech Republic
[2]Police Academy of the Czech Republic in Prague, Faculty of Security Management, Department of Management and Information Science, Prague, Czech Republic

Abstract: Equality between men and women has long been one of the basic values of the Czech Republic (see the Charter of Fundamental Rights and Freedoms), yet many gender inequalities persist. In terms of the level of equality between women and men, the Czech Republic ranks well below the EU average: according to the Gender Equality Index the Czech Republic ranks 25th out of 27 EU countries, and according to the Global Gender Gap Index 2023, it is even second to last and 101st among 146 evaluated countries worldwide. The contribution is devoted to selected aspects of gender equality in the security forces. It presents the results of a pilot investigation at the Police Academy of the Czech Republic in Prague. The paper aims to find out how the issue of equality between men and women in the security forces is perceived and to identify areas in which the integration and support of women in the police and other security forces can be optimized, thus contributing to developing theory, practice, and education in the security management field and reducing gender inequalities.

Keywords: Equality, gender, police, security forces, security management

JEL classification: Z18, J18

1. Introduction

Equality between women and men has long been one of the basic values of the Czech Republic (see the Charter of Fundamental Rights and Freedoms, 1992). The first document at the level of the government of the Czech Republic, Government's Priorities and Procedures for Promoting Equal Opportunities for Women and Men (2014), which coordinated activities around promoting equality between women and men, was adopted in 1998. Nevertheless, a series of gender inequalities persist, and the Czech Republic belongs to the level of equality of women and men far below the EU and world average. According to the Gender Equality Index of the European Institute for Gender Equality (2023), the Czech Republic is in 25th place out of 27 EU countries, and according to the Global Gender Gap Index of the World Economic Forum (2023), it is even second to last, i.e. 35th, out of all 36 European countries and 101st out of 146 evaluated countries worldwide.

The Action Plan for Equal Remuneration of Women and Men of the Czech Republic 2023-2026 (2023, p. 14) states that "in the public sphere, where there is greater regulation of earnings, either through salary tables or directly according to Act No. 234/2014 Coll., on state service, the differences in remuneration between women and men are generally lower. The salaries of women and men doing the same job in the same workplace in the public sector differ by an average of 5%". However, using more accurate data and comparing the hourly wages for 2016 (2023, p. 48) of men and women working full-time, including bonuses and overtime pay, the difference was 15%.

Security forces in the Czech Republic defined by Act No. 361/2003 Coll., on the employment relationship members of the security forces, as amended, are the Police of the Czech Republic and the

* Corresponding author's email: "junkova@polac.cz"

Fire Rescue Service of the Czech Republic, the Customs Administration of the Czech Republic, the Prison Service of the Czech Republic, the General Inspection of the Security Forces, the Security Information Service and the Office for Foreign Relations and Information. The Police of the Czech Republic, together with the Prison Service of the Czech Republic and the Customs Administration, are among the armed security forces that perform general and special tasks of a security nature resulting from the state's security policy, such as the protection of society-wide interests and values, the safety of persons, their lives, health, and human dignity and property, legal entities and their property.

The paper aims to find out how the issue of equality between men and women in the security forces is perceived and to identify areas in which the integration and support of women in the police and other security forces can be optimized. Thus, it aims to contribute to developing theory, practice, and education in the security management field and reducing gender inequalities.

2. Literature Review and Methods

Below Table No. 1 Differences in remuneration in selected ministries of the Czech Republic concerning the area of internal and external security and security forces shows data from the Czech Statistical Office on differences in remuneration in ministries (including departmental institutions) expressed in the GPG as of 12/31/2020. The Ministry of the Interior had the highest Gender Pay Gap (outside of senior positions) of the 14 ministries of the Czech Republic and the Office of the Government of the Czech Republic - at 24.8%; and the sixth highest GPG (leading position) out of 14 ministries of the Czech Republic and the Office of the Government of the Czech Republic at 12.5%.

Table No. 1 Differences in remuneration in selected ministries of the Czech Republic concerning the area of internal and external security and security forces

Selected ministries of the Czech Republic	Gender Pay Gap (except for managerial positions)	Gender Pay Gap (managerial positions)	Security Forces
Ministry of the Interior	24,8 %	12,5 %	The Police of the Czech Republic The Fire Rescue Service of the Czech Republic The Office for Foreign Relations and Information
Ministry of Defence	7,2 %	7,0 %	-
Ministry of Finance	6,3 %	17,2 %	The Customs Administration of the Czech Republic
Ministry of Justice	2,9 %	16,8 %	The Prison Service of the Czech Republic

As of January 1, 2023, the total registered number of members of the Police of the Czech Republic was 39,422, of which 7,057 (18%) were women. The anti-corruption group of the Council of Europe GRECO states in its report (2024, p. 38) that the Czech Republic has very few women in leading positions in the Police of the Czech Republic. As of 1/1/2023, there were only two women (i.e. 2.4%) in the leading positions of the Police of the Czech Republic at the first level of management, while there were 82 men at this level of regional police directors, their deputies, and deputies of the police presidium. Women held the largest share in the amount of 12.3% in the third level of management, i.e. the level of heads of departments and representatives of heads of departments. Of 4,036 managerial positions, women held 10.1%, i.e. 408, in the Police of the Czech Republic.

Based on an analysis of the internal and external environment, the following risks in matters of gender equality in the police were defined and investigated in a pilot questionnaire survey:

1. Gender stereotypes and prejudices, which, according to Zeltová (2008) in Machovcová (2018), " are negative in their content and include an emotional component." In the Czech Republic, persistent stereotypes about "male" and "female" roles can limit opportunities for women in various aspects of policing, from recruitment and selection to career progression and assignment to specialist departments.

2. Work-life balance: Police work often entails demanding and unpredictable working hours, making it difficult to reconcile professional obligations and family life, especially for women. In the Czech Republic according to the 2022 Gender Equality Report (2023, p. 9) women often play a primary role in caring for the family and where availability is generally low of part-time jobs and the low level of availability of care services for children up to 3 years of age.

3. Limited career advancement: Structural barriers, institutional obstacles, or invisible barriers (glass ceiling) can make it difficult for women in the police to advance to higher positions and achieve leadership roles, leading to inequality in leadership and decision-making.

4. Mental health and stress: High stress associated with police work incl. the possibility of borderline situations (use of a firearm, contact with death, child victims, assaults on duty, etc.) together with possible isolation and lack of support within the work environment, can have negative effects on the psychological health of female police officers. At the same according to Sabayova (2021) in Dinusova (2021, p. 124) “the police organization and its members are expected to be honest, trustworthy, reliable, willing to cooperate, respecting the interests of all interested parties, ensuring the satisfaction of customers and their employees, participating in increasing the sense of security of citizens and institutions, etc.”.

5. Discrimination and sexual harassment: Women in the police force can face discrimination and sexual harassment from colleagues and superiors, which can lead to a toxic work environment, reduced work motivation, and, in extreme cases, resignation. As stated in 2022 Gender Equality Report (2023, p. 52), the Czech Republic has no explicit legal regulation aimed at gender-based violence or sexual harassment.

6. Lack of Mentorship and Support: In environments where women are traditionally a significant minority, finding mentors or professional role models to help with professional development and navigating the institutional structure can be difficult.

7. The influence of government policy, the media, television, film, and literary production focused on police work: Public attitudes towards gender issues in the police are significantly influenced by the entities above and their activities. As stated in the Gender Equality Strategy for 2021-2030 (2021, p. 78-79), in general, the media influence and shape public opinion and can play a vital role in the protection of human rights and basic democratic principles, at the same time they can contribute to the spread and anchoring of gender stereotypes. The following are cited as the main problems in this area: the insufficient share of women in the creation and content of the media, the reproduction of gender stereotypes, or the lack of use of women as experts.

8. Physical risk and safety: Although this risk applies to all police officers, there is concern that women may be perceived as "easier targets" for physical assault or may face doubts about their physical fitness and ability to perform certain types of police duties.

9. Insufficient re/presentation: Although the number of women in the police is increasing, they are still in a significant minority with their eighteen percent representation in the Police of the Czech Republic, which can lead to a feeling of isolation and lack of support.

Within the Ministry of the Interior, to protect the rights of civil servants and employees, the function of the ombudsman of the Ministry of the Interior has been established, whose responsibility, among other things, also includes the agenda of promoting equal opportunities. Currently, the services of the ombudsman of the Ministry of Interior are not provided, due to the fact, that this position is not filled.

The contribution is devoted to selected aspects of gender equality in the security forces. It presents the results of a pilot investigation at the Police Academy of the Czech Republic in Prague. The research took place in the summer semester of the academic year 2023-2024. 66 questionnaires were included in the pilot research. Of the 66 respondents, 44, i.e. 66.7%, were women and 22, i.e. 33.3%, were men. 27 respondents were also members of the Police of the Czech Republic. The age of 45,5 % of respondents was in the range of 19-25 years, 16,7 % in the range of 26-35 years, 21,2% in the range of 36-45 years, and 15,2 % of respondents were over 46 years of age. According to the highest completed education: 39,4 % of the respondents had the highest completed university education and 60,6 % of the respondents had a secondary school education.

3. Results

The first two research questions focused on how the respondents perceive and generally evaluate the positions of equal access to women and men in the security forces of the Czech Republic and how they perceive and evaluate the situation at their workplace. Chart 1: General assessment of the position of equal access to women and men in the security forces of the Czech Republic and an evaluation of the situation at a specific workplace shows the results: the blue columns show the assessment of the situation in the security forces of the Czech Republic and the orange evaluation of the problem at the respondent´s workplace.

The respondents rated the situation above average in both cases, with the fact, that they rated the situation at their workplaces better. The average point assessment of the situation of equality between women and men in the security forces of the Czech Republic was 6.6 points and the average point evaluation of equality between women and men in the workplace was 7.5 points.

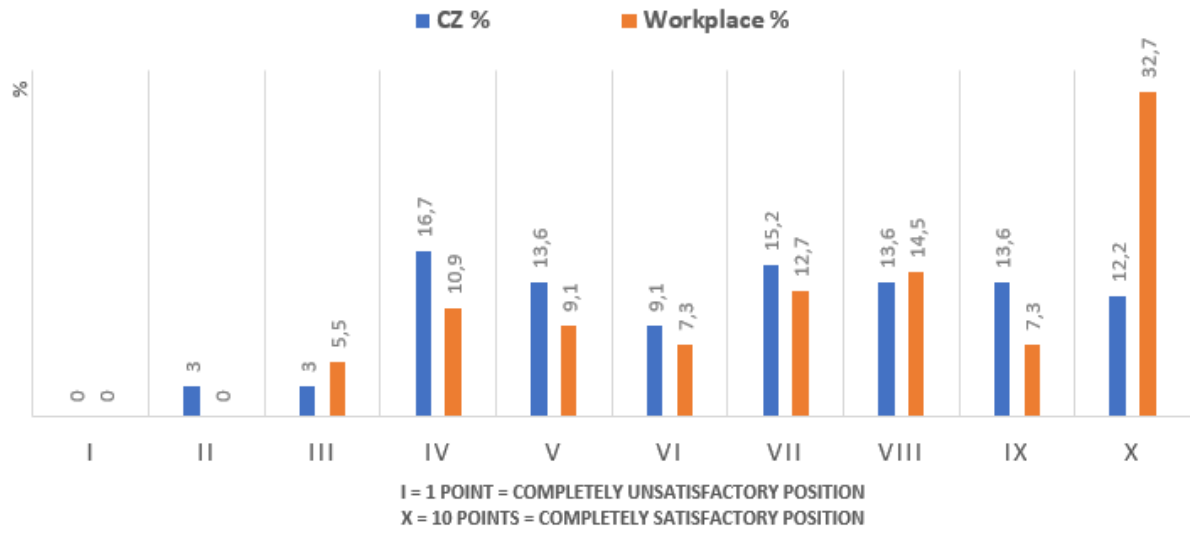


Chart 1: General assessment of the position of equal access to women and men in the security forces of the Czech Republic and an evaluation of the situation at a specific workplace

Respondents were asked to indicate 3 risks that they consider to be the most significant in the environment of the Police of the Czech Republic, out of the nine submitted: 1. Gender stereotypes and prejudices; 2. Work-life balance; 3. Limited career progression; 4. Mental health and stress, 5. Discrimination and sexual harassment, 6. Lack of mentorship and support, 7. Influence of government policy and media, 8. Physical risk and safety, 9. Insufficient re/presentation.

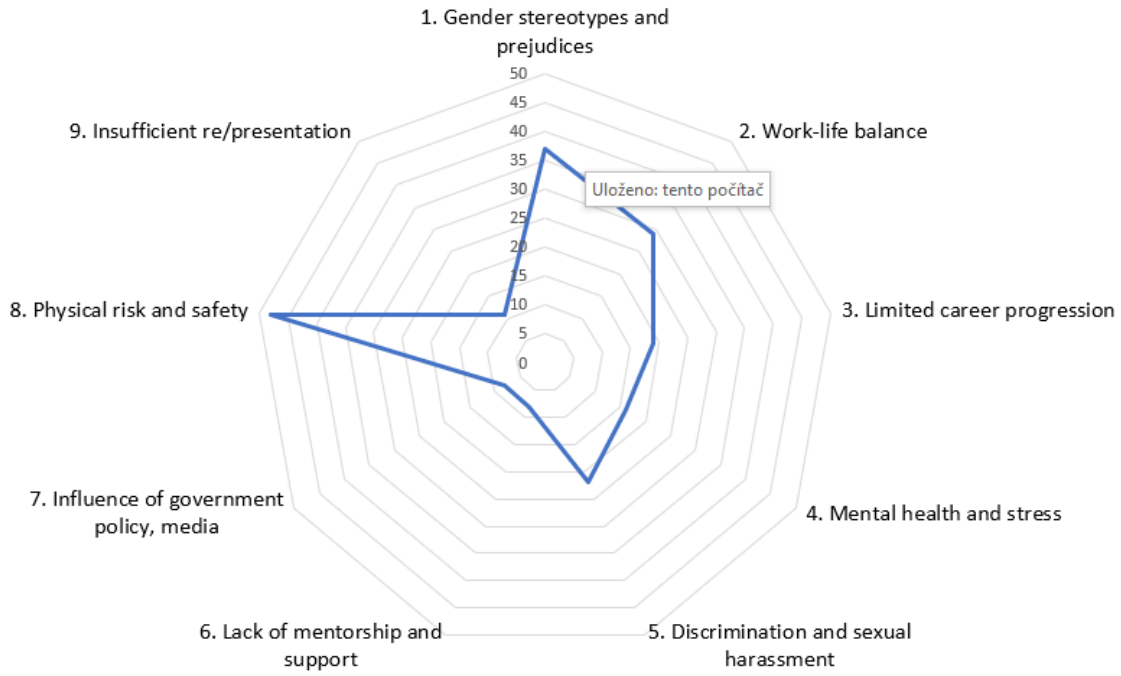


Chart 2: What risks do you consider to be the most significant in terms of gender equality in the Police of the Czech Republic

Chart 2: What risks do you consider to be the most significant in terms of gender equality in the Police of the Czech Republic shows that the respondents consider the following three most important risks:

physical risk and safety, gender stereotypes and prejudices, and work-life balance. They cited discrimination and sexual harassment in fourth place and limited career advancement in fifth place.

It can be concluded that the listed risks and their order are determined both by personal and professional experience and by information disseminated in the public space. E.g. the risk of safety and physical integrity concerns only a certain range of activities of the Police of the Czech Republic.

4. Discussion and conclusion

The aim of the paper is to find out how the issue of equality between men and women in the security forces is perceived and to identify factors in which the integration and support of women in the police and other security forces can be optimized. The authors are aware of the influence of the relatively low number of respondents. The research is the pilot phase of the investigation into the chosen issue and provides an initial insight into the issue. The obtained data are influenced by the majority (62.2%) of respondents under the age of 35. In the other age categories, the majority are men and members of the Police of the Czech Republic. Despite the above-average evaluation and the situation where even 54.5% of respondents rated the situation at their workplaces on the presented point scale high in the range of 8 to 10 points, the answers to other specific questions point to the possibility of persistent stereotypes, structural barriers, institutional obstacles, etc.

Based on the analysis of the internal and external environment and specific findings from the presented research, their interpretation and generalization, it can be summarized, that the opportunities for women in the police and their professional careers are influenced by three main factors. The first factor is the persistent traditional view of so-called typically female and male activities and professions in Czech society. The second factor is an insufficient implementation of already existing legislation and key European and national documents on gender equality and the creation of conditions for their specific fulfillment (e.g. by harmonizing professional and private life). The third factor is subjective causes, among which can be included both the insufficient managerial competence of the governing bodies in dealing with human resources and the defensiveness of women when accepting the challenges of career growth, often resulting from the responsibility of priority fulfillment of duties towards children and family.

As for the first factor, resulting from the traditional concept of female and male roles, it is possible to express suggestions for professional discussion and the opinion that the solution is a new perspective on the fulfillment of the security strategy and the mission of the Police of the Czech Republic – “To help and protect”. In this dimension, the female factor is essential, irreplaceable, and still undefined in the very concept of police activity. In the spirit of Masaryk's reference to the so-called “women's question” in Dytrl (2014, p. 17), a sensitive and sophisticated view of the equality of (professional) opportunities for women and men and specificity in the development of the potential of feminine and masculine qualities is needed.

References

Český statistický úřad. (2020, December 31). https://www.czso.cz/documents/11296/25210481/2020_k04t02.xlsx/d65c3174-f0d7-4258-a9f6-768c6db32886?version=1.0

Dytrt, Z. (2014). *Ženy a management: kreativita - inovace - etika - kvalitativní management*. Brno: BizBooks.

European Institude for Gender Equality. (2023) *Gender Equality Index 2023.* https://eige.europa.eu/modules/custom/eige_gei/app/content/downloads/factsheets/EU_2023_factsheet.pdf

Group of States against Corruption. (2024, March 4). Páté hodnotící kolo. Hodnotící zpráva Česká republika. https://rm.coe.int/grecoeval5rep-2022-7-final-cz-evaluation-report-czech-republic-ver/1680aeb6a9

Machovcová, K. (2018, October 16). *Stereotypy a předsudky jako myšlenkové chyby.* Metodický portál RVP.CZ. https://clanky.rvp.cz/clanek/c/G/21736/stereotypy-a-predsudky-jako-myslenkove-chyby.html

Ministerstvo práce a sociálních věcí. (2023) *Akční plán rovného odměňování žen a mužů České republiky 2023-2026.* https://www.mpsv.cz/documents/20142/225508/Akcni-plan_2023-2026.pdf/20a8daec-2039-314c-0764-196bc9673067

Poslanecká sněmovna Parlamentu České republiky. (1992, December 16). *Listina základních práv a svobod.* https://www.psp.cz/docs/laws/listina.html

Sabayová, M. (2021). Determinanty dôvery polícii. In D. Dinušová (Eds.), *Dôveryhodnosť Policajného zboru na pozadí aktuálnych otázok policajnej teórie a praxe: zborník vedeckých prác* (pp. 119–131). Akadémia Policajného zboru v Bratislave.

Úřad vlády České republiky. (2023) *Zpráva za rok 2022 o rovnosti žen a mužů.* https://vlada.gov.cz/assets/ppov/rovne-prilezitosti-zen-a-muzu/dokumenty/Zpravaorovnosti2022.pdf

Úřad vlády České republiky. (2021) Strategie rovnosti žen a mužů na léta 2021-2030. https://vlada.gov.cz/assets/ppov/rovne-prilezitosti-zen-a-muzu/Aktuality/Strategie_rovnosti_zen_a_muzu.pdf

Vláda České republiky. (2014, October 23). *Souhrnná zpráva o plnění priorit a postupů vlády při prosazování rovných příležitostí žen a mužů v roce 1998.* https://vlada.gov.cz/cz/ppov/rovneprilezitosti-zen-a-muzu/dokumenty/souhrnne-zpravy-o-plneni-priorit-a-postupu-vladypri-prosazovani-rovnych-prilezitosti-zen-a-muzu-za-roky-1998---2013-123732/

World Economic Forum. (2023, June 20). *Global Gender Gap Report 2023.* https://www.weforum.org/publications/global-gender-gap-report-2023/in-full/benchmarking-gender-gaps-2023/#country-coverage

Distinguishing the circular economy

Peter Kelemen[1]*, Iuliia Koreshkova[2], Veronika Vaseková[3], Kristýna Raimerová[4]

[1] Palacký University, Faculty of Arts, Department of Economic and Managerial Studies, Olomouc, Czech Republic

[2, 3] Palacký University, Faculty of Arts, Department of Asian Studies, Olomouc, Czech Republic

[4] Palacký University, Faculty of Arts, Department of Sociology, Andragogy and Cultural Anthropology, Olomouc, Czech Republic

Abstract: In this paper, we address the lack of definitional clarity in the area of Circular Economy by outlining the common characteristics and differences between the concepts of Circular Economy, Green Manufacturing, and Circular Business Model. We do this using a simple literature review of papers indexed in the Web of Science database. We found that the three closely related concepts pursue the same goal of reducing the environmental impact of economic activity, however, each of the concepts approaches the goal using different practices, tools, and has at a different scope. Readers may use this paper as an introduction to Circular Economy as a research area, as well as a source of recommendations for good practices in their future research.

Keywords: Circular Economy, Circular Business Model, Green Manufacturing

JEL classification: Q530, Q560

Grant affiliation: This publication was made possible thanks to targeted funding provided by the Czech Ministry of Education, Youth and Sports for specific research, granted in 2024 to Palacký University Olomouc (IGA_FF_2024_028 Challenges and opportunities of the circular economy and social entrepreneurship)

1. Introduction

As the awareness of environmental issues such as resource depletion, pollution and waste intensify in the collective psyche of the general public, ever more emphasis is being placed on sustainable development and reduction of waste. The circular economy is one of the many proposed frameworks which should, ideally, contribute to a transition to sustainable development.

The circular economy has been garnering significant attention in research both in academic circles as well as in the public space. This attention has translated into myths and unreasonable expectations by policy makers and academics alike (Corvellec et al., 2022), especially as a clear, agreed upon single definition continues to elude researchers. Definitions have been offered by many, such as Kirchherr et al. (2017), who painstakingly synthesized over a hundred definitions. Their paper has been cited thousands of times. Yet even this definition has been criticized by Figge et al. (2023) as too broad and too narrow at the same time, and modify the Kirchherr definition based on their criticism, describing CE as a "multilevel resource use system" (p. 2) which aims to close all resource loops in its idealized form, though they admit that realistically some use of virgin resources is inevitable. They also include activities such as recycling in the definition, attributing to them a supporting role. The multilevel nature of CE as highlighted by this definition is crucial, since it shows that it is impossible for a single business to be "fully circular". Nevertheless, it is clear that circular economy as a concept is being treated as a

* Corresponding author's email: peter.kelemen@upol.cz

potential solution to the challenge of combining economic benefits with a reduction in waste generation (Lieder & Rashid, 2016).

The goal of this paper is to contribute to a reduction in the lack of concept clarity in the field of circular economy. We fulfil this aim by using the simple literature review method to put the concept in contrast with two other concepts related to sustainable development, specifically Green Manufacturing and Circular Business Model. Furthermore, we use those comparisons along with an overview of circularity measurement methods to create a general list of indicators that a circularity measurement tool should include.

2. Theoretical background

The Circular Economy (CE) has been conceived of as a way to separate economic activity from its negative consequences for the environment. The primary way of achieving this separation is the repeated and continued reuse of raw materials and intermediates in the production process and of the final product by the end consumer, as well as recycling of the end products and materials at the end of their life cycles. In other words, materials and products need to return to the biological or technical cycle (McDonough & Braungart, 2008). By improving the efficiency of resource use and prolonging the life cycle of products (Blomsma & Brennan, 2017), CE may reduce the demand for virgin materials, thereby contributing to a more sustainable mode of economic development (Kennedy & Linnenluecke, 2021).

Although the potential value of the CE approach is intuitive, it has also faced significant criticism. Corvellec et al. (2022) refer to CE as a 'definitional quagmire' (p. 422), asserting that it builds on a wide range of distinct concepts and does not bring them together in a satisfactory way. Consequently, they argue, the term comes to be understood differently by different people. Indeed, there are studies that for example confound CE with Green manufacturing (Guo & Tsinopoulos, 2023), or the Circular Business Model (Kanda et al., 2021). Corvellec et al. (2022) add further criticisms, arguing that CE neglects established knowledge leading to unrealistic goals and expectations, unclear potential for actual implementation of the concept or related practices at the state or business level, and even unclear potential to actually contribute to environmental and social sustainability, ostensibly the primary value proposition of the concept as a whole. Kennedy & Linnenluecke (2021) add to this criticism by pointing out the lack of empirical evidence for the notion that greater resource efficiencies truly lead to lower demand for virgin materials, due to the possibility of firms taking advantage of the efficient use by increasing their production, using the same amount of virgin materials in the end. In summary, CE remains an untested ground, an umbrella term with an unclear operationalization, which nevertheless provides a new framing to old problems, and which has received significant business, academic and political endorsement.

The political endorsement has resulted in top-down pressure in favor of the adoption of CE-related practices. Although such institutional and legislative pressure has been found as a viable mechanism for increase in the rate of CE implementation (Ren & Albrecht, 2023), such pressure cannot be sustainable without them resulting in tangible benefits for businesses subjected to such pressures. In other words, for any CE transition to endure in the long-term, such transition must result in increased productivity, financial and business performance, or other positive effects on corporate bottom lines.

Although there is a considerable volume of research into the financial aspects of CE implementation (e.g. Fernando et al., 2023; Mazzucchelli et al., 2022), this research suffers from the already-described lack of concept clarity and fragmented operationalization; the specific CE-related activities are different, meaning that different studies actually measure the impact of different things on financial performance. It is no surprise, then, that research on the impact of CE implementation on financial performance remains inconclusive.

It is clear from the above that CE as a concept faces significant challenges. This paper attempts to tackle the concept clarity challenge by outlining the differences between the concepts of Circular Economy, Circular Business Model, and Green Manufacturing. We used a simple literature research method to find common characteristics and differences between the concepts of Circular Economy, Circular Business Model, and Green Manufacturing, having focussed our attention on the goals that each concept is trying to achieve, and the ways in which it seeks to achieve them. We searched for papers in the Web of Science database using each of the three concepts as keywords.

3. Distinguishing the Circular Economy

3.1. Circular Economy and Circular Business Model

A business model is a simplified representation of how value is created, delivered and captured within an organization (Geissdoerfer et al., 2018, p. 401). A Circular Business Model (CBM), then, is a business model which incorporates the ideas of CE in some form, such as by including recycling, efficiency increases, use phase extensions (Geissdoerfer et al., 2020). It is designed to enable firms to transition from linear to circular modes of functioning in order to decouple growth from environmental degradation (Esposito et al., 2024). A CBM focuses heavily on minimizing waste, extending product lifecycles and utilizing materials efficiently (Antony et al., 2023).

Transitioning to a CBM may have positive effects on performance and sustainability of profit (Lulaj et al., 2023). Bjørnbet et al. (2021) argue that CBM implementation is a means of sustainable development which also supports business competitiveness through the transformation of production processes. However, the progress the transformation of the economic system towards a CE model requires coordination supported by a central authority (Arana-Landin et al., 2023).

It appears that both CE and CBM as concepts have similar goals – reduced waste generation, more efficient resource use, decoupling growth from environmental degradation. However, whereas CE aims at achieving these goals on the level of the economic system as a whole, the goals of CBM are limited to specific organizations. As such, changes related to CE must include all relevant stakeholders on the level of the economic system, including municipalities, citizens, business, and governments. On the other hand, changes related to CBM only need to include stakeholders related to the business itself, such as the employees, management, partners, customers. Including the customer in the transition towards a CBM may be especially important, given the large role played by the customer in achieving the goals of CBM – prolonging the use of products, discarding unusable products such that they may be reused by other consumers, repaired, or at least the materials recycled, and enabling business profitability through purchasing decisions (Shevchenko et al., 2023).

3.2. Circular Economy and Green Manufacturing

Green Manufacturing (GM) has been defined as a method of manufacturing which reduces the environmental consequences of production by embracing sustainable manufacturing solutions and avoiding waste generation (Haleem et al., 2023). It is a process or system which minimizes or nullifies the impact of manufacturing on the environment (Dornfeld et al., 2012). The word 'green' here refers to the reduction of hazardous waste generated, reducing energy consumption or changing the structure of consumption such that the manufacturing process relies more on renewable energy sources (Paul et al., 2014).

The goals of Green Manufacturing and Circular Economy appear largely congruent (see Table 1), with both concepts broadly aiming at reducing the impact that the human need for consumption has on the environment. Though the two approaches share a broad goal, they focus on different levels: CE targets the broader economic system, whereas GM focusses on improving the efficiency and environmental impact of specific production processes.

Table 1: Goals of Green Manufacturing and Circular Economy

Goals	
Green Manufacturing	Circular Economy
Minimizing waste generation	Minimizing waste and pollution
Reducing environmental impact	Closing material loops
Improving resource efficiency	Promoting resource efficiency
Promoting the use of sustainable materials	Decoupling growth from consumption
Complying with environmental regulations	Enhancing resilience
Reducing carbon footprint	Closing material loops
Enhancing product lifecycle sustainability	Extending product lifecycles
Fostering innovation in eco-friendly technologies	Creating new opportunities and jobs
Aligning economic performance with environmental goals	Supporting sustainable development goals

Comparing the principles of green manufacturing as outlined by Helu & Dornfeld (2012) and the value framework for a sustainable circular economy as proposed by Suárez-Eiroa et al. (2019) and Velenturf & Purnell (2021), several key distinctions and overlaps can be observed: Scope and Focus, Evaluation and Metrics, Levels of Application, Social Considerations, Approach to Innovation and System Change, Economic Perspective, Decision-Making and Policy Implications. Whereas GM focusses on improving the efficiency and sustainability of manufacturing processes, CE aims for a more comprehensive transformation that redefines how resources are used across society. The CE framework broadens the scope to include social equity, long-term sustainability, and systemic innovation, whereas GM remains more process-oriented with a narrower focus on specific environmental and economic metrics. Both approaches are complementary, with green manufacturing providing practical steps toward the broader goals of the circular economy.

4. Discussion

The simple review of literature above reveals that the concepts of Circular Economy, Circular Business Model and Green Manufacturing are closely related, with the common unifying vision of weakening the link between economic output necessary for sustaining the modern way of life and degradation and depletion of the natural environment and resources. There may therefore be a temptation to declare some of these concepts redundant and call for an abandonment of research into the concept in a quest for greater academic unity. However, the sheer number of concepts related to sustainability demonstrates the increasing awareness in academic, professional, and policy circles of the unsustainable nature of humanity's current trajectory. It appears, then, that implementing Green Manufacturing in processes across a business may be a condition for achieving CBM in the business. Similarly, implementing CBM in all or a majority of businesses across a given market or society may be a condition for achieving a CE in that market. CE may be an umbrella concept, but it is one that provides a new drive and motivation for progress (Blomsma & Brennan, 2017). This unifying call for meaningful change may itself be valuable.

Our paper highlights that each of the three examined concepts approaches the overall vision at a different level and scope: the level of a single process for GM, urging for optimizations in the choice of materials and production technology; the level of a single business for CBM, exploiting new developments in supply chain management and greater investments into innovation, and society as a whole for CE, where national and international policy instruments are used to effect change. For prospective future researchers, this means that they should first decide which level they are going to be focussing on. This decision can then guide them in choosing the key concept investigate. Then there is the question of measurement. Though there have been a number of tools suggested for measuring circularity, or the extent of circular economy implementation, there is little agreement over which instrument should be used. De Oliveira et al. (2021), for example, provide a review of circularity measurement tools categorized into the nano and micro levels, with the micro level associated with a single company and the nano level with a single component. This approach built on findings of Kirchherr et al. (2017) who also distinguishes macro and meso levels of the Circular Economy – meso representing networks of organizations, macro representing cities and regions.

The issue of scope is, however, not the only issue with measurement of circularity. Even at a single level, there may be differences in what processes are relevant for circularity. For instance, research in the mining industry has been focussed on extracting additional resources from what was until recently considered waste (Kinnunen et al., 2022). However, indicators used to assess circularity in a mining operation (e.g. Lèbre et al., 2017), such as tailings generation, may not be relevant in other industries, such as food processing. Even within the same industry, indicators relevant for a set of products manufactured by one business may not be relevant for another business. What this means, then, is that researchers should carefully consider what tool they use to measure CE implementation at their chosen scope. The indicators they measure need to fit the target products, companies, or regions. This may mean that each investigated company requires its own, tailor-made set of circularity indicators to assess the extent to which they succeeded in decoupling their production from environmental harm.

5. Conclusions

The goal of this paper was to introduce more clarity into the nebulous nature of Circular Economy as a concept. For this, we used a simple literature review to find common characteristics and differences

between Circular Economy, Circular Business Model, and Green Manufacturing. The paper may serve as a basic introduction into the are of Circular Economy, to reduce confusion for those researchers who are looking to join the quest toward a more sustainable future.

The paper also highlights the need for caution when attempting to assess the extent of circularity implementation. The chosen circularity indicators must correspond to the scope and specific attributes of the investigated product.

References

Antony, J., Swarnakar, V., Sony, M., McDermott, O., & Jayaraman, R. (2023). How do organizational performances vary between early adopters and late adopters of Quality 4.0? An exploratory qualitative study. *The TQM Journal*.

Arana-Landin, G., Sigüenza, W., Landeta-Manzano, B., & Laskurain-Iturbe, I. (2024). Circular economy: On the road to ISO 59000 family of standards. *Corporate Social Responsibility and Environmental Management*, *31*(3), 1977-2009.

Bjørnbet, M. M., Skaar, C., Fet, A. M., & Schulte, K. Ø. (2021). Circular economy in manufacturing companies: A review of case study literature. *Journal of Cleaner Production*, *294*, 126268.

Blomsma, F., & Brennan, G. (2017). The emergence of circular economy: a new framing around prolonging resource productivity. *Journal of industrial ecology*, *21*(3), 603-614.

Corvellec, H., Stowell, A. F., & Johansson, N. (2022). Critiques of the circular economy. *Journal of industrial ecology*, *26*(2), 421-432.

De Oliveira, C. T., Dantas, T. E. T., & Soares, S. R. (2021). Nano and micro level circular economy indicators: Assisting decision-makers in circularity assessments. *Sustainable Production and Consumption*, *26*, 455-468.

Dornfeld, D. A. (Ed.). (2012). *Green manufacturing: fundamentals and applications*. Springer Science & Business Media.

Esposito, B., Sica, D., Supino, S., & Malandrino, O. (2024). Measuring the impact of circular economy performance on financial performance: The moderating role of stakeholder engagement. *Business Strategy and the Environment*.

Fernando, Y., Shaharudin, M. S., & Abideen, A. Z. (2022). Circular economy-based reverse logistics: dynamic interplay between sustainable resource commitment and financial performance. *European Journal of Management and Business Economics*, *32*(1), 91-112.

Figge, F., Thorpe, A., & Gutberlet, M. (2023). Definitions of the circular economy-circularity matters. *Ecological Economics*, *208*.

Geissdoerfer, M., Pieroni, M. P., Pigosso, D. C., & Soufani, K. (2020). Circular business models: A review. *Journal of cleaner production*, *277*, 123741.

Geissdoerfer, M., Vladimirova, D., & Evans, S. (2018). Sustainable business model innovation: A review. *Journal of cleaner production*, *198*, 401-416.

Guo, H., & Tsinopoulos, C. (2023). Enabling a circular economy through green manufacturing in chinese apparel manufacturers: antecedents and outcomes. *IEEE Transactions on Engineering Management*.

Haleem, A., Javaid, M., Singh, R. P., Suman, R., & Qadri, M. A. (2023). A pervasive study on Green Manufacturing towards attaining sustainability. *Green Technologies and Sustainability*, *1*(2), 100018.

Helu, M., & Dornfeld, D. (2012). Principles of green manufacturing. In *Green manufacturing: Fundamentals and applications* (pp. 107-115). Boston, MA: Springer US.

Kanda, W., Geissdoerfer, M., & Hjelm, O. (2021). From circular business models to circular business ecosystems. *Business Strategy and the Environment*, *30*(6), 2814-2829.

Kennedy, S., & Linnenluecke, M. K. (2022). Circular economy and resilience: A research agenda. *Business Strategy and the Environment*, *31*(6), 2754-2765.

Kinnunen, P., Karhu, M., Yli-Rantala, E., Kivikytö-Reponen, P., & Mäkinen, J. (2022). A review of circular economy strategies for mine tailings. *Cleaner Engineering and Technology*, *8*, 100499.

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, conservation and recycling*, *127*, 221-232.

Lèbre, É., Corder, G., & Golev, A. (2017). The role of the mining industry in a circular economy: a framework for resource management at the mine site level. *Journal of Industrial Ecology*, *21*(3), 662-672.

Lieder, M., & Rashid, A. (2016). Towards circular economy implementation: a comprehensive review in context of manufacturing industry. *Journal of cleaner production*, *115*, 36-51.

Mazzucchelli, A., Chierici, R., Del Giudice, M., & Bua, I. (2022). Do circular economy practices affect corporate performance? Evidence from Italian large-sized manufacturing firms. *Corporate Social Responsibility and Environmental Management*, *29*(6), 2016-2029.

McDonough, W., & Braungart, M. (2010). *Cradle to cradle: Remaking the way we make things*. North point press.

Paul, I. D., Bhole, G. P., & Chaudhari, J. R. (2014). A review on green manufacturing: it's important, methodology and its application. *Procedia materials science*, *6*, 1644-1649.

Ren, Q., & Albrecht, J. (2023). Toward circular economy: The impact of policy instruments on circular economy innovation for European small medium enterprises. *Ecological Economics*, *207*, 107761.

Shevchenko, T., Saidani, M., Ranjbari, M., Kronenberg, J., Danko, Y., & Laitala, K. (2023). Consumer behavior in the circular economy: Developing a product-centric framework. *Journal of Cleaner Production*, *384*, 135568.

Suárez-Eiroa, B., Fernández, E., Méndez-Martínez, G., & Soto-Oñate, D. (2019). Operational principles of circular economy for sustainable development: Linking theory and practice. *Journal of cleaner production*, *214*, 952-961.

Velenturf, A. P., & Purnell, P. (2021). Principles for a sustainable circular economy. *Sustainable production and consumption*, *27*, 1437-1457.

Developing Soft Skills for Conscious Business with ChatGPT

Jaroslava Kubátová[1]*, David Kosina[2], Ondřej Kročil[3], Michal Müller[4], Pavla Slavíčková[5]

[1, 2, 3, 4, 5]Palacký University, Faculty of Arts, Department of Economic and Managerial Studies, Olomouc, Czech Republic

Abstract: The aim of this paper is to find out if ChatGPT can assist in the development of particular soft skills. This question arises from the intersection of two major trends that are present in today's society and economy. First, the growing belief that businesses should have a positive social impact, with conscious business being one of the approaches. Second, the growing availability of generative artificial intelligence (GAI) based tools to the general public, among which ChatGPT stands out for its popularity. Based on literature review, firstly the soft skills that are considered most important for both doing business and using GAI consciously are identified in the paper. Secondly, the potential of using ChatGPT to assist in developing specific soft skills is explored.

Keywords: ChatGPT, conscious business, ethics, soft skills

JEL classification: O31

Grant affiliation: MEGASKILLS – MEthodology of Psycho-pedagogical, Big Data and Commercial Video GAmes procedures for the European SKILLS Agenda Implementation (Project number: 101094275). Funded by the European Union. Views and opinions expressed are however those of the authors only and do not necessarily reflect those of the European Union or the European Research Executive Agency.

1. Introduction

This paper aims to determine if ChatGPT can assist in the development of specific soft skills. It focuses on particular soft skills crucial for addressing two current challenging trends: the increasing necessity for businesses to be led consciously to generate positive social impact, and the rising influence of GAI on modern society. First, the manifestations of the mentioned trends are described. Then the soft skills that are most important for both doing business and using GAI consciously are identified. The potential of using ChatGPT to assist in developing specific soft skills is eventually explored and discussed.

Although soft skills are a frequently researched and discussed topic, there is a great deal of conceptual ambiguity in this area (Marin-Zapata et al., 2022). In this paper, competencies represent a broad set of skills necessary for job performance, with soft skills being a critical component. Soft skills are crucial for effectively applying technical skills and knowledge not only in professional contexts but also in social contexts.

2. Essential Soft Skills for Conscious Business in the Era of GAI

The discussion about the purpose of business has been a topic of interest across various fields such as economics, philosophy, and business ethics for many years. The exploration of this topic can be traced back to the early development of commerce and trade, but more structured academic discussions have evolved significantly during the 20th century. Today, discussions around the purpose of business are highly interdisciplinary, involving insights from ethics, economics, environmental studies, and social sciences. Contemporary debates often focus on balancing profitability with ethical considerations and

* Corresponding author's email: jaroslava.kubatova@upol.cz

long-term sustainability (Krøjer & Langergaard, 2023). However, with the launch of GAI-supported tools such as ChatGPT, which are available to the general public, the question about the purpose of business becomes even more urgent (Haleem et al., 2022). Ritala (2023) argues that our global society faces severe grand challenges. A grand challenge refers to a broad and complex problem that is both scientifically difficult and has significant societal impact. These challenges, such as climate change, water and food security, cybersecurity, AI and robotics development, etc., require innovative solutions and interdisciplinary cooperation to be resolved. Ritala (2023) states that addressing grand challenges requires organizational structures that enable participation and coordinated action by multiple actors, a way to coordinate these actors' actions toward a specific higher-order purpose, and facilitating the achievement of those goals at scale. Without sufficient scale complex challenges cannot be resolved effectively. One solution for achieving scale is supranational legislation, although this is difficult to accomplish, even when clearly needed. Alternatively, a range of community, nonprofit, and public-private initiatives can also contribute to achieving scale. Addressing grand challenges is inherently extremely challenging, including a challenge stemming from the very nature of collective action, which is known to break down in the presence of self-interested behavior by individuals and organizations.

Nevertheless, there is hope that economically sustainable business strategies, which are primarily focused on positive social impact, are also being developed. One of these is conscious business. Conscious business refers to business practices intended to make the world a better place. Profit is naturally important for conscious businesses, but it is neither their main nor only purpose (Mackey & Sisodia, 2013). The necessity to address grand challenges supports the call for conscious business led by conscious leaders (Kubátová & Kročil, 2022). Kubátová and Kročil (2022) identified over thirty competencies that conscious leaders possess, many of which are soft skills. Developing these competencies in today's society could therefore contribute to solving the grand challenges.

In November 2022 ChatGPT was launched and with 100 million active users by the end of 2023 stands out for its popularity (Brandl, 2024). With its potential to change not only ways of working but also ways of life, ChatGPT is considered revolutionary (McGeorge, 2024). To leverage its potential for the common good and to avoid any potential risks, a revision of necessary competencies including soft skills in this new GAI-driven era is inevitable. In their research focused on the most important soft skills in the 21st century, Kubátová et al. (2023) identified thirty soft skills that are important in the current AI-supported environment.

By conducting a thematic analysis (Guest et al., 2012) of both sources, it was possible to identify common competencies with a focus on soft skills. Each competency was treated as a separate theme, and themes that encompassed similar competencies were grouped together. The analysis revealed that both sources shared several key soft skills, specifically ethics and ethical behavior, communication and communication skills, and cultural competence and cultural intelligence. This alignment underscores the critical role of ethics, communication, and cultural intelligence in navigating the complexities of contemporary business practices. Nevertheless, we do not claim that these three soft skills identified at the intersection of the two studied sources represent an exhaustive list of prerequisites for conducting business consciously in the GAI era.

3. Development of soft skills with the use of ChatGPT

Research exploring ChatGPT's ability to develop soft skills has already begun. ChatGPT's potential for developing communication, critical thinking, and logical and methodological reasoning has been

demonstrated by Michalon and Camacho-Zuñiga (2023). Brin et al. (2023) demonstrated that ChatGPT, notably GPT-4, shows capacity for empathy, indicating GAI's potential to meet the complex interpersonal, ethical, and professional demands intrinsic to the practice of medicine.

In the next part of this paper, we will focus on ethics as a fundamental soft skill and its development with the use of ChatGPT. The key role of ethics in human conduct has been documented throughout history. Its importance in contemporary organizations has been emphasized, for example, by Buch (2024). Ethics steers businesses toward sustainable practices that benefit society and the environment. It also guides the development and deployment of AI technologies, ensuring these innovations serve society and protect vulnerable populations from harm.

We propose defining ethics as internalized principles and moral codes that guide an individual's behavior and decisions, promoting fairness, honesty, and integrity. Ethics manifests as consistently acting in a manner that upholds personal and societal values, even in challenging situations.

While acknowledging its limitations and potential objections, we conducted a case study (Meyer, 2001) to find out if ChatGPT can help with ethics development. A case study involves an in-depth, detailed examination of a single subject or case - in this instance, our own experience using ChatGPT-4o for ethics development.

3.1. ChatGPT-based Ethics Mentor

Based on relevant prompts, ChatGPT, as a GAI, can support ethical development in various ways, such as by providing educational materials and scenarios, role-playing exercises, or feedback on ethical decisions. Moreover, several GPTs, i.e. custom versions of ChatGPT called also GPT models, focused on ethics, are available. However, it must be taken into account that ChatGPT can sometimes provide incorrect or outdated information, generate biased or harmful content, or produce plausible but false or nonsensical content, known as hallucinations.

To mitigate these risks, we decided to create our own semi-public (available to users with a link) GPT model named Ethics Mentor, Mentor Etiky in Czech. As it is potentially targeted at Czech students, it was created in Czech at the link https://chatgpt.com/g/g-8OktiFupX-mentor-etiky, however, it can communicate in English too.

The process of creating a custom GPT involves several steps, each of which is crucial for ensuring the model meets specific educational objectives. The first step was to clearly define the objectives. In this case, the goal was to develop a GPT that could support the enhancement of ethics and ethical reasoning among university students. GPT was instructed to create theoretical tests, case studies, and ethical dilemmas, and to evaluate the solutions provided by students.

The next step involved selecting appropriate training data. For Ethics Mentor, relevant sources on ethics were used. The key resources included *Etika pro pokročilé* (Šiler, 2020b) and *Aplikovaná etika* (Šiler, 2020a), both available under Creative commons license. These texts provide a comprehensive foundation in ethical theory and practical application. The Ethics Mentor is not allowed to access the internet but is not restricted from accessing the ChatGPT knowledge base. This expands its capabilities, but at the same time increases the above mentioned risks and limitations. The ideal would be to upload enough verified sources and prompt the model to draw only from them. The customization also

involved setting specific instructions for how the model should respond to queries, focusing on promoting ethical understanding and reasoning.

After initial training, Ethics Mentor was tested with various ethical questions and scenarios to ensure it provided accurate and insightful responses. Feedback was used to further refine the model. Now, Ethics Mentor, as a customized GPT, exhibits several capabilities tailored to fostering ethics:

- Ethics Mentor can generate theoretical tests on ethics, covering various topics such as moral principles, ethical theories, and applied ethics. These tests can be used for both formative and summative assessments.
- Ethics Mentor can create ethical dilemmas that challenge students to apply their ethical knowledge and reasoning skills. These dilemmas are designed to be relevant and thought-provoking, encouraging deep reflection and discussion.
- Ethics Mentor can generate detailed case studies based on real-world scenarios. Such case studies can be used in classroom discussions to enhance students' practical understanding of ethical issues.

One of the key features of Ethics Mentor is its ability to evaluate the solutions provided by students. The model can provide feedback on the ethical reasoning demonstrated in students' responses, helping them to improve also their critical thinking and decision-making skills.

Despite its advanced capabilities, Ethics Mentor has also limitations:

- While the model is trained on comprehensive ethical texts, it may still struggle with understanding nuanced contexts that require deep human insight. This can sometimes result in responses that are technically correct but lack the depth of human judgment.
- The model's responses are influenced by the data it was trained on. If the training data contains biases, these can be reflected in the model's outputs. Additionally, the model might occasionally produce inconsistent responses to similar queries.
- The quality of the model's responses heavily depends on the quality and clarity of the input it receives. Ambiguous or poorly framed questions can lead to less accurate or relevant answers.
- While Ethics Mentor can provide valuable insights into ethical reasoning, it lacks the emotional and empathetic understanding that human educators bring to discussions on sensitive ethical issues.
- Access to Ethics Mentor is granted only to users with at least a free ChatGPT account.

Custom GPT models like Ethics Mentor offer a promising tool for developing soft skills. By creating tailored educational content and providing feedback, these models can enhance traditional teaching methods and provide students with additional resources for learning. However, it is essential to recognize their limitations and use them as a complement to, rather than a replacement for, human facilitated education. Nevertheless, as technology continues to advance, the potential for using GAI in education will likely expand, offering new opportunities for fostering essential skills in innovative ways.

4. Discussion and conclusion

The aim of this paper was to find out if ChatGPT can assist in the development of particular soft skills. The conclusion may seem simple and straightforward, because on the first sight, the answer is yes, ChatGPT can assist in the development of soft skills. But there are other aspects to consider. For

example, can GAI be viewed as another new factor affecting professional ethics development in addition to those identified by Dehghani (2020)? How to measure the development of the soft skill such as ethics through the GPT model; could it be inspired for example by Clarkeburn et al. (2003)?

However, the fact that we have addressed the issue of developing one soft skill that is important for a conscious approach to business using GAI raises another much more general question. How will the work of university instructors and their students change in the GAI environment? GAI-supported tools are advancing (Haan & Watt, 2024). What does this mean for the instructors and students? To discuss these questions, in table 1 we propose SWOT analysis of integrating GAI like ChatGPT in university teaching. Again, this SWOT analysis is more for discussion than a final version. The list of factors in the analysis can be definitively expanded. Moreover, in this case, there is a natural overlap between the external (outside the direct control of the university) and internal (within the direct control of the university) factors.

Table 1: SWOT analysis of integrating GAI in university teaching

(Source: author team)

Strengths • **Enhanced Instructional Support:** GAI tools can provide personalized assistance to students, freeing up instructors' time for more high-level teaching. Continuous support beyond traditional office hours. • **Content Creation and Curation:** GAI can help create and update lecture notes, slides, quizzes, and lesson plans, ensuring dynamic and current course materials. • **Adaptive Learning:** GAI platforms can tailor learning experiences to individual students' needs, improving learning outcomes. • **Assessment and Feedback:** Automated grading and feedback ensure timely and consistent evaluation, allowing instructors to focus on complex assessments. • **Enhanced Engagement:** Interactive GAI tools can make learning more engaging and immersive, fostering better student involvement. • **Research Assistance:** GAI can assist with literature reviews, data analysis, and hypothesis generation, enhancing the quality of student research.	**Weaknesses** • **Resistance to Change:** Instructors and students may resist adopting new technologies, hindering the effective integration of GAI tools. • **Digital Literacy Requirements:** Both instructors and students need to have sufficient digital literacy to effectively use GAI tools. • **Dependency on Technology:** Over-reliance on GAI could lead to a reduction in critical thinking and problem-solving skills if not managed properly. • **Maintenance and Updates:** Continuous updates and maintenance of GAI tools are required to ensure they function correctly and stay relevant. • **Quality Control:** Ensuring the accuracy and quality of GAI-generated content can be challenging and time-consuming. • **Intellectual Property Concerns:** Issues surrounding the ownership of GAI-generated content could arise, creating legal and ethical dilemmas.
Opportunities • **Professional Development:** Opportunities for instructors and students to engage in ongoing professional development and stay updated with GAI advancements.	**Threats** • **Equity Issues:** Potential disparities in access to GAI tools and digital resources among students.

• **Innovative Teaching Methods:** GAI opens doors for new, innovative teaching methods and collaborative projects, enhancing the educational experience. • **Broader Access:** GAI can provide more flexible learning options, benefiting students in different time zones or with varied schedules. • **Ethical and Critical Thinking Education** Integrating discussions on the ethical use of GAI, data privacy, and societal impacts into the curriculum. • **Scalability:** GAI tools can help manage large classes more effectively, providing personalized support at scale.	• **Academic Integrity:** Risk of misuse of GAI for cheating or plagiarism, requiring robust measures to ensure academic integrity. • **Bias in GAI:** GAI algorithms may have inherent biases, leading to biased outcomes in educational support and assessments. • **Privacy Concerns:** Ensuring data privacy and security when using GAI tools to handle student information. • **Balancing GAI and Human Interaction** Risk of diminishing the value of human interaction and mentorship in the educational process.

GAI based tools like ChatGPT and customized GPT models present numerous strengths and opportunities for transforming university teaching. However, addressing the weaknesses and threats is crucial to maximize the benefits and mitigate potential drawbacks. In exploring the potential of ChatGPT as a tool for ethical education, it is essential to consider existing frameworks of moral development. For example, Kohlberg's model, as applied to college students' technology ethics decisions (Kiser et al., 2009), provides insights into how moral reasoning evolves through educational interventions. Thus, while AI tools like ChatGPT can offer new ways to engage students in ethical reasoning, the progression through Kohlberg's stages may still require careful curriculum design to ensure that students develop a deep, principled understanding of ethical issues. We believe that with careful implementation, continuous evaluation, and ongoing professional development, instructors can leverage GAI to enhance the educational experience while maintaining the essential human elements of teaching and learning.

References

Brandl, R. (2024, May 29). *ChatGPT Statistics 2024. All the latest statistics about OpenAI's chatbot. Tooltester.* https://www.tooltester.com/en/blog/chatgpt-statistics/

Brin, D., Sorin, V., Vaid, A., Soroush, A., Glicksberg, B. S., Charney, A. W., Nadkarni, G., & Klang, E. (2023). Comparing ChatGPT and GPT-4 performance in USMLE soft skill assessments. *Scientific Reports, 13,* 43436. https://doi.org/10.1038/s41598-023-43436-9

Buch, A. (2024). *Ethics After the 'Turn to Practice'.* Abstract from 4th PHILOS conference, Paphos, Greece.
https://www.ucviden.dk/ws/portalfiles/portal/191291087/Abstract_Anders_Buch_PHILOS_2024.pdf

Clarkeburn, H. M., Downie, J. R., & Gray, C. (2003). Measuring ethical development in life sciences students: A study using Perry's developmental model. *Studies in Higher Education, 28*(4), 443-456. https://doi.org/10.1080/0307507032000122288

Dehghani, A. (2020). Factors affecting professional ethics development in students: A qualitative study. *Nursing Ethics, 27*(1), 5-14. https://doi.org/10.1177/0969733019845135

Guest, G., MacQueen, K. M., & Namey, E. E. (2012). *Applied Thematic Analysis.* SAGE Publications.

Haan, K., & Watt, R. (2024, April 2024). *How Businesses Are Using Artificial Intelligence In 2024*. https://www.forbes.com/advisor/business/software/ai-in-business/

Haleem, A., Javaid, M., & Singh, R. P. (2022). An era of ChatGPT as a significant futuristic support tool: A study on features, abilities, and challenges. *BenchCouncil Transactions on Benchmarks, Standards and Evaluations, 2*(4), Article 100089. https://doi.org/10.1016/j.tbench.2023.100089

Kiser, A. I. T., Morrison, E. E., & Craven, A. (2009). The application of Kohlberg's moral development model to college students' technology ethics decisions. *Journal of College Teaching & Learning, 6*(5), 89-96. https://doi.org/10.19030/tlc.v6i5.1146

Krøjer, J., & Langergaard, L. L. (Eds.). (2023). *Social sustainability in unsustainable society: Concepts, critiques and counter-narratives*. Springer.

Kubátová, J., & Kročil, O. (2022). A conscious leadership competency framework for leadership training. *Industrial and Commercial Training, 54*(2), 279-292. https://doi.org/10.1108/ICT-08-2021-0062

Kubátová, J., Müller, M., Kosina, D., Kročil, O. & Slavíčková, P. (2023). *Soft skills for the 21st century. Taxonomy and model.* [Unpublished deliverable D2.3v1 from MEGASKILLS project, HORIZON-CL2-2022-TRANSFORMATIONS-01, Grant agreement nº 101094275].

Mackey, J., & Sisodia, R. (2013). *Conscious capitalism: Liberating the heroic spirit of business.* Harvard Business Review Press.

Marin-Zapata, S. I., Román-Calderón, J. P., Robledo-Ardila, C., & Jaramillo-Serna, M. A. (2022). Soft skills, do we know what we are talking about? *Review of Managerial Science, 16*(4), 969–1000. https://doi.org/10.1007/s11846-021-00474-9

McGeorge, D. (2024). *The ChatGPT revolution: Get curious, get productive and get creative with AI*. Wiley.

Meyer, C. B. (2001). A Case in Case Study Methodology. *Field Methods, 13*(4), 329-352. https://doi.org/10.1177/1525822X0101300402

Michalon, B., & Camacho-Zuñiga, C. (2023). ChatGPT, a brand-new tool to strengthen timeless competencies. *Frontiers in Education, 8*, 1251163. https://doi.org/10.3389/feduc.2023.1251163

Ritala, P. (2023). Grand challenges and platform ecosystems: Scaling solutions for wicked ecological and societal problems. *The Journal of Product Innovation Management, 41*(2), 168–183. https://doi.org/10.1111/jpim.12682

Šiler, V. (2020a). *Aplikovaná etika*. Filozofická fakulta Ostravské univerzity. https://www.researchgate.net/profile/Vladimir-Siler/publication/349724715_Aplikovana_etika_Ucebnice_2020/links/603e9973a6fdcc9c780c67a9/Aplikovana-etika-Ucebnice-2020.pdf.

Šiler, V. (2020b). *Etika pro pokročilé.* Filozofická fakulta Ostravské univerzity. https://siler.fi.cz/wp-content/uploads/2020/09/Etika-pro-pokrocile-Ucebnice.pdf.

Impact of Cultural Intelligence and Project Success with mediating effect of Team Cohesion and moderating effect of Leadership Styles

Bufeng Lan [1*],Richard Brunet-Thornton [2]

[1,2]Faculty of Business Administration, Prague University of Economics and Business

Abstract: This paper explores the impact of cultural intelligence on project success, focusing on the mediating effect of team cohesion and the moderating effect of leadership style. Data was collected from project organizations of Chinese multinational enterprises in the Czech Republic, Hungary, and Poland. The study aims to identify leadership styles suitable for cross-cultural project management and improve team cohesion to achieve project milestones efficiently.

Keywords: Cultural Intelligence, Team Cohesion, Leadership Style, Project Success

1. Introduction

Today, all economic activities depend on international projects (Davis, 2011). With the rapid development of globalization and the contemporary world, project management is increasing across various industries, such as defense, aerospace, and infrastructure (Rezvani et al., 2016). Chinese enterprises, in particular, face challenges in managing international engineering projects due to deficiencies in managing diverse environments. This study investigates how cultural intelligence, team cohesion, and leadership styles influence project success.

2. Literature Review

2.1. The correlation of Cultural Intelligence and Project Success and Team Cohesion

Cultural intelligence, the ability to adapt to new cultural environments, is crucial for project success. Project managers with high cultural intelligence improve team collaboration and project outcomes (Earley & Ang, 2003; Ng & Earley, 2006).

H1: There is a positive correlation between cultural intelligence and project success.

Cultural intelligence enhances team cohesion by fostering better understanding and respect among team members (Groves & Feyerherm, 2011). Leaders with high cultural intelligence improve team dynamics in diverse environments.

H2: There is a positive correlation between cultural intelligence and team cohesion.

2.2. The correlation of Team Cohesion and Project Success

Team cohesion, the rapport and commitment among team members, positively impacts project success by improving communication, coordination, and decision-making. (Hoegl & Gemuenden, 2001).

H3: There is a positive correlation between team cohesion and project success.

* Corresponding author's email: "lanb02@vse.cz"

2.3. Mediating Role of Team Cohesion

Team cohesion mediates the relationship between cultural intelligence and project success. High cultural intelligence enhances team cohesion, which in turn improves project success (Mullen & Copper, 1994).

H4: Team cohesion plays a mediating role between cultural intelligence and project success.

2.4. Moderating Role of Leadership Style

Leadership style moderates the relationship between cultural intelligence and team cohesion. Transformational leaders enhance the positive effects of cultural intelligence on team cohesion (Bass & Riggio, 2006).

H5: Leadership style positively moderates the relationship between cultural intelligence and team cohesion.

2.5. Research Model

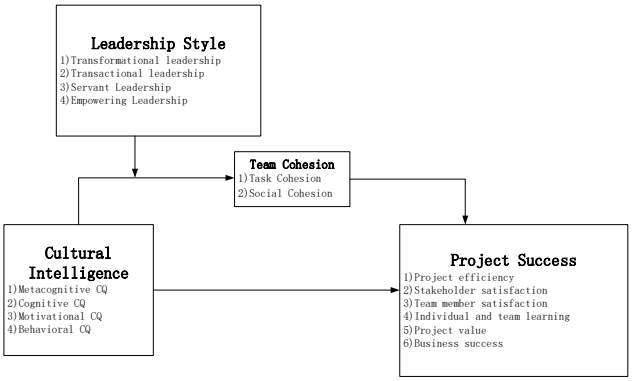


Figure 1 Research Model of Impact of Cultural Intelligence and project success with mediating effect of team cohesion and moderating effect of leadership styles

3. Research Methodology

3.1. Research Design

An online questionnaire was designed and distributed to gather data. The questionnaire consists of five parts:

1) Basic information of the respondents.

2) Cultural Intelligence Measurement Questionnaire (Earley & Ang, 2003), Cronbach's α coefficient is 0.93, question number is 20.

3) Team Cohesion Measurement Questionnaire (Carron et al., 1985) , Cronbach's α coefficient is 0.90, question number is 45.

4) Leadership Style Measurement Questionnaire (Bass & Avolio, 1996), Cronbach's α coefficient is 0.947, question number is 6.

5) Project Success Measurement Questionnaire (Aga et al., 2016). ,Cronbach's α coefficient is 0.929, question number is 6.

3.2. Data collection and Sample

The survey targeted project team members from Chinese multinational companies in the Czech Republic, Poland, and Hungary. 404 valid samples were received, resulting in the distribution of 800 questionnaires.

Snowball sampling was used to collect data from accessible and willing respondents.

3.3. Control Variables

Independent sample t-tests and ANOVA identified significant control variables such as age, education, and English proficiency.

Table 1:Independent sample t-tests and one-way analysis of variance (ANOVA)

Variables	F	Significance
Gender	12.822	0.356
Age	5.904	0.001
Qualification	19.712	0.000
English Level	4.644	0.003
Position	1.184	0.316

4. Result

4.1. Data Analysis

4.1.1. Descriptive Statistics

Table 3 shows that there were a total of 404 respondents in this study.

Table 3:Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Cultural Intelligence	404	1	5	3.82	0.90
Project Success	404	1	5	4.15	0.70
Team Cohesion	404	1	5	4.25	0.78
Leadership Style	404	1	5	3.47	0.97

4.1.2. Correlation Analysis

There is a significant positive correlation between Cultural Intelligence (independent variable) and Team Cohesion (mediator), with $r = 0.391$ and $p < 0.01$. There is a significant positive correlation between Cultural Intelligence (independent variable) and Leadership Style (moderator), with $r = 0.573$ and $p < 0.01$. There is a significant positive correlation between Cultural Intelligence and Project Success, with $r = 0.393$ and $p < 0.01$.

There is a significant positive correlation between Team Cohesion and Leadership Style, with $r = 0.337$ and $p < 0.01$. There is a significant positive correlation between Team Cohesion and Project Success, with $r = 0.628$ and $p < 0.01$. There is a significant positive correlation between Leadership Style and Project Success, with $r = 0.423$ and $p < 0.01$.

Table 4:Correlations

	PS	CI	LS	TC
PS	1			
CI	.393**	1		
LS	.423**	.573**	1	
TC	.628**	.391**	.337**	1

Notes. **Correlation is significant at the 0.01 level (2-tailed)

4.1.3. Regression Analysis

Table 5:Regression Analysis

Predictor	B	R^2	ΔR^2	F	Sig.
Model Cultural Intelligence	0.118	0.154	0.152	74.029	0

The table above shows that the model is statistically significant overall. The variation in Project Success due to Cultural Intelligence can explain and shows a variation of 0.118. The value is between 0 and 1, making it acceptable. The p-value indicates the model's significance. Observing the F-value, it is evident that the model is significant overall, with a value of 74.029. There is a statistically significant relationship between Cultural Intelligence and Project Success, indicating a direct relationship.

Hypothesis 1: There is a positive association between Cultural Intelligence and Project Success.

Table 6:Regression Analysis

Predictor	B	R^2	ΔR^2	F	Sig.
Model Cultural Intelligence	0.138	0.153	0.151	73.311	0

Table 6 shows the values indicate an R^2 value of 0.153 and a beta value of 0.3, with $p < 0.001$. The R^2 value indicates the coefficient of determination, showing the model's statistical significance. The beta value indicates the rate of change, suggesting that a one-unit change in Cultural Intelligence results in a 31% change in Team Cohesion. The values are acceptable as they fall between 0 and 1.The p-value also indicates significance. With an F-value of 73.311, the model is significant overall. The positive and significant association between Cultural Intelligence and Team Cohesion confirms a direct relationship.

Hypothesis 2: There is a positive association between Cultural Intelligence and Team Cohesion.

Table 7:Regression Analysis

Predictor	B	R^2	ΔR^2	F	Sig.
Model Team Cohesion	0.539	0.395	0.393	264.66	0

Table 7 shows impressive results. The beta value is 0.539; R^2 is 0.395, and $p < 0.001$. A one-unit change in Team Cohesion leads to a 53.9% change in Project Success. The values are significant, indicating a positive relationship. As Team Cohesion increases, Project Success also increases.

Hypothesis 3: There is a positive association between Team Cohesion and Project Success.

4.2. Mediation Effect

Table 8:Model Summary

R	R-sq	MSE	F	df1	df2	p
0.3911	0.153	14.9407	36.4747	1	202	0

	coeff	Se	T	P	LLCI	ULCI
Constant	14.9874	1.76	8.5157	0	11.5171	18.4577
Cultural Intelligence	0.1375	0.0228	6.0394	0	0.0926	0.1824

Table 8 shows the model summary, with the outcome being Team Cohesion. The p-value indicates a significant relationship between Team Cohesion, Project Success, and Cultural Intelligence. The p-value of .0000 at $p < 0.05$, along with beta values not equaling zero between LLCI and ULCI, indicates a positive relationship, confirming the mediation effect.

4.3. Direct, Indirect, and Total Effects

Table 9 shows a significant positive association between Team Cohesion and Project Success, with a p-value of 0.000 and $p < 0.05$, and no zero between LLCI and ULCI.

Table 9:Direct Effect of Cultural Intelligence on Project Success

Effect	se	t	p	LLCI	ULCI
0.0524	0.0176	2.9743	0.0033	0.0176	0.0871

With no zero between LLCI and ULCI, the relationship is positive, indicating a direct effect between the predictor and the mediating Project Success.

Table 10:Total Indirect Effect

Effect	BootSE	BootLLCI	BootULCI
0.0661	0.0132	0.0409	0.0918

The table 10 shows the significant value indicates a positive relationship, confirming the

mediation effect.

Hypothesis 4: Team Cohesion mediates the relationship between Cultural Intelligence and Project Success.

4.4. Moderation Effect

Next is the moderation analysis, where the moderator shows how the independent variable relates to the dependent variable.

Table 11:Moderation Analysis

	coeff	Se	T	P	LLCI	ULCI
Constant	24.372	1.454	16.766	0	21.505	27.239
TC	0.477	0.049	9.774	0	0.38	0.573
CI	0.104	0.028	3.681	0	0.048	0.16
LS	0.041	0.019	2.174	0.031	0.004	0.078
Int_l	0	0.001	0.164	0.870	-0.002	0.002

Table 11 shows a significant moderated relationship, as the interaction term p-value is 0.000, $p < 0.05$, with no zero between LLCI and ULCI, validating the moderated mediation effect.

Hypothesis 5: Leadership Style moderates the relationship between Cultural Intelligence and Team Cohesion.

5. Discussion and Conclusion

5.1. Discussion

The study confirms that cultural intelligence positively affects project success, with team cohesion as a significant mediator and leadership style as a moderator. Transformational leadership enhances the positive effects of cultural intelligence on team cohesion.

5.2. Strengths, Limitations, and Directions for Future Research

This study relied on self-reported measures, which may be subject to response bias. Future research could incorporate objective performance indicators and multi-source data to enhance the robustness of the findings. Additionally, this study, based on the number of questions in the current questionnaire, selected a relatively small sample size, which may have resulted in insufficient statistical significance for some findings, thus limiting the reliability of the results. Future research could enhance the robustness of the findings by increasing the sample size.

5.3. Conclusions

This study provides valuable insights into the mechanisms by which CQ, team cohesion, and leadership style of team members in cross-cultural projects of Chinese multinational enterprises (MNEs) in Central and Eastern Europe influence project success. The findings

suggest improving CQ and fostering team cohesion are critical to project success. In addition, leadership style plays a vital role in moderating these relationships.

References

Aga, D. A., Noorderhaven, N., & Vallejo, B. (2016). Transformational leadership and project success: The mediating role of team-building. *International Journal of Project Management*, 34(5), 806–818.

Bass, B. M., & Avolio, B. J. (1996). Multifactor leadership questionnaire. *Western Journal of Nursing Research.*

Carron, A. V., Widmeyer, W. N [W. Neil], & Brawley, L. R. (1985). The development of an instrument to assess cohesion in sport teams: The Group Environment Questionnaire. *Journal of Sport and Exercise Psychology,* 7(3), 244–266.

Davis, S. A. (2011). Investigating the impact of project managers' emotional intelligence on their interpersonal competence. *Project Management Journal*, *42*(4), 37–57.

Earley, P. C., & Ang, S. (2003). Cultural intelligence: Individual interactions across cultures. *08047431*.

Goleman, D. (2017). *Leadership that gets results (Harvard business review classics)*. Harvard Business Press.

Mullen, B., & Copper, C. (1994). The relation between group cohesiveness and performance: An integration. *Psychological Bulletin*, *115*(2), 210.

Zhang, H., Yang, Z., & van den Bulcke, D. Geographical agglomeration of Indian and Chinese multinationals in Europe: A comparative. *Oceania*, *70*, 80.

Artificial Intelligence (AI) in the service of the Impact Revolution

Iris Lubitch[1]*

[1]Reichman University, Adelson School of Entrepreneurship, Herzliya, Israel

Abstract: We are at the forefront of an exciting and transformative era, facing a unique opportunity to accelerate the movement towards a better planet. We are confronted with a complex, multidimensional crisis that compels humanity to seek for solutions. The crisis has given rise to the Impact Revolution, a paradigm shift in our economic system that seeks to harness the power of business to address global challenges. The 17 Sustainable Development Goals (SDGs), serve as a compass for this movement. Concurrently, the AI Revolution promises to reshape our world. This article explores AI's potential to support the Impact Revolution forward, with a particular focus on its capacity to bolster SDG 17 (Partnerships for the Goals), which serves as the essential binding agent for all other SDGs. While acknowledging the risks associated with AI expansion, the article discusses the exclusive and uncompromised role of humanity in leading the trajectory of the AI and to consider it merely as a tool.

Keywords: Impact Revolution, Sustainable Development Goals, Global collaboration, Economic Paradigm shift, SDG 17

1. Introduction (style H1, font Calibri, size 12pt, bold)

We are facing a complex crisis that forces humanity to pursue solutions in an effective manner. In response to this global challenge, the United Nations has created the 2030 Agenda (United Nations, 2015). This agenda provides a clear framework and vision for our collective path forward, outlining the goals and steps we need to take to achieve sustainable development and a thriving planet (Cohen, 2020).

According to the 2024 Sustainable Development Goals Report, we are significantly behind in achieving the 2030 Agenda and its SDGs. The report highlighted that only 17 per cent of the SDG targets are on track, nearly half of the 17 SDGs are showing minimal or moderate progress, while over one-third are going in reverse since they were adopted by 193 Member States in the UN back in 2015. The urgency for accelerated action and a renewed commitment to the 2030 Agenda is emphasized by the UN. The time has arrived and with it the emergence of AI which seems to have the potential to support our goals (United Nations, 2024).

This article begins by exploring the intersection of the Impact Revolution and the AI Revolution, creating a transformative movement. We assert that AI can be a game-changer for the Impact Revolution, pushing it forward and accelerating progress. While AI has the potential to support all 17 SDGs, we focus on its critical role in advancing SDG 17: Partnerships for the Goals. We view SDG 17 as the essential binding agent for all other goals, acting as a powerful accelerator for their achievement. By harnessing AI to enhance global collaboration, we can amplify our efforts across all SDGs. We will then discuss how AI can support SDG17 (as an enabler or inhibiter) (Vinuesa et al., 2020) - strengthen partnerships, improve resource allocation, and foster innovative solutions that transcend traditional boundaries. And yet, it is crucial to recognize that AI is just a tool (Ozair, 2023b), and its impact depends entirely on how we choose to use it. The article then discusses the evolving dynamics between competition and partnership in the AI and Impact era, drawing inspiration from nature and systemic

* Corresponding author's email: Iris@EffectiveIR.co.il

thinking (Capra & Luisi, 2014). In the current era, organizations are increasingly recognizing that addressing global challenges requires collective effort. This realization is fostering an environment where companies compete while simultaneously cooperating on shared objectives. In this new paradigm, competitive advantage is derived from the ability to form and optimize strategic partnerships and extract value from aggregated data. Companies shall compete on their capacity to create value through collaboration (Iansiti & Lakhani, 2020).

For this article, we consider AI as all AI technologies and capabilities, which include but is not limited to: Natural Language Processing (NLP) systems like ChatGPT, Computer Vision technologies, Generative AI, and Machine Learning algorithms. Here, we will indicate that sometimes the complete solution will involve the integration of some technologies in addition to AI (Ozair, 2023b). We invite the readers to envision a future where AI is the best tool for the most urgent mission – accelerating sustainable progress, with SDG 17 driving unprecedented global cooperation.

2. The Impact Revolution

The Impact Revolution represents a paradigm shift in our economic system (Cohen, 2020). This movement is characterized by the rise of impact-driven enterprises (Johnson & Schaltegger, 2020), impact investing (Juddoo, Malki, Mathew & Sivaprasad, 2023), and new paradigms for valuing business and success. At its core, the Impact paradigm seeks to utilize the power of business and finance to address pressing global challenges, as outlined in the SDGs. It reflects a growing recognition that long-term prosperity depends on creating value for all stakeholders - including society and the environment - rather than just shareholders. Increasing momentum over the last decade, the Impact Revolution is reshaping how businesses operate, how investors allocate capital, and how success is measured across various sectors (Olteanu & Fichter, 2022), driving a transition towards a sustainable and equitable global economy.

The Impact Revolution is about hope: A belief in our collective ability to create a sustainable and equitable future. It redefines the purpose of business not just for gaining financial profit but for creating three bottom lines, including social and environmental impacts (people, planet, profit). This approach suggests that companies should focus on social and environmental concerns just as they do on profits. Accordingly, new paradigms for valuing business integrate qualitative considerations with quantitative metrics to create a more comprehensive understanding of value (such as ESG (Environmental, Social, and Governance criteria) (Eccles & Klimenko, 2019). It represents a new understanding that we cannot value the nature of systems, societies and economies if we try to describe them in purely quantitative terms (Capra & Henderson, 2009). We need to consider qualitative indicators. With the 2030 Agenda the attention of organizations is shifting from quantities to qualities.

This shift in the mindset affects the way we will measure success - through indicators of health, happiness, and social and environmental impact rather than just profit. It implies that we can move towards Qualitative economic growth rather than Quantitative growth. Qualitative growth focuses on enhancing the quality of life and aims to be both ecologically sustainable and socially good (Raworth, 2018). It recognizes that while growth is essential for economic vitality, it should be sustainable and aligned with growth patterns in nature (Capra & Henderson, 2009). As we strive for a sustainable planet, drawing inspiration from nature becomes increasingly essential.

2.1. The Compass of the Impact Revolution

The 2030 Agenda adopted by the United Nations in 2015 (United Nations, 2015), outline a blueprint for global progress and cover all the economic, social, and environmental challenges humanity is faced with today. At its heart are the 17 SDGs, which are an urgent call for action by all countries - developed and developing - in a global partnership. This framework underscores the critical role of collaboration, positioning partnerships as the cornerstone for realizing the ambitious vision of the SDGs (United Nations, 2019). It represents a global consensus on the urgent need for transformative change, implementing the impact paradigm by recognizing the interconnectedness of prosperous business, a thriving society, and a healthy environment (United Nations, 2019).

Two of the SDGs main features concerning our discussion are their ***universal applicability*** - providing a common language and common objectives for nations, businesses, and organizations worldwide (United Nations, 2015); and their ***inherent interconnect*****ivity** - with progress in one goal catalyzing advancements in others, creating a systemic effect that amplifies overall impact (United Nations, 2019). The interconnectedness of the SDGs is remarkable as it correlates with the interconnectedness of the major problems of our time – energy, climate change, and food security. These problems cannot be understood in isolation as "They are systemic problems, which means that they are all interconnected and interdependent" (Capra & Henderson, 2009, p.11). The same idea is expressed in the UN Sustainable Development Report 2024 which asserts that in an interconnected world, no nation can tackle global challenges independently (United Nations, 2024).

Those features underscore the importance of adopting a holistic, systemic, and integrated approach to the SDGs, that leverages these interconnections. By holistic we mean the need to view the SDGs as a comprehensive framework rather than isolated goals. By systemic we mean analyzing root causes, feedback loops, and system dynamics rather than just surface symptoms. By integration, we refer to the importance of integrating efforts across different goals, sectors, and stakeholders, to reach those goals (United Nations, 2019).

2.2. SDG 17 – Partnerships for the Goals

The United Nations defines the crucial purpose of SDG 17 as: "Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development" (United Nations, 2015). SDG 17 with all its targets uniquely provides the essential mindset and mechanism for achieving the entire SDGs framework. It serves as the operating system for all the goals and holds them together, reinforcing the idea of the interconnectedness of all the goals (United Nations, 2015). The SDGs can only be realized through strong global partnerships and cooperation, involving diverse players including governments, the private sector, and civil society organizations (Schwab Foundation, 2024).

The vital role of SDG17 is emphasized by the ecological perspective, as declared by Prof. Capra: "Partnership is a key characteristic of life" (Capra, 2021, p. 173). In ecosystems, species engage in networks of mutualistic interactions, co-evolving to enhance survival and promote biodiversity. Their partnerships, from the subatomic to the cosmic scale, highlight the interconnectedness and interdependence that characterize the natural world, reinforcing the idea that collaboration is not just beneficial, but essential, for the emergence and sustenance of complex systems throughout the planet (Capra & Luisi, 2014). One of the challenges in achieving the 2030 Agenda is eliminating duplication of Efforts (United Nations, 2019). Despite worldwide investments in sustainable development, the full

potential of these efforts often remains unrealized due to insufficient sharing and collaboration. As noted, "We are not sharing best practices. As a result, solutions are being invented from scratch in different parts of the world, leading to a waste of resources" (Bankhwal, Chiu, Bisht, Roberts & van Heteren, 2024, p. 23). SDG 17 directly addresses this challenge by promoting robust data sharing and global collaboration.

3. The AI Revolution

The appearance of the AI and the stardust around it signals that something big is happening. It has already been said that AI stands as a pivotal force reshaping our world and future, heralding a new era of technological advancement and redefining entire industries. This transformative technology is pushing the boundaries of what is possible and enabling breakthroughs in any field. As AI continues to evolve, it promises to unlock new realms of innovation, productivity, and problem-solving capacity. However, risks are inherent to the AI revolution mainly its biases, ethical issues, misuse, and data security (Ozair, 2023a; Bankhwal, Bisht, Roberts & van Heteren, 2024). This complex and evolving landscape, where AI's capabilities are expanding but its limitations and potential negative impacts grows as well, emphasizes the crucial role humans must maintain in operating, supervising, and critically assessing AI systems to ensure they align with our ethical standards and 2030 Agenda. As the AI revolution progresses, we need human expertise in interpreting AI outputs, contextualizing results, and making final judgments in complex scenarios where ethical considerations are required.

As much as we consider AI as artificial, eventually, humans write the code and decide which methods and data to use. "Therefore, AI is as smart as the person(s) who coded it and the data it was trained on" (Ozair, 2023a, p.1). It underscores the need to relate to AI as a tool and not the end goal (Ozair, 2023b). It is the responsibility of humanity to ensure that the end goal is to promote the 2030 Agenda.

4. AI for the Impact Revolution

AI's inherent capabilities position it as a powerful enabler for the Impact Revolution. Here, we wish to discuss four key contributions.

4.1. Democratize knowledge and Universal Accessibility

The Impact Revolution fundamentally aims to promote equality, a cornerstone of sustainable development as outlined in the SDGs (United Nations, 2015). In our data-driven world, access to knowledge is crucial for progress. AI tools have the potential to make high-quality, professional content accessible to everyone, transcending geographical, social, and financial barriers. This democratization of knowledge is particularly impactful for developing and underserved regions (Vinuesa et al., 2020).

4.2. One Platform – One Commonplace

Agenda 2030, with its ambitious goals, explicitly emphasizes that multi-stakeholder partnerships and collaboration are essential for its successful implementation. To achieve the systemic shift required, these partnerships need a common platform that enables coordinated efforts, resource sharing, and the development of long-term trust. AI can serve as an enabler to fulfill these requirements, providing robust capabilities for data integration, and diverse source analysis, and facilitating real-time collaboration as an ideal solution to meet these needs and facilitating real-time collaboration (Vinuesa, 2020).

4.3. AI contribution to achieving the SDGs

AI technologies have significant potential to advance all the SDGs across multiple dimensions, by providing powerful tools for problem-solving, decision-making, and scaling solutions. The three SDGs recognized as those with the highest potential to evolve through AI are: Good Health and Well-being (SDG 3) – by analyzing vast amounts of medical data, predicting disease outbreaks, and personalize treatment plans, medical image analysis to detect diseases; Quality Education (SDG 4) – by revolutionizing personalization for the students' needs and deliver quality education to underserved populations; Climate Action (SDG 13) - analyze complex climate data to predict extreme weather events, optimize energy systems, monitoring deforestation and more (Bankhwal, Chiu, Bisht, Roberts & van Heteren, 2024).

4.4. AI in the service of SDG 17

AI can play a crucial role in fostering global partnerships (Vinuesa et al., 2020). It can support the efficiency of global partnerships by facilitating knowledge-sharing and collaboration, providing one commonplace for togetherness in working towards the goals. AI-powered platforms can connect diverse stakeholders across the globe and overcome language barriers. It can support optimizing resource allocation by analyzing complex datasets and providing real-time insights into SDG progress. AI platforms can facilitate collaboration among companies from diverse sectors by identifying potential synergies, matching complementary capabilities, and suggesting innovative partnership models. By analyzing data from multiple sources, AI can predict potential disruptions and optimize inventory management (Bankhwal, Chiu, Bisht, Roberts & van Heteren, 2024).

5. Partnership Vs. Competition in the era of the AI and the Impact Revolution

Given the focus on global partnerships, the competitive business landscape is transforming. This evolution is characterized by a shift towards more collaborative business models. The emerging paradigm fosters a collaborative-competitive environment, where organizations simultaneously cooperate and compete with each other. Organizations will increasingly form partnerships and cross-sector alliances, to address the complexity of the challenges in the transition into a sustainable business activity while developing their unique value proposition. The phenomenon of simultaneous competition and cooperation among organizations, known as “coopetition”, is not novel in the business landscape (Brandenburger & Nalebuff, 1996). Finally, the advent of AI together with the urgency to act and the transformation in the mindset has the potential to make "Partnering as the new normal" (United Nations, 2019, p. 12).

The traditional economic paradigm that focuses only on competition is giving way to an approach that emphasizes strategic partnerships and collaborative ecosystems. When AI makes collaborations easier, organizations will increasingly recognize that competitive advantage lies in excelling at forming and optimizing partnerships. This shift does not eliminate competition; rather, it reframes it within a collaborative context. The key challenge becomes creating value through cooperation while still competing on how that value is captured and utilized by each partner (Brandenburger & Nalebuff, 1996; Iansiti & Lakhani, 2020). Competition within a collaborative context is a model aligned with Prof. Capra's observations on nature's roles: "Because of the finiteness of the ecosystem's resources, there is competition at all levels. But this competition takes place within a larger framework of cooperation and partnership" (2021, p.157). In this evolving collaborative landscape, the most successful

organizations will be those that can effectively harness AI to form and maintain strategic partnerships, enhance their innovation capabilities, and balance the complex interplay between competition and collaboration.

6. Conclusion

We are in the midst of a global transformative movement towards a sustainable and equitable future, presented by the 2030 Agenda. However, progress is dramatically slower than anticipated, necessitating a significant acceleration of our efforts. The article asserts that the intersection of the Impact Revolution and AI technologies presents a transformative opportunity to accelerate progress towards the 2030 Agenda. AI emerges as a powerful enabler for SDG 17, fostering global partnerships and collaboration essential for achieving all SDGs. This synergy has the potential to amplify our collective efforts and drive innovative solutions across sectors. However, the effectiveness of AI in service of the Impact Revolution depends on our ability to use it responsibly and ethically. As we stand at this critical juncture, we must recognize that AI is merely a tool—whose trajectory we must consciously shape. The onus is on us to leverage AI's capabilities wisely, fostering a new paradigm of collaboration that transcends traditional boundaries and accelerates our journey toward a sustainable and equitable world.

References

Schaltegger Bankhwal, M., Chiu, M., Bisht, A., Roberts, R., & van Heteren, A. (2024). AI for social good: Improving lives and protecting the planet. *McKinsey & Company.* https://www.mckinsey.com/capabilities/quantumblack/our-insights/ai-for-social-good

Brandenburger, A. M., & Nalebuff, B. J. (1996). *Co-opetition*. Currency/Doubleday.

Capra, F. (2021). *Patterns of Connection: Essential Essays from Five Decades*. University of New Mexico Press.

Capra, F., & Henderson, H. (2009). *Qualitative growth*. The Institute of Chartered Accountants in England and Wales.

Capra, F., & Luisi, P. L. (2014). *The systems view of life: A unifying vision*. Cambridge University Press

Cohen, R. (2020). *Impact: Reshaping capitalism to drive real change*. Random House.

Eccles, G. R., & Klimenko, S. (2019). The investor revolution. *Harvard Business Review*, *97*(3), 106–116. https://hbr.org/2019/05/the-investor-revolution

Iansiti, M., & Lakhani, K. R. (2020). *Competing in the age of AI: Strategy and leadership when algorithms and networks run the world*. Harvard Business Press.

Johnson, M. P., & Schaltegger, S. (2020). Entrepreneurship for sustainable development: A review and multilevel causal mechanism framework. *Entrepreneurship Theory and Practice*, *44*(6), 1141-1173.

Juddoo, K., Malki, I., Mathew, S., & Sivaprasad, S. (2023). An impact investment strategy. *Review of Quantitative Finance and Accounting*, *61*(1), 177-211.

Olteanu, Y., & Fichter, K. (2022). Startups as sustainability transformers: A new empirically derived taxonomy and its policy implications. *Business Strategy and the Environment*, *31*(7), 3083-3099.

Ozair, M. (2023a). John Oliver is right: AI should be regulated—but how? *Nasdaq*. https://www.nasdaq.com/articles/john-oliver-is-right-ai-should-be-regulated-but-how

Ozair, M. (2023b). Technology is the means to an end, not the end. *Nasdaq*. https://www.nasdaq.com/articles/technology-is-the-means-to-an-end-not-the-end

Raworth, K. (2018). *Doughnut economics: Seven ways to think like a 21st century economist*. Chelsea Green Publishing.

Schwab Foundation. (2024). *AI for impact: Strengthening AI ecosystems for social innovation*. https://www.weforum.org/publications/ai-for-impact-strengthening-ai-ecosystems-for-social-innovation/

United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development* (A/RES/70/1). https://documents.un.org/doc/undoc/gen/n15/291/89/pdf/n1529189.pdf

United Nations. (2019). *SDG partnership guidebook*. United Nations. https://sustainabledevelopment.un.org/content/documents/26627SDG_Partnership_Guidebook_0.95_web.pdf

United Nations. (2024). *The Sustainable Development Goals report 2024*. https://unstats.un.org/sdgs/report/2024/The-Sustainable-Development-Goals-Report-2024.pdf

Vinuesa, R., Azizpour, H., Leite, I., Balaam, M., Dignum, V., Domisch, S., ... & Fuso Nerini, F. (2020). The role of artificial intelligence in achieving the Sustainable Development Goals. *Nature communications*, *11*(1), 1-10.

Innovation potential and sustainability of Slovak enterprises

Ivana Mišúnová Hudáková[1]*, Juraj Mišún[2]

[1]University of Economics in Bratislava, Faculty of Business Management,
Department of Management, Bratislava, Slovak Republic
[2]University of Economics in Bratislava, Faculty of Business Management,
Department of Management, Bratislava, Slovak Republic

Abstract: The business environment is constantly evolving. Established businesses need to respond adequately to the many changes. The complexity of the environment affects their sustainability. The era of sustainable innovative enterprises is changing the business environment, which is primarily influenced by the external environment. Enterprises with innovative business models and effective strategies need to gradually respond to their sustainability, complexity and uncertainty. A key prerequisite for their sustainability depends not only on an effective strategy, which must not only be effective but also continuously developed, but also on innovative approaches introduced into enterprises. The main objective of the paper is to examine innovation as an important factor for the sustainability of enterprises in the business environment in Slovakia, which provides them with higher growth, increased efficiency, competitiveness.

Keywords: Innovation, innovative enterprises, sustainability

JEL classification: M10, M13, M19

Grant affiliation: VEGA # 1/0006/22 “Accelerating the growth of innovative enterprises - scaling up scale-ups and new technology-based firms (NTBFs)”

1. Introduction

In a context of increasing globalisation and digitalisation, innovation is becoming a key factor for business success. They provide businesses with higher growth, increase efficiency and competitiveness, and enable the creation of new markets. In the current era, innovation is a key success factor for many businesses. Every entrepreneur seeking to grow and continuously improve their business relies on innovation as an essential tool to achieve predefined goals. Innovation has the potential to bring about revolutionary changes that can transform the whole world, but sometimes it only takes a small change to improve specific aspects. Businesses that do not implement new practices or innovate their products will quickly find that customers lose interest in their product or service offerings. These tend to be outdated and out of date. Nowadays, with rapid changes and new discoveries being made on a daily basis, it is easy to consolidate your position in the market. If businesses do not keep up with new trends and innovations, they start to lose out. It is therefore essential to regularly monitor new developments and actively innovate their processes and products, to renew business strategies and business models in order to ensure not only their competitiveness but also their sustainability from a strategic point of view.

* Corresponding author’s email: “ivana.misunova@euba.sk”

2. Theoretical and empirical approaches to innovation

We have few innovative companies in Slovakia. These are new technology-based firms (NTBFs) with high innovation and a regular stream of small innovations. Similarly, scaleups, former start-ups, are using business strategies and business models that are scalable. Innovation can open the door to creating new markets and opportunities for Slovak businesses that develop innovative solutions. The appropriate means to foster and develop innovation is through the creation and implementation of an innovation strategy. Innovation achieves the long-term growth and success of enterprises in a changing business environment (Day & Schoemaker, 2016) so innovative enterprises will need to develop new strategy concepts (Hart, 1995) and ensure their sustainability (DAngelo & Magnusson, 2021; Denicolai, Zucchella & Magnani, 2021).

According to the Europe 2020 Strategy, innovation is the driving force behind future economic growth. The current dynamic period has further highlighted the importance of innovation, especially in the face of an unexpected pandemic that has required businesses to adapt quickly and flexibly to changing market conditions.

Despite existing efforts to establish, develop and sustain innovative enterprises in Slovakia and to create a favourable innovation environment, Slovak innovation performance still lags behind many European countries. These facts of lagging behind are particularly felt in Slovakia behind the Nordic and Western countries, which are global leaders in innovation. It is primarily Slovak SMEs where the implementation of innovation is crucial for their adaptation and maintaining competitiveness. It is clear from many studies that, according to the European Commission's assessment, it is in the area of skills and innovation that Slovak small and medium-sized enterprises are lagging behind the most.

We note that without innovation and action, the country could stagnate in the middle-income trap and fail to achieve sustained economic growth (Ižip, 2023). Innovation is one of the areas in which Slovak SMEs are lagging behind the most (Slovak Business Agency, 2020) and their economic prosperity requires a dynamic solution. The Slovak Republic has long ranked among the EU's below-average countries in terms of innovation uptake (Adamcová, 2020).

Emerging innovative enterprises are able to achieve strategic sustainability through key success factors (Saura, Palos-Sanchez & Grilo, 2019; Ceaușu et al., 2017), which are prerequisites for a sustainable enterprise, (Ghezzi, 2020; Shepherd & Gruber, 2020; Bortolini et al., 2018; Schwaninger & Scheef, 2016), are viable and sustainable in the long term (Etim, 2020). The impact of innovation moves the enterprise forward, and in this logic, we point to the positive impacts of innovation strategies that pose specific challenges for the enterprise (Dahlander, O'Mahony & Gann, 2014).

But innovation is very risky and very costly, with uncertain outcomes. For this reason, the sustainable development of innovative enterprises requires a steady flow and overproduction of creative ideas (invention and innovation). Favourable enterprise performance is conditional on quality ideas/inventions; quality implementation of invention-innovation; quality and successful commercialisation of innovation. This process spirals upwards.

Staying afloat in a dynamic and competitive environment requires a high degree of flexibility and adaptability on the part of businesses. Businesses need not only to generate new ideas but also to make efficient use of existing resources and know-how to implement and market them. It is therefore

essential that businesses put in place comprehensive and reliable processes to foster creativity and innovation, as well as mechanisms to effectively manage the risks associated with these activities.

3. Aim, methods and research sample

In the paper, we draw primarily on theoretical knowledge. We focus on the analysis of existing literature and theoretical concepts in the field of innovation in Slovak enterprises. The aim is to synthesize the current knowledge and identify key factors and barriers affecting the innovation process.

The data for the theoretical research was obtained through a literature search, which includes analysis of scholarly articles, books, reports and other relevant sources, and secondary sources such as data from Eurostat, Oslo and Frascati Manual. Qualitative analysis of this data was carried out using content and thematic analysis methods. The results of the analysis will be synthesised into a clear framework that will provide a comprehensive view of the innovation process in Slovak enterprises.

The research focuses on finding answers to questions related to the main theoretical approaches to innovation in enterprises, factors and barriers influencing the innovation process in Slovak enterprises according to the available literature sources and recommendations for future research and practice in innovative enterprises in Slovakia.

4. Research results and discussion

The 2021 research, which was conducted in enterprises of all sizes in Slovakia, shows that enterprises consider their ability to adapt to change and their sustainable competitive advantage as a key factor. Competitive advantage is a phenomenon that is multi-layered, multi-component and complementary and becomes the core of a business strategy that needs to be continuously improved. The use of business strategies is varied and businesses make choices depending on the stage of the life cycle they are currently in.

Many researchers in this area of research agree that for large and medium-sized enterprises, innovation is more important to the long-term functioning of the business than cost reduction. According to the European Innovation Scoreboard, Slovakia shows weak long-term innovation growth, but annual growth between 2022 and 2023 is the fourth highest in the EU, indicating a positive trend. Slovak companies could improve their innovation activities through more cooperation with other companies and educational institutions, as well as through better protection of innovation through trademarks and patents. Improving lifelong learning for employees and increasing innovation in business processes is also a positive trend.

Also, according to the statistical data of the Slovak Business Agency, it is clear that companies in the Slovak Republic are lagging behind in innovation compared to most Western European countries of the European Union. Slovakia is classified as an average innovator, but it achieves only 70% of the European average in the field of innovation, including the other V4 countries. Key obstacles are the low attractiveness of research and insufficient funding for innovation activities.

Research conducted by the SBA in 2020, which included 144 Slovak SMEs, indicates that 60% of businesses engage in innovation activities because they are essential to their business (57%) or provide a competitive advantage (37%). The primary areas of innovation include products (80%), processes

(60%) and marketing (50%). SMEs are influenced to innovate by pressure or inspiration from the external environment because they lack the capacity to carry out their own R&D.

There is no doubt that enterprises should systematically maintain and renew their competitiveness through continuous innovation and the generation of new sources of competitive advantage, while at the same time emphasising the efficient use of existing resources. A key challenge for resource-constrained enterprises is to achieve high growth through the further development of dynamic capabilities that allow them to identify and capture new opportunities from the changing business environment. This includes the ability to reconfigure internal resources and activities to maximise their efficiency and adaptability.

The Research and Innovation Strategy for Smart Specialisation of the Slovak Republic 2021-2027 refers to a system of policies and measures in the field of research, innovation and human resources that will support the stimulation of the structural change of the Slovak economy towards growth based on increasing research and innovation capacity and excellence in the segments with the highest competitive ability (Slovak Business Agency, 2020).

In 2022, globally, four of the five companies with the largest R&D expenditures were located in the USA. These are companies such as Amazon ($42.7 billion), Alphabet ($27.6 billion), Microsoft ($19.3 billion) and Apple ($18.8 billion).

Slovakia is Europe's innovation laggard and will not progress without innovation. In 2022, it ranked 46th in the list of the 50 most innovative countries in the world. Russia and Vietnam were given the same ranking as Slovakia. There are only two countries in this top 50 ranking that invest less in innovation than Slovakia, namely Romania and Chile (NBS, 2022), which we view negatively.

In the past period from the Oslo Manual (OECD/Eurostat, 2005) four types of innovation (product, process, organisation and marketing) were used and the Frascati Manual (OECD Publishing, 2015) also describes design as an innovation activity and the Eurostat (European Commission, 2022) also defines eco-innovation.

The current wave of innovation in Slovak companies is characterised by Industry 4.0 trends, focused on digitisation and the use of information technologies. Innovations in Industry 4.0 are based on the implementation of 5G networks, Internet of Things (IoT), blockchain technologies, chatbots, artificial intelligence, virtual reality and big data analysis. IoT has the potential to significantly change not only the business environment, but also the public sector, including healthcare delivery and city management. In the business sector, IoT is already transforming supply chains, logistics and manufacturing processes towards a more efficient use of resources, including electricity consumption.

According to the type of innovation, Slovak enterprises most often focus on business process innovation (15% of all enterprises). However, 66% of Slovak enterprises do not show any innovation activity. Slovak enterprises primarily focus on innovations that improve the quality of existing products or services and satisfy the needs of existing customers.

According to the SBA, a downward trend in the share of innovating SMEs in the total number of SMEs has been noted, indicating that interest in innovation among Slovak SMEs is not growing, but despite this, more than 94% of entrepreneurs consider it necessary to innovate, and at the same time, more than half of innovating enterprises (53.8%) reported that they innovate regularly (Adamcová, 2020).

Innovation processes do not need to be managed alone, as external partnerships also play an important role and can be beneficial (Dahlander & Gann, 2010; Love, Roper & Vahter, 2013; Bouncken, Fredrich & Gudergan, 2022; Hutter, Gfrerer & Lindner, 2020). An examination of the reasons for the low share of innovating businesses according to the SBA in May-June 2020 revealed that entrepreneurs considered lack of finance (71.5%), lack of adequate government/EU support (38.2%), and lack of skilled workforce (25.7%) to be the biggest barriers to innovation adoption. In the context of the pandemic, up to 50.0% of respondents said that they had to cancel or delay planned innovation activities (Adamcová, 2020).

A key feature of the strategy is the provision of value over and above business as usual (Zimmermann & Arndt, 2011). In the emergence and sustainability of innovative enterprises through competitive advantage, five factors from the business environment are important – innovation, investment, human resources, natural resources (wealth), financial resources.

After the exhaustion of the driving forces, which are production factors (natural and human resources), then investment in the Slovak Republic, especially foreign investment, innovation should be the main force of the country's economic growth at present and in the near future. The whole process of innovation should end with the accumulation of wealth in the Slovak Republic.

Renewal for sustainability has been found to require incumbents to improve their business model and value creation (Hofmann & Jaeger-Erben, 2020; Ranta, Keränen & Aarikka-Stenroos, 2020), business and core operations (Albino, Balice & Dangelico, 2009; Shrivastava & Scott, 1992), as well as stakeholder relationships, networks and entrepreneurial ecosystems (Aarikka-Stenroos, Ritala & Thomas, 2021; Kaipainen, Aarikka-Stenroos & Ranta, 2020).

From the information gathered, we conclude that innovation is high-risk and costly, but it is essential for the sustainable development of businesses from a strategic perspective. Success depends on a steady flow of quality ideas and their effective implementation and subsequent commercialisation. Their spiral process of continuous improvement and innovation is the key to the long-term success and competitiveness of enterprises. It is clear from the above that Slovakia has the conditions and prerequisites to become a strong innovator if it invests and pulls Slovakia to a higher rank of innovators in the 21st century, not only at the European level, but also at the global level in the next period. An innovation environment connected to the international context will give us the courage to face the most complex challenges of the 21st century.

5. Conclusion

The results of research conducted in enterprises of different sizes in Slovakia point to the necessity of adaptability and innovation to maintain and strengthen competitive advantage. Cooperation between entities and effective protection of innovation is a key factor for intensifying innovation activities. Despite obstacles such as lack of funding and support, a positive trend towards increased innovation is evident. In order to remain competitive, it is essential that enterprises systematically explore and implement new approaches and technologies, while investing in the development of their staff and innovation processes. Innovation through improvement and extension has its place, but is usually not sufficient to gain a significant share of new markets. Therefore, companies are often faced with the decision whether to innovate in a gradual and sustainable way or to take risks with a disruptive

approach. Disruption can bring the risk of lower performance of the new product, which can affect market acceptance as well as the overall success of the business.

References

Aarikka-Stenroos, L., Ritala, P., & Thomas, L. (2021). Circular economy eco-systems: A typology, definitions and implications. In S. Teerikangas(Ed.), Edgar Elgar handbook of sustainability agency. Edgar Elgar publishing. https://doi.org/10.4337/9781789906035.00024

Adamcová, E. (2020, August 19). *Slovenskí podnikatelia nestačia na európskych inovačných lídrov* [Slovak entrepreneurs are not keeping up with European innovation leaders]. Monitoring MSP. https://monitoringmsp.sk/2020/08/19/slovenski-podnikatelia-nestacia-na-europskych-inovacnych-lidrov/

Albino, V., Balice, A., & Dangelico, R. M. (2009). Environmental strategies and green product development: An overview on sustainability-driven companies. *Business Strategy and the Environment*, *18*(2), 83–96. https://doi.org/10.1002/bse.638

Bortolini, R. F., Nogueira Cortimiglia, M., Danilevicz, A. de, & Ghezzi, A. (2018). Lean startup: A comprehensive historical review. *Management Decision*, *59*(8), 1765–1783. https://doi.org/10.1108/md-07-2017-0663

Bouncken, R. B., Fredrich, V., & Gudergan, S. (2022). Alliance Management and innovation under uncertainty. *Journal of Management & Organization*, *28*(3), 540–563. https://doi.org/10.1017/jmo.2022.34

Ceaușu, I., Marquardt, K., Irmer, S. J., & Gotesman, E. (2017, July). Factors influencing performance within startup assistance organizations. In *Proceedings of the International Conference on Business Excellence, 11*(1), 264–275

Dahlander, L., & Gann, D. M. (2010). How open is innovation? *Research Policy*, *39*(6), 699–709. https://doi.org/10.1016/j.respol.2010.01.013

Dahlander, L., O'Mahony, S., & Gann, D. M. (2014). One foot in, one foot out: How does individuals' external search breadth affect innovation outcomes? *Strategic Management Journal*, *37*(2), 280–302. https://doi.org/10.1002/smj.2342

DAngelo, V., & Magnusson, M. (2021). A bibliometric map of intellectual communities in frugal innovation literature. *IEEE Transactions on Engineering Management*, *68*(3), 653–666. https://doi.org/10.1109/tem.2020.2994043

Day, G.S. & Schoemaker, P.J.H. (2016). Adapting to fast-changing markets and technologies, *California Management Review*, *58*(4), 59-77. https://doi.org/10.1525/cmr.2016.58.4.59

Denicolai, S., Zucchella, A., & Magnani, G. (2021). Internationalization, digitalization, and sustainability: Are smes ready? A survey on synergies and substituting effects among growth paths. *Technological Forecasting and Social Change*, *166*, 120650. https://doi.org/10.1016/j.techfore.2021.120650

Etim, E. S. (2020). The Utilization of Social Media Platforms for viability of Femaleowned Small and Medium-scale Enterprises in South Eastern Nigeria. *Acta Universitatis Danubius. Œconomica*, *16*(1), 96–111.

European Commission. (2022). *Eco-Innovation*. Green Business. https://ec.europa.eu/environment/eco-innovation/faq/index_en.htm#eco-innovation-background-information

Ghezzi, A. (2020). How entrepreneurs make sense of lean startup approaches: Business models as cognitive lenses to generate fast and frugal heuristics. *Technological Forecasting and Social Change*, *161*, 120324. https://doi.org/10.1016/j.techfore.2020.120324

Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, *20*(4), 986–1014. https://doi.org/10.5465/amr.1995.9512280033

Hofmann, F., & Jaeger-Erben, M. (2020). Organizational transition management of circular business model innovations. *Business Strategy and the Environment*, *29*(6), 2770–2788. https://doi.org/10.1002/bse.2542

Hutter, K., Gfrerer, A., & Lindner, B. (2020). From popular to profitable: Incumbents' experiences and challenges with external corporate accelerators. *International Journal of Innovation Management*, *25*(3), 2150035. https://doi.org/10.1142/s1363919621500353

Ižip, R. (2023, September 6). *Ako sa vymaniť z pasce stredného príjmu? Kľúčové sú dva faktory* [How to get out of the middle income trap? Two factors are key]. TREND. https://www.trend.sk/trend-archiv/ako-vymanit-pasce-stredneho-prijmu-klucove-su-dva-faktory?itm_brand=trend&itm_template=search&itm_modul=articles-search-list&itm_position=2

Kaipainen, J., Aarikka-Stenroos, L., & Ranta, V. (2020). Strategic renewal process towards environmental sustainability – A longitudinal case. *XXXI ISPIM Conference Proceedings*, June 2020

Love, J. H., Roper, S., & Vahter, P. (2013). Learning from openness: The dynamics of breadth in external innovation linkages. *Strategic Management Journal*, *35*(11), 1703–1716. https://doi.org/10.1002/smj.2170

NBS. (2022). *Správa o činnosti inovačného hubu a regulačného Sandboxu Národnej banky Slovenska* [Report on the activities of the Innovation Hub and Regulatory Sandbox of the National Bank of Slovakia]. https://nbs.sk/dokument/d7e89f9b-bf63-4b80-857c-8b17614ba652/stiahnut?force=false

OECD/Eurostat. (2005, November 10). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition*. OECD iLibrary. https://www.oecd-ilibrary.org/science-and-technology/oslo-manual_9789264013100-en

OECD Publishing. (2015, October 8). Frascati Manual 2015: Guidelines for collecting and reporting Data on Research and Experimental Development. https://www.oecd.org/innovation/frascati-manual-2015-9789264239012-en.htm

Ranta, V., Keränen, J., & Aarikka-Stenroos, L. (2020). How B2B suppliers articulate customer value propositions in the circular economy: Four innovation-driven value creation logics. *Industrial Marketing Management*, *87*, 291–305. https://doi.org/10.1016/j.indmarman.2019.10.007

Saura, J. R., Palos-Sanchez, P., & Grilo, A. (2019). Detecting indicators for startup business success: Sentiment analysis using text data mining. *Sustainability*, *11*(3), 917. https://doi.org/10.3390/su11030917

Schwaninger, M., & Scheef, C. (2016). A test of the Viable System Model: Theoretical claim vs. empirical evidence. *Cybernetics and Systems*, *47*(7), 544–569. https://doi.org/10.1080/01969722.2016.1209375

Shepherd, D. A., & Gruber, M. (2020). The Lean Startup Framework: Closing the academic–practitioner divide. *Entrepreneurship Theory and Practice*, *45*(5), 967–998. https://doi.org/10.1177/1042258719899415

Shrivastava, P., & Scott, H. I. (1992). Corporate self-greenewal: Strategic responses to environmentalism. *Business Strategy and the Environment*, *1*(3), 9–21. https://doi.org/10.1002/bse.3280010303

Slovak Business Agency. (2020). *Inovačný potenciál MSP na Slovensku* [Innovation potential of SMEs in Slovakia]. http://www.sbagency.sk/sites/default/files/inovacny-potencial-msp-na-slovensku.pdf

Zimmermann, R., & Arndt, O. (2011). *Das Strategiebuch 72 grundfiguren strategischen handelns für Wirtschaft, Politik, kommunikation, design, Architektur und Alltag*. Campus-Verlag.

The Boeing Story – from Obliquity to Alignment

Ludmila Mládková[1]*

[1]Prague University of Economics and Business, Faculty of Business Administration, Department of Management, Prague, Czech Republic

Abstract: The paper discusses the problem of different approaches to objective setting and their effect on corporate knowledge. The problem is discussed in the example of Boeing and its decline in the 21st century. Boeing's history goes back to 1915, and till the beginning of the 21st century, the company was entirely dedicated to, as they called it, the "world of aeronautics". The strong focus on knowledge, technical expertise, feeling of belonging, and higher purpose (oblique objectives) enabled Boeing to be the leader in the field and make remarkable changes like introducing jet motors to civil aeronautics. At the beginning of the 21st century, the company shifted from indirect, oblique objectives to direct (alignment) financial objectives represented by profits. This shift changed the knowledge flows in the company, prioritised profits and cost-cutting to engineering excellence and caused significant problems with quality and safety.

Keywords: obliquity, alignment, knowledge, knowledge market

JEL classification: M1

Grant affiliation: none

1. Introduction

The paper discusses the problem of different approaches to objective setting and their effect on corporate knowledge. The problem is discussed in the example of Boeing and its decline in the 21st century. Boeing's history goes back to 1915, and till the beginning of the 21st century, the company was entirely dedicated to, as they called it, the "world of aeronautics". The strong focus on knowledge, technical expertise, feeling of belonging, and higher purpose (oblique objectives) enabled Boeing to be the leader in the field and make remarkable changes like introducing jet motors to civil aeronautics. At the beginning of the 21st century, the company shifted from indirect, oblique objectives to direct (alignment) financial objectives represented by profits. This shift changed the knowledge flows in the company, prioritised profits and cost-cutting to engineering excellence, caused significant problems with quality and safety and damaged the deep spirit of the company represented by a strong feeling of belonging to “eating, breathing, and sleeping the world of aeronautics.”(Holt, 2020, para.6).

As Holt (2020, para.1) writes, "Boeing is an iconic American company. The aerospace and defence giant helped put the first astronauts on the moon and played a key role in the Allies’ victory in WWII. Boeing, however, posted its first annual loss in 22 years in 2019 and ousted Chief Executive Officer Dennis Muilenburg in December, signalling a need for soul-searching and uncomfortable questions at the company”.

* Corresponding author’s email: “mladkova@vse.cz”

2. Alignment contra Obliquity – Two Different Approaches to Objectives

Organisations are "group of people who work together in an organised way for a shared purpose" (dictionary.cambridge, n.d.). Organisations, even in the same business, may have different objectives (what they want to achieve) and develop them differently. There are two basic ways to approach the objectives of organisations. The traditional approach is called alignment. Alignment is "way to manage objectives" via "direct approach" (Birkinshaw & Goddard, 2009, p. 83). "Managers define a clear set of targets for their team and a time frame in which those targets should be achieved" (Birkinshaw & Goddard, 2009, p. 83). Objectives defined via the alignment approach are often financial objectives and meet the requirements of the SMART method. They are specific as to what should be done, who will do it and when. They are measurable by clear criteria (usually quantitative), they are assignable, e.g. define clearly responsibility; they are perceived as being realistic from the perspective of internal and external factors of organisation (resources, strengths, weaknesses, opportunities and threats) and trackable (it is possible to follow the process of how they are achieved). The alignment approach is recommended to organisations as it allows them to create clear hierarchies of objectives with clear duties and responsibilities.

The research shows that companies may use a totally different so-called oblique approach to their objectives. They focus on achieving non-financial objectives (indirect objectives) and, through them, achieve their financial objectives. The term was popularised by Kay (1998, para. 1), who wrote that "With maturity – personal or corporate – comes the principle of obliquity. Many people have noted the paradox that the most profitable companies are not necessarily the most profit-oriented". To explain the idea, he uses the example of happiness. It is well known that pursuing happiness does not lead to happiness because happiness depends on interactions with other people, and treating them in a calculative way (do they help us to achieve happiness or not) leads to loss of cooperative relationships and decreases our success. The other argument against pursuing happiness is that we cannot exactly define what makes us happy. He found out that "And research on the characteristics of successful companies confirms that what is true of happiness is also true of profits" (Kay, 1998, para. 13).

The example of two new YouTubers can explain the difference between the two approaches. The one with the alignment approach objective wants to achieve a maximum of followers, and the one who uses obliquity wants to do interesting videos (Stuber, n.d.).

Each approach influences the system of organisation differently. The alignment approach clearly defines the roles and responsibilities of individual employees; the coordination is simple, and it is possible to predict whether the organisation is achieving their objectives or not. Knowledge is linked with employees, jobs, and teams responsible for individual objectives, and communication channels are formalised.

Such a system does not support the free knowledge market. People with knowledge and people who need knowledge may be separated into groups with different objectives. The tacit knowledge is closed in separate silos represented by jobs and departments and does not flow through the organisation. Explicit knowledge sharing depends on the corporate bureaucratic regulations and the type of information system. Responsibility for clearly defined short-term objectives and clear evaluation criteria forces employees to prefer their own interests to the interests of the company. In such an environment, employees understand knowledge as a personal advantage for objective achievement

and develop knowledge monopolies. The company will suffer from typical knowledge market dysfunctions like asymmetry and localisation of knowledge (Davenport & Prusac, 1998).

The oblique approach gives the organisational system flexibility that allows them to adapt and improvise, allowing lateral thinking and awareness of knowledge imperfection. It also solves the profit-seeking paradox (Kay, 1998) (companies focused directly on profit are not the most profitable). The oblique approach provides employees with objectives that have a broader sense. As such, it helps to develop a common identity and allows to integration of "values and beliefs about life and about our own existence" (Bratianu, 2013, p. 216) of employees, so-called spiritual knowledge. As such, it supports trust and helps to create informal communication channels supportive of tacit knowledge sharing and the creation of knowledge communities. The knowledge market of such an organisation has a higher potential to be healthy and support knowledge sharing and creation. The spiritual knowledge moderates its functioning.

Both approaches have their disadvantages: the alignment approach is short-term profit-focused, employees are not loyal, simple KPIs may be difficult to formulate, and such companies satisfy shareholders' interests at the expense of stakeholders.

As for the oblique approach, the typical disadvantages are the ambiguity and uncertainty it brings, risks that employees will not keep the same direction and nervous shareholders.

Based on the advantages and disadvantages of both approaches, alignment is recommended for smaller organisations in stable and predictable environments. Obliquity is recommended for organisations in less predictable environments where outcomes are difficult to predict or measure and for large and complex organisations.

3. Boeing - from Indirect Oblique Objectives to Direct Financial Objectives

The company was founded by William Boeing in 1916. The story goes that he discovered the pleasure of flying but did not find a good aircraft builder. So, he built his plane himself. During the WWI. the company designed the planes for the Navy; they altered military planes for civil aviation after the war. Between the wars and during WWII. the company worked for the army, delivering pursuit planes, observation craft, torpedo planes, and patrol bombers. They also built commercial aircraft, provided their customers with other services and started airline operations (Amir et al., 2024; Boeing.com, n.d.a; Talton, 2024).

After the WWII. the company was successful mainly as a military aircraft and missile producer. In the 50th, they came up with the idea of using jet motors in aircraft in the commercial market, which was a huge risk. The four-engine 707 went into service in 1958 and changed the field of commercial flying. The company took another risk with the 747 Jumbo Jet, whose development costs nearly led to bankruptcy but ensured Boing the monopoly position in the market for a long time.

In the 60th, the company went into the helicopter business and became dominant in the space sector (orbits to the moon, Saturn rockets for Apollo, lunar vehicles, the prime contractor for ISS).

These days, Boeing "develops, manufactures and services commercial aeroplanes, defence products and space systems for customers in more than 150 countries. Boeing is organised into three business units: Commercial Airplanes; Defense, Space & Security; and Global Services” (Boeing.com, n.d.b).

The reason behind Boeing's success was a significant stress on technical innovations, a feeling of professional pride and devotion to the exploration of new areas. "Bill Allen, Boeing's chief executive from 1945 to 1968, said that the spirit at the company at that time was to "eat, breathe, and sleep the world of aeronautics." (Holt, 2020, para. 6). An oblique objective unified the company employees and provided spiritual direction.

After the end of the Cold War, US defence companies, afraid of not surviving, began to merge. In 1997, Boeing merged with its competitor McDonell Douglas (Isidor, 2024). Up till then, the company was managed by people with technical backgrounds. After the merge, many positions were filled with McDonnell Douglas managers with financial, not technical backgrounds, some with experience from companies where "cost-cutting and improved efficiency was a near religion" (Isidor, 2024, Everything had to be cost justified). The new management intentionally moved the focus from technological issues to financial as the CEO Harry Stonecipher said, "When people say I changed the culture of Boeing, that was the intent, so that it's run like a business rather than a great engineering firm," he said. "It is a great engineering firm, but people invest in a company because they want to make money." (Callahan, 2019, para. 11).

"Boeing's CFO at the time, Deborah Hopkins, said in a 2000 Bloomberg interview that Boeing employees shouldn't overly focus on the planes themselves which, while "obviously important," were already assumed to be of great quality. That scandalised and demoralised engineers and the market was none too impressed" (Holt, 2020, para. 7).

Stonecipher credo, "Pushing for results, that's what good leadership does" (Callahan, 2019, para. 14), "prompted some employees to feel they had to succeed at all costs" (Callahan, 2019, para. 12) and led to the break of ethical rules and laws. The management insisting on short-term financial results did not see these consequences.

Prior to the merger, Boeing worked like a family. New management found this to be "arrogant. They were a team, not a family, he said (Sonecipher). This irked workers who felt they had beaten McDonnell Douglas, only to see its CEO make them feel insecure about their jobs. The cultural uprooting culminated when Boeing in 2001 moved its headquarters to Chicago after more than eight decades in Seattle" (Callahan, 2019, para. 57). Employees thought that "we have a senior leadership team that understands very little about the business and yet are driving us to certain objectives" (Holt, 2020, para. 9). The senior representatives did not get such views and argued that "language used in these communications, and some of the sentiments they express, are inconsistent with Boeing values, and the company is taking appropriate action in response"(Holt, 2020, para. 10).

All this led to huge problems with knowledge. After the merge, one-third of employees left, taking their knowledge with them. Boeing sold "its Wichita division and Oklahoma operations, raising $900 million in cash by doing so" (Isidor, 2024, para. 32) and therefore had to buy their products since then. "In 2009, about a year after weathering a 58-day strike at its unionised plants in Washington state, the company announced plans for a non-union plant in right-to-work South Carolina to assemble its new, most advanced jet, the 787 Dreamliner, giving it a factory with lower pay that wasn't at risk of going on strike in the future" (Isidor, 2024, para. 33). During the pandemic, the company again dismissed thousands of experienced workers (Chokshi & Ember, 2024). "Therefore, a lot of knowledge has been lost" (Chokshi & Ember, 2024). The company has lost thousands of experienced workers), and many new employees lacked the required knowledge and feeling of belonging to the company.

In old Boeing, all senior managers had technical backgrounds, so they understood the manufacturing processes and "any problem that might be developing there“ (Isidor, 2024, para. 29), which changed after the merger. The new senior management had no idea what was happening in the factories, which problems people faced and how important quality and ethical aspects are in the field of aeronautics. The headquarters were moved from Seattle to Chicago and later on to Washington to be close to "various regulators like FAA" (Isidor, 2024, para. 29). This widened the gap between senior management and the company.

Up to this, senior management tried to inhibit discussions and knowledge sharing among employees. “In the old Boeing there was a lot of open discussion,” said Larry Clarkson, a retired Boeing corporate officer. After the merger, “Harry had his point of view, and he shut off anybody who tried to come up with a different point of view or raise a question about it” (Calahan, 2019, para. 18). People complained that delivering bad news became carrier-limiting (Callahan, 2019). The democratic leadership style changed to the authoritarian one.

People did not like it, "an ethics review Boeing commissioned last fall at the request of the Air Force found employees “almost universally” pine for the days before the McDonnell Douglas merger. “In those days, `people were treated as people, not numbers,'” the report said, quoting a worker” (Callahan, 2019, para. 15).

All this corrupted the corporate knowledge market. Knowledge was lost, the new inadequately trained people replaced the experienced labour force, the knowledge stopped circulating the company and knowledge silos and monopolies development processes were intensified by managers who tried to limit knowledge sharing, especially about production and quality problems.

The pressure on production, dangerous practices and long-term neglect of quality issues and lapses in quality-control practices reported by Boeing employees caused "so many Boeing products in this area (aviation) are delayed, troubled and/or confronting technical challenges that it's difficult to keep track“ (Talton, 2024, para. 8) which led to crashes of Boeing 737 Max in 2018 and 2019 and recent problems of 737 Max 9 (Chokshi & Ember, 2024).

“Whistleblowers have since come forward to detail alleged quality control lapses at the storied company, and the Federal Aviation Administration (FAA) said it was auditing Boeing's production. The Justice Department also announced it would open a criminal investigation into the Alaska Airlines incident” (Helton, 2024, para. 14). So the company is under investigation by the FAA due to reported bad quality-control practices (Chokshi & Ember, 2024) and reported a loss of $355 million in the first three months of 2024.

“In all these cases, the Boeing Problem is evident: attempting to please Wall Street at the expense of the company’s historic engineering culture, which has been gobbled up by the McDonnell Douglas bean-counter mentality and a lack of transparency and accountability. As with the door plugs on the Alaska Airlines flight, the problems in Boeing’s defense unit carry potentially lethal consequences” (Talton, 2024, para. 21). All this results in “higher manufacturing costs and a lack of skilled employees“ (Talton, 2024, para. 8).

4. Conclusion

“Boeing’s production alone represents a significant part of America’s economy. But the country – and the world – relies on its planes for travel, business, deliveries and jobs” (Mena, 2024, para. 5). Boeing is “the aircraft manufacturer is a massive company with a workforce of more than 140,000 employees around the world, generating tens of billions in revenue each quarter as one of two global players in the production of planes, the other being Airbus” (Mena, 2024, para. 4).

The shift from oblique to direct mostly financial objectives damaged the company and its ability to provide high quality service in the highly technologically demanding field.

“New Boeing CEO David Calhoun has vowed to address the issue. “I have to restore trust, confidence and faith in the Boeing Co,” he said last month, in a call with analysts. That will require, among other things, narrowing the gap between the company’s professed core values, which include quality and safety, and its lived values. The company’s website says it values " human life and well-being" above all else and that when it comes to safety ", there are no competing priorities" (Holt, 2020, para. 12). Still, after four years of this statement, it does not work. "Boeing has announced several steps to improve quality, including adding inspections" (Chokshi & Ember, 2024, para. 17), redefining the quality of supplied elements, and adding training into factories (Chokshi & Ember, 2024). The senior management of the company is going to change (Chokshi & Ember, 2024), and Boeing is searching for managers who would be able to help the company recover from its deep crisis. There are many factors that may cause whether they succeed or not, but as Holt (2020) writes: “To regain trust, Boeing needs to recommit to the engineering prowess that enabled it to become a leading company and a pillar of the American economy” (Holt, 2020, para. 15).

References

Amir R. A., Stanley I. & Weiss S. I. (2024). Boeing Company. *Britannica.* https://www.britannica.com/money/Boeing-Company/Rockwell-International-Corporation

Boeing.com (n.d.a). *Boeing in brief.* https://www.boeing.com/company/general-info#overview.

Boeing.com (n.d.b). *Boeing history chronology*. https://www.boeing.com/content/dam/boeing/boeingdotcom/history/pdf/Boeing-Chronology.pdf

Bratianu, C. (2013). The triple helix of the organisational knowledge. *Management dynamics in the knowledge economy*. 1(2), 207-220.

Birkinshaw, J., & Goddard, J. (2009). What is your management model?. *MIT Sloan Management Review.* 50(2).

Callahan, P. (2019). So why does Harry Stonecipher think he can turn around Boeing? *Chicago Tribune.* https://www.chicagotribune.com/2004/02/29/so-why-does-harry-stonecipher-think-he-can-turn-around-boeing/.

Chokshi, N. & Ember, S. (2024, May 28). Takeaways About Boeing’s Quality Problems. *New York Times.* https://www.nytimes.com/2024/03/28/business/boeing-quality-takeaways.html

Davenport, T. & Prusac, L. (1998). *Working Knowledge.* Harvard Business School Press.

Dictionary.cambridge (n.d.). Retrieved May 28, 2024, from https://dictionary.cambridge.org/dictionary/english/organization#google_vignette

Helton J. (2024, May 18.). Boeing's troubled Starliner spacecraft launch is delayed again. *NPR.* https://www.npr.org/2024/05/18/1252311564/nasa-boeing-starliner-launch-delayed-international-space-station.

Holt J. (2020, Feb 3). How Boeing Lost Its Way Joe Holt. Forbes. https://www.forbes.com/sites/josephholt/2020/02/03/how-boeing-lost-its-way/?sh=10f625163f14.

Isidor C. (2024, February 5.) Boeing was once known for safety and engineering. But critics say an emphasis on profits changed that. *CNN.* https://edition.cnn.com/2024/01/30/business/boeing-history-of-problems/index.html.

Kay, J. (2011). Obliquity: *Why Our Goals are Best Achieved Indirectly.* The Penguin Press. NY.

Kay J. (1998 October 28). The oblique approach. https://www.johnkay.com/1998/10/28/the-oblique-approach.

Mena B. (2024 May 28). Boeing's problems could soon become your problem. CNN. https://edition.cnn.com/2024/03/15/economy/boeing-airfares-economy/index.html

Stuber J. (n.d.). Stop SIMPING for your goals! - Obliquity Book Review. [Video]. You Tube. https://www.youtube.com/watch?v=v-dahOvISx0

Talton, J. (2024, February 9.). Boeing's poor performance in defense offers more signs of deep trouble. *Seatle Times.* https://www.seattletimes.com/business/boeings-poor-performance-in-defense-offers-more-signs-of-deep-trouble/

CSR in Purchasing and Logistics Operations: B2B Decision-Making

Martin Mlázovský[1]*, Ondřej Svoboda[1], Marcela Kožená[1], Irena Honková[1]

[1] University of Pardubice, Faculty of Economics and Administration, Institute of Economy and Management, Pardubice, Czech Republic

Abstract: This article examines the role of purchasing and logistics in corporate social responsibility (CSR) and their impact on strategic decision-making in the Czech B2B context. The analysis focuses on corporate strategy, the integration of the purchasing department with supply chain relationships, and the criteria for selecting suppliers that influence the perception of corporate competitiveness and consumption values. Special attention is given to the application of CSR principles in the supply chain, including gift policy. The objective of the study is to investigate the determinants of purchasing and logistics decision-making in the Czech B2B market in the context of purchasing social responsibility and business strategy. The research form is a quantitative study in B2B market, and the research is based on a questionnaire survey. The data are processed using the chi-square test of independence. Socially responsible purchasing behaviour seems important for improving corporate strategy.

Keywords: Business Strategy, Decision-Making, Logistics, Purchasing, Purchasing Social Responsibility

JEL classification: M11, M14, L21

Grant affiliation: This paper was supported by the Student Grant Competition SGS_2024_012 of the University of Pardubice in 2024.

1. Introduction

In the dynamic business environment, a purchasing department is often tasked with maximizing financial efficiency, which may present challenges for long-term strategy. Customer purchasing decisions in the B2B market are generally considered much more rational compared with those in the B2C market (Kotler and Keller 2016). All managerial theories view decision-making as a key component of all processes in the business and at all levels of management. Holistic managerial approaches are the last phase, which also consider the social-ethical dimension of decision-making and aim at building and maintaining long-term relationships with partners (Kotler and Keller 2016). Moreover, Drucker (2010) emphasizes to ask questions leading to strategy choices in decision-making rather than seeking answers leading to tactical levels of management. However, many decisions, which were previously more routine or marginal in nature, are now becoming strategically important. These strategic questions include whether and to what extent a company should take the interests of external stakeholders and its social responsibility into account. However, SMEs, especially in Central and Eastern Europe, still have shortcomings in the adoption of corporate social responsibility (CSR) (European Commission 2021).

The aim of this paper was to explore the interrelationships among strategic purchasing integration, perceptions of firm and product competitiveness, and social responsibility purchases. Not only purchasing activities but also the application of the CSR approach is typically studied at large companies with high bargaining power (Vandchali et al., 2020). Therefore, another contribution of the

* Corresponding author's email: martin.mlazovsky@upce.cz

present paper is to evaluate the integration of purchasing activities and the CSR approach, not only in large companies but also at the SME level.

2. Theoretical Background

Corporate competitiveness refers to the ability to produce goods and services that meet customer expectations while increasing the profitability for shareholders. This is influenced by both internal factors (e.g., internal integration and choice of business strategy) and external factors (the most direct factors are relationships with customers and other business partners) (Kotler and Keller 2016). Specific factors of competitiveness are customer needs, preferences, and expectations. These are mainly influenced by the functional, emotional, and social values offered by the product (Sheth et al., 1991). These consumption values are often extended by epistemic and conditional values. Moreover, our research still uses the price dimension, since, e.g., Sweeney and Soutar (2001) state that "*price and quality are functional subfactors that contribute separately to perceived value and that they should be measured separately*".

Since a company can only directly influence its internal environment (Kotler and Keller 2016), the key to achieving competitiveness is to primarily deal with the internal environment, whereas strategic purchasing integration is crucial. The purchasing decision process is also greatly influenced by an enterprise type and its focus. Laios and Moschuris (2001) state in their study that, in addition to the basic focus of the enterprise, a company's mission also influences purchasing decisions at all stages of the decision-making process. Kaufmann and Gaeckler (2015) examine the strategic process of firms' purchasing decision-making, demonstrating the influence of strategic integration on accelerating the purchasing-decision process. Indeed, the integration of purchasing into the strategic management of the company has a significant impact on business competitiveness. Another strategic decision is whether a company should produce the appropriate input in-house or purchase it (Le Dain et al., 2010). Kaufmann and Gaeckler (2015) address a similar issue in the form of whether firms should provide logistics services themselves or purchase them from a specialized company. These studies illustrate that outsourcing is increasingly used as a competitive advantage in today's economy in the form of cost reduction, quality improvement, or increased flexibility. However, outsourcing also raises the issue of resilience, especially in times of turbulent socio-economic change.

However, the approach to business and competitiveness has changed over time. There is an increased sense of responsibility toward the entire society in developed regions (Gallardo-Vázquez et al., 2019). In general, there is no one clear key competitiveness factor because each sector and region have their own needs and priorities (Svoboda and Cichá 2015). In developed and post-transition economies, the business ecosystem, which deals primarily with relationships between market participants in the form of networking, seeking and developing knowledge, and providing feedback, has become a modern topic.

Thus, a specific topic is CSR and its importance for business and competitiveness. This concept integrates economic (i.e., governance, safety, gift policy etc.), social, and environmental concerns in business operations and interactions with their stakeholders. CSR can be applied in every part of a business, and, in terms of transparency and relevance, these activities should be implemented throughout the supply chain. For this reason, social responsibility in regard to purchasing is separately studied (Duangjan and Wang 2019). Furthermore, El Waatmani (2018) proves an importance for the successful building and running of business clusters on competitiveness and CSR. Furthermore, the

contribution of CSR can be perceived in the internal integration of a company and the increase of intellectual capital (Gallardo-Vázquez et al., 2019). It is the allocation of sufficient resources for CSR-aware purchasing integration and the setting and maintenance of a long-term business strategy that can help overcome global barriers. Generally, it can be concluded that environmental protection is currently the most debated pillar of corporate social responsibility.

Based on the link among factors of competitiveness, CSR, and strategic purchasing integration, the following research questions (RQ1 and RQ2) are defined:

> RQ1: What impact do non-financial factors of business competitiveness have on purchasing social responsibility?
>
> RQ2: What impact do consumption values have on purchasing social responsibility?

3. Materials and Methods

To achieve the stated objectives of the study, it was necessary to collect, analyse, and interpret the data. The research was conducted between March and May 2023 using a quantitative research design (questionnaire survey); 25 companies were addressed. The questionnaire included 11 battery questions focusing on competitiveness and purchasing and eight identification questions. The research design was validated by pilot testing in the field to enhance content validity and internal consistency of the survey. The questionnaire survey was based on a deductive design to obtain ease of quantification and a high degree of generalizability (Leavy 2023). The statistical analysis was conducted using IBM SPSS v25 software, with the chi-square test of independence (to distinguish the significance of the investigated relationships) and phi coefficient (to determine the direction of statistically significant relationships) – for more details see: Linoff and Berry (2011).

4. Results

First, the identification of the surveyed companies is shown: 76% of the respondents correspond to SMEs; 12% correspond to micro-enterprises; 28% correspond to small enterprises; 36% correspond to medium-sized enterprises; 24% correspond to large enterprises; 64% are active in services; 80% trade on the B2B market; 28% have a key share of turnover generated from activities abroad; 68% generate at least part of their turnover through exports; more specifically, 40% of respondents have direct exports, 28% carry out indirect exports, and 32% do not export at all. Furthermore, there was examined conditions with gift policy – i.e., accepting and giving gifts: 54% of respondents have formal written terms and conditions for dealing with gifts. Moreover, 60% of the respondents have a separate purchasing department.

The perceived business competitiveness was evaluated based on four factors: strategic purchasing integration, corporate strategy and strategic planning, building clusters and strategic alliances, and marketing and customer relationships. Furthermore, the relationships between company characteristics focusing on CSR (i.e., economic, social, and environmental pillars of CSR, extended by individual exploration of gift policy) were examined. The relationships found are shown in the table of phi-coefficients (see Table 1). Above and beyond this, a relationship was found between the perceived impact of a formally established process for dealing with gift policy and the importance of the economic (phi-coefficient: 0.421; p-value: 0.025) and social responsibility (phi-coefficient: 0.421; p-value: 0.032) of the supplier. Beyond the results of Table 1, it was found that SMEs (compared to large

enterprises) put significantly more emphasis on their own experience when choosing a supplier (phi-coefficient: 0.549; p-value: 0.039).

Based on the Table 1, it could be answered on the RQ1: It was found that the investigated factors of competitiveness have a significant impact on the significance of perceived supplier's CSR. Strategic purchasing integration promotes supplier economic responsibility both on an aggregated basis and especially within the economic dimension of responsibility. From the point of view of the second internal factor (Corporate strategy and strategic planning) it is even more linked to all dimensions of CSR. The most connected link with CSR was found among the first external factor (Building clusters and strategic alliances). On the contrary, the second external factor (Marketing and customer relations) appears to be the least linked to CSR (in this case, a statistically significant relation was found only with the environmental responsibility of the suppliers).

Table 1: Phi-coefficient – CSR and factors of non-financial business competitiveness

Significance of the CSR factor	Strategic purchasing	Corporate strategy and	Building clusters and strategic	Marketing and customer
Supplier's economic responsibility	0.523 **	0.512 **	0.540 **	ns
Supplier's social responsibility	ns	0.520 **	0.540 **	ns
Supplier's environmental responsibility	ns	0.520 **	0.540 **	0.560 **
Aggregated supplier's CSR	0.578 **	0.667 ***	0.421 *	ns
Gift policy	0.592 **	ns	0.498 *	ns

ns (non-significant): $p > 0.05$; *: $p \leq 0.05$; **: $p \leq 0.01$; ***: $p \leq 0.001$

Further, consumption values were examined, with respondents most frequently predicting an increase in purchase price and operating costs, mainly due to high inflation affecting the price of inventory and energy. One respondent mentioned increased competition from China and Southeast Asia in addition to this reason. This was followed by an exploration of the relationship between purchasing social responsibility and perceived consumption values and the existence of a formalized process for gift policy: 56% of respondents have a policy in place for gift policy (28% have this policy to avoid corruption; 7% have this policy in place to keep records of received gifts from customers; 65% have implemented the policy based on the expectations of business partners or did not specify the reason for implementing the policy). The relationships found are shown in the table of phi-coefficients below (see Table 2).

Based on Table 2, it could be answered the RQ2: Perceived values of the product provided by the customer (consumption values) also to some extent influence the perceived importance of the social responsibility factors of the purchase. Price value is the most closely related to the supplier's CSR, and negatively so. If the customer's main competitive advantage is a low price, then he does not demand compliance with CSR principles for his accessories. On the contrary, a positive link with the social dimension was found within epistemic value.

Table 2: Phi-coefficient – CSR and consumption values

Significance of the CSR factor	Price value	Epistemic value
Supplier's economic responsibility	-0.421 *	ns
Supplier's social responsibility	-0.599 **	0.439 *
Supplier's environmental responsibility	ns	ns
Aggregated supplier's CSR	-0.468 *	ns
Gift policy	ns	ns

ns (non-significant): $p > 0.05$; *: $p \leq 0.05$; **: $p \leq 0.01$; ***: $p \leq 0.001$

5. Discussion

The present research demonstrated significant correlations between all CSR pillars and strategic planning in organisations. The importance of strategic planning for CSR is also demonstrated by Galbreath (2010). Moreover, he points out the strong importance of not only the approach to leadership but the whole corporate culture.

This study shows a very strong relationship between building clusters and the implementation of CSR principles, which is in line with the findings of El Waatmani (2018). This author also points out that the diffusion of CSR principles within supply chains is most likely to occur when there are public incentives and legislative support. Given that the Czech Republic is part of the European Union, where this support is commonly provided, the very strong findings of the present research are consistent with this suggestion.

This was followed by an examination of the link between strategic purchasing integration and the importance of CSR in supplier selection decisions. The integration of purchasing strategies has been demonstrated to have a positive effect on the demand for supplier economic responsibility (not environmental or social responsibility). In contrast, Kožená and Mlázovský (2021) found that the environmental pillar of CSR is more important for CEE managers due to pressure from the entire society and government institutions. Furthermore, the implementation of CSR has been demonstrated to have a direct impact on customer relationships (van Tonder et al., 2020). However, this was found only in relation to the social dimension in the present study.

The research findings indicated that when price is perceived as an independent factor of product competitiveness, it is negatively correlated with social responsibility in purchasing. This finding highlights the intricate relationships between price (perceived consumption value) and social responsibility, as previously reported by Rizkalla (2017) and Biswas and Roy (2015). Furthermore, Rizkalla (2017) reports a positive correlation between CSR and functional and epistemic consumption values. Similarly, Biswas and Roy (2015) demonstrate a relationship between purchasing green products and epistemic and functional product values, thereby illustrating the multifaceted ways in which CSR influences consumer choices.

The present research did not find any significant correlation between CSR and functional consumption value. The only one positive significant correlation identified was between epistemic value and the

social pillar of CSR. This could be explained by the markedly high price elasticity of Czech consumers, as previously discussed by Jaderná et al. (2018). Conversely, the impact of this phenomenon is already waning, particularly among the younger Czech demographic (Němcová and Staňková, 2019).

6. Conclusion

The objective of this article was to examine the relationships between strategic purchasing integration, perceptions of firm and product competitiveness, and social responsibility in purchasing. The effective integration of purchasing strategies can significantly contribute to the strengthening of a company's market position and its sustainable development. This necessitates the interdependence of internal processes and the overall direction of the business, which cannot be altered instantaneously. The integration of purchasing activities into the top management level and the cooperation of purchasing managers with other departments are necessary to facilitate the alignment of purchasing activities with strategic decision-making. This research was conducted as quantitative research on the B2B market. Most published studies on purchasing behaviour focus on the B2C market, so this research contributes to filling the research gap regarding changes in purchasing behaviour in B2B markets.

The main findings are that the corporate strategy and building clusters support customer demand for supplier responsibility in all dimensions of CSR. While strategic purchasing integration and customer relationships have only a few relations regarding the supplier's implementation of CSR. The perceived value of the price is negatively associated with the supplier's CSR, i.e., customers with an emphasis on low prices do not require compliance with CSR. On the contrary, epistemic value is positively associated with the social dimension of CSR, which means that customers valuing the product's knowledge contribution place more emphasis on social responsibility.

References

Biswas, A., & Roy, M. (2015). Leveraging factors for sustained green consumption behaviour based on consumption value perceptions: testing the structural model. *Journal of Cleaner Production, 95,* 332–340. https://doi.org/10.1016/j.jclepro.2015.02.042

Drucker, P. F. (2010). *The Practice of Management*. New York: HarperCollins Publishers.

Duangjan, C., & Wang, H. (2019). The Moderating Role of Strategic Integration in Performance Improvement Through Purchasing Social Responsibility in Thailand. *Canadian Journal of Administrative Sciences, 36*(2), 248–259. https://doi.org/10.1002/cjas.1489

El Waatmani, A. (2018). Industrial clusters and promotion of CSR: the case of developing countries. *Journal of Academic Finance, 9*(2), 69–80. https://doi.org/10.59051/joaf.v9i2.172

European Commission. (2021). *Uptake of Corporate Social Responsibility (CSR) by European SMEs and start-ups: Good Practice Document*. December 12, 2021 [online]. Retrieved January 8, 2023, from https://data.europa.eu/doi/10.2826/093808

Galbreath, J. (2010). Drivers of corporate social responsibility: The role of formal strategic planning and firm culture. *British Journal of Management, 21*(2), 511–525. https://doi.org/10.1111/j.1467-8551.2009.00633.x

Gallardo-Vázquez, D., Valdez-Juárez, L. E., & Lizcano-Álvarez, J. L. (2019). Corporate social responsibility and intellectual capital: sources of competitiveness and legitimacy in organizations' management practices. *Sustainability, 11*(20), Article No. 5843. https://doi.org/10.3390/su11205843

Jaderná, E., Picková, R., Přikrylová, J., & Mlázovský, M. (2018). Consumers´ green attitude towards transport. In: *CLC 2018 – 8th Carpathian Logistics Congress*, 495–500. Ostrava: TANGER. ISBN 978-80-87294-88-8.

Kaufmann, L., & Gaeckler, J. (2015). On the relationship between purchasing integration and purchasing decision-making speed. *International Journal of Physical Distribution & Logistics Management, 45*(3), 214–236. https://doi.org/10.1108/IJPDLM-05-2013-0150

Kotler, P., & Keller, K. L. 2016. *Marketing Management*. 15th ed. Boston: Pearson Education.

Kožená, M., & Mlázovský M. (2021). The impact of customer behaviour on the corporate competitiveness in the European environment. *SHS Web of Conferences, 129,* Article No. 07003. https://doi.org/10.1051/shsconf/202112907003

Laios, L. G., & Moschuris, S. J. (2001). The influence of enterprise type on the purchasing decision process. *International Journal of Operations & Production Management, 21*(3), 351–372. https://doi.org/10.1108/01443570110364687

Le Dain, M. A., Calvi, R., & Cheriti, S. (2010). Developing an approach for design-or-buy-design decision-making. *Journal of Purchasing and Supply Management, 16*(2), 77–87. https://doi.org/10.1016/j.pursup.2010.03.010

Leavy, P. (2023). *Research Design: Quantitative, Qualitative, Mixed Methods, Arts-Based, and Community-Based Participatory Research Approaches*. 2nd ed. New York: Guilford Press.

Linoff, G. S., & Berry, M. J. A. (2011). *Data Mining Techniques: For Marketing. Sales, and Customer Relationship Management*. Indianapolis: Wiley Publishing.

Němcová, J., & Staňková, P. (2019). Factors influencing consumer behaviour of generation Y on the Czech wine market. *E+M Economics and Management, 22*(4), 145–161. https://doi.org/10.15240/tul/001/2019-4-010

Rizkalla, N. (2017). Determinants of Sustainable Consumption Behaviour: An Examination of Consumption Values, PCE Environmental Concern and Environmental Knowledge. *International Journal of Social Science and Humanity, 8*(2), 48–54. https://doi.org/10.18178/ijssh.2018.V8.932

Sheth, J. N., Newman B. I., & Gross, B. L. (1991). Why we buy what we buy: A theory of consumption values. *Journal of Business Research, 22*(2), 159–170. https://doi.org/10.1016/0148-2963(91)90050-8

Svoboda, O., & Cichá, V. (2015). The Effect of Different Time Horizon in Measuring the Regional Economic Resilience. *18th International colloquium on regional sciences*, 49–55. https://doi.org/10.5817/CZ.MUNI.P210-7861-2015-5

Sweeney, J. C., & Soutar, G. N. (2001). Consumer perceived Value: The development of a multiple item scale. *Journal of Retailing, 77*(2), 203–220. https://doi.org/10.1016/S0022-4359(01)00041-0

van Tonder, E., Fullerton, S., & de Beer, L.T. (2020). Cognitive and emotional factors contributing to green customer citizenship behaviours: a moderated mediation model, *Journal of Consumer Marketing, 37*(6), 639–650. https://doi.org/10.1108/JCM-06-2019-3268

Vandchali, H. R., Cahoon, S., & Chen, S. L. (2020). Creating a Sustainable Supply Chain Network by Adopting Relationship Management Strategies. *Journal of Business-to-Business Marketing, 27*(2), 125–149. https://doi.org/10.1080/1051712X.2020.1748354

Implications of generative artificial intelligence for human-human interaction in knowledge work: Are knowledge workers at risk of isolation and loss of team synergy?

Michal Müller[1]*, Natthan Elias Godinho dos Santos[2], Lucas Mesquita Cardoso[3], Jaroslava Kubátová[1]

[1] Palacký University Olomouc, Faculty of Arts, Department of Economic and Managerial Studies, Olomouc, Czech Republic

[2] Federal Institute of Southern Rio Grande, Faculty of Computer Science, Department of Informatics, Passo Fundo, Brazil

[3] Federal University of the State of Rio de Janeiro, Faculty of Biomedical Science, Department of Genetics and Molecular Biology, Rio de Janeiro, Brazil

Abstract: This article explores the implications of generative artificial intelligence for human interaction in knowledge work. The aim is to explore experts' perspectives on whether knowledge workers are prone to isolation and reduced team synergy as a result of the growing presence of generative AI. The research is based on in-depth semi-structured interviews with knowledge workers from different fields such as data analysis, business consulting, engineering and marketing, followed by thematic analysis. The findings highlight different perspectives on the impacts of generative AI, with experts emphasising the importance of individual personalities and specific worker approaches in determining these impacts. Despite the acknowledgement of the diversity of views, there is a consensus among experts on the general trend of increasing independent work facilitated by the use of technology.

Keywords: human-AI interaction, human-human interaction, generative artificial intelligence, knowledge management, teamwork

JEL classification: I150, O33

Grant affiliation: IGA_FF_2024_028

1. Introduction

The rapid development of generative AI technologies is changing the face of knowledge work and raising questions about its impact on human interaction and collaboration (Woodruff et al., 2024). This study explores the implications of generative AI on human interaction and focuses on the potential risks of increased isolation and reduced teamwork among knowledge workers.

The ability of generative AI to produce human-like texts, analyse complex data and engage in creative tasks has raised both excitement and concern (Feuerriegel et al., 2024). While these tools promise to increase productivity and efficiency (Noy & Zhang, 2023), they could also change traditional work dynamics and communication patterns (Brynjolfsson et al., 2023). Through in-depth interviews with professionals from a variety of knowledge related fields, we aim to answer the following research question: To what extent do knowledge workers perceive a risk of isolation and loss of team synergy due to the increasing integration of generative AI into their work environment?

* Corresponding author's email: michal.muller@upol.cz

2. Technology and isolation

The relationship between technology and social isolation has been a subject of growing concern in recent years, particularly in the context of remote work and digital communication (Vega & Brennan, 2000). As information and communication technologies (ICTs) have become increasingly prevalent in professional settings, researchers have identified various ways in which these tools can contribute to workers' feelings of disconnection and isolation (Day et al., 2019), on the one hand, but also point to new opportunities for teamwork across the world and even enable social interaction for excluded or lonely people, especially among older adults (Schlomann et al., 2020), on the other.

In relation to negative impacts, Mirowska and Bakici (2024) refer to the concept of "techno-isolation" as technostress, which arises as a result of heavy reliance on information and communication technologies in professional social interactions. Their research suggests that the characteristics of different communication platforms can significantly influence the experience of isolation, highlighting the importance of considering the compatibility of medium and interaction when understanding stress in the workplace.

The COVID-19 pandemic has further accelerated the adoption of remote work and digital collaboration tools, bringing the issue of technology-mediated isolation to the forefront (Silard et al., 2023). Taskin et al. (2024) explored how management adapts to "co-presence" – presence mediated by ICTs rather than physical proximity – in the context of enforced telework. Their findings revealed that while co-presence can help maintain a sense of proximity, it also presents challenges in terms of humanizing management approaches and fostering genuine connections among team members.

3. Generative AI and isolation

The introduction of generative AI tools adds another layer of complexity to this discussion. Stone et al. (2024) noted that organizations are increasingly using AI-enabled chatbots as virtual tutors or "digital friends" to combat the isolation often associated with online learning and training. While these tools aim to create a sense of social connection, their effectiveness in truly mitigating feelings of isolation remains a subject of debate.

Li et al. (2024) conducted a randomized controlled experiment examining the impact of generative AI on team performance. Their findings suggest that while AI-augmented teams significantly outperformed traditional human teams, there may be diminishing returns with increased AI integration. Moreover, individual-AI pairs performed as well as conventional teams, indicating that traditional team structures may be less necessary in certain situations. This raises questions about the optimal balance between AI assistance and human collaboration in knowledge work settings.

From the critical point of view, Jacobs (2024) argues that AI companions may actually reproduce rather than reduce the dynamics of loneliness, potentially leading to a form of "digital loneliness". This perspective emphasizes the importance of critically examining the role of AI in addressing social isolation and maintaining meaningful human connections in the workplace.

As generative AI continues to evolve and become more prevalent in knowledge work, it is crucial to consider its potential impact on human-human interaction and team dynamics. While these tools offer significant benefits in terms of productivity and efficiency, they may also inadvertently contribute to

feelings of isolation or reduce opportunities for spontaneous collaboration among team members. Understanding these potential implications is essential for developing strategies to harness the power of AI while preserving the value of human connection and teamwork in knowledge-intensive industries.

4. Methods

This article is based on a broader qualitative research study exploring the opportunities and challenges of generative artificial intelligence in knowledge work. Qualitative research is suited to grasp emerging complex problems associated with AI (Hasiaj & Esper, 2022). The research is conducted online through participant-preferred platforms (Zoom, MS Teams, etc.). In-depth semi-structured Interviews are recorded and then analysed using principles of grounded theory (Charmaz, 2006). Interviews are approximately 60 minutes in length. All participants signed an informed consent for the research. The selection criteria for participants included roles that involved creating and applying new knowledge (Iazzolino et al., 2017; Curado & Bontis, 2006), as well as continuous learning and development of others (Drucker, 1999). Table 1 describes the sample of participants who were included in this study.

Table 1: Study sample

No.	Sex	Age	Nationality	Occupation / expertise
1	female	58	USA	AI consultant, entrepreneur
2	male	38	Brazil	Senior machine learning engineer
3	male	40	Uzbekistan	Marketing specialist
4	male	52	Czech Republic	Consultant with a background in data analytics, economics, and psychology
5	male	48	Brazil	Consultant with electrical engineering background
6	male	38	Belgium	AI business consultant
7	male	47	Poland	Sale manager in healthcare industry, business consultant
8	male	24	Germany	Business consultant
9	male	20	Brazil	Support analyst
10	male	54	India	Expert in persuasion and Neuromarketing for business leaders, GenAI implementation consultant
11	male	50	Australia	Recruitment director, business development manager, AI consultant, entrepreneur
12	female	24	Brazil	Quality assurance analyst
13	male	50	Greece	CEO – AI platform business, Customer experience
14	male	27	Brazil	Mechanical engineer

5. Results

5.1 Isolation

Knowledge workers note that a certain degree of isolation is part of global technological development. This is particularly typical in some areas of knowledge work that are heavily tied to the use of technology:

> In my professional experience, being siloed is something that is common in technology. You stay within your individual realm, be it the design, data, etcetera. And you don't talk to another group and you may not even talk to your own. Team member because we're all in our little cubes and we're doing our own little thing and we're constantly in. We are self-isolating. (Knowledge worker 1)

Given the interconnectedness of various socio-technological factors, for example, knowledge worker 1 believes that the effects of generative AI on social isolation will not be well measured. He points out. that technological development leads to increasing opportunities to avoid even ordinary social interactions:

> I don't think Chat GPT caused anything measurable or substantial. But by the way it fits into that more global trend, I think, it [worker isolation] will continue to strengthen as it goes on. Instead of asking the live person next to you, they'll just ask the AI, in the same way that we see when they go to McDonald's today, the young ones don't normally order anymore. (Knowledge Worker 4)

The knowledge worker 8 sees AI as both a potential ally and a significant threat, highlighting its dual role of providing psychological support and posing a risk due to the vulnerability of the data. Like other knowledge workers, he sees this as part of an overall trend:

> I think AI can be in the future, something like a best friend. Also, someone who helps you with psychological problems. [...] it can adapt to your needs, but on the other hand it's also in my opinion a big threat because it has a lot of vulnerable data about a person. [...] AI will make people become more isolated. [...] I think also the development of the internet, of social media, they contributed to that as well. [...] [It] will be another catalysator to further isolate humans from humanity or other humans. (Knowledge worker 8)

> I feel that, for example, in this specific tool that I have at work in my company, sometimes it replaces the need to talk to other people. (Knowledge worker 14)

Several participants cited the rise of remote work and distributed teams as a factor that is already contributing to reduced in-person interaction and increasing isolation in the workplace, which generative AI could compound. Knowledge worker 4, for example, states that he and his co-workers may "physically come to work but they don't have the closest co-workers there," which is a typical situation for today's teams. Knowledge worker 1 point to the overall social context and generational shift in social dynamics by pointing to her childhood and present:

> It's interesting to see the different frames of mind depending on when you were born and how much you've experienced and how much actual human interaction because when I

> was a kid, we were outside till 10:00 and we came home and the street lights are on these kids. And even the parents who are in their 30s complain that their kids just they wake up and this is it. All day we did not have that. (Knowledge worker 1)

Several knowledge workers (1, 6, 10) have pointed out that social isolation does not only result from the impact of the increasing development of new technologies, but also depends on the personality of individuals, especially their introversion or extraversion:

> I feel that it's maybe related to personality and the people that were usually more what do. I think they will not have an issue with continuing to have interaction even if they have less in the. In the real field of asking questions to others, but they will still go to the coffee machine and want to talk to X e Y and even if they work from home or alone in their office, they will go out, go to the neighbourhood, buy a sandwich and interact. But those that are more introverted. It might lead to that kind of. Of isolation, especially like you said during COVID, there must have been cases where people were alone. (Knowledge worker 6)

Knowledge worker 1 points out that extroverts, who thrive on social interactions, might struggle with the isolation that comes with increased reliance on AI, whereas introverts might appreciate the reduced need for social engagement, finding it more efficient. Some knowledge workers noted potential consequences of increased isolation due to over-reliance on AI, such as diminished social skills:

> No, it's not the same as interacting with a real person. It's always going to lack that human aspect, it's just a text box that you write prompts. But I notice that interacting too much with AI makes me less sociable, you know? Like sometimes I forget to say "hello" to people at the start of conversations at work, and then I get rebuked by my colleagues. (Knowledge worker 14)

Moreover, AI can contribute to information overload. Some autoregulation strategies may also increase isolation:

> I get the feeling that I'm kind of addicted to information. [...] there's a constant flow of information on my mind, [...] I'm kind of losing the connection to my human self because I'm so much interacting with other media. Sometimes I walk in the forest without cell phone, [...] connected to the outer world. It's very helpful just to calm down. (Knowledge worker 8)

5.2 Human-AI interaction and team consequences

The advent of AI technology has significant implications for human interaction and team dynamics in professional environments. This section explores how AI impacts interpersonal communication and team cohesion, offering insights from various knowledge workers. Knowledge Worker 11 highlights a concern that digital interactions, facilitated by AI, may lack the depth and authenticity of face-to-face communication:

> People [...] are interacting with [technology] in a way which has failed to provide them the further skills in interpersonal connections that aren't digital connections. [...] Graduates communicate in a manner which a lot of meaning is missing from these

> interactions. From the perspective of the future, there's clearly opportunities for the culture and the society to improve the way we interact [...] to [be] more meaningful, to be truer, more authentic. (Knowledge worker 11)

Knowledge worker 8 sees AI as a valuable tool for cultural understanding and conflict resolution. By providing insights into different cultural norms and offering alternative approaches to communication, AI can help individuals navigate intercultural interactions more effectively.

> [For] exploring other cultures [...] and how to react or interact with people from other countries, it's very helpful to us. Everything, every sign or word will have a different meaning, not just from the wording, but also from the understanding of the people. [...] (Knowledge worker 8)

Moreover, Knowledge Worker 8 posits that AI can serve as a mediator in team conflicts, offering neutral solutions that might not be immediately apparent to those involved:

> AI can be a problem server between different people. For example, [...] if [...] a group leader has a conflict with a member, instead of expressing straightly his opinion and maybe his internal needs... Double checking with AI and asking AI for different options [on] how to react might help interpersonal [dialogue]. (Knowledge worker 8)

Knowledge Worker 11 highlights a critical duality in the use of AI technology: while it offers the potential for "greater accuracy and efficiency, freeing up time for more creative or exploratory discussions", it also poses the risk of diverting attention away from pertinent issues.

6. Discussion and conclusion

The results of this study reveal a complex relationship between generative AI and human interaction in knowledge work. While generative AI brings significant benefits such as increased productivity, efficiency, and cultural understanding (Noy & Zhang, 2023; Feuerriegel et al., 2024), it also poses significant risks of increased isolation and decreased team synergy (Silard et al., 2023). Knowledge workers' experience suggest that the impact of AI is not uniform, but strongly depends on individual personalities and work styles. Extroverted individuals may struggle with a reduced need for social engagement, while introverts may find solace in the efficiency that AI provides (Knowledge Worker 1, 6, 8). Moreover, AI's potential to mediate cultural interactions and team conflicts points to its versatility but raises concerns about the loss of depth and authenticity in digital communication (Jacobs, 2024). To take full advantage of AI, organizations must foster strategies that balance technological integration with the preservation of human connections and ensure that AI serves as a tool to enhance, not replace, meaningful interpersonal interactions. Despite these insights, the study is limited by its reliance on qualitative data from a specific sample of knowledge workers, which may not fully capture the diverse experiences and perspectives present in different industries and cultural contexts. However, the topics outlined open up a wide range of possibilities for further research.

References

Brynjolfsson, E., Li, D., & Raymond, L. (2023). Generative AI at Work. *NBER Working Paper Series*. https://doi.org/10.3386/w31161

Charmaz, K. (2006). *Grounded theory: A practical guide through qualitative analysis*. Sage.

Curado, C., & Bontis, N. (2006). The knowledge-based view of the firm and its theoretical precursor. *International Journal of Learning and Intellectual Capital, 3*(4), 367–381. https://doi.org/10.1504/IJLIC.2006.011747

Day, A., Barber, L. K., & Tonet, J. (2019). Information communication technology and employee well-being: Understanding the "iParadox Triad" at work. In R. N. Landers (Ed.), *The Cambridge handbook of technology and employee behavior* (pp. 580–607). Cambridge University Press. https://doi.org/10.1017/9781108649636.022

Drucker, P. F. (1999). *Management challenges for the 21st century.* HarperBusiness.

Feuerriegel, S., Hartmann, J., Janiesch, C., & Zschech, P. (2024). Generative AI. *Business & Information Systems Engineering, 66*(1), 111–126. https://doi.org/10.1007/s12599-023-00834-7

Hasija, A., & Esper, T. L.. (2022). In artificial intelligence (AI) we trust: A qualitative investigation of AI technology acceptance. *Journal of Business Logistics, 43*(3), 388–412. https://doi.org/10.1111/jbl.12301

Jacobs, K. A. (2024). Digital loneliness—changes of social recognition through AI companions. *Frontiers in Digital Health, 6*. https://doi.org/10.3389/fdgth.2024.1281037

Iazzolino, G., Laise, D., & Gabriele, R. (2017). Knowledge-based strategies and sustainability: a framework and a case study application. *Measuring Business Excellence, 21*(2), 152–174. https://doi.org/10.1108/MBE-11-2015-0050

Li, N., Zhou, H., & Mikel-Hong, K. (2024). Generative AI enhances team performance and reduces need for traditional teams. *arXiv.* https://doi.org/10.48550/arXiv.2405.17924

Mirowska, A., & Bakici, T. (2024). Working in a bubble: techno-isolation as an emerging techno-stressor in teleworkers. *Information Technology & People, 37*(3), 1403–1422. https://doi.org/10.1108/ITP-09-2022-0657

Schlomann, A., Seifert, A., Zank, S., Woopen, C., & Rietz, C. (2020). Use of information and communication technology (ICT) devices among the oldest-old: Loneliness, anomie, and autonomy. *Innovation in Aging, 4*(2). https://doi.org/10.1093/geroni/igz050

Silard, A., Watson-Manheim, M. B., & Lopes, N. J. (2023). The influence of text-based technology-mediated communication on the connection quality of workplace relationships: the mediating role of emotional labor. *Review of Managerial Science, 17*(6), 2035–2053. https://doi.org/10.1007/s11846-022-00586-w

Stone, D. L., Lukaszewski, K. M., & Johnson, R. D. (2024). Will artificial intelligence radically change human resource management processes? *Organizational Dynamics, 53*(1), 101034. https://doi.org/10.1016/j.orgdyn.2024.101034

Taskin, L., Klinksiek, I., & Ajzen, M. (2024). Re-humanising management through co-presence: Lessons from enforced telework during the second wave of Covid-19. *New Technology, Work and Employment, 39*(1), 143–167. https://doi.org/10.1111/ntwe.12271

Vega, G., & Brennan, L. (2000). Isolation and technology: the human disconnect. *Journal of Organizational Change Management, 13*(5), 468–481. https://doi.org/10.1108/09534810010377435

Woodruff, A., Shelby, R., Kelley, P. G., Rousso-Schindler, S., Smith-Loud, J., & Wilcox, L. (2024). How knowledge workers think generative AI will (not) transform their industries. In *CHI '24: Proceedings of the CHI Conference on Human Factors in Computing Systems* (pp. 1–26). https://doi.org/10.1145/3613904.3642700

Advancing GDP Forecasting: The Potential of Machine Learning Techniques in Economic Predictions

Bogdan Oancea[1]*

[1]University of Bucharest, Faculty of Business and Administration, Department of Applied Economics and Quantitative Analysis, Bucharest, Romania

Abstract: The quest for accurate economic forecasting has traditionally been dominated by econometric models, which most of the times rely on the assumptions of linear relationships and stationarity in of the data. However, the complex and often nonlinear nature of global economies necessitates the exploration of alternative approaches. Machine learning methods offer promising advantages over traditional econometric techniques for Gross Domestic Product forecasting, given their ability to model complex, nonlinear interactions and patterns without the need for explicit specification of the underlying relationships. This paper investigates the efficacy of Recurrent Neural Networks, in forecasting GDP, specifically LSTM networks. These models are compared against a traditional econometric method, SARIMA. We employ the quarterly Romanian GDP dataset from 1995 to 2023 and build a LSTM network to forecast to next 4 values in the series. Our findings suggest that machine learning models, consistently outperform traditional econometric models in terms of predictive accuracy and flexibility.

Keywords: Machine learning, LSTM, GDP forecasting

JEL classification: C45, C53

1. Introduction

GDP forecasting is a critical process in economic planning and policymaking. Accurate GDP forecasts enable governments and financial institutions to make informed decisions regarding fiscal policies, budget allocations, and economic strategies. Traditional methods of GDP forecasting often rely on statistical models and historical data to identify trends and project future performance. However, these methods can sometimes fall short in capturing the complexities and nonlinearities of modern economies, especially during periods of rapid change or economic upheaval. In this context, economic forecasting in general and particularly GDP prediction has significantly benefited from the integration of machine learning techniques (Woloszko, 2017; Tamara et al., 2020).

Machine learning (ML) has emerged as a powerful tool in the realm of economic forecasting, offering significant advantages over traditional statistical methods. ML algorithms can process vast amounts of data and uncover intricate patterns and relationships that might not be apparent through conventional analysis. Techniques such as Random Forest, Support Vector Machines, or Neural Networks have been effectively employed to enhance the accuracy of GDP predictions and these methods can outperform traditional autoregressive models in forecasting GDP, providing more reliable and timely insights (Yoon, 2021; Chu & Qureshi, 2023). Thus, Tamara et al. (2020) examined the application of multiple machine learning algorithms, including Random Forest, LASSO and Ridge Regression, Elastic Net,

* Corresponding author's email: bogdan.oancea@faa.unibuc.ro

Neural Networks, and Support Vector Machines, for nowcasting Indonesia's GDP growth. They found that all machine learning models outperformed the autoregressive (AR) benchmark, with Random Forest showing the best individual performance. Combining forecasts using LASSO regression further improved accuracy, highlighting the effectiveness of ensemble approaches in economic forecasting. On the other hand, Flannery (2023) evaluates the accuracy of flash GDP estimates using deep learning approaches (LSTM models) compared to traditional time series econometric models (ARIMA, ARIMA with explanatory variables, and VAR), concluding that ARIMA models with explanatory variables offer the most accurate estimates and recommending the incorporation of additional explanatory variables for improving Ireland's flash GDP estimates. Other authors such as Vrbka (2016) applied neural networks to predict the GDP growth of Eurozone countries until 2025. The study utilized various neural network architectures and found that Radial Basis Function (RBF) networks provided the most accurate predictions. The neural network models showed strong correlation with actual GDP data, making them suitable for long-term economic forecasts. Kurihara and Fukushima (2019) compared traditional autoregressive (AR) models with machine learning models, specifically Long Short-Term Memory (LSTM) networks, for forecasting GDP and consumer prices in G7 countries. Their empirical results indicated that while traditional AR models slightly outperformed machine learning models in some cases, the latter showed substantial potential, particularly for data with strong trends. In another work, Paruchuri (2021) examined the application of machine learning in forecasting the Italian economy. The study employed various machine learning techniques, including nonlinear autoregression (NAR), support vector regression (SVR), and boosted trees (BT). The results underscored that machine learning models, especially NARX and SVR, provided quick and reliable predictions, essential for timely economic policy adjustment.

In this paper we propose a special type of recurrent neural networks, namely the Long Short-Term Memory (LSTM) networks to forecast the GDP in a univariate setting, and compare its performances with an econometric model, SARIMA, showing that the ML method outperform the econometric approach.

The rest of the paper is organized as follows. In the next section, we present the data series used in our experiment, followed by the proposed neural network model for GDP forecasting. A special section is dedicated to the presentation of the results, where we compare the performance of the neural network with the SARIMA method. We end our paper with a conclusion section.

2. Data

We used the quarterly GDP data from Q1 1995 to Q4 2023, CAEN Rev.2 gross series, average prices of 2020, values given in national currency, for Romania. The GDP data in the dataset provide a comprehensive view of economic performance over nearly three decades. The descriptive statistics for the period under analysis are reported in Table 1 while figure 1 shows the evolution of the GDP. The data was retrieved from the National Statistics Institute of Romania's database (http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table)

Table 1: Descriptive statistics

Statistics	GDP
Mean	199681.0552
Standard Error	6114.13206

Median	192018.65
Standard Deviation	65851.21759
Kurtosis	-0.483138316
Skewness	0.389917727
Range	274466.4
Minimum	84817.9
Maximum	359284.3

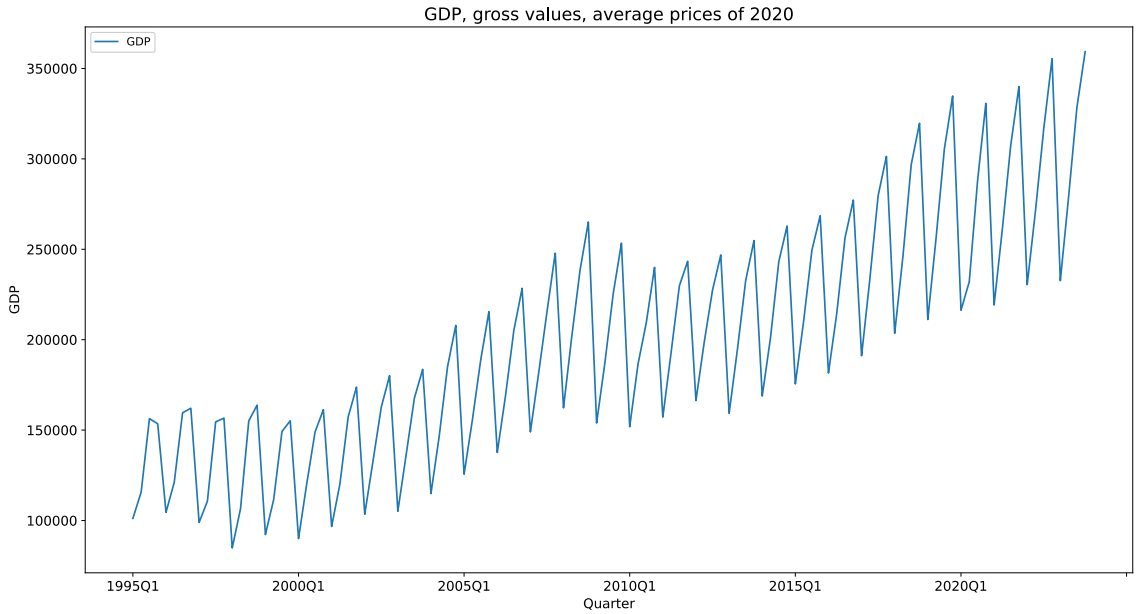


Figure 1: Quarterly GDP of Romania, gross series

As can be easily seen, the data series has a pronounced seasonality and an ascending trend, making it non-stationary. The ADF statistics is 0.31, with p-value=0.97 confirming the non-stationarity hypothesis.

Machine learning (ML) methods for time series forecasting are inherently flexible and robust, making them well-suited to handle non-stationary data. Unlike traditional statistical techniques, such as ARIMA, which require the data to be stationary to make accurate predictions, many ML algorithms do not impose any requirement on the data sets. ML models, including neural networks, decision trees, or ensemble methods, can learn and adapt to complex patterns in the data, including trends and seasonality, without the need for explicit differencing or detrending. These models can automatically capture and adjust to the underlying data dynamics, even when the statistical properties of the series change over time.

3. Methods

In this paper we propose a special type of recurrent neural networks, namely the Long Short-Term Memory (LSTM) networks (Hochreiter & Schmidhuber, 1997) to be used for GDP forecasting. LSTM networks have gained prominence for their effectiveness in time series forecasting. LSTMs are

designed to capture temporal dependencies in data, making them particularly suitable for sequential data where the order of observations is crucial as it is the case with time series. Traditional RNNs suffer from the vanishing gradient problem, which hampers their ability to learn long-term dependencies. LSTMs address this issue with their unique architecture that includes cell states and gating mechanisms, allowing them to maintain and update information over long periods. This makes LSTMs especially adept at handling time series data, where understanding the relationship between past and future observations is essential for accurate forecasting (Graves et al., 2009).

To show the advantages of using ML methods for time series forecasting we compared the results obtained with the LSTM networks with the ones obtained with a classic econometric model, SARIMA (Korstanje, 2021).

In order to use the LSTM for GDP forecasting we divided our GDP series in two subsets for training and testing purposes. We kept the last 4 values in the series (Q1:2023 – Q4:2023) as testing values while the rest of the data were used for training the models. No other preprocessing operations were performed on the data series.

For the implementation of the LSTM networks, we used Keras (Chollet et al., 2015), and TensorFlow (Abadi et al., 2016), libraries. These libraries offer multiple advantages such as scalability, flexibility and easy-of-use. The SARIMA model was also implemented using Python together with the statsmodel library (Seabold & Perktold, 2010). The neural network model used in our study has 2 LSTM layers and one final dense layer. We used the ReLU activation function, the *adam* optimizer and Mean Squared Error as loss function. To avoid overfitting, we used regularization techniques such as dropout of the recurrent neurons in the second LSTM layer and an L2 kernel regularization in the final dense layer.

Hyperparameter tuning is very important for optimizing machine learning models used in economic time series forecasting. Both classical econometric methods and advanced deep learning architectures depend heavily on hyperparameters to perform optimally. Selecting the right hyperparameters greatly impacts the model's predictive accuracy, robustness, and ability to capture the complex patterns inherent in economic data. To select the best values for the hyperparameters, we employed a grid search for both models.

Table 2: The search space for the hyperparameters

SARIMA		LSTM network	
Parameter	Values	Parameter	Values
p, d, q	0,1,2	Training epochs	250, 500,1000
P, D, Q	0, 1	Recurrent dropout	0.0, 0.1, 0.2, 0.3
s	4 (quarterly data)	Number of neurons in the LSTM layers	250, 500,1000
		Batch size	1,4, 8
		L2 for the kernel regularizer	0.01, 0.02, 0.03

4. Results

For the grid search procedure applied to the LSTM network we used a 3-fold cross validation while for SARIMA we used the AIC score to select the best values for the parameters. These values are presented in table 3.

Table 3: The best values of the hyperparameters for SARIMA and LSTM models

SARIMA		LSTM network	
Parameter	Best Values	Parameter	Best Values
p, d, q	2	Training epochs	1000
P, D, Q	1	Recurrent dropout	0.1
s	4	Number of neurons in the LSTM layers	250
		Batch size	1
		L2 for the kernel regularizer	0.01

After building and training the models with the best hyperparameter values we used them to predict the values from the test data set and computed the Mean Squared Error (MSE), Mean Absolute Error (MAE) and Mean Absolute Percentage Error (MAPE) performance metrics.

In figure 2 we present the actual versus the predicted values for the training and testing data sets for the LSTM network while in figure 3 we present the performance metrics monitored during the training process.

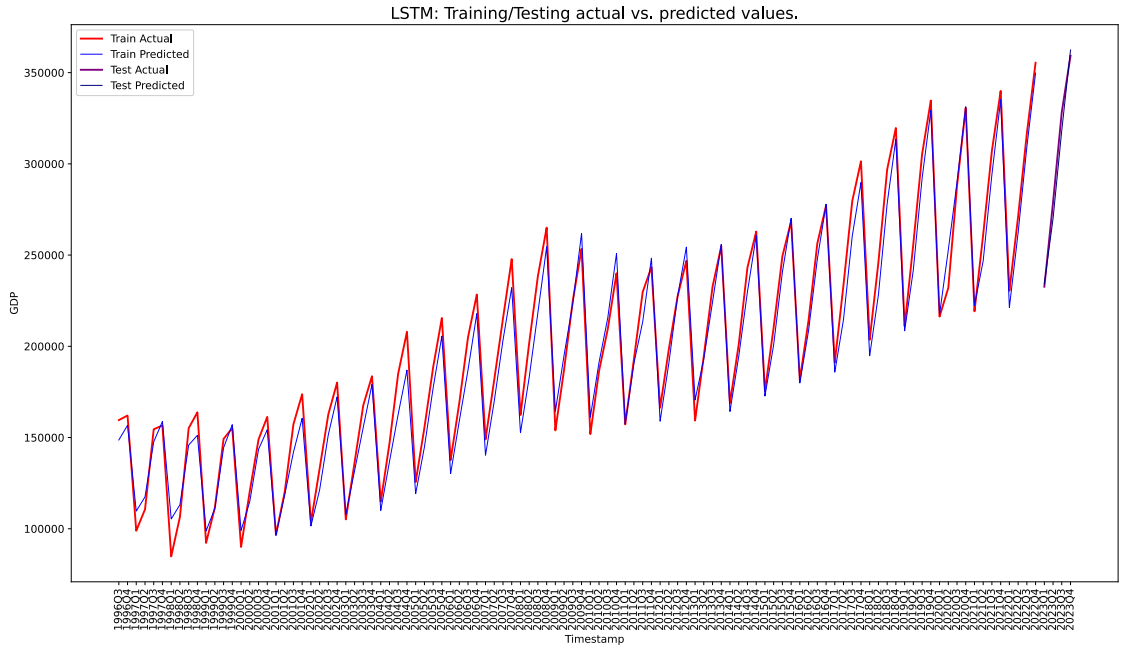


Figure 2: Training/testing actual versus predicted values

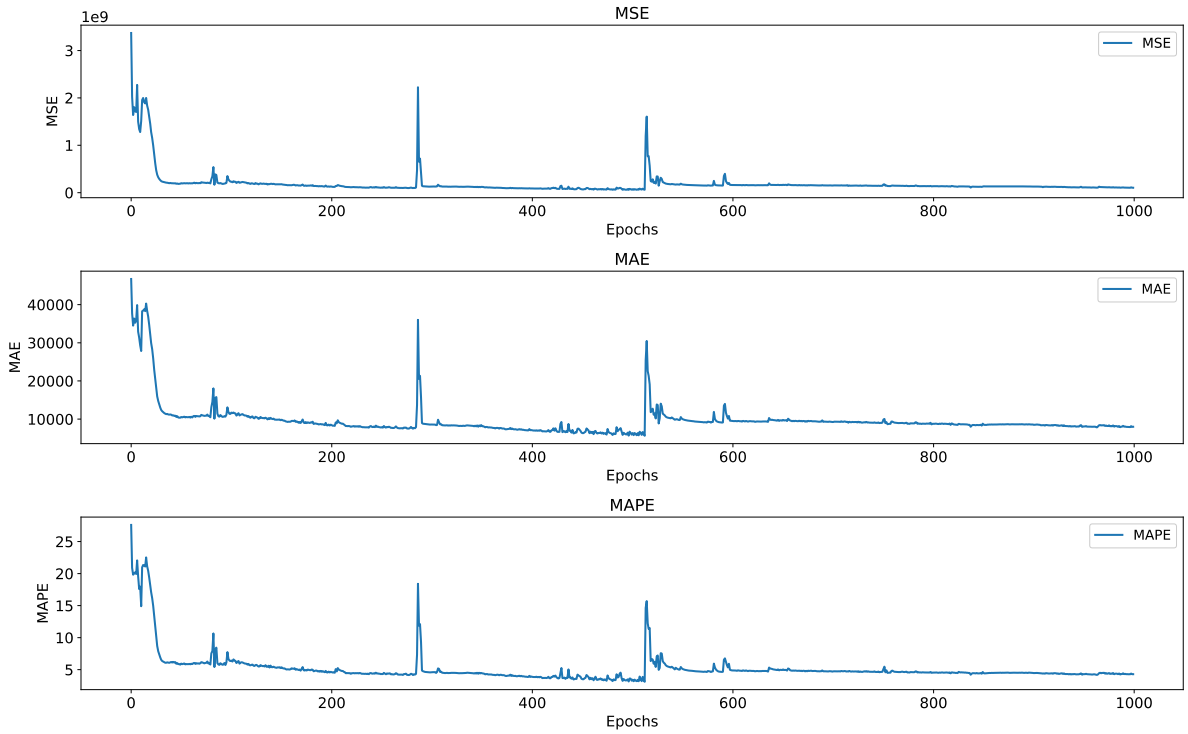


Figure 3: MSE, MAE and MAPE for the LSTM network during training

The performance metrics for the test data set, for both SARIMA and LSTM are presented in table 4.

Table 4: Performance metrics for the SARIMA and LSTM models

Performance metrics	LSTM	SARIMA
MAPE	1.96%	2.56%
MAE	5955	7144
MSE	48670983	63999869

These results show that LSTM network outperforms the SARIMA model for all performance metrics and align with numerous studies that demonstrate the superiority of machine learning methods over traditional econometric techniques for GDP forecasting. By leveraging advanced algorithms and the ability to model complex, nonlinear relationships in data, ML methods consistently provide more accurate and robust forecasts. This is particularly evident in our findings, where LSTM network outperformed traditional econometric models, such as SARIMA, in terms of predictive accuracy and the ability to capture intricate patterns in the economic data. These results corroborate existing research, underscoring the potential of ML approaches to enhance the precision and reliability of GDP forecasts, thereby offering significant advantages for economic analysis and policymaking.

5. Conclusion

Machine learning has proven to be a powerful tool for economic forecasting, offering improved accuracy and the ability to handle complex, nonlinear data. Studies indicate that techniques like Random Forest, Adaptive Trees, and neural networks are particularly effective for GDP prediction. In this study we compared the performances of a LSTM network with a SARIMA model showing that the

LSTM has a better performance for forecasting the GDP, all metrics computed for our experiment showing better values for LSTM compared with SARIMA.

References

Abadi, M., Barham, P., Chen, J., Chen, Z., Davis, A., Dean, J., Devin, M., Ghemawat, S., Irving, G., Isard, M., Kudlur, M., Levenberg, J., Monga, R., Moore, S., Murray, D. G., Steiner, B., Tucker, P., Vasudevan, V., Warden, P., Wicke, M., Yu, Y., & Zheng, X. (2016). TensorFlow: A system for large-scale machine learning. In *Proceedings of the 12th USENIX symposium on operating systems design and implementation*, 265-283.

Chollet, F. (2015). Keras: The Python Deep Learning library. https://keras.io

Chu, B., & Qureshi, S. (2023). Comparing Out-of-Sample Performance of Machine Learning Methods to Forecast U.S. GDP Growth. *Computational Economics*, 62, 1567–1609 (2023).

Flannery, J. (2023). Recurrent Neural Networks for flash GDP estimates in Ireland: A Comparison with Traditional Econometric Methods, ICT.44 Retrieved June 1, 2024, from https://arc.cct.ie/ict/44

Graves, A., Liwicki, M., Fernandez, S., Bertolami, R., Bunke, H., & Schmidhuber, J. (2009). A Novel Connectionist System for Unconstrained Handwriting Recognition. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 31(5), 855-868.

Hochreiter, S., & Schmidhuber, J. (1997). Long short-term memory. *Neural computation*, 9(8), 1735-1780.

Korstanje, J. (2021). The SARIMAX Model. In: Advanced Forecasting with Python. Apress, Berkeley, CA.

Kurihara, Y., & Fukushima, A. (2019), AR Model or Machine Learning for Forecasting GDP and Consumer Price for G7 Countries, *Applied Economics and Finance*, 6(3), 1-6.

Paruchuri, H. (2021). Conceptualization of Machine Learning in Economic Forecasting, *Asian Business Review*, 11(2), 51-58.

Seabold, S., & Perktold, J. (2010). Statsmodels: Econometric and statistical modeling with Python. In van der Walt, S. & Jarrod Millman, J. (Eds.) *Proceedings of the 9th Python in Science Conference*, 92 – 96.

Tamara, N., Muchisha, N. D., Andriansyah, A., & Soleh, A. M. (2020). *Nowcasting Indonesia's GDP Growth Using Machine Learning Algorithms*. Munich Personal RePEc Archive, MPRA Paper No. 105235.

Vrbka, J. (2016). Predicting Future GDP Development by Means of Artificial Intelligence. *Littera Scripta*, 9(3), 154-165.

Woloszko, N. (2017). *Economic Modelling & Machine Learning: A Proof of Concept*. Technology Policy Institute, OECD.

Yoon, J. (2021). Forecasting of Real GDP Growth Using Machine Learning Models: Gradient Boosting and Random Forest Approach. *Computational Economics*, 57, 247–265.

Mobilizing First-Time Voters: Assessing the Impact of School-Based Incentives in the 2024 European Parliament Elections

Dana Ondrušková1[1]*, Richard Pospíšil [2]

[1]Faculty of Arts of Palacky University in Olomouc, Czech Republic
Department of Economic and Managerial Studies
[2]Faculty of Arts of Palacky University in Olomouc, Czech Republic
Department of Economic and Managerial Studies

Abstract: The European Parliament elections are supposed to be one of the main pillars of democracy in the European Union area, yet turnout rates, particularly among first-time voters, remain a challenge. This research focuses on evaluating the effectiveness of incentives provided at schools to encourage participation in the 2024 European Parliament elections. Through surveys conducted in ten secondary schools across ten EU countries, we investigated the perceptions and responses of students towards these incentives. Utilizing a questionnaire, we examined the impact of various incentives on motivating first-time voters. Our research question canters on determining the effectiveness of school-based incentives in increasing voter turnout among this demographic. The findings of this study will provide valuable insights into strategies for enhancing democratic engagement among young citizens and ensuring the inclusivity and representativeness of European elections.

Keywords: European Parliament elections, voter turnout, first-time voters, school-based incentives, democratic engagement

JEL classification: D720 Political Processes: Rent-seeking, Lobbying, Elections, Legislatures, and Voting Behavior

Grant affiliation: IGA_FF_2024_028 Challenges and opportunities of the circular economy and social entrepreneurship

1. Introduction

The European Parliament elections are a fundamental aspect of the democratic process within the European Union (EU), representing the citizens' opportunity to influence legislative decisions and the direction of EU policies. Despite their importance, voter turnout in these elections has been consistently low, particularly among young and first-time voters (Eurostat, 2019). This trend raises concerns about the inclusivity and representativeness of the electoral process. Addressing this issue is crucial for enhancing democratic engagement and ensuring that the voices of all demographics are heard in the policymaking process (Stockemer & Sundström, 2022). Over the last five European Parliament elections, young people's participation and preferences have changed significantly in response to various socio-economic, political and cultural factors (Ares, 2019).

The EU is politically and socially diverse, meaning this evolution has not been uniform across member States – it reflects a huge range of local concerns and socio-economic contexts. Given the extensive and diverse electorate for the European Parliament elections—comprising approximately 400 million voters from 27 EU member states—no single issue is expected to dominate the 2024 campaign. Figure 1 depicts the development of voter turnout during previous elections (European Parliament, 2019).

* Corresponding author's email: dana.ondruskova01@upol.cz

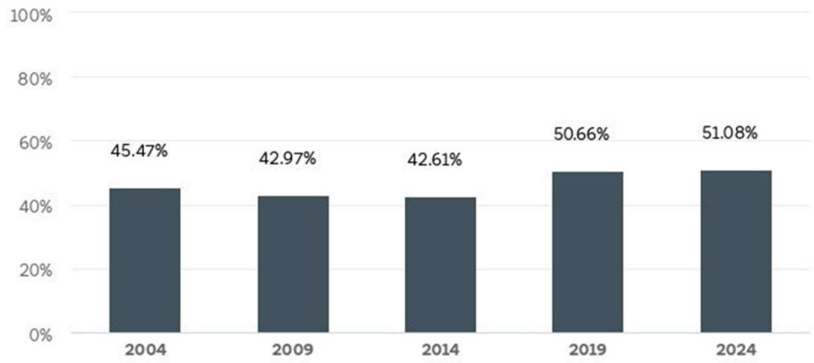


Figure 1: Voter turnout in European Parliamentary elections

As per Zalc et al. (2019) the age of the voters in 2019 profile remains similar to 2014. The analysis shows that the most striking change pattern is by age, with a much larger turnout among younger people and first-time voters. Although older people remain more likely to vote, the increase between 2014 and 2019 was larger among young people aged under 25 (42%, +14 pp) and aged 25–39 (47%, +12pp), when compared with those aged 55 or over (54%, +3 pp). Despite the increased turnout among younger people (as described above), the overall voter population continues to show a strong representation among older people, including 43% aged 55 or over (unchanged from 2014). Table 1 shows the participation in European Parliament elections in 2019 (Zalc et al.,2019).

Table 1: Voter turnout in European Parliamentary elections 2019 by age

Age	Voted in 2019 (%)
16/18 -24	42
25-39	47
40-54	52
55+	54

In 2023, EU citizens identified several top priorities, with the most frequently mentioned being the fight against poverty and social exclusion, public health concerns, and policies for climate change adaptation and mitigation (European Commission, 2024). Significantly, the 2024 European Parliament elections mark the first time that all citizens over the age of 16 were eligible to vote in Austria, Belgium, Germany, and Malta, and all citizens over the age of 17 in Greece. This extension of voting rights to younger citizens introduces a new and influential demographic to the electorate. Engaging these young voters, particularly those voting for the first time, is crucial as their participation has the potential to shape the long-term political landscape (Menezes et al. 2023). Effective engagement of this group is essential for cultivating a politically active and informed citizenry. Various strategies have been implemented to encourage voter participation, with school-based incentives emerging as a potentially effective approach (Ondrušková & Pospíšil, 2024), (Cohodes & Feigenbaum, 2021).

The concerns of young Europeans are diverse, reflecting the varied experiences and priorities of this generation. In democratic systems, voters can make decisions repeatedly at various levels, participating in national elections and elections to local councils. Some voters assign greater importance to these elections, and European elections are not as significant for them. Having matured

during the COVID-19 pandemic, young people now face anxieties on several fronts, including the war in Europe, climate change, an uncertain job market, and a shortage of affordable housing. These multifaceted concerns highlight the unique context in which this generation has developed its socio-political awareness and priorities. As per recent statistics (European Commission, 2024), approximately 49% of young Europeans surveyed reported having engaged in activities aimed at societal change, such as signing petitions, participating in rallies, or sending letters to politicians, within the past year. In nine EU member states, at least 50 % of young respondents indicated they had taken such actions over the past year. The highest proportion of youth activism was observed in Romania at 57%, while the lowest levels were reported in Cyprus (31%), Luxembourg (33%), and Sweden (34%).

The growing interest of young people in public affairs is increasingly reflected in their participation in European Parliament elections. They seem to engage more actively in the electoral process, driven by their confrontation with contemporary political, security, and economic issues. The influence of social media, the online environment, and access to information play a crucial role in shaping their political engagement (Zyad, 2023). Young voters are more informed and more mobilized through digital platforms that facilitate the dissemination of information and foster political discussions. Social networks and online communities provide young people with spaces to express their opinions, engage in debates, and organize around common causes (Hoskins & Janmaat, 2019). These platforms enhance their awareness of global and local issues, making them more likely to participate in elections and other forms of civic engagement (Ohme et al., 2019). Consequently, the digital age has empowered young voters by providing them with the tools and platforms necessary to influence political discourse and decision-making processes. Young Europeans show an overall growing interest in political and social issues that directly affect their future (Pontes et al., 2019). Key concerns include climate change and environmental sustainability, which drives strong support for green policies and parties promising firm action to combat global warming. This trend underscores the importance of integrating digital literacy and critical thinking skills into educational curricula to further support the informed and active participation of young citizens in democratic processes. Caplan (2008) argues that voters continually elect politicians who either share their biases or else pretend to. He lays out several bold ways to make democratic government work better: for example, urging economic educators to focus on correcting popular misconceptions.

2. Purpose of the study and methods

The present study aims to evaluate the actions provided by schools concerning the actual participation of young voters in the elections. In a broader study, it would be necessary to take into account that some of the survey respondents might have different reasons for not participating in the elections The central research question guiding this study is whether the school-based incentives reflect in increasing voter turnout among first-time voters in the European Parliament elections. To address this research, question the survey was conducted through quantitative questioning at secondary schools across ten different EU countries. The survey utilized a structured questionnaire designed to capture students' perceptions and responses to various incentives aimed at encouraging electoral participation. The online questionnaire survey took place one to two weeks after the European Parliament elections in June 2024 at ten secondary schools in EU member states. The questionnaire was handed out by the local teachers to those students who participated in the European Parliament elections for the first time. A total of 264 students participated in the survey, of which 245 questionnaires were fully completed. The quantitative questionnaire consists of five questions to gain clear and factual answers.

The questions in the questionnaire were designed to provide answers to the following research questions:

RQ1: How do first-time voters perceive and respond to incentives provided at schools to encourage participation in the 2024 European Parliament elections?

RQ2: What is the impact of school-based incentives on the motivation of first-time voters to participate in the 2024 European Parliament elections?

Finally, the data collected were analyzed to identify trends and assess the overall effectiveness of the incentives conducted by schools before the elections.

3. Results and Discussion

The following part of the paper reveals the results obtained through questionnaires distributed to the target group of respondents. The following tables show the overview of the closed answers of the first-time voters from ten secondary schools in different EU member states (own processing).

Table 2: Participation in Elections 2024

Q1: Did you participate in the 2024 European Parliament elections?	
Yes	No
125 (51 %)	120 (49 %)

Table 3: Evaluation of school activities on understanding the electoral process

Q2: Did participating in any school-based activities related to the European Parliament elections enhance your understanding of the electoral process?	
Yes	No
162 (66 %)	83 (34 %)

Out of 245 respondents, 51 % finally cast the ballot. This result is higher than the figure showing the percentage of first-time voters in 2019 (see Table 1). The findings of this study may be attributed to several causes. The results largely align with the conclusions of previous studies cited above (Cohodes & Feigenbaum, 2021), (Ohme et al., 2019). Notably, these findings correspond to the facts identified in Q3: it was revealed that during their educational process, students encountered activities aimed at election awareness in 95 % of cases. Thus, schools have the potential to increase the interest of young people in public affairs through appropriately targeted activities. A significant majority of respondents indicated in Q2 that they understand the electoral process better due to school interventions. This suggests that the school plays an important role in the electoral process. However, this does not negate the fact that there is substantial room for improvement.

The third question aimed at the school activities that might enhance voting participation. Based on the responses to the third sample, it is evident that the surveyed schools addressed the topic of European elections through one or more of the specified activities see Figure 2. The percentage indicating that none of the mentioned activities were conducted at their school falls within the statistical margin of error. This indicates that campaign messages are seen and heard by the young Europeans and in most cases they have a bearing on their participation in the elections.

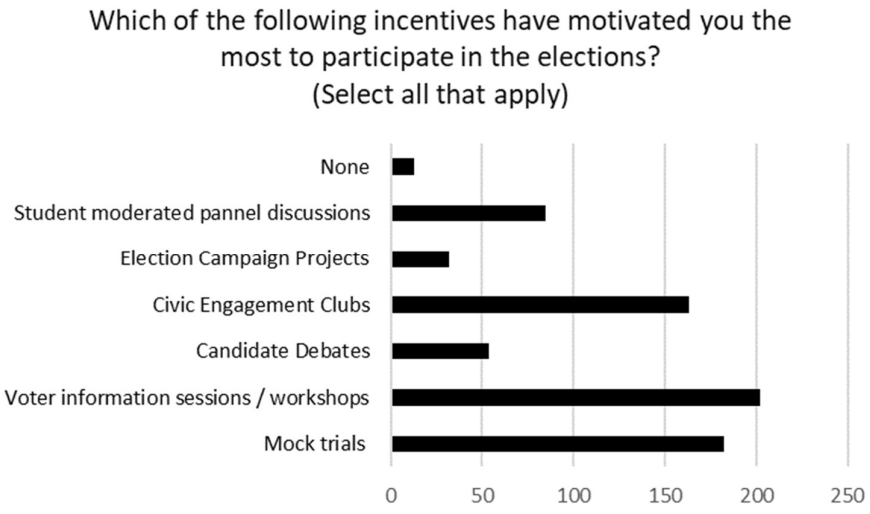


Figure 2: School activities focused on voter participation

The Q4 aimed at the respondents´ evaluation of the school activities. About a quarter of the respondents do not believe that school activities positively influence their willingness to vote in elections, and half of the respondents hold an indifferent opinion. About one-third concede that these activities have positively influenced them.

Table 4: Evaluation of school activities on the motivation to participate in EU elections

Q4: How much do you agree with the statement: The activities provided at my school have positively influenced my motivation to participate in the 2024 European Parliament elections?				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
25 (10 %)	48 (20 %)	121 (49 %)	31 (13 %)	20 (8 %)

These findings must be supplemented with information regarding the respondents' perception of the importance of their vote. The willingness to participate in elections is influenced by how voters perceive their role in the process, particularly first-time voters in this case. In the present research, only 30 % of respondents agreed that their vote in the elections could influence the future. Conversely, it is alarming that more than half of young people believe that electing their representative to the European Parliament does not enable them to influence their future. In that case, for a deeper comprehension of the abstention from voting, another theory or rational ignorance raises the question of why it is rational for individuals not to vote (Downs, 1957).

Table 5: The perception of the significance of the voting ballot

Q5 : Do you agree that through your vote in elections, you can influence your future?				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

21 (9 %)	53 (22 %)	45 (18 %)	62 (25 %)	64 (26 %)

The outcomes of the study show that the importance of elections must be communicated to young people in easily understandable and accessible ways for the given age group. Thus, the answers on research questions RQ1 and RQ2 are as follows: This study found that young individuals comprehend the mechanics of elections but do not perceive their role as sufficiently impactful. Schools have the potential to influence the decision-making of young people. However, this survey revealed that the methods employed by schools fail to engage more than a third of potential first-time voters. Ensuring that young people grasp the significance of their participation in the democratic process is essential for fostering a politically engaged citizenry. Therefore, it is essential to develop innovative and effective strategies within educational institutions to effectively convey the importance of elections to young individuals. By employing diverse and engaging approaches, schools can empower young people to recognize the value of their vote and actively participate in shaping the future of their communities and nations.

4. Conclusion

Schools are positioned to foster civic engagement and enhance students' understanding of the democratic process through continuous and comprehensive educational initiatives. By expanding and refining these activities, schools can further cultivate a politically informed and active youth demographic, thus contributing to higher voter turnout and more robust democratic participation. This ongoing evolution will ensure that students not only comprehend their voting rights but also feel motivated and equipped to fully participate in the electoral process. Young individuals are increasingly engaging in various forms of political activism, from demonstrations to social media campaigns. They utilize digital platforms and innovative tools such as smartphone apps and vlogging to express their political opinions and contribute to societal discourse. These alternative avenues for political engagement demonstrate a departure from traditional modes of involvement and signify a proactive approach to shaping the future.

In conclusion, while the current efforts of schools in promoting electoral awareness and participation are impactful, there is a clear need for ongoing development and innovation in this area to maximize their effectiveness. This will ensure that students are not only aware of their voting rights but are also motivated and prepared to engage fully in the electoral process.

References

Ares, C. (2019). Engaging Young People and Women in European Parliament Elections. *International IDEA*, 1-72. https://doi.org/10.31752/idea.2019.16

Caplan, B. (2007). *The Myth of the Rational Voter: Why Democracies Choose Bad Policies* - New Edition (REV-Revised). Princeton University Press. https://doi.org/10.2307/j.ctvcm4gf2

Cohodes, S. & Feigenbaum, J. J. (2021). Why Does Education Increase Voting? Evidence from Boston's Charter Schools, *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3931831

Downs, A. (1957). An Economic Theory of Political Action in a Democracy. *Journal of Political Economy*, 65(2), 135-150. https://doi.org/10.1086/257898

European Commission. (2024). Politics and the European UnionEducation and TrainingSociety, Culture and Demography. Retrieved June, 2024 from https://europa.eu/eurobarometer/surveys/detail/3181

European Parliament. (2019). Turnout by year. Retrieved March, 2023 from https://www.europarl.europa.eu/election-results-2019/en/turnout/

European Union. (2024). European election results. Retrieved June, 2024 from https://results.elections.europa.eu/

Hoskins, B. & Janmaat, J. G. (2019). *Education, Democracy and Inequality - Political Engagement and Citizenship Education in Europe*. Palgrave Macmillan.

Menezes, P., Ribeiro, N. & Menezes, I. (2023). 'Cast a clear vote!': The role of mock elections in the political education of young people. *American Journal of Educational Research*, 11(8), 500-509. https://doi: 10.12691/education -11-8-4

Ohme, J., Marquart, F., & Kristensen, L. M. (2019). School lessons, social media and political events in a get-out-the-vote campaign: successful drivers of political engagement among youth? *Journal of Youth Studies*, 23(7), 886–908. https://doi.org/10.1080/13676261.2019.1645311

Ondrušková, D. & Pospíšil, R. (2024). European Parliament Elections Incentives for First-Time Voters: Evidence from the Secondary Schools. *European Studies – The Review of European Law, Economics and Politics*, 10(1), 33-52. https://doi.org/10. 33-52. 10.2478/eustu-2023-0002

Pontes, A. I., Henn, M., & Griffiths, M. D. (2019). Youth political (dis)engagement and the need for citizenship education: Encouraging young people's civic and political participation through the curriculum. *Education, Citizenship and Social Justice*, 14(1), 3-21. https://doi.org/10.1177/1746197917734542

Stockemer, D. & Sundström, A. (2022). *Youth without Representation: The Absence of Young Adults in Parliaments, Cabinets, and Candidacies*. https://doi.org/10.3998/mpub.11459940

Zalc, J., Becuwe, N. E, Buruian, A. (2019). Eurobarometer Survey 91.5 of the European Parliament: A Public Opinion Monitoring Study. Retrieved June, 2024 from https://www.europarl.europa.eu/at-your-service/files/be-heard/eurobarometer/2019/post-election-survey-2019-complete-results/report/en-post-election-survey-2019-report.pdf

Zyad, H. (2023). An exploration of the effects of social media on youth online and offline sociopolitical engagement. *Education, Citizenship and Social Justice*, 18(1), 71-84. https://doi.org/10.1177/17461979211048676

Remote Work: Focus on Job Performance

Lucie Ottová[1*]

[1]Palacký University, Faculty of Arts, Department of Psychology, Olomouc, Czech Republic

Abstract: The global shift to flexible forms of work has transformed the traditional work model, leading to a hybrid approach that combines flexible forms of work and on-site work. Driven by technological advancements and the COVID-19 pandemic, this transition has redefined how organizations function and how employees perform. This paper presents an empirical study that investigates the effects of this change on the job performance of knowledge workers, comparing results between on-site and remote work environments.

Keywords: job performance, remote work, knowledge workers

JEL classification: M54

Grant affiliation: IGA_FF_2024_028 Challenges and opportunities of the circular economy and social entrepreneurship

1. Introduction

The aim of this paper is to communicate the subject and findings of the research project aimed at job performance in remote work conditions. The research project is carried out among knowledge workers of an international manufacturing company based in the Czech Republic, and it deals with an important topic of the current working environment - the performance of knowledge workers in flexible forms of work, namely on-site and remote work. The research included a sample of 400 knowledge workers, of which 262 responded, providing a sufficient base for analysis and evaluation.

The research used a quantitative method of questionnaire survey, which allows to systematically collect data from a large number of respondents and analyze them using statistical methods. This method was chosen primarily because of its ability to obtain an objective view of job performance in two different work environments (on-site and remote) and its ability to provide a comprehensive overview of the key factors that influence the job performance of knowledge workers.

2. Theoretical framework and terminology

The research started from the starting point of finding a scientifically accepted categorization of job performance. In this context, the major scientific studies that have been directed towards the categorization of job performance and the research that supports the importance of categorization in researching the issue are presented below.

The initial phase of research on job performance covers the period from the early 20th century to the mid-1980s. Hackman and Oldham (1976) proposed a model to define the conditions of intrinsic motivation of workers to achieve tasks. Research during this period focused on the relationships between personality scales and job performance. In the mid-1980s, there was a significant shift in the

* Corresponding author's email: lucie.ottova01@upol.cz

approach to this research. Barrick et al. (2001) summarized the results of 15 meta-analyses that examined the relationship between personality characteristics defined by the Big Five model (FFM) and job performance. Over the following years, researchers have focused on various aspects of job performance in the context of organisational change and flexible working conditions. Motowidlo and Kell (Motowidlo & Kell, 2013) came up with the suggestion to create a categorization of job performance. This categorization has become scientifically accepted for examining job performance. In their model, they distinguish between task and contextual performance. This distinction is essential to ensure that important aspects that have a key impact on the overall effectiveness of the organization are not neglected in performance evaluation. According to Motowidlo and Van Scotter (1994), task performance encompasses two main categories of behavior: 1. activities related to the direct conversion of raw materials into products, and 2. activities related to the distribution of needed materials. Task performance forms the technical basis of an organization, while contextual performance focuses on behaviors that promote organizational effectiveness through their influence on the psychological, social, and organizational environment. Motowidlo and Kell (2013) emphasize that positive social behavior of individuals can increase interpersonal trust and cooperation in an organization, which contributes to improved overall job performance. In further exploring job performance, they add that contextual performance is highly associated with organizational citizenship behavior (OCB), which is behavior that benefits the organization. OCB involves voluntary activities that are not associated with an expectation of reward, while counterproductive behavior (CBB), on the other hand, reduces value to the organization. OCB is a helpful and cooperative behavior (having a positive expected value). In contrast, counterproductive CBB (Organ, 1997) is behaviour that is performed in a way that hinders positive outcomes (has a negative expected value of the organisation).

In the context of their research on job performance, Orhan et al. (2016) point out that limited face-to-face contact can undermine interpersonal trust and cooperation, which are key components of contextual performance. Although remote work provides benefits for task performance, the authors point out that it is essential to actively promote social interactions among employees to maintain high levels of contextual performance, which is critical to overall organizational effectiveness. Later, in the post-pandemic period, Rebolledo et al. (2021) confirmed in their study that remote work can positively affect employee performance through better time management and reduced commuting-related stress. However, this study reiterated that, in addition to these benefits, it is important to ensure effective communication channels and support for interpersonal relationships to avoid undermining contextual performance. This research suggests that effective management of contextual performance is essential for sustaining teamwork and organizational effectiveness.

The findings of the research to date have been used to formulate the research question and hypotheses.

3. Research question and hypothesis

With respect to the research aim, the research question is: Is there a difference between the job performance of on-site and remote work among knowledge workers?

Due to the character of the data, which is based on the research character when two sets of values are compared, which come from the same subjects, but in different conditions, a paired t-test was chosen for evaluation. For the paired t-test to be used, it is necessary to establish the null hypothesis H0 and the alternative hypothesis H1.

H0: There is no difference in job performance between working on-site and remote.

H1: There is a difference in job performance between working on-site and remote.

4. Methods

The job performance was measured using the Individual Work Performance Questionnaire – IWPQ in Czech translation. This method was translated into Czech by Horčičková (2019). This method covers the aforementioned categorization of job performance, including the linking of contextual job performance to counterproductive behaviours CBB. To avoid receiving identical responses on the repeated IWPQ questionnaire, which uses a Likert scale, one day was designated for on-site work and the following day for remote work.

The data collection for this study took place in May 2024. The research was conducted in a corporate manufacturing company in the Czech Republic. A total of 400 workers were contacted via an online questionnaire, of which 262 responded. All these employees had at least six months of experience with remote work. The questionnaire included items related to general information and items concerning their experiences with on-site work and remote work.

Table 1 shows the distribution of respondents by gender. The gender breakdown plays a role in the context of the use of flexible working arrangements and childcare. Table 2 shows the highest educational attainment of respondents. There is scientific research by Ali et al. (2023) that reports that workers with higher educational levels tend to have a greater capacity for self-management and may experience higher job satisfaction when working remotely due to the increased control over their schedules and work environment.

Table 1: Distribution of respondents by gender

Male	63%
Female	36%
Others	1%

Source: own research

Table 2: Distribution of respondents by education

General secondary school, economics	13%
High school technical (industrial)	19%
Higher vocational school	4%
University degree (humanities, economics, natural sciences, agriculture, security,..) including doctoral	26%
University technical (mechanical, electrical,.) including doctoral	38%

Source: own research

5. Results

The research question and hypothesis are answered through paired t-test and correlation analysis.

5.1. Paired t-test

A paired t-test was employed because the data consisted of two sets of measurements taken from the same subjects under two distinct conditions: on-site and remote settings.

The questionnaire IWPQ contained responses where participants rated various aspects of their job performance using qualitative scales like: "always", "often", "regularly", "seldom" and "never". To perform the t-test, these qualitative responses were converted into numerical values as you can see in table 3. This transformation allowed to compute average performance scores for each participant, both for on-site work and for remote work.

Table 3: Conversion of responses to numeric values

5	always
4	often
3	regularly
2	seldom
1	never

Source: own research

The t-test results indicate the following:

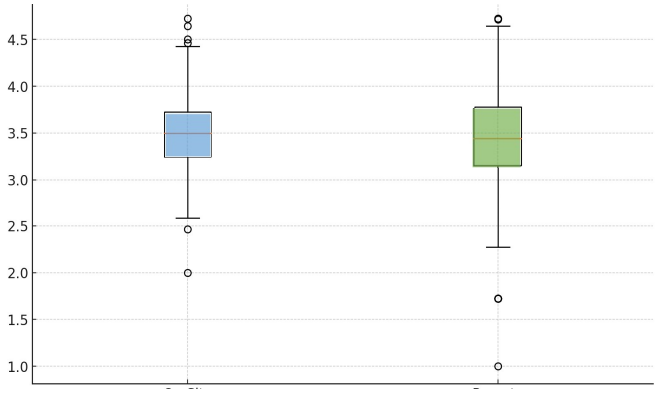
- t-statistic: 2.51

A t-statistic of 2.51 indicates that the difference between the two performance conditions (on-site vs. remote) is about 2.51 times the standard error of the difference. The higher this number, the more evidence there is against the null hypothesis H0.

- p-value: 0.0127

Since the p-value is less than 0.05, we can reject the null hypothesis H0 and conclude that there is a statistical difference between job performance on-site and during remote work.

Figure 1 illustrates the differences in performance score distributions between on-site and remote work settings, providing a visual representation that complements the t-test results.



Source: own research

Figure 1: Comparison of on-site vs remote job performance

The result of data analysis through paired t-test is as following:
The null hypothesis H0 was rejected.
The alternative hypothesis H1 was supported.

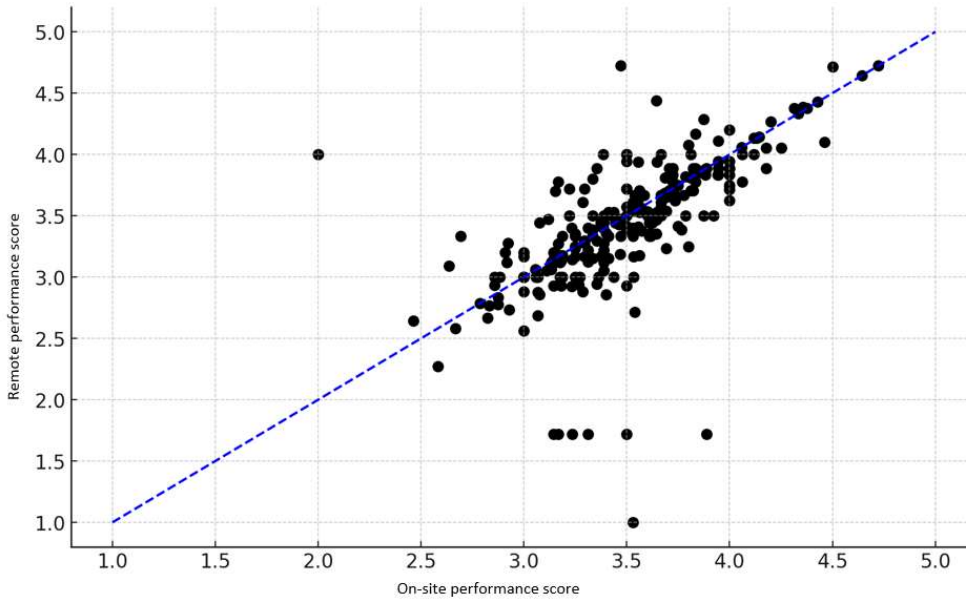
5.2. Correlation analysis

In order to explore the relationship between job performance in on-site and remote work settings, a Pearson correlation analysis was conducted. The analysis aimed to determine whether individuals who perform in one setting (on-site) also tend to perform in the other (remote work).

The Pearson correlation coefficient between on-site and remote performance is 0.66. This indicates a moderate positive correlation between the two performance conditions. In other words, respondents who demonstrated strong performance in on-site work also tended to perform well in a remote work environment. However, the strength of the correlation also implies that other factors may contribute to performance variability in these contexts. Some individuals may excel more in one environment than the other, depending on their work style, external circumstances, or the nature of their tasks.

This finding provides evidence that employees may generally transfer their work habits and productivity across different settings, but it also highlights the importance of considering individual differences and contextual factors when analyzing job performance in hybrid or remote work models.

To complement the correlation analysis, a paired scatter plot was created (see figure 2). The plot visually represents the performance scores for each individual across on-site and remote work conditions. The black dots represent the individual participants' performance scores, while the blue diagonal line (y = x) shows where performance would be equal between the two conditions. Most points lie near the diagonal, further illustrating the positive relationship between the two performance contexts.



Source: own research

Figure 2: Paired scatter plot

6. Discussion and conclusion

The aim of this paper was to communicate the subject and findings of the research project aimed at job performance in remote work conditions and answer the research question of whether there is a difference between on-site and remote job performance among knowledge workers and to find evidence to support the hypothesis. The research found a difference between on-site and remote job performance, which was supported by a moderate positive correlation between the two variables. This difference was supported by a paired t-test, which showed that the job performance of employees differed in the two work environments.

The answer to the research question is as below: There is a difference in job performance between on-site and remote work environments among knowledge workers. The alternative hypothesis H1 was supported, which indicates that job performance is not the same in both environments.

The findings have practical implications for organizations that employ knowledge workers, particularly in the context of hybrid or remote work arrangements. While many employees are able to transfer their work habits and maintain similar levels of performance in both settings, the variability observed suggests that organizational policies and support systems must be flexible to accommodate individual needs and work contexts. Providing employees with the right tools, support, and autonomy can help optimize performance, regardless of where they are working.

In conclusion, the study supports the growing recognition that the work environment plays a critical role in job performance and that a flexible, tailored approach to managing knowledge workers is essential to ensure sustained performance in both on-site and remote work settings. Future research should examine other factors that influence performance, such as job type, personality traits, and organizational culture, to more comprehensively understand how to maximize employee effectiveness in the evolving world of work.

References

Ali A.D., Narine L.K., Hill P.A. & Bria D.C. (2023) Factors Affecting Remote Workers' Job Satisfaction in Utah: An Exploratory Study. *International Journal of Environmental Research and Public Health*, 20(9): 5736. https://doi.org/10.3390/ijerph20095736

Barrick, M. R., Mount, M. K. & Judge, T. A. (2001), Personality and performance at the beginning of the new millennium: What do we know and where do we go next? *International Journal of Selection and Assessment*, 9, 9-30. https://doi.org/10.1111/1468-2389.00160

Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. Organizational Behavior and Human Performance, 16(2), 250-279. https://doi.org/10.1016/0030-5073(76)90016-7

Horčičková, V. (2019). Překlad a adaptace dotazníku na posouzení vlastního pracovního výkonu (IWPQ). [Master Thesis, Masaryk University]. MUNI Thesis Archive https://is.muni.cz/th/yy7us/Horcickova_FINAL.pdf

Motowidlo, S. J., & Kell, H. J. (2013). Job performance. In N. W. Schmitt, S. Highhouse, & I. B. Weiner (Eds.), Handbook of psychology: Industrial and organizational psychology (pp. 82–103). John Wiley & Sons, Inc.

Motowidlo, S. J., & Van Scotter, J. R. (1994). Evidence that task performance should be distinguished from contextual performance. Journal of Applied Psychology, 79(4), 475- 480. https://doi.org/10.1037/0021-9010.79.4.475

Orhan, M. A., Rijsman, J. B., & Van Dijk, G. M. (2016). Invisible, therefore isolated: Comparative effects of team virtuality with task virtuality on workplace isolation and work outcomes. *Revista De Psicologia Del Trabajo y De Las Organizaciones, 32*(2), 109-122. https://doi:10.1016/j.rpto.2016.02.002

Organ, D. (1997). Organizational citizenship behavior: It's construct clean-up time. Human Performance, 10(2), 85-97. https://doi.org/10.1207/s15327043hup1002_2

Rebolledo, O. A., Vega, D. C., & Belmar, R. S. (2021). Learning to work while homebound-the effects of remote work on job performance during the COVID-19 pandemic. *JeFMS*, *4*(6), 772-793.

Identification and Prediction of Factors Affecting European Electromobility

Marcela Papalová[1]*, Patrik Mlýnek[2], Kateřina Stanovská[1]

[1]VSB-TU Ostrava, Faculty of Economics, Department of Management, Ostrava, Czech Republic
[2]Brose Czech, Kopřivnice, Czech Republic

Abstract: Transport, especially passenger transport, has a significant negative impact on air pollution. This is why the automotive industry is undergoing a fundamental shift towards electrification. Overall, however, there are barriers to the development and diffusion of electromobility that make it difficult to switch to low- or even zero-emission transport. These barriers are mainly financial and technological. The aim of this paper is to identify and analyse the main socio-economic influences that will affect the development of electromobility in Europe/European Union over the next 5-15 years. A PESTLE analysis is used to identify the most important factors and their likely impact on the European EV industry. This article will focus on a selection of these factors.

Keywords: Electromobility, Emission CO2, Europe, Forecasting, Key Socioeconomic Factors.

JEL classification: O380, Q580, R48
Grant affiliation: This paper was supported by the Student Grant Competition of the Faculty of Economics, VSB-TU O, project registration number: SP2024/028: Digital Transformation in the Management of Companies.

1. Introduction

1.1. The environmental policy in EU

The environmental policy is one of the European Union's newest political activities. Although it is presented as almost the most important issue of the EU institutions, which influences economic developments across all sectors in a serious and significant way, its beginnings can be observed only since the 1980s (Slaviková et al., 2012). The European Union's environmental policy is directed towards reducing CO2 emissions through the development of electric vehicles. However, the unprecedented development of electromobility in recent years is not due to high customer demand or innovative ideas of car owners. The European Union, which is primarily concerned with climate protection, started this phenomenon.

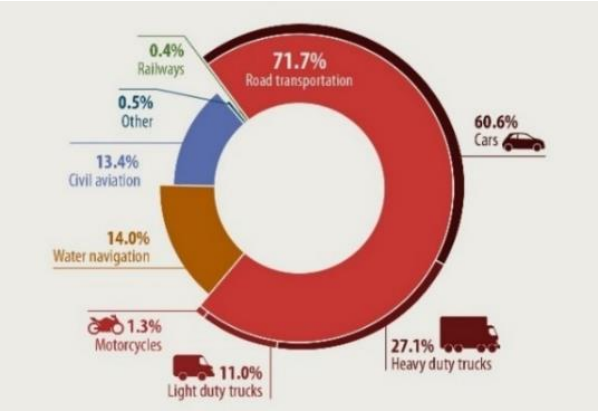


Figure 1: Transport emission in the EU – greenhouse gas emissions breakdown by transport mode (European Environment Agency, 2022)

And transport, especially passenger car transport, is the most significant emitter of greenhouse gases, as shown in Figure 1: Transport emission in the EU - greenhouse gas emissions breakdown by transport mode (European Environment Agency, 2022). The expansion of electromobility is affected both

* marcela.papalova@vsb.cz

positively and negatively by several aspects. There are a number of barriers that make it difficult to switch to low or even zero emission transport (European Environment Agency, 2022).

1.2. History and development of the electric vehicle industry in the EU

The electric vehicle industry in the EU has transformed due to technological advances, environmental concerns, and supportive policies. This reflects the EU's commitment to reducing greenhouse gas emissions and promoting sustainable transport. Advances in battery technology and EU policies, such as the 2009 Renewable Energy Directive, have been crucial. The directive set binding targets for Member States to achieve specific renewable energy consumption by 2020, boosting electric vehicle development (IEA, 2022, 2023; Szumska & Jurecki, 2023).

1.3. The current state of the market for electric vehicles in the EU

In January 2024, the share of electric vehicles (EVs) in the EU passenger car market was 10.9%, compared to 9.5% in January 2023. This represents a significant year-on-year increase in EVs sales of 28.9% to 92 741 units. The combined market share of petrol and diesel vehicles has fallen to almost 50%, down from 54% in 2023. Hybrid cars have reached a market share of almost 30%, making them the second most popular choice among EU buyers (ACEA, 2024).

2. Research problem

A full 60% of CO2 emissions are caused by passenger cars, while rail transport produces only 0.4% according to 2022 data (European Environment Agency, 2022; European Federation for Transport and Environment AISBL, 2024). Promoting electric vehicles is one way to reduce CO2 emissions. The development of electromobility is influenced by some socio-economic aspects. Which aspects are they? And which ones help to achieve this goal? A number of factors make the transition to low-emission transport more difficult.

The principal aim of this research is to identify the factors that influence the development of electric vehicles (EVs) in Europe, and to predict their future development. In this paper, only a brief research design will be proposed.

3. Research objectives and research questions

The aim of the research is to identify several factors, select the key ones and try to outline their future trend. Based on the secondary sources, the following research questions were formulated which should lead to the fulfilment of the research objective:

1. What factors influence the development of electromobility? 2. Which factors are key to the development of electromobility? 3. Can the development of the factors be predicted? 4. What methods/techniques are useful for predicting the factors?

Knowledge of the factors, their evolution and the possibility to influence them can then help to promote electromobility goals. For the actual prediction of the factors, it will then help to select an appropriate forecasting method or technique.

4. Metodology

The research first defined the problem of identifying and predicting the factors influencing European electromobility. The concepts were clarified, the historical development was described, and appropriate methods were selected to identify the factors. The main research techniques will be PESTLE analysis to systematically identify the political, economic, social, technological, environmental

and legislative factors affecting the European EV industry. This will be followed by the selection of forecasting methods (Figure 2: Characteristics of selected prognostic methods) appropriate to the nature of the factors. The criteria for the selection of forecasting methods were a long to medium time horizon and an exploratory approach.

4.1. Socio-economic analysis

PEST analysis is a strategic management tool used to identify, analyse and monitor macroeconomic factors that may affect the economy in the short and long term. The acronym PEST stands for Political, Economic, Social and Technological factors, which provide a framework for macroeconomic analysis (Grant, 2019; Sylvan and Thorson, 1980). The PEST analysis can be extended to other areas as needed, particularly legislative, environmental or demographic. Understanding external influences enables the development of policies that exploit opportunities and minimise threats (Grant, 2019; Sylvan and Thorson, 1980).

4.2. Prognostic methods

There are several forecasting methods. Armstrong (2002) distinguishes two basic groups of methods: judgemental (J) and quantitative (Q). Judgemental methods include Delphi, analogy, casual layered analysis, conjoint analysis, role-playing, expert opinion. Quantitative methods include extrapolation models, econometric models, multivariate models (Armstrong, 2002; see also Bartusková, Kresta & Papalová, 2015; Hair, 2013; Postma & Liebl, 2005; Rowe & Wright, 1996; Slaughter, 2004). A brief overview of the methods, including their basic characteristics, is presented in Figure 3: Characteristics of selected prognostic methods.

Scenario Method	Quantitative / Judgemental (Q/J)	Expert Participation Yes/No	Normative / Explorative N/E	Time Horizon	Financial / Time Intensity
Delphi	J	Yes	E	LT, ELT	+++ / +++
Causal Layered Analysis	J	Yes	E	LT, ELT	++ / ++
Analogy	J	Yes	N	ST	++ / +
Scenario Method	J	Yes	E	ST, MT	+ / ++
Conjoint Analysis	J	Yes	N	ST, MT	+++ / +++
Morphological Technique	Q	Yes	N	ST, LT	++ / ++
Mathematical Models	Q	No	E	ST, LT	+ / ++
Extrapolation Models	Q	No	E	ST, MT	+++ / +++
Econometric models	Q	No	E	ST, LT	+ / ++

Legend:
ST Short Term,
MT Medium Term
LT Long Term
ELT Extreme Long Term
\+ Low Intensity
++ Medium Intensity
+++ High Intensity

Figure 4: Characteristics of selected prognostic methods, (own elaboration)

The forecast in this research is developed for a long-term period of about 10-15 years using an exploratory approach. The most appropriate methods for analysing the data are causal layer analysis, the scenario method and, in some cases, the use of mathematical models.

5. Summary of main findings

5.1. PEST analysis factors

A number of socio-economic factors have been identified through secondary data analysis. For example, Gallar and Muehlegger (2011) believe that financial subsidies from the government significantly impact consumers' decisions to purchase an EV. They add that government policies can influence consumer behavior through these benefits. According to Buhne et al. (2015), subsidies in the

form of tax exemptions can promote the adoption of EVs. The following factors have been identified (Chládek, 2020; IEA 2022, 2023; Mlýnek, 2024; Statharas et al., 2019):

Political: EU environmental policy, subsidies.

Economic: Price of electric cars, pricing policy of car companies, subsidy policy, tax benefits - in particular reduced or no road tax payments, inflation, GDP, personal income, price of substitutes, price of electricity, price of diesel, price of petrol, price of LPG, price of CNG, subsidies, excise duty, possibility of free charging of electric cars at work, lower energy costs, other benefits - free parking, free access to the centre of major cities, VAT exemption, free transport on ferries (Norway), relation between average wages and the price of an EVs, actual individual consumption, battery price, cost of breakdown insurance, economic cycle, lobbying by car companies, tariffs for non-EU cars, etc.

Social: population, number of households, attitudes towards EVs, distribution of the population - especially the share of urban dwellers, transport infrastructure, age of cars, propensity to save, carsharing, vehicle preference, number of new cars per capita, etc.

Technological: battery capacity, battery efficiency, range, recharging rate, recharging infrastructure, density, vehicle maintenance, car company warranty, MOT checks, development of other alternative powertrains (hydrogen), etc.

Environmental: CO2 limitation, actual energy production, country environmental impact index, air pollution, environmental impact of resource extraction, recyclability of batteries, etc.

Legislative: emission standards regulation, batteries and accumulator directive, renewable energy directive, speed limit increase (Austria), use of bus lanes (Germany), etc.

Some of the factors can be categorised into more basic areas such as political, economic or legal. The accuracy of the classification is not important. What is important is to identify at the outset the maximum number of factors that will affect the whole area under analysis. The next step is to rank the factors in terms of importance, data availability and predictability. Some of the factors are shown in Figure 3: Prediction of factors. This forecast is founded upon secondary data, yet the estimation of the potency and probability of trends in factors is inherently subjective.

For each factor, data from secondary sources were found and estimated based on the selected forecasting technique. E.g. One of the main challenges for the European EV industry is competition from China, which dominates battery production and offers EVs at very competitive prices. European car manufacturers need to face this pressure while keeping pace with technological innovation (IEA, 2023). Collaboration between formerly competing brands such as Volkswagen, Renault and Stellantis is also an important trend as they explore the possibility of jointly producing more affordable EVs and seek solutions to existential challenges (Wakefield & Bergbaum, 2024).

One of the main challenges is the lack of charging infrastructure in most EU member states. In the event of a sudden increase in the number of EVs, the existing infrastructure would be completely inadequate and there could be significant waiting times at charging points. Another key area that needs to be developed is the battery technology itself. Current batteries still have limited capacity and range, long charging times, reduced performance at low temperatures and a fire risk due to their flammability. In addition, Europe is currently heavily dependent on battery imports from China, which controls over 70% of global production. At the same time, China controls a dominant share of the mining of rare earths and metals, which are the raw materials for battery production.

Area	Factor	Impact Strength	Probability of Factor		
			Growth	Stagnation	Decline
Political Factors	Emission regulations and standards	4	45%	50%	5%
	State subsidies and support	3	35%	45%	20%
Economic Factors	Electricity prices in the EU	3	50%	30%	20%
	Prices of electric vehicles (BEV)	4	25%	30%	45%
	Oil prices	2	55%	30%	15%
	Competition from China	3	20%	50%	30%
Social Factors	Consumer preferences	3	55%	30%	15%
	Public attitude towards the environment	3	60%	30%	10%
Technological Factors	Technological development of batteries	3	60%	30%	10%
	Development of charging infrastructure	3	30%	60%	10%
	Development of alternative fuels and drives	2	25%	40%	35%
Environmental Factors	Greenhouse gas emissions	4	10%	20%	70%
	Air quality	2	65%	25%	10%
Legislative Factors	Regulation on emission standards	4	50%	40%	10%
	Batteries and Accumulators Directive	3	45%	30%	25%

Figure 5: Prediction of factors (own processing according to Mlýnek, 2024)

6. Conclusion

The aim of this research is to identify key socio-economic factors that will contribute to the forecast of the European EV industry. The forecast is developed for a long-term period of about 10-15 years using an exploratory approach.

The European electric vehicle market is experiencing a period of significant growth and is one of the fastest growing segments of the automotive industry. This boom is being fuelled by growing demand for zero emission vehicles, legislative changes and technological advances. The development of this sector is closely linked to the European Union's policy of reducing CO2 emissions and promoting sustainable mobility. Policy measures such as subsidies and emission penalties for traditional combustion engines are a major factor in the growth of electric vehicles in the EU. In response, car manufacturers in the EU are expanding their range of EVs to meet stricter emission standards that will come into force in 2025.

It seems reasonable to posit that the proportion of electric vehicles in the European market will increase gradually. The development will be supported by a number of key factors, including the tightening of emissions standards and regulations, the expansion of charging infrastructure, technological advances in batteries and the reduction in the price of electric vehicles. From an economic perspective, the significant transition towards electric mobility may pose challenges for the European automotive industry and its supply chains. The production of electric vehicles is generally less complex than that of vehicles with internal combustion engines. However, batteries represent a significant portion of the production cost of electric vehicles, which could potentially result in a significant outflow of manufacturing investment and jobs to China, the primary producer of these batteries.

The environmental impacts of electromobility remain a topic of ongoing research and debate. While the operation of EVs is emission-free, the production of such vehicles, particularly the manufacture of batteries, is still relatively emissions-intensive. The overall environmental advantage therefore

depends on the energy sources used to generate the electricity. In 2023, only 44% of electricity in the EU came from renewable sources. The lifetime of the vehicle and the recyclability of the batteries are also important factors. Some studies suggest that EVs can be a greener choice when using renewable sources, while others point to the negative impacts of extracting raw materials for batteries.

The research is still in progress. Some of the factors have already been predicted, while others are currently being selected based on the suitability of the prediction methods. The scenario method appears to be a comprehensive approach that allows for the capture of different possibilities for future developments. It is an appropriate follow-up to the PESTLE analysis. CLA is not a frequently used technique in European forecasting, but it is comprehensive and provides a different perspective. It is suitable for studying the future development of socio-economic problems. The data and information required for the analysis of the EV industry is available; however, it is of the utmost importance to meticulously select data sources that are both relevant and current. Some older information or studies may be rendered obsolete or inaccurate due to the accelerated pace of change in this field.

The successful development of electro-mobility will depend on significant technological advances in battery production and recycling, substantial investment in renewable energy, and the construction of a large-scale charging infrastructure. Concurrently, it is imperative to bolster consumer confidence, which currently remains low due to the dearth of EV infrastructure, limited range, and high purchase costs. In the interim, legislative measures imposing restrictions on alternative options may serve to accelerate the adoption of EVs.

In order to achieve more precise forecasts, it is essential to ensure that the scenarios are continuously updated in light of emerging factors and developments, both within Europe and globally. It is of particular importance to consider the impact of the current challenges, particularly in light of the complex geopolitical situation that is affecting the supply of raw materials and the potential for turbulence in fuel and energy markets. Furthermore, it is crucial to observe the distribution of political forces within the European Union following the elections, as this may significantly influence the EU's stance on electromobility. Should eurosceptic and protectionist forces gain ground, this could result in a weakening of support for the transition to EVs and a prioritisation of the interests of the domestic car industry over environmental objectives. Conversely, the strengthening of pro-European and pro-environmental parties could result in the further tightening of emission standards and regulations, which would accelerate the development of electro-mobility in Europe. It is therefore essential to monitor these factors on a regular basis and to incorporate them into forecasts in order to ensure the accuracy and relevance of future predictions.

References

ACEA (2024, February 20). *New car registrations: +12.1% in January 2024; battery electric 10.9% market share.* ACEA. https://www.acea.auto/pc-registrations/new-car-registrations-12-1-in-january-2024-battery-electric-10-9-market-share/

Armstrong, J. S., (2002). *Principles of Forecasting: A Handbook for Researchers and Practitioners*. New York: Kluwer.

Bartusková, T., Papalová, M. & Kresta, A. (2015). Selection of a forecasting method: Analytical hierarchy process approach. *Scientific Papers of the University of Pardubice*, *Series D: Faculty of Economics and Administration* 22(34), 17-28. https://dk.upce.cz/server/api/core/bitstreams/60893af3-6030-4d48-ad77-9a297417a602/content

Bühne, J. A., Gruschwitz, D., Hölscher, J. & et al. (2015). How to promote electromobility for European car drivers? Obstacles to overcome for a broad market penetration. *European Transport Research Review* 7, 30. https://doi.org/10.1007/s12544-015-0178-0

Chládek O. (2020). *Elektromobilita v EU* [Master thesis, VSB-Technical University of Ostrava]. https://dspace.vsb.cz/handle/10084/139712

European Environment Agency. *(2022). Transport emission in the EU [Infographic].* https://www.europarl.europa.eu/resources/library/images/20220602PHT32026/20220602PHT32026_original.jpg

European Federation for Transport and Environment AISBL (2024, March 20). *Europe's transport sector set to make up almost half of the continent's emissions in 2030*. Retrieved April 11, 2024, from: https://www.transportenvironment.org/articles/europes-transport-sector-set-to-make-up-almost-half-of-the-continents-emissions-in-2030

Gallagher, K.S. & Muehlegger, E. (2011) Giving Green to Get Green? Incentives and Consumer Adoption of Hybrid Vehicle Technology. *Journal of Environmental Economics and Management*, 61, 1-15. Retrieved June 10, 2024, from https://doi.org/10.1016/j.jeem.2010.05.004

Grant, R. M. (2019). *Contemporary strategy analysis*. Wiley.

Greenmatch. (2023, January 1). *The Most Eco-Costly Countries in the EU*. Retrieved April 11, 2024, from: https://www.greenmatch.co.uk/blog/2018/07/top-eco-costly-countries-in-eu

Hair, J. et al. (2013). *Multivariate data analysis.* (7th ed.). Harlow: Pearson.

Hyndman, J. R. (2011). Business forecasting methods. In M. Lovric (Ed.) *International Encyclopedia of Statistical Science* (pp. 185-187). Springer. https://doi.org/10.1007/978-3-642-04898-2_156

IEA (2022, May). *Global EV Outlook 2022*. https://www.iea.org/reports/global-ev-outlook-2022

IEA (2023, April). *Global EV Outlook (2023)*. https://www.iea.org/reports/global-ev-outlook-2023

Mlýnek P. (2024). *Prognóza socioekonomických vlivů na evropský elektromobilový průmysl (*Master thesis, VSB-Technical University of Ostrava). https://dspace.vsb.cz/handle/10084/152994

Postma, T.J.B.M. & Liebl, F. (2005). How to improve scenario analysis as a strategic management tool? *Technological Forecasting and Social Change*, 72 (2), 161-173. https://doi.org/10.1016/j.techfore.2003.11.005

Rowe, G. & Wright, G. (1996). The impact of task characteristics on the performance of structured group forecasting techniques. *International Journal of Forecasting*, 12 (1), 73-89. https://doi.org/10.1016/0169-2070(95)00658-3

Szumska, E. M. & Jurecki, R. (2023). Technological developments in vehicles with electric drive. *Combustion Engines,* 194 (3), 38-47. https://doi.org/10.19206/CE-168219

Slavíková, L., Vejchodská, E. & Slavík, J. (2012) *Ekonomie životního prostředí - teorie a politika* Praha: Alfa

Statharas S., Moysoglou Y., Siskos P., Zazias G. & Capros P. (2019). Factors Influencing Electric Vehicle Penetration in the EU by 2030: A Model-Based Policy Assessment. *Energies,* 12(14), 2739. https://doi.org/10.3390/en12142739

Slaughter, R. (2004). *Futures beyond dystopia: creating social foresight.* New York: RoutledgeFalmer.

Sylvan, D.A. & Thorson, S.J. (1980). Choosing appropriate techniques for socio-political forecasting. *Policy Sci*, 12, 265–282. https://doi.org/10.1007/BF00138156

Wakefield, M. & Bergbaum, A. (2024, June 27). The Traditional Automotive Operating Model Must Change as China Brands Poised to Capture One-third of the Global Automotive Market by 2030, *Says AlixPartners Forecast*. https://www.alixpartners.com/newsroom/2024-alixpartners-global-automotive-outlook/

The Role of Emotional Intelligence in Achieving Work Satisfaction and Life Happiness

Katarína Procházková[1*]

[1]University of Economics in Bratislava, Faculty of Business Management, Department of Management, Bratislava, Dolnozemská cesta 1, Slovakia

Abstract: This research paper focuses on measuring the level of emotional intelligence and its role in the workplace and personal life. Emotional intelligence involves understanding and managing one's emotions and empathizing with others. In the workplace, it enhances leadership, teamwork, and conflict resolution, leading to a more productive and harmonious environment. In personal relationships, it fosters deeper connections and better communication. We analyzed the structure of emotional intelligence according to the questionnaire on a research sample of 106 respondents from the Slovak business environment, occupying different positions in the company hierarchy. Descriptive analysis was applied to describe the research sample, and two hypotheses regarding work satisfaction and life happiness were tested. Both hypotheses were confirmed in the research. We therefore conclude a strong correlation between emotional intelligence, job satisfaction, and personal happiness. Overall, emotional intelligence contributes to mental well-being, effective collaboration, and adaptive problem-solving, making it a key skill for success in both professional and personal life.

Keywords: emotional intelligence, work, satisfaction, life happiness, positive psychology

JEL classification: M1, M12

Grant affiliation: This research was supported by the Slovak Academy of Sciences VEGA project No. 1/0623/22 Virtualization in people management– employee life cycle in businesses in the era of digital transformation

1. Introduction

In many aspects of life, emotional intelligence is essential and has a significant impact on personal and professional success. It is also considered as a crucial leadership trait in the workplace. It makes it possible for people to recognize and comprehend both their own emotions as well as those of other people, which improves communication and strengthens relationships. High emotional intelligence aids in stress management, social complication resolution, and the development of healthy relationships. It improves teamwork, leadership, and conflict resolution in the workplace, resulting in improved performance and job satisfaction. Empathy, self-awareness, and effective emotion regulation are all aspects of emotional intelligence that contribute to personal well-being, resilience, and emotional health. Therefore, cultivating emotional intelligence is necessary for achieving success, fulfilment, and balance in life. Positive psychology also emphasizes the importance of positive emotions and traits in achieving well-being and happiness, as well as positive human functions and strengths.

2. Theoretical background on emotional intelligence and hypothesis development

Emotional intelligence involves the ability to engage in sophisticated processing of information about one's own emotions and the emotions of others, and the ability to use this information to guide thinking and behavior. That is, individuals with high emotional intelligence pay attention to their emotions, use them, understand them, and manage them at a level that can benefit not only

* Corresponding author's email: katarina.prochazkova@euba.sk

themselves but others as well. (Mayer, Salovey & Caruso, 2008). In their original study, the authors Mayer & Salovey (1990) presented the idea of emotional intelligence through the following abilities, which they consider part of emotional intelligence: understanding, managing, perceiving, and using emotions. In practice, this means the following activities: knowing and understanding one's own emotions, understanding and understanding one's own emotions, knowing and understanding the emotions of others, and managing relationships. The authors created a 16-item model to measure emotional intelligence. The model contained four core components:

- The ability to perceive one's own emotions and the emotions of others. (perceiving emotions)
- Ability to use emotions. (using emotions)
- The ability to understand emotions, emotional language, and the signals conveyed by emotions (understanding emotions).
- Ability to manage emotions to achieve specific goals. (managing emotions)

In a study published Daniel Goleman (1998) argued that while IQ and technical skills matter for job performance, emotional intelligence is twice as important. He defined emotional intelligence as five key skills: self-awareness, self-regulation, motivation, empathy, and social skills, which help leaders and their teams maximize performance.

In the literature and research, authors often address the composition of leadership qualities and characteristics that predispose a person to effective leadership. One study is by a pair of authors (Manning & Curtis, 2012) who created a list of key leadership qualities by comparing and meta-analyzing three studies focusing on this issue.

The list of ten key leadership qualities was used in our research and contained: the ability to have a vision (ability to create and communicate a vision, ability to define what should be done and how it should be done) knowledge and result orientation, enthusiasm (ability to get excited about things, personal passion), stability (balanced emotional attitude, ability to control oneself and to judge things objectively), concern for others (focus on other people and a concern for their well-being), self-awareness (knowing oneself, one's strengths and weaknesses), perseverance (the ability to complete tasks and be decisive in difficult situations that are important for moving to the next step), vitality (stamina and ability to focus), charisma (the ability to influence people, the ability to influence people by the force of one's personality), integrity (personal integrity based on the values one communicates and lives under). Many of these qualities and leadership traits are connected to the idea of emotional intelligence, as shown in the preceding structure.

In the context of emotional intelligence, positive psychology also needs to be defined and analyzed. Positive psychology was officially declared an important field of study by Martin Seligman in the late 1990s. The author (Seligman, 2007) also highlights positive psychology about effective leadership and coaching. Positive psychology was formed in response to the great interest psychologists had in negative topics such as: anxiety, fear, pain, depression, and burnout syndrome. This resulted in the formation of a scientific approach called positive psychology - or also the psychology of human strengths - at the end of the last century, which focuses both on the study of positive emotions (self-confidence, hope, joy) and the study of positive qualities (altruism, indomitability, wisdom, humility), as well as on human abilities (Kodráčová, 2010). Thus, in such studies and research, emphasis has begun to be placed on positive elements such as joy, happiness, love, hope, nice experiences, positive experiences, and experiencing (flow). Over time, the exploration of positive qualities and traits was added and the topic of happiness came to the fore.

According to Peterson (2006), "positive psychology is the scientific study of what makes our lives most worth living." Peterson (2006) focused his research specifically on examining optimism, personality,

and overall happiness. Positive psychology has been studied and applied in areas such as quality of life, personal well-being, positive emotions, and optimal functioning (Trčková, 2016). Research shows that a positive mind, self-awareness, managing one's emotions, building healthy relationships, and getting along with people in the workplace and in life are prerequisites for living a happy and satisfied life. The representative of humanistic psychology, Karl Rogers, in his studies of human needs and healthy human development (Rogers, 1959), also explored several elements that we now consider to be supportive in building emotional intelligence. Other authors have built on this research in the field of positive psychology (Csikszentmihalyi, 2014; Lyubomirsky, 2008). A major contribution to the field has been the research of Carol Ryff (1989), who developed the 6-factor model of psychological well-being. According to the author, a person achieves well-being if he or she is optimally successful in fulfilling the overall six domains of positive psychological functioning: self-acceptance, positive relationships with others, autonomy, environmental control, meaning in life, and personal growth. These factors contribute to an individual's psychological well-being, satisfaction, and happiness (Ryff & Singer, 1996 & 2008).

Based on this knowledge and the link between leadership traits, emotions, happiness, and satisfaction *we predict that people with high EI will be happier in life and people with high leadership qualities will be more satisfied in work*. The survey included scaled questions to measure job satisfaction or subjective feelings of happiness and standardized questionnaires focusing on EI and leadership qualities structure. Two hypotheses were formulated:
H1: People with high emotional intelligence scores report high levels of happiness.
H2: People with high scores of leadership qualities report high levels of work satisfaction.
Hypothesis development rationale: Based on previous studies and research, the results confirm a positive relationship between feeling happy and emotional intelligence. High emotional intelligence scores are closely associated with a positive mindset (Achor, 2012) and significantly influence other domains such as performance, productivity, creativity, or the ability to get along with people, and overall sense of well-being and happiness (Ryff & Singer, 1996 & 2008). Thus, in H1 we will look for associations between the level of emotional intelligence and the level of personal experience of happiness. Studies examining leadership qualities and skills seek to answer the question of what are the key leadership qualities and characteristics at the core. In H2, we will seek to answer whether there is a relationship between the level of leadership qualities and the personal perception of the work satisfaction. This hypothesis will help to extend the understanding of the trait-based leadership construct to include the novel fact of whether and how leadership traits (containing the elements of emotional intelligence) are related to work satisfaction. There is a positive correlation between personality traits and relationship satisfaction, according to previous research (Tackett, 2011) and overall life satisfaction (Heller, Watson & Ilies, 2004). Thus, in testing this hypothesis, we will focus on investigating the relationship between personality traits that are associated with leadership potential and their effect on job satisfaction.

3. Methods and research sample

Quantitative data collection was used to create the research database, which was conducted between November 2019 and April 2020 via an online questionnaire. The sample consisted of 106 respondents, whose responses were processed for subsequent statistical analysis. The questionnaire was distributed via established e-mail lists (contacts from managerial and corporate practice), and social networks (LinkedIn, Facebook) to respondents from corporate practice throughout Slovakia (respondents were

actively working in the corporate and/or managerial field). According to the structure of the research sample based on the identifier: job position, the representation within the sample was as follows:

- non-managerial position: full-time employees in the company: 61.3%
- managerial position (top management, middle and operational management, owners, and entrepreneurs): 38,7 %

The largest representation within the research sample were respondents from the age category of 26 to 40 years, where the percentage of representation was almost 50%, the smallest representation was in the age category of 51 years and over. Women made up around two-thirds of the research sample (70,8%), while men had a representation of almost 30% (29,2%). The questionnaires were used to measure the level of each component of emotional intelligence (Self-Evaluation Questionnaire EQ - short version, University of San Diego), which contained 40 statements (10 per each element of EI) and to measure the level of leadership traits (10 Leadership Qualities Questionnaire). The reliability and internal consistency of the questionnaire were verified by Cronbach's alpha (Emotional Intelligence Self-evaluation: 0.7525; 10 Leadership Qualities Questionnaire: 0.811).

For the research, two statistical hypotheses were established and tested, to process the results of this paper:

H1: People with high emotional intelligence scores report high levels of happiness.

H2: People with high scores of leadership qualities report high levels of work satisfaction.

The formulation of hypotheses is guided by the fundamental principles of compatibility with verified facts, clarification of known information, prediction of new facts, and experimental and practical verifiability.

4. Results and discussion

H1 linked the level of emotional intelligence to an individual's subjective sense of happiness. Research suggests that people with high EQ scores tend to be more balanced, happier, and more satisfied in life. H2 has been tested to see if the assumption is valid that to perform a leadership role, one needs to possess a certain blend of leadership qualities and characteristics that form the basis for effective leadership and workplace behaviours that bring a sense of satisfaction, self-fulfilment, and work satisfaction.

H1: People with high emotional intelligence scores report high levels of happiness.

For H1 (Table 1), we tested the statement "Do you consider yourself a happy person" to the overall level of EI. The hypothesis was confirmed ($r=0.355$ $p<0.001$). A significance level of 5% is one-sided in terms of the hypothesis. Thus, in this case, it is true that individuals showing high subjective happiness also have high levels of emotional intelligence.

Table 1: H1 testing – Pearson correlation

Correlations	H1
Person Correlation	0.355
p-value	0.000
N	106

H2: People with high scores of leadership qualities report high levels of work satisfaction.

In evaluating H2 (Table 2), we tested the statement referring to "Overall job and career satisfaction" to the Leadership Qualities Questionnaire Leadership10. The hypothesis was confirmed (r=0.297 p=0.001). The significance level is 5% one-sided in terms of the hypothesis.

Table 2: H2 testing – Pearson correlation

Correlations	H1
Person Correlation	0.297
p-value	0.001
N	106

In the workplace, good relationships, a friendly atmosphere and supportive communication are the basis for building a strong effective team, and at the same time, in the current crisis situation, a high level of psychological resilience is needed, which is also closely related to working with emotions and building a positive approach to life (Slezáčková, 2012). According to Huppert and So (2009), self-esteem, optimism, resilience, vitality, self-determination and positive relationships are essential criteria for optimal human flourishing, which the authors consider as an indicator of the degree of positive mental health and overall life well-being. In addition, the studies (Achor, 2012) provide results that a positive mindset, a focus on achieving satisfaction, and experiencing joy have a positive effect on employees' creativity, productivity, and engagement in the workplace. Through understanding the basic nuances and essence of positive psychology, it is possible to understand emotions, work with them, and manage them as a fundamental and necessary prerequisite for the essence of the human personality as well as for its sophisticated development and effective behavior. Emotional intelligence is the skill of the present but also the future of effective leadership. Its importance in the case of building an appropriate working atmosphere, building effective teams, or setting up appropriate and functional communication and healthy conflict management and solving current challenges is essential.

In concluding this discussion, this research paper also highlights the importance of emotional intelligence in the workplace and in businesses, especially in communication, effective problem-solving and conflict resolution. As the author (Cherniss, 2001) stated, there is a direct relationship between emotional intelligence and organizational or team effectiveness. Also well-known is the study of the Italian manufacturing company Amadori, one of McDonald's main suppliers in the European market. After measuring and testing in the company's plants, they found that the Teramo plant, where the highest EQ (emotional quotient) score was measured, also had the highest EQ scores for the monitored criteria such as motivation, employee retention rates, and productivity. At the same time, the engagement rate increased as the EQ level increased, and in the plant with the highest EQ scores, it reached the highest values (Freedman, 2013). Emotional intelligence has its meaning and importance within the leadership process, through the individual components of emotional intelligence, the leader can be aware of himself and control his emotions, as well as to perceive the emotions of others, and through empathic behavior he can build healthy relationships in the workplace. He or she can create a supportive working environment atmosphere, to solve conflicts and problems arising from formal tasks and projects as well as from informal relationships and the level of communication in the company. Several authors (Goleman, 1998; Schulze&Roberts, 2007; Porvazník, 2009) point out the importance of emotional intelligence not only in private but also in professional life. Emotional

intelligence leads to a harmonious distribution of competencies within a workgroup so that its performance exceeds that of a group that shares only cognitive skills. Harmonious groups can benefit from the creativity of each member of the group, unlike groups where the dominance of one member is a source of negative and hostile feelings. Groups that achieve peak performance include members who foster the development of empathy, cooperation, and social skills among all group members.
The research has some limitations. First, the sample size was small, which affected the distribution across analyzed categories. Second, the selected areas of study may limit the results but help maintain clarity. Lastly, the use of self-assessment in the questionnaire may reduce objectivity, though anonymity likely encouraged more critical self-reflection.

5. Conclusion

In summary, emotional intelligence is essential not just for effective leadership but has also a strategic role in success in the workplace, and perceiving personal happiness. Particularly during times of crisis, it enhances team cohesion and dynamics, supports communication, and fosters positive relationships. Employee engagement, creativity, and productivity are all linked to a high level of emotional intelligence. Current research shows that organizations led by emotionally intelligent individuals exceed their goals, demonstrating the impact on performance. EQ leaders create supportive environments, effectively manage conflict, and promote harmonious team dynamics. Despite certain constraints, empirical evidence consistently demonstrates that a high level of emotional intelligence is a significant predictor of both personal well-being and work satisfaction. This is why it is important to develop these skills not only from a career perspective but also from a perspective of life balance and personal development.

References

Achor, S. (2012). Positive intelligence. *Harvard Business Review, 90*(1-2). https://hbr.org/2012/01/positive-intelligence

Csikszentmihalyi, M. (2014). *Flow and the foundations of positive psychology*. Springer. https://doi.org/10.1007/978-94-017-9088-8

Freedman, J. (2013). The Amadori case: Supplying McDonald's – Organizational engagement, emotional intelligence and performance. Case study, Amadori. *The Emotional Intelligence Network*. https://www.6seconds.org/2013/04/03/amadori-case-engagement-emotional-intelligence/

Goleman, D. (1998). *Working with emotional intelligence*. Bloomsbury Publishing.

Heller, D., Watson, D., & Ilies, R. (2004). The role of person versus situation in life satisfaction: A critical examination. *Psychological Bulletin, 130*(4), 574–600. https://doi.org/10.1037/0033-2909.130.4.574

Huppert, A. F., & So, T. C. T. (2009). What percentage of people in Europe are flourishing, and what characterizes them? University of Cambridge. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=1cbb72d9b0da0c61f59035a39737cae02b80827b

Cherniss, C. (Ed.). (2001). *The emotionally intelligent workplace: How to select for, measure, and improve emotional intelligence in individuals, groups, and organizations*. Jossey-Bass.

Kordáčová, J. (2010). Miesto pozitívnej psychológie v psychológii zdravia. In *Zborník z konferencie Psychológia zdravia - Zdravie a múdrosť. Psychológia zdravia a syndróm vyhorenia. Rodové rozdiely v zdraví* (pp. 106–114). MAURO Slovakia.

Lyubomirsky, S. (2008). *The how of happiness: A new approach to getting the life you want*. Penguin Books.

Manning, G., & Curtis, K. (2012). *The art of leadership* (4th ed.). McGraw Hill International.

Mayer, J. D., & Salovey, P. (1990). Emotional intelligence. *Imagination, Cognition and Personality, 9*(3), 185–211. https://doi.org/10.2190/DUGG-P24E-52WK-6CDG

Mayer, J. D., Salovey, P., & Caruso, D. R. (2008). Emotional intelligence: New ability or eclectic traits? *American Psychologist, 63*(6), 503–517. https://doi.org/10.1037/0003-066X.63.6.503

Peterson, C. (2006). *A primer in positive psychology*. Oxford University Press.

Porvazník, J., et al. (2009). *Celostná manažérska kompetentnosť: Potreba, prístupy a metódy jej ohodnocovania* (1st ed.). Ekonóm.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069–1081. https://doi.org/10.1037/0022-3514.57.6.1069

Ryff, C. D., & Singer, B. H. (1996). Psychological well-being: Meaning, measurement, and implications for psychotherapy research. *Psychotherapy and Psychosomatics, 65*(1), 14–23. https://doi.org/10.1159/000289026

Ryff, C. D., & Singer, B. H. (2008). Know thyself and become what you are: A eudaimonic approach to psychological well-being. In *The exploration of happiness: Present and future perspectives* (pp. 97–116). Springer Science + Business Media. https://doi.org/10.1007/978-94-007-5702-8_6

Seligman, M. E. P. (2007). Coaching and positive psychology. *Australian Psychologist, 42*(4), 266–267. https://doi.org/10.1080/00050060701648233

Schultze, R., & Roberts, D. R. (2007). *Emoční inteligence: Přehled základních přístupů a aplikací* (1st ed.). Portál.

Slezáčková, A. (2012). *Průvodce pozitivní psychologií: Nové přístupy, aktuální poznatky, praktická aplikace* (1st ed.). Grada Publishing.

Tackett, L. S. (2011). Personality and relationship satisfaction: Evaluating the direct associations between neuroticism, agreeableness, extraversion, and relationship satisfaction. In *Romantic couple relationships* (Thesis). Brigham Young University. https://scholarsarchive.byu.edu/etd/2723

Trčková, J. (2016). PCA a pozitivní psychologie. *Socioterapia a psychoterapia, 6*(3), 2–3.

Gold price forecasting - analysing the effect of Empirical Mode Decomposition on the accuracy of selected forecasting methods

Ilia Revin[1*], Jan Stoklasa[1,2*], Pasi Luukka[1]

[1]LUT University, Business School, Lappeenranta, Finland
[2]Palacký University, Department of Economic and Managerial Studies, Olomouc, Czech Republic

Abstract: Gold has long secured funds during financial instability, adding value to currencies and protecting investments from inflation and downturns. Its price reflects broader economic conditions, making accurate forecasting essential. Financial time series exhibit non-linear relationships and significant volatility, requiring sophisticated models for effective analysis and planning. This study assesses the impact of Empirical Mode Decomposition (EMD) on forecasting accuracy of different models for time series analysis. Using gold price data from 01.07.2012 to 31.03.2024 and 11 additional explanatory variables, the findings show that the Long Short-Term Memory model is the most efficient before the application of EMD in the analysed period. After the application of EMD, the Autoregressive Integrated Moving Average (ARIMA) model becomes the most efficient in terms of forecasting error. The application of the EMD method improved the performance of both the ARIMA and Linear Regression models, underlining the effectiveness of EMD for complex time series analysis. The effects of EMD on DeepAR and N-Beats forecasting accuracy are also investigated.

Keywords: Empirical Mode Decomposition, forecasting, gold, price, accuracy

JEL classification: C32, C45, C53

1. Introduction

Over a long time, gold has fulfilled the role of securing the value of the world's national currencies and protecting funds from financial losses and inflationary risks. The stable and predictable price of gold is the most important thing that makes this precious metal a way to save money. The price of gold can mirror the global economic situation. In addition, gold has special properties that distinguish it from other commodities and contribute to the economies of many nations on a global scale. A change in the price of gold can affect global markets, so it is important to be able to anticipate such situations. (Farhat & Ghalayini, 2020)

The motivation for this study is rooted in the historical significance of gold as a stable investment, especially evident during economic downturns such as the financial crises of the 1990s to the late 2000s. (Gaspareniene et al., 2018). These periods highlighted the growing importance of gold, not just as a traditional asset, but also as a strategic tool for risk management within financial markets (Gaspareniene et al., 2018). Therefore, developing sophisticated predictive models to forecast gold prices becomes essential for effective decision-making and financial planning.

The urgency of studying gold prices is further underscored by its implications for a variety of key stakeholders, including those in charge of setting monetary policy, managing hedge funds, and overseeing global portfolios. During the 2008-2009 financial crises, while other commodities experienced significant price drops, gold prices notably increased, demonstrating its countercyclical nature and its key role in economic stability. (Sari et al., 2010)

[*] Corresponding authors' emails: "ilia.revin.lpr@gmail.com, jan.stoklasa@upol.cz"

Although the topic of gold price predictions is deeply researched, new methods can still be applied in this field. For example, Tripathy (2017) emphasizes the need for more sophisticated and in-depth methods to predict the price of gold and suggests the implementation of the Neural Networks model in future research. At the same time, Herawati et al. (2017), emphasize the potential of combining the application of Empirical Mode Decomposition (EMD) and different models to predict the gold price. The usefulness of the Empirical Mode Decomposition method for Bitcoin price prediction was also demonstrated by Aggarwal et al. (2020). The researchers used EMD in combination with the Support Vector Machines model, highlighting its effectiveness. They recommend applying the EMD method to other models and different time series data in future studies.

The aim of this study is to investigate whether applying Empirical Mode Decomposition method can make model predictions more accurate. By improving the accuracy of gold price forecasts, this research not only strives to help make better investment decisions but also to contribute to the stability of financial markets around the world. In addition to applying Empirical Mode Decomposition (EMD), this study also applies innovative DeepAR and N-Beats models to predict the gold price. These two methods have not been previously applied to gold price prediction, and the EMD method has only been used twice. This paper builds on the findings of Revin (2004), but focuses on the effects of applying EMD as a data pre-processing tool on the performance of predictive models in gold price prediction. The actual “meaning” or construction process of the price of gold are left out of the scope of the paper, as the main focus is on the investigation of the ability of EMD to enhance the predictive power of other predictive methods. As such the gold-price time series here serves as a case study, representing a commodity that is well known and sufficiently researched so that the implications of the EMD’s abilities when combined with other methods are easy to see and understand. Also, given the aim, the paper analyses a chosen time period (with time series compatible cross-validation) without any intention to interpret the fitted models in the context of their ability to predict structural breaks and other infrequent events. The analysis relies on the comparison of performance of EMD-enhanced and “vanilla” versions of predictive models within the same time period, with the same cross-validation applied to all. This allows us to see if the EMD implementation has analogous effects in all the studied predictive methods.

2. Methods and data

In this study, Linear Regression (LR) (Brooks, 2019), Autoregressive Integrated Moving Average (ARIMA) (Brooks, 2019), Long Short-Term Memory (LSTM) (Rumelhart et al., 1986), Vector autoregression (VAR) (Brooks, 2019), DeepAR (Salinas et al., 2020) and N-BEATS (Oreshkin et al., 2019) models and Empirical Mode Decomposition (EMD) (Huang et al., 1998) data preparation method are used for time series forecasting. This section focuses only on the last three of these methods, as they are the least studied in the field of gold price prediction, the other methods are frequently considered to be a forecasting gold standard and as such sufficiently known to the readers.

Empirical Mode Decomposition (EMD), introduced by Huang et al. (1998), decomposes a signal into Intrinsic Mode Functions (IMFs) and a residual, capturing various oscillatory modes in the data. The process involves identifying local maxima and minima, constructing cubic spline envelopes, and iteratively sifting the signal until meaningful IMFs are extracted. This technique is particularly effective for analyzing nonlinear and nonstationary data, ensuring that each IMF retains significant physical meaning through criteria such as the Standard Deviation (SD) formula for sifting process cessation.

DeepAR, developed by Salinas et al. (2020), utilizes a Recurrent Neural Network (RNN) with Long Short-Term Memory (LSTM) cells for probabilistic forecasting. This model trains on historical data across all time series in the dataset, predicting future values by learning the distribution parameters of the time series. DeepAR's autoregressive nature and Monte Carlo simulations enable robust probabilistic forecasts, accommodating various likelihood functions like Gaussian or negative binomial. This method captures seasonal patterns and covariate impacts, making it highly adaptable for business process optimization.

N-BEATS, designed by Oreshkin et al. (2019), is a deep learning architecture focusing on time series forecasting. It employs backward and forward residual connections within a deep stack of fully connected layers. The model's architecture, featuring multiple blocks and stacks, enables both backcast (input data estimation) and forecast (future value prediction), enhancing interpretability and prediction accuracy. The basis expansion method, integral to N-BEATS, allows the model to capture nonlinear relationships without manual specification, optimizing for trend and seasonality components.

The first step in the analysis was data collection. The dataset used in the study covers the period from 01.07.2012 to 31.03.2024, with daily observations totalling 3036 entries. It includes gold prices, Bitcoin prices, oil prices, prices of silver and platinum, currency exchange rates (USD to Euro, Yuan, and Pound), the MSCI Index, the VIX Index, U.S. inflation rates, and U.S. interest rates. Gold price data is sourced from the World Gold Council, while other financial data is obtained from the financial website Investing and MSCI. These variables were chosen due to their potential impact on gold prices, driven by economic conditions, market sentiment, and geopolitical factors.

The second step was to conduct an exploratory analysis to examine the structure of the data. The third step was to select a method to validate the results. K-fold cross-validation, adapted for time series, is used to validate the models. Traditional cross-validation is unsuitable due to the temporal dependence of observations. Instead, the dataset is divided into five folds, maintaining chronological order. In the first iteration, the model trains on 2036 observations and validates on 1000. Each subsequent iteration expands the training set by 200 observations and reduces the validation set by 200, ensuring comprehensive evaluation across the entire time series. This method allows for robust model performance assessment while preserving the temporal structure of the data.

In the fourth step, all the models selected for the study were applied to each of the five folds before applying Empirical Mode Decomposition (EMD). The next step involved calculating the Mean Absolute Error (MAE), Mean Absolute Percentage Error (MAPE), Mean Squared Error (MSE), and Root Mean Squared Error (RMSE) values for each fold and then calculating the average values for each model. Subsequently, the EMD method was applied to the original dataset, and the same models were used again to predict the gold price on the updated data. The average values of the indicators across all the validation folds for all models were then calculated again. This stage of the analysis allowed to draw conclusions and evaluate the results.

3. Results

The analysis of the ARIMA, DeepAR, and N-Beats models, particularly after implementing the EMD, yielded notable insights into their predictive capabilities. The ARIMA model benefited from the EMD, displaying an increase in prediction accuracy. This model became the most accurate among all models

and iterations (before and after EMD), as signalled by all four indicators (MAE, MAPE, MSE, and RMSE). The MAPE value decreased to 3.6% and the MAE value decreased to 70.3, which is the lowest compared to all the other models. The model accurately predicted the trend and changes in the price of gold throughout the testing period (1000 observations). The most accurate predictions were made by the ARIMA model on the first 60 observations from each 5-fold cross-validation test set. Figures 1 and 2 below provide a comparison of the predictions made by the ARIMA model on the same time interval before EMD was applied (Figure 1) and after EMD was applied (Figure 2).

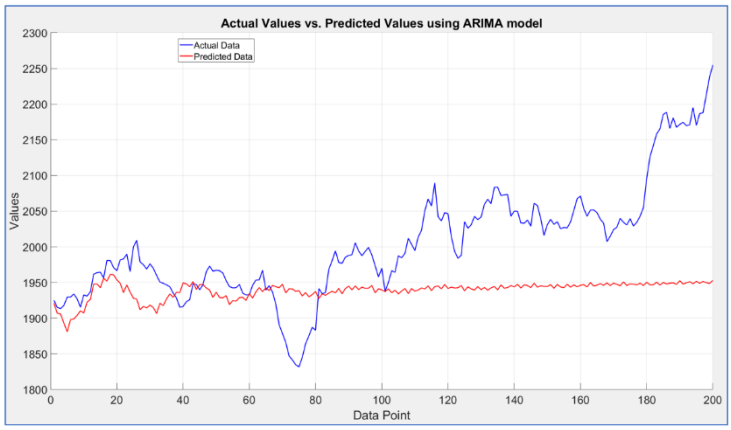


Figure 1: Predictions of the ARIMA model for the 5th fold before applying EMD

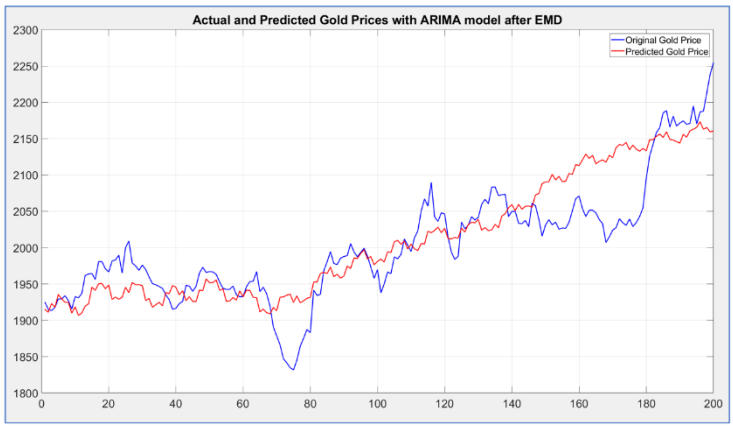


Figure 2: Predictions of the ARIMA model for the 5th fold after applying EMD

If only ARIMA, VAR, DeepAR and N-Beats models are considered, then the DeepAR model had the best performance of all indicators among these three specified models before the application of EMD but showed slight improvement after applying EMD. After the application of EMD, the MAPE value decreased by only 0.4 percentage points. On the other hand, the N-Beats model showed a decline in performance after applying EMD, and the performance became worse compared to the ARIMA and DeepAR models. This comparative performance underscores the varied impacts of EMD across different forecasting models. A comprehensive summary of these results is provided in Table 1 below.

The results described above are separated from the results of the LR and LSTM models. The reason is that ARIMA, VAR, DeepAR, and N-Beats models predict values a large number of steps ahead and use their previous predictions as a basis for the next rolling forecast. A forecast produced by these models, for example, 200 observations ahead, can indeed be obtained at a given point in time. Whereas LR and LSTM models cannot make such a long-term forecast, and to predict the gold price 200 observations

ahead, it is necessary to know the values of the explanatory variables, for example, 190 observations ahead. Therefore, the comparison of MAE, MAPE, MSE and RMSE scores is most relevant when comparing the two models separately to evaluate the effectiveness of applying the EMD method to the original data.

Table 1: Performance and accuracy comparison of the applied models (average of all 5 folds), best values highlighted in bold

	EMD not applied				EMD applied			
	MAE	MAPE	MSE	RMSE	MAE	MAPE	MSE	RMSE
LR	194.1	10.1%	57063	238.9	106.1	5.5%	30016	173.3
ARIMA	149.2	7.5%	33274	182.4	**70.3**	**3.6%**	**9188**	**90.7**
VAR	345.2	22.5%	176320	415.3	458.2	24.4%	201683	462.5
LSTM	**107.3**	**5.7%**	**24126**	**102.7**	144.5	5.4%	19756	115.6
DeepAR	135.2	6.9%	28582	160.2	128.5	6.5%	25948	152.7
N-Beats	143.2	7.1%	29338	154.3	144.4	9.5%	36323	179.5

The LSTM model outperforms the Linear Regression model in accuracy before the application of EMD. This model has the lowest values of all indicators compared to all models, which can be observed in Table 1 above. For example, the MAE value for the LSTM model before applying EMD is 107.3 and the MAPE value is 5.7%. The model captures well both the long-term trend of gold price changes and local short-term changes. However, it cannot be definitely concluded that after applying EMD, the efficiency of the LSTM model increased. Although MAPE and MSE values showed a slight decrease, but MAE value increased from 107.3 to 144.5 and RMSE value increased from 102.7 to 115.6. Overall, the application of EMD did not affect the performance of the LSTM model significantly.

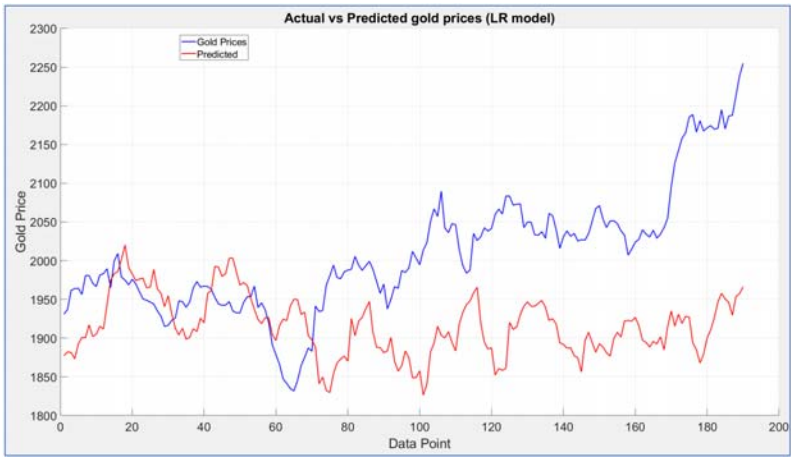


Figure 3: Predictions of Linear Regression model for the 5th fold before applying EMD

At the same time, the Linear Regression model was outperformed by other models on all indicators (except the VAR model) prior to the application of EMD. The predicted values over a large time interval diverged from the actual values. After applying EMD, the Linear Regression model improved its performance and the average MAPE value became equal to the MAPE value for the LSTM model. This shows that the IMFs obtained from applying EMD have meaningful information for the Linear Regression model. Figures 3 and 4 below provide a comparison of the predictions made by Linear

Regression model on the same time interval before EMD was applied (Figure 3) and after EMD was applied (Figure 4).

In general, it is worth emphasizing again that before the application of Empirical Mode Decomposition, the most efficient model was the LSTM. After the application of EMD, the most efficient model is ARIMA. Moreover, the application of the ARIMA model after EMD showed the highest accuracy among all the experiments conducted. The Linear Regression model also improved its performance after applying EMD. DeepAR and N-Beats models could compete in accuracy with classic models prior to the use of EMD. However, after EMD was applied, the classical models performed better, while the accuracy of the DeepAR and N-Beats remained essentially unchanged.

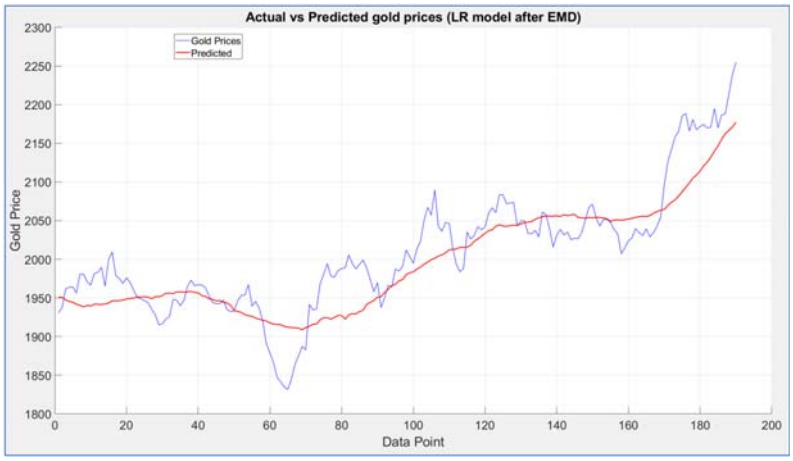


Figure 4: Predictions of Linear Regression model for the 5th fold after applying EMD

4. Conclusion

This study has contributed to the field of gold price forecasting by applying the EMD method to improve the accuracy and efficiency of forecasting models. By integrating the Empirical Mode Decomposition (EMD) method, the study validated this approach in a new context and provided a comparative analysis highlighting their strengths and weaknesses.

The performance and accuracy of DeepAR and N-BEATS models show distinct advantages and limitations compared to traditional econometric models. Before applying EMD, DeepAR and N-BEATS models demonstrated slightly higher forecasting accuracy than ARIMA and Linear Regression models. However, the efficiency of DeepAR and N-BEATS models decreased after EMD application. The DeepAR model captures long-term dependencies accurately but requires careful parameter tuning, while N-BEATS is easier to use with less customization.

The application of EMD improved the prediction accuracy of ARIMA and Linear Regression models, while the improvement was less pronounced for LSTM and DeepAR models. The performance of the N-BEATS model deteriorated after EMD application, indicating that the benefits of EMD depend largely on the model's characteristics and its ability to utilize decomposed components. Despite some challenges, such as potential overfitting in complex models like VARs, EMD proved valuable as a pre-processing tool in economic forecasting. The study illustrated the dynamic relationship between different predictive models and pre-processing methods, offering a deeper understanding of their

mechanisms in the context of gold price forecasting. Practically, these findings provide financial analysts and policymakers with more reliable tools for risk management and investment decisions.

However, the study has limitations. The chosen timeframe did not include economic events like the 2008 financial crisis, which may affect the generalizability of the findings. Additionally, relying on a specific set of variables and a baseline version of EMD may limit the findings' scope. Future research should consider diverse economic conditions, advanced EMD versions such as Complete Empirical Ensemble Mode Decomposition (CEEMD) and Ensemble Empirical Mode Decomposition (EEMD), and explore other time series data, gold price seasonality, and additional explanatory variables. These explorations can enhance the understanding of gold price determinants and improve the applicability and reliability of predictive models in financial economics.

References

Aggarwal, D., Chandrasekaran, S., & Annamalai, B. (2020). A complete empirical ensemble mode decomposition and support vector machine-based approach to predict Bitcoin prices. *Journal of behavioral and experimental* finance, 27, 1-12. https://doi.org/10.1016/j.jbef.2020.100335

Brooks, C. (2019). *Introductory Econometrics for Finance* (4th edition). Cambridge University Press. https://doi.org/10.1017/9781108524872

Farhat, S. & Ghalayini, L. (2020). *Modeling and Forecasting Gold Prices.* [Unpublished master's thesis]. Lebanese University.

Gaspareniene, L., Remeikiene, R., Sadeckas, A., & Ginevicius, R. (2018). The main gold price determinants and the forecast of gold price future trends. *Economics & Sociology,* 11(3), 248-264.

Herawati, S., Latif, M., Rachmad, A., & Adiputra, F. (2017). Implementing Method of Ensemble Empirical Mode Decomposition And Recurrent Neural Network For Gold Price Forecasting. *International Journal of Engineering, Research and Applications,* 7(11), 39-43.

Huang, NE., Shen, Z., Long, SR., Wu, MLC., Shih, HH., Zheng, QN., Yen, NC., Tung, CC., & Liu, HH. (1998). The empirical mode decomposition and the Hilbert spectrum for nonlinear and non-stationary time series analysis. *Proceedings of the royal society a-mathematical physical and engineering sciences,* 454(1971), 903-995. https://doi.org/10.1098/rspa.1998.0193

Oreshkin, B., Chapados, N., Carpo, D., & Bengio, Y. (2019). N-BEATS: Neural basis expansion analysis for interpretable time series forecasting. *International Conference on Learning Representations,* 1-31. https://doi.org/10.48550/arXiv.1905.10437

Revin, I. (2024). *Application of Empirical Mode Decomposition, DeepAR, and N-Beats for gold price analysis and forecasting* [Master's thesis, LUT University]. LUT Pub. https://lutpub.lut.fi/handle/10024/167607?show=full

Rumelhart, D., Hinton, G., Williams, R. (1986). Learning representations by backpropagating errors. *Nature,* 323(6088), 533-536. https://doi.org/10.1038/323533a0

Salinas, D., Flunkert, V., Gasthaus, J., & Januschowski, T. (2020). DeepAR: Probabilistic forecasting with autoregressive recurrent networks. *International journal of forecasting,* 36(3), 1181-1191. https://doi.org/10.48550/arXiv.1704.04110

Sari, R., Hammoudeh, S., & Soytas, U. (2010). Dynamics of oil price, precious metal prices, and exchange rate. *Energy Economics,* 32(2), 351-362. http://dx.doi.org/10.1016/j.eneco.2009.08.010

Tripathy, N. (2017). Forecasting Gold Price with Auto Regressive Integrated Moving Average Model. *International Journal of Economics and Financial Issues,* 7(4), 324-329.

Entrepreneurial Attitudes in the Czech Republic

Dominik Salat[1]*

[1]Silesian University, School of business administration, Department of business economics and management, Karviná, Czech Republic

Abstract: The role of the contemporary entrepreneur is, in fact, quite complex. The rise of digitalisation has led to a notable reduction in the complexity of numerous tasks, consequently enhancing the efficiency of business operations. Nevertheless, this may lead to a stagnation in the personal development of individuals. In the field of entrepreneurship, this can have a profoundly adverse impact, as entrepreneurs are the primary drivers of economic growth and development. The objective of this paper is to evaluate the characteristics required for successful entrepreneurship, as defined by Salat (2023), within the context of Czech business owners. Data was collected from a sample of 446 Czech entrepreneurs in the first quarter of 2024. The findings illustrate the current attitudes of modern entrepreneurs and highlight the significance of cultivating entrepreneurial skills and personalities.

Keywords: Czech entrepreneurs, Entrepreneurship, Entrepreneurial attitudes

JEL classification: L26, M21

Grant affiliation: „This paper was supported by the Ministry of Education, Youth and Sports Czech Republic within the Institutional Support for Long-term Development of a Research Organization in 2023“. [IP/05/2023]

1. Introduction

Entrepreneurship has been a driving force behind the advancement of numerous civilisations throughout history (Schumpeter, 1934). In recent times, its significance has only grown. In the 1960s and 1970s, researchers concentrated on the personality traits of entrepreneurs, such as the high need for achievement, high personal control over behaviour and self-efficacy (Bandura, 1977). While personality traits are undoubtedly significant, researchers have divergent views on the role of personal traits in predicting entrepreneurship (Crant, 1996). In the early 1980s, researchers shifted their focus to cognitive issues and attitudinal effects. At the present time, there is a noteworthy interest in these previous psychological factors, and in particular the personality characteristics of entrepreneurs (Freese, 2009; Caliendo et al., 2016; Howard, 2023). Ajzen (1991) proposed that a number of concepts pertaining to behavioural dispositions, including social attitudes and personality traits, which possess a pivotal role in the prediction and explanation of human behaviour. Every individual is distinct, and personality (Ernawati et al., 2022) represents a core attitudinal trait that is inherent to every person throughout their life. Personality traits play a pivotal role in shaping an individual's life trajectory. In order for an individual to become a successful entrepreneur, it is essential that they possess the requisite personality traits. According to Vandor (2021), personality is the most crucial element in entrepreneurship, exerting a significant influence on numerous life and work decisions. Consequently. Personality traits can be regarded as a form of human capital (Maczulskij & Viinikainen, 2023).

* Corresponding author's email: salat@opf.slu.cz

2. Theoretical background

The internal entrepreneurial ecosystem, including entrepreneurship education, entrepreneurship courses, lectures, and training, which is maintained at the university, plays an essential role in the formation of student's entrepreneurial intentions (EI). This can be defined, as some studies (Sahid et al., 2024; Huang & Kee, 2024) have suggested, as an individual's desire to own a business and become an entrepreneur in the future. Bird (1988) defined intention as a state of mind that directs an individual's attention, experience, and action towards a specific path to achieve a goal. Ajzen (1991) defined intention as the degree to which an individual displays motivation to perform desirable behaviours. Ajzen's (1991) Theory of Planned Behaviour (TPB) provides a robust theoretical framework for understanding intentions, wherein TPB assumes that intentions predict an individual's behaviour. This provides support for the theory that attitude toward entrepreneurship (ATE) and perceived behavioural control (PBC) may act as potential determinants of EI (Huang & Kee, 2024). Jena (2020) conducted a study and identified three components of ATE, including behavioural, cognitive, and affective components, as illustrated in Figure 1.

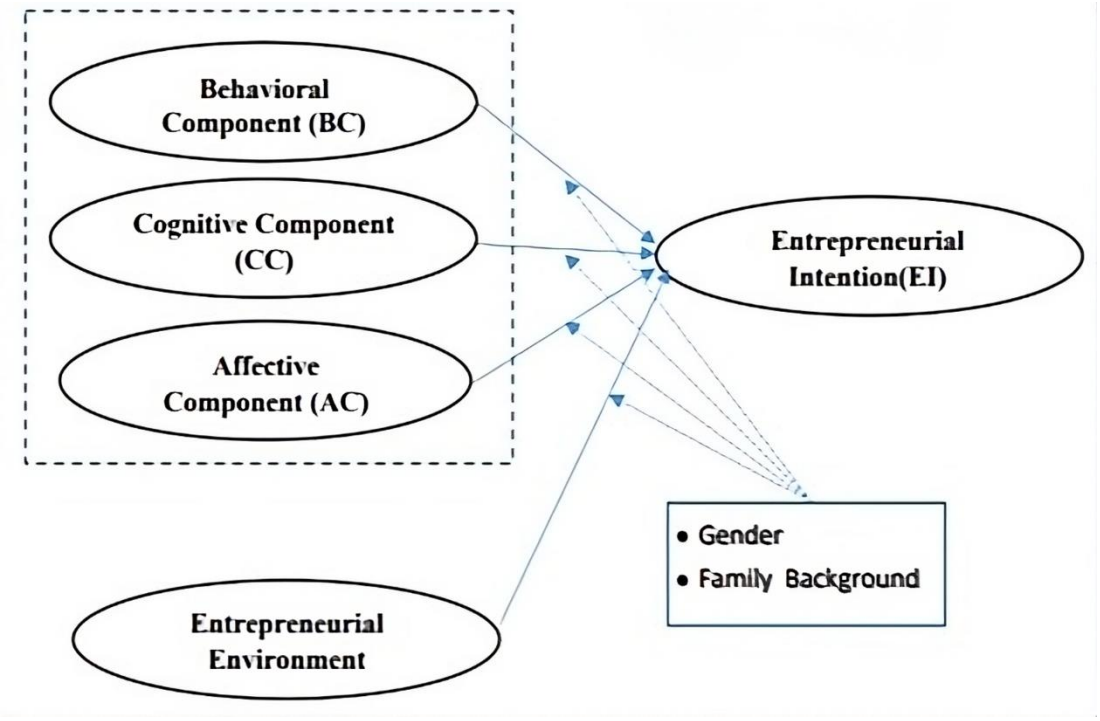


Figure 1: The proposed research model based on TPB (Jena, 2020)

Cognitive component including belief, thought and knowledge

The cognitive component (CC)may be defined as a set of beliefs, thoughts and knowledge related to a specific attitude object. The accuracy of belief is irrelevant; what is essential is that it exists. Similarly, beliefs are detailed cognitive constructs that an individual holds about a given subject. A belief may be defined as the accumulated feelings and priorities associated with a particular object or concept. An individual's beliefs are shaped by their upbringing within a community and their association with particular reference groups. Every individual acquires and develops beliefs in accordance with their interactions within society. An individual's beliefs are primarily shaped by their social environment, including their family and reference groups. Additionally, beliefs can facilitate the development of a favourable inclination over time.

Affective Component including feeling and emotion

The affective component (AC) refers to the emotional response and feelings associated with an attitude object. As argued by Arroyo et al. (2017), the perceived desirability of entrepreneurship and its associated education may be shaped through intuitive thinking. This indicates that the perceived value of entrepreneurship is constructed through the application of effective attitudinal judgement. Furthermore, it was observed that individuals evaluate the same feelings and emotions in a manner that is influenced by a number of factors, including their unique motivational, personality, past experience, reference group, and physical conditions. This indicates that some individuals may hold positive sentiments towards entrepreneurship, whereas others may respond with a negative reaction.

Behavioural component including behaviour, overt response and willingness

The behavioural component (BC) refers to the specific manner in which individuals respond or react to a particular set of attitudinal objects. The behavioural component reflects the intention of students to engage in specific behaviours, as expressed in the form of goals, objectives and aspirations, as well as anticipated responses to the attitude object. To illustrate, a student who aspires to become an entrepreneur, either before or after graduation, may demonstrate behavioural tendencies towards attending educational programmes and developing a keen interest in entrepreneurship.

Ajzen's (1991) PBC concept reflect the perceived ease or difficulty of becoming an entrepreneur. In this context, it is necessary to mention another variable associated with Ajzen's theory of Planned Behaviour (TPB) (1991), namely subjective norms (SN). These are based on beliefs about whether or not important reference individuals or groups approve or disapprove of an individual's establishment of a business, and to what extent this approval or disapproval is important to the individual. Both PBC and SN have been linked to EI and psychological characteristics, and both variables have been identified as predictors of EI. Furthermore, evidence indicated that psychological characteristic exert an influence on PBC and SN. Psychological variables that positively influence PBC include propensity to risk, self-efficacy, proactive personality, and the need for achievement (Ng et al. 2019). With regard to SN, the study by Niţu-Antonie & Feder (2015) indicates that a propensity to risk has a positive influence on SN. Nevertheless, the understanding of the entrepreneurial process through personal characteristics is a complex undertaking, and thus the literature has proposed the mediating role of PBC and SN as a means of elucidating this phenomenon. Some authors have demonstrated that these personality variables can explain entrepreneurial intention through PBC and SN (Munir et al. 2019).

In their study, Munir et al. (2019) demonstrate that personality traits, specifically risk-taking propensity, proactive personality and internal locus of control, are associated with EI through the mediating roles of PBC and SN. Other studies have concentrated on other personal characteristics, such as self-efficacy. For Bandura et al. (1999), the PBC concept is essentially analogous to self-efficacy. However, in subsequent studies, the distinction between PBC and self-efficacy is highlighted.

3. Research Methodology

In the first quarter of 2024, the initial data collection phase was initiated in order to facilitate the research process. The data was gathered through a questionnaire survey (Roopa & Rani, 2012) utilising an online questionnaire, specifically Google Forms. A total of 446 entrepreneurs from the Czech Republic participated in the survey. The initial section of the questionnaire addressed general inquiries pertaining to the entrepreneurial experience. The remaining variables included the gender of the

respondents, age range, highest educational attainment and the main activity of the entrepreneurship. Subsequently, respondents were asked to indicate their attitudes towards entrepreneurship by ranking the following concepts (inspiration, passion. Creativity, motivation and opportunity) on a Likert scale of 1 to 5 (with 1 being the most important and 5 being the least important) according to Salat (2023).

4. Results

In terms of the gender composition of the sample, the male population was found to be the majority compared to the female population. This is illustrated in Table 1.

Table 1: Gender characteristics

Gender	Frequency	Relative frequency (%)	Cumulative frequency (%)
Female	144	32.3	32.3
Male	302	67.7	100.0
Total	446	100.0	100.0

In terms of age range of respondents, the most commonly represented age category of entrepreneurs is between 41 and 55 years old. This is followed by the age group of entrepreneurs of 26 to 40 years. Additional results of the age range is shown in Table 2.

Table 2: Age range of participants

Age category	Frequency	Relative frequency (%)	Cumulative frequency (%)
18 – 25 years	63	14.1	14.1
26 – 40 years	122	27.4	41.5
41 – 55 years	198	44.4	85.9
56 – 65 years	50	11.2	97.1
66 years and over	13	2.9	100.0
Total	446	100.0	100.0

The results of the examination of educational achievement are presented in Table 3. With respect to the highest level of education achieved by entrepreneurs, secondary education (67.9%) is more prevalent than university education (31%) and primary education (1.1%).

Table 3: Highest educational attainment of entrepreneurs

Education level	Frequency	Relative frequency (%)	Cumulative frequency (%)
Primary education	5	1.1	1.1
Secondary education	303	67.9	69.0
University education	138	31.0	100.0
Total	446	100.0	100.0

The last general descriptive question about entrepreneurs was to find out the main area of their business (Table 4). The most represented area is services (63.2%). On the other hand, the least number of subjects were from agriculture and other field of business.

Table 4: Area of business activity

Area	Frequency	Relative frequency (%)	Cumulative frequency (%)
Manufacturing	70	15.8	15.8
Trade	84	18.8	34.6
Services	282	63.2	97.8
Agriculture	5	1.1	98.9
Other	5	1.1	100.0
Total	446	100.0	100.0

The research presented here focuses on the characteristics necessary for entrepreneurship, drawing on the findings of the survey of entrepreneurial attitudes (see Table 5). Given the complexity and continuity of the individual factors that contribute to the formation and expression of entrepreneurial intention, only a limited number of elements were selected for analysis. The indicators presented here offer insight into the current entrepreneurial attitudes of today's entrepreneurs in the Czech Republic.

Table 5: Entrepreneurial Attitudes

	1	2	3	4	5
Inspiration	**105**	79	96	76	88
Opportunity	93	**104**	77	70	97
Creativity	67	73	**160**	68	73
Motivation	104	98	38	**133**	68
Passion	80	90	70	86	**115**

The ranking of the given characteristics, presented in absolute frequency, was determined based on the data obtained from the entrepreneurs. According to the entrepreneurs, inspiration, opportunity, creativity, motivation and passion were identified as the most important characteristics. The results of this research correspond with the proposed model.

5. Discussion and conclusion

The human psyche is a multifaceted phenomenon, and despite extensive research spanning several years, a considerable number of questions remain unanswered in this domain. Given the way in which it affects all aspects of life, it is perhaps unsurprising that there is a growing interest in this topic in the business world today. It is important to recognise that human being are not machines, and that the final decision rests with them. The contemporary digital age has undoubtedly facilitated the completion of numerous tasks in a more expedient manner. Consequently, the role of the entrepreneur has become comparatively less demanding. However, this technological advancement has also given rise to a number of inherent disadvantages. It is not uncommon for entrepreneurs to experience a lack of growth and development, leading to a state of stagnation. Despite the abundance of digital resources offering insights. Information, and opportunities, the remains a shortage of fresh capital, particularly in the form of psychological capital.

The field of entrepreneurship is inherently complex and requires a diverse range of capital. A multitude of institutions have emerged to facilitate the provision or evaluation of this capital. However, these institutions have largely overlooked the crucial role of the human psyche. This presents a significant opportunity for research and potential enhancements to the business landscape. This article, therefore, focuses on the psychological aspect of entrepreneurship, which is still in its infancy in the Czech Republic and has yet to receive sufficient attention from researchers.

The research sample indicated that the majority of respondents were male (67.7%). The largest cohort was constituted by entrepreneurs between the ages of 41 and 55, representing 44.4% of the total sample. The majority of entrepreneurs (67.9%) reported that their highest level of education was secondary. The majority of the study population comprised entrepreneurs in the services sector (63.2%).

In consideration of entrepreneurial attitudes, five of the aforementioned attitudes were selected, as proposed by Salat (2023), to form the business cycle model. The results of the research on entrepreneurs indicated that proposed model aligns with the attitudes of entrepreneurs in the Czech Republic. However, the sample size is insufficient for a more in depth qualitative assessment of entrepreneurial attitudes. Furthermore, if the sample were to be extended to include additional entrepreneurs, the results may not be consistent. In comparison to Kozubikova et al. (2018) who examined attitudes in their study, this research also avoided the business environment of the Czech Republic and focused on the inside of entrepreneurs.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T.

Arroyo, J., Puente-Díaz, R., & Agarwal, N. (2017). An examination of certain antecedents of social entrepreneurial intentions among Mexico residents. *Review of Business Management*, *19*(64), 180–218. https://doi.org/10.7819/rbgn.v19i64.3129.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191.

Bandura, A., Freeman, W. H., & Lightsey, R. (1999). Self-Efficacy: The Exercise of Control. *Journal of Cognitive Psychotherapy*, *13*(2), 158–166. https://doi.org/10.1891/0889-8391.13.2.158.

Bird, B. (1988). Implementing Entrepreneurial Ideas: The Case for Intention. *The Academy of Management Review*, *13*(3), 442-453. https://doi.org/10.2307/258091.

Caliendo, M., Künn, S., & Weißenberger, M. (2016). Personality traits and the evaluation of start-up subsidies. *European Economic Review*, *86*(7), 87–108. https://doi.org/10.1016/j.euroecorev.2015.11.008.

Crant, J. (1996). The Proactive Personality Scale as a Predictor of Entrepreneurial Intention. *Journal of Small Business Management*, *34*(3), 42-49. https://homepages.se.edu/cvonbergen/files/2013/01/Proactive_Personality-Scale-as-a-Predictor-of-Entrepreneurial-Intentions.pdf.

Ernawati, E. A. Sinambela, Cici, R. J. Silviana, R. N. Azizah & S. Naudalia. (2022). The Effect of Social Support and Extraversion Personality on Entrepreneurial Interest in Students, *Journal of Social Science Studies*, *2*(2), 39 – 44. https://doi.org/10.56348/jos3.v2i2.25.

Frese, M. (2009). Towards a psychology of entrepreneurship—An action theory perspective. *Foundation and Trends in Entrepreneurship*, *5*(6), 437-496. http://dx.doi.org/10.1561/0300000028.

Howard, M. C. (2023). Creation of the entrepreneurial personality scale: Removing conceptual and empirical barriers from the study of personality and entrepreneurship. *Journal of Business Venturing Insights*, *20*(November 2023), e00398. https://doi.org/10.1016/j.jbvi.2023.e00398.

Huang, Z., & Kee, D. M. H. (2024). Exploring entrepreneurial intention: The roles of proactive personality, education, opportunity and Planned Behavior. *Heliyon*, *10*(11), e31714. https://doi.org/10.1016/j.heliyon.2024.e31714.

Jena, R. K. (2020). Measuring the impact of business management Student's attitude towards entrepreneurship education on entrepreneurial intention: A case study. *Computers in Human Behavior*, *107*(6), 106275. https://doi.org/10.1016/j.chb.2020.106275.

Kozubíková, L., Čepel, M. and Zlámalová, M. (2018), Attitude toward innovativeness based on personality traits in the SME sector. Czech Republic case study. *Management & Marketing. Challenges for the Knowledge Society*, *13*(2), 913-928. https://doi.org/10.2478/mmcks-2018-0013.

Maczulskij, T., & Viinikainen, J. (2023). Self-confidence predicts entrepreneurship and entrepreneurial success. *Journal of Business Venturing Insights*, *19*(June 2023), e00382. https://doi.org/10.1016/j.jbvi.2023.e00382.

Munir, H., Jianfeng, C., & Ramzan, S. (2019). Personality traits and theory of planned behavior comparison of entrepreneurial intentions between an emerging economy and a developing country. *International Journal of Entrepreneurial Behavior & Research*, *25*(3), 554–580. https://doi.org/10.1108/IJEBR-05-2018-0336.

Ng, H. S., Kee, D., & Khan, M. (2019). Effects of personality, education and opportunities on entrepreneurial intentions. *Education + Training*, *63*(7/8), 992-1014. https://doi.org/10.1108/ET-02-2019-0040.

Niţu-Antonie, R., & Feder, E. (2015). The Role of Economic Academic Education on Entrepreneurial Behaviour. *Amfiteatru Economic Journal*, *17*(38), 261–276. https://hdl.handle.net/10419/168915.

Roopa, S., & Rani, M. (2012). Questionnaire Designing for a Survey. *Journal of Indian Orthodontic Society*, *46*(4), 273–277. https://doi.org/10.5005/jp-journals-10021-1104.

Sahid, S., Norhisham, N. S., & Narmaditya, B. S. (2024). Interconnectedness between entrepreneurial self-efficacy, attitude, and business creation: A serial mediation of entrepreneurial intention and environmental factor. *Heliyon*, *10*(9), e30478. https://doi.org/10.1016/j.heliyon.2024.e30478.

Salat, D. (2023). Seeking for a new entrepreneurial driver: A literature review. In M. Müller & P. Slavíčková (Eds.), *KNOWCON 2023: Knowledge on Economics and Management: Conference Proceedings* (pp. 178-184). Palacký University Olomouc. https://dx.doi.org/10.5507/ff.23.24463902.

Schumpeter, J. A. (1934). *The Theory of Economic Development*. Routledge. https://doi.org/10.4324/9781003146766.

Vandor, P. (2021). Are voluntary international migrants self-selected for entrepreneurship? An analysis of entrepreneurial personality traits. *Journal of World Business*, *56*(2), 101142. https://doi.org/10.1016/j.jwb.2020.101142.

CZECH VERSIONS OF THE AMERICAN ACCOUNTING

Pavla Slavíčková[1]*

[1]Palacký University Olomouc, Faculty of Arts, Department of Economic and Managerial Studies, Olomouc, the Czech Republic

Abstract: The aim of this contribution is to elucidate the essence of the so-called American accounting system, which was employed in the territory of the present-day Czech Republic during the 19th and early 20th centuries. This system was a simplified version of double-entry accounting, adapted by Czech experts to meet the needs of Czech entrepreneurs, drawing from foreign models. Through an analysis of contemporary professional literature, textbooks, and other sources, this contribution describes two indigenous versions, known as the old and new American accounting systems. The paper aims to highlight the advantages and disadvantages of this accounting system in practical application. The primary advantage was its ease of learning and simplicity of use, whereas the major disadvantage, especially with a large number of accounts, was the extensive scope of the bookkeeping required.

Keywords: accounting, American accounting, Czech Republic, history, double-entry

JEL classification: M41, N90, K19

Grant affiliation: Project No. FPVC2018/12, Faculty of Arts, Palacky University Olomouc.

1. Introduction

The first order on accounting (116/1946 Sb.) was issued in the territory of the current Czech Republic in 1946. It ordered for the first time to keep accounts using a double-entry accounting system and unified its form. Until then, economic entities themselves determined which accounting system they would use and adapted the accounting structure to their own needs. (Puchinger & Slavíčková, 2014, p. 88). Among others, in the second half of the 19th century, so-called American accounting came into use. It probably originated in the late 18th or early 19th century in France (also referred to as French accounting), from where it made its way to the USA and from there back to Europe. It became popular in Germany and Central European countries, among others, where it acquired a number of local variants, including Czech ones. The aim of this article is to explain the essence of the Czech versions of American accounting and show advantages and disadvantages of this accounting system when used in practice.

2. Literature overview

Originally, the versions of American accounting used in the territory of the current Czech Republic were taken over from abroad. These included e. g. the original version published by Edmond Degrande from 1804 and later the so-called Rück system from 1891 or Ruhfus system from 1924/1925, etc. (Fuksa, 1931, p. 616) In the Czech written literature, the brief guide of the American accounting was published, among other accounting systems, by Wilhelm Wertheimer in his handbook published in 1889. However, the first printed Czech written descriptions in detail date back to the beginning of the 20th

* Corresponding author's email: "pavla.slavickova@upol.cz"

century. These are books of Antonín Hrdlička from (perhaps) 1907 and especially Ludvík Panzner from 1910. After the Czechoslovak Republic was established in 1918, a flood of descriptions of American accounting was published, which testifies to its growing popularity. From a long list of authors we can name e. g. Rudolf Wimmer (1918), Jindřich Menec (1919), Ladislav Martinů (1920), Jaroslav David (1922), Josef Matys (1923), Rudolf Šimáček (1923), Jan Lutovský (1928), Václav Paděra (1930), Jan and Antonín Patočka (1931) or Ladislav Orna (1932). The last instructions on how to account in the American system were published after the end of World War II, two prints by Antonín Preuss (1947, 1948) even after the publication of the mentioned order from 1946. The prints had different purposes, some could serve as textbooks for business schools or self-taught students. Different authors targeted different users, Orna (1932) and David's (1922) books were intended for businessmen, Menec (1919) for self-employed people, Martinů (1920) and Preuss (1947, 1948) for small and large businesses. Most of these books contain brief instructions intended for accountants who work with this accounting system. Jan and Antonín Patočka (1931) or Jaroslav David (1922) paid more attention to the essence of the accounting system. A common feature is the own invention, which the authors brought to the accounting system, mostly based on their practical experience. For the purpose of this contribution, two domestic versions of the American accounting were distinguished: the so-called old American accounting and new American accounting.

3. Main features of the old version of the Czech American accounting

The so-called old version of American accounting was built on three basic books: the inventory, the journal and the general ledger (balance book). The inventory, its purpose and content, is unchanged compared to conventional double-entry or even single-entry accounting of that time. It contained an inventory of property (assets and liabilities). (Panzner, 1910, p. 166; David, 1922, p. 65; etc.) The most important part of this system was the journal (so called ´American journal´). It was used to record all transactions in chronological order, however in this case, distinguished directly to the individual accounts into which the journal was divided.

According to Jaroslav David (1922), the journal contained the following columns: a column with a reference number, a column for dating, a column for a description of the operation (text column), a column with a control entry of the monetary amount (control column) and the so-called monetary columns (see Table 1). There could be a different number of monetary columns depending on how many accounts were kept in the journal. Two money columns were set aside for each account, one for Debit and the other for Credit. (David, 1922, p. 69)

Table 1: Journal in the Czech version of American accounting by Jaroslav David (1922)

Nr.	Date	Description		Control account		Monetary account X		Monetary account Y		Monetary account Z		Monetary account V	
				Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit

Source: Own processing based on David´s description. (David, 1922, p. 69)

The names of the two corresponding accounts, the so-called debtor's and creditor's accounts, i.e. the account to which the Debit side was entered and the other account to which the same operation was entered to the Credit side, were written in the text column; and a detailed description of the financial transaction in question. The amount of money was entered once into the control column, which was then transferred twice more to the relevant accounts (once to the side Debit and the second time to the side Credit). (Hrdlička, 1907, p. 37) Each financial transaction was therefore recorded in this American journal three times. In effect, this meant that the Debit columns had the same amounts as the Credit columns and the control column, in other words, the sum of the control column had to equal the sum of the Debit columns as well as the sum of the Credit columns. (David 1922, p. 69-70) A checksum, referred to as the gross balance, could be performed at any time to verify the accuracy of the records.

However, the description of the structure of the journal was different for each author. The proposal of Josef Pazourek (1920), which can be compared with the David´s version, can be seen in Table 2.

Table 2: American journal with a summarizing horizontal line by Josef Pazourek (1920)

Date	Cash register Account		Promissory notes account		Goods account		Suppliers account		Buyers Account			In total	
	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit		Debit	Credit
In total	xxxx		Xxxx		xxxx		xxxx		xxxx			Xxxx	
		xxxx		Xxxx		xxxx		xxxx		Xxxx			Xxxx

Source: (Pazourek, 1920, p. 108c)

There should not be too many accounts in the journal. The more accounts the diary contained, the larger the format of the book had to be, and its usefulness decreased as the size increased. The solution was to introduce columns for an account designated as Miscellaneous (Diversi), in which entries could be entered for which there were no separate accounts (columns) in the journal. (Panzner, 1910, p. 167)

All accounts were contained in the general ledger (also the balance book). The journal entries were transferred to it once for a specified period, e.g. at the end of the month. The columns of the Miscellaneous account, if kept in the journal, had to be allocated to their respective accounts. In other words, the general ledger in this version of American accounting had the same form and served the same purposes as in conventional double-entry accounting. (Hrdlička, 1907, pp. 42-43)

4. Main features of the new version of the Czech American accounting

The new American accounting system has reduced the basic books to just two: the inventory and the journal. The inventory, its structure and purpose remained the same. The journal contained all the accounts of a given accounting unit, including the general (summary) accounts (see Table 3). (Preuss, 1947, pp. 22-28)

Each account was kept separately in the journal, which means that it could often be quite large. The new version eliminated the transfer of monthly results to the general ledger (the balance book), which this version of the accounting system did not keep. Closing was thus carried out directly in the American journal. (Patočka & Patočka, 1931, p. 69)

Table 3: American journal by Antonín Preuss (1947)

Item	Date	Descrip.	Sales tax		Line number	Control col.	Cash register				Subscribers			
			3 %	1 %			Debit	Credit	Rest		Debit	Credit	Rest	
		Transfer												

Source: (Preuss, 1947, Annex Nr. 1)

5. Discussion

Both Czech versions of the American accounting could be compared with the original Degrannge´s version. In his system, the journal was divided into five double columns for the five main accounts, each with a Debit and Credit side. (Fuksa, 1931, p. 620) These were: general account, money account, securities account for collection, securities account for payment, profit and loss account. In addition, an account could be established for each person with whom the merchant did business. A sixth double column for special accounts and a seventh double column for total sums of debit and credit amounts could be added to this basic structure. (Fuksa, 1931, p. 621) There is no doubt that the Czech authors followed this original, what led them to add additional columns or change the original form of the journal in general, their descriptions do not contain.

The number of accounts that caused the (often too) large scope of the book was the biggest problem with the new version of American accounting. Therefore, users tried to solve this problem, with varying

degrees of creativity. One of the possibilities was the reduction of columns for individual accounts, or merging two accounts into one. In such a case, the transactions belonging to one account were written in black, while the other accounts were written in red colour (see Table 4). For accounts where only one side of the account was written, while the other remained empty, it was advantageous to reduce the other side (e.g. salary account, etc.). This method evolved by keeping two separate journals, one with accounts on the Debit side only and the other on the Credit side only. (Patočka & Patočka, 1931, p. 82)

Table 4: American journal with a reduced number of columns by Josef Pazourek (1920)

Date	Nr.	Description		Cash register		Coins Securities		Promissory notes Bills payable			Basic account	
				Debit	Credit	Debit	Credit	Debit	Credit		Debit	Credit
				xxx xxx xxx	xxx	xxx xxx	 xxx xxx	 xxx	 xxx xxx xxx			

Source: Own processing based on Pazourek (1920, p. 108b)

This method of accounting in the journal was especially suitable for such accounting units, in which the accounting of operations was divided between two accountants. In that case, one of them recorded an income journal and the other in an expense journal. In such journals, the text column was also usually reduced. This information was entered in a special text journal, in which the item had the same number as in the income/expense journal. Thanks to it, the importance of the link column has increased. (Patočka & Patočka, 1931, p. 71)

Contemporary authors evaluated American accounting very positively. While the principle of double entry to accounts remained, this system brought a number of advantages to users compared to ordinary double-entry accounting. In these accounting systems was possible to find out the status of individual accounts from the journal at any time, and, moreover, the new version eliminated the need for monthly settlements, which in practice took accountants a lot of time depending on the size of the accounting unit.

6. Conclusion

To summarize, American accounting simplified the work for accountants, making it clearer and more concise while maintaining reliability and accuracy. However, it was not suitable for all organizations. Despite the innovative solutions proposed by various authors, the excessive number of required accounts rendered this accounting system inefficient and practically unusable. Even with a smaller number of accounts, the major drawback was that that it left a lot of unwritten space and required frequent conversions, which increased the risk of errors.

References

David, J. (1922). *Americké účetnictví. Pomůcka pro samostatné obchodníky a žáky obchod. i odbor. škol*. Weinfurter.

Francouzské účetnictví (1931). In J. Fuksa (Ed.), Slovník obchodně-technický, účetní a daňový 3 (pp. 611-621). Tiskové podniky Ústředního svazu československých průmyslníků.

Lutovský, J. (1928). *Mechanisace účetnictví podle americké praxe*. Nákl. vlast.

Martinů, L. (1920). *Nejjednodušší praktické účetnictví podvojné (podle soustavy americké) pro kterýkoliv obor i rozsah podniků výdělečných.* Revisní pokladna.

Matys, J. (1923). *Účetnictví jednoduché, podvojné i americké*. K. Ausobský.

Menec, J. (1919). *Živnostenské účetnictví americké*. Nákl. vlast.

Orna, L. (1932). *Americké účetnictví pro obchodníky a samouky*. Nákl. vlast.

Paděra, V. 1930). *Americké účetnictví pro stavební družstva s rodinnými domky*. Úst. svaz československých družstev.

Patočka, J., & Patočka, A. (1931). *Učebnice účetnictví. Jednoduché, podvojné, americké, průpisné.* Otokor Janáček.

Pazourek, J. (1920). *Theorie i praxe účetních soustav*. Archiv.

Preuss, A. (1947). *Americké účetnictví pro male a střední podniky*. Nákl. vlast.

Preuss, A. (1948). *Účetní technika se zřetelem k racionalisaci účetní práce (italské, americké propisovací a strojové účetnictví*. Nákl. vlast.

Puchinnger, Z., & Slavíčková, P. (2014). *Malé dějiny účetnictví*. Univerzita Palackého v Olomouci.

Šimáček, R. (1923). *Americké účetnictví souborně*. Píša.

Wertheimer, W. (1889). *Theoretická rukověť účetnictví dle jednoduché, dvojité, italské a americké soustavy, jakož I běžné účty a směnky*. Jindř. Mercy.

Wimmer, R. (1918). *Snadné a praktické účetnictví jednoduché, podvojné i americké pro obchodníky a živnostníky*. Alois Hynek.

Zákon č. 116/1946 Sb., o jednotné organizaci podnikového početnictví.

The impact of financial literacy on the choice of distribution channel among young people in the Slovak republic

Branislav Slobodník*

University of Economics in Bratislava, Faculty of economics and finance, Department of Insurance, Bratislava, Slovak republic

Abstract: Young people with lower levels of financial literacy are more likely to experience difficulties in making financial decisions and choosing the most appropriate financial product. The study examines the impact of financial literacy on the choice of distribution channel among young people in Slovakia. A total of 511 responses were collected from young people in Slovakia between the ages of 15 and 25 using a convenience sampling technique. The data was subjected to multiple regression analysis. The study focuses on the choice of distribution channels for financial products when the price of the financial product changes. The results show that individuals with lower levels of financial literacy are more likely to use direct purchase than online distribution channels and AI tools. Young people with higher levels of financial literacy are less likely to use AI tools, such as robo-advisors and chatbots. Improving young people's financial literacy is of paramount importance, as it has a profound impact on their future financial wellbeing.

Keywords: financial literacy, distribution channel, finance, young adults

JEL classification: D14; P46; G29

Grant affiliation: The research presented in this article was funded by the Young Scientists Project (grant number I- 24-103-00) with the aim of analysing the impact of financial intermediation on the financial consumer welfare.

1. Introduction

Financial products are a ubiquitous feature of today's society. The exponential growth of complex financial products requires individuals to make informed decisions about their savings, investments and financial management strategies. This responsibility requires households to have a high level of financial literacy. However, research shows that financial literacy remains relatively low among consumers in many countries (Lusardi and Mitchell, 2014). It also shows that consumers have a limited understanding of basic financial principles and products (Lusardi and Mitchell, 2011; Atkinson and Messy, 2012). This limited knowledge may not be sufficient to ensure that consumers make prudent financial decisions.

A large number of studies conducted around the world have highlighted the central role of financial literacy in the context of an evolving and complex financial landscape, and studies have shown that financial literacy has a significant impact on financial behaviour. Those who lack financial literacy are more prone to debt management problems (Lusardi & Tufano, 2009). For example, Stango and Zinman (2007) found that individuals with low financial literacy are less likely to engage in financial planning for the future. Conversely, low financial literacy is associated with suboptimal financial decision-making in areas such as equity investment, debt financing and long-term retirement planning, which can have a detrimental effect on overall well-being. Those with lower financial literacy are less likely to participate in the stock market (Kimball & Shumway, 2006; Van Rooij et al., 2011). In addition, households with limited financial knowledge often make sub-optimal choices

* Corresponding author's email: "branislav.slobodnik@euba.sk"

when selecting loans or mortgages (Lusardi & Tufano, 2008; Utkus & Young, 2011). Such poor choices can lead to debt accumulation, bankruptcy and foreclosure (Lusardi & Tufano, 2008; Gerardi et al., 2010). It is crucial to focus on young people's financial literacy and their demand for financial products. As Bernanke (2006) pointed out, financial literacy is essential for making sound financial decisions. It helps individuals process economic information and enables them to make informed choices about financial planning, wealth, debt and pensions (Lusardi & Mitchell, 2014). As a result, financial literacy is expected to empower young people to make better financial decisions.

A key issue in the financial sector is the lack of financial literacy, especially among young adults. Digitalisation has introduced many new distribution channels, particularly those targeting younger demographics. These channels require a certain level of financial literacy to facilitate objective assessment. Existing literature shows that there is a notable discrepancy in financial literacy levels between younger and older generations. This discrepancy in financial understanding has contributed to a significant increase in the use of short-term credit among young adults (Achtziger, 2022; Lusardi & Streeter, 2023; Szilagyiova, 2015). Young adults are more likely to accumulate unsecured debt, often as a result of overspending, in contrast to older adults who tend to manage their finances more prudently (Achtziger, 2022). This trend increases the risk of over-indebtedness for young adults, as highlighted by Szilagyiova (2015). The financial behaviours and vulnerabilities of young adults highlight the need for improved financial education and resources to help them navigate economic challenges and avoid debt traps.

There is currently no evidence that financial literacy is a factor in young adults' decision making process when choosing between different distribution channels. In this study, we used data collected from 511 young adults in Slovakia to examine how individuals with different levels of financial literacy choose distribution channels for financial products. The survey was conducted across most of Slovakia and included questions on financial literacy and distribution channel choice. The results of the study indicate that individuals with higher levels of financial literacy prefer the online distribution channel and that the price attitude of switching distribution channels is positively influenced by the level of financial literacy.

2. Financial literacy

The term 'financial literacy' is well established among researchers (Lusardi & Mitchell, 2011; Lusardi & Mitchell, 2014) and serves to highlight the importance of individuals making well-informed financial decisions. The OECD (2013) defines financial literacy as encompassing knowledge and understanding of financial concepts and risks, as well as the skills, motivation and confidence to use this knowledge to make sound financial decisions, ultimately improving the financial well-being of individuals and society.

Krechovska (2015) defined financial literacy as the basic skills and knowledge required for individuals to function effectively in modern society. Lusardi and Mitchell (2014) defined financial literacy as 'people's ability to process economic information and make informed decisions about financial planning, asset accumulation, debt and pensions'. Remund (2010) identified budgeting, saving, borrowing and investing as the four most common operational definitions of financial literacy.

Previous research has investigated the impact of financial literacy on financial decisions and has consistently found a relationship between these two variables (Rooij, Kool & Prast, 2007). Another

important area of research concerns the investigation of the relationship between financial literacy levels and demographic factors (Lusardi & Mitchell, 2008; Rooij, Lusardi & Alessi, 2011). However, there is a lack of studies that examine the impact of financial literacy on investment decisions and the variables that interact with it. Guiso and Jappelli (2008) found that individuals with low financial literacy perceive unfamiliar financial instruments as riskier, while familiar instruments are perceived as less risky.

A growing number of studies have examined the relationship between financial literacy and different demographic groups, including teenage students, millennials, individuals without a college degree and adults (Henager & Cude, 2019). These studies confirm that both subjective and objective levels of financial literacy differ between men and women (Lusardi & Mitchell, 2017; Lusardi & Streeter, 2023). In general, men tend to have better financial knowledge and greater confidence in managing their finances than women. The 2012 PISA study (Lusardi, 2015) showed that a significant number of students from different countries have only basic financial knowledge, which hinders their ability to perform financial tasks effectively. As a result of their limited financial knowledge, these students are unable to make the most complex financial decisions. A recent study on financial literacy in the US (Lusardi & Streeter, 2023) shows that financial literacy is lower among young people (18-35 years old) and tends to increase with age.

2.1. Financial literacy and its relationship to seeking for advice through distribution channels

Few studies have examined the relationship between financial literacy and the use of distribution channels when choosing financial products. It is unclear from existing research whether those with lower levels of financial literacy are more likely to seek advice to make up their shortfalls. A complicating factor is that financial capability is often correlated with access to financial resources or wealth. Consequently, consumers with limited financial resources may be less likely to seek or need the services of a financial adviser.

Calcagno and Monticone (2011) developed an economic model of the financial advice market that distinguished between clients with high and low financial literacy. Using European household data, the researchers showed that individuals with low financial literacy had the lowest demand for financial advice. This finding suggests that financial advisers are unlikely to meet the needs of households with low financial literacy. Chalmers and Reuter (2010) examined the impact of financial advisors on the retirement portfolio choices of public university employees in a US state. The researchers found that younger, less educated and lower income individuals were more likely to use financial advisors. Similar results were found by Hackethal, Haliassos and Jappelli (2010) using European data.

3. Hypothesis, Data and Research methodology

The main objective is to determine which distribution channel is used by young adults with different levels of financial literacy, and how price attitudes affect financial literacy when the distribution channel is changed. Based on the above literature, we formulate the hypotheses to be tested:

H1: Young adults with higher level of financial literacy are the most using online distribution channels by purchasing financial products.

H2: Price attitude of changing distribution channel is positively affected by level of financial literacy. Research methodology and data sampling.

The initial phase of the analysis will concentrate on the identification of the distribution channels utilised by young adults with varying levels of financial literacy. To ascertain this, weemployed data from a questionnaire and employed a percentage analysis to determine how respondents in a given situation had chosen their distribution channel.

3.1. Research methodology and data sampling

The emphasis here is on studying to explain the relationships between price attitude of changing distribution channel in purchasing financial product we performed series of tests were conducted to assess the normality of the data, including correlation and multiple regression analysis. Descriptive statistics were used to describe the respondents and to examine central tendency and dispersion. The use of measures such as range, mean, median, standard deviation, skewness and kurtosis provided clear insights into the respondents' responses to the survey questions and the effectiveness of the interventions (Sekaran, 2003). Multiple regression analysis was used to test the hypothesis as there was a single dependent variable.

The target population for this research was 511 young adults in Slovakia aged between 18 and 25. A survey method was used to collect data through a self-administered questionnaire. The questionnaire was distributed by e-mail between December 2023 and February 2024. The primary objective of the interviewer was to determine the respondent's preference regarding the distribution channel to be used in a given scenario. Non-probability convenience sampling was used, which involves selecting random sampling units that are the easiest and quickest to obtain for the research sample (Saunders, Lewis & Thornhill, 2009).

3.2. Measure of financial literacy

Financial literacy was measured using Lusardi and Mitchell's (2011) 'Big Five' questions, which are used to assess financial capability. To assess the level of financial literacy of the US population, the researchers used a set of questions derived from the 2009 US National Financial Capability Survey (NFCS). The questions assess respondents' knowledge of interest rates, inflation and risk. Similarly, the OECD's 2013 survey instrument toolkit includes comparable questions with minor notational differences (Worthington, 2013).

A respondent was classified as a high financial literacy consumer if they answered between five and four questions correctly. Conversely, a respondent was classified as a low financial capability consumer if they answered fewer than four questions correctly. Table 1 shows the distribution of the sample.

Table 1 : Difference of sample according to measure financial literacy

	Higher level of financial literacy	**Lower level of financial literacy**
	47,35% (242 respondent)	**52.64% (269 respondent)**
Man	48,76%	51,30%
Woman	51,24%	48,70%

4. Results

Table 2 shows respondents' distribution channel choices based on their financial literacy levels. Results indicate that young adults with higher financial literacy prefer online channels and are more likely to use AI tools, while those with lower literacy tend to buy in-store. The findings suggest a lack of trust in AI among less financially literate respondents, leading us to not reject H1.

Table 2: Choosing the distribution channel in relationship with financial literacy

	With higher level of FL		With lower level of FL	
	Man	Woman	Man	Woman
Online	52,82%	44,18 %	24,13 %	21,17 %
Using service of fin. intermediary	20,14%	20,52 %	27,09 %	26,76 %
Using Artificial Intelligence	11,80 %	11,40 %	0,02 %	0,97 %
Direct at marketplace	15,24 %	23,90 %	48,76 %	51,10 %

As shown in Table 3, all variables are statistically significant. A correlation test was then carried out to examine the relationship between the independent variables, the results of which are presented in Table 3. The results indicate that there is no significant relationship between the variables, which is desirable to ensure the reliability of the analysis.

Table 3: Correlation test between independent variables

	Wilks' Lambda	F-value	p-value
Financial literacy	0,835***	4,38	0,012
Price attitude by choosing distributionchannel	0,788***	9,74	0,001

In this study, regression analysis was conducted using metric variables following discriminant analysis to predict price attitudes by distribution channel choice through financial product purchase as a metric variable.

Table 4: Regression analysis

Independent variable	**B**	**Sig. (p- value)**
Constant		0,000
Price attitude by choosing Distribution Channel	.0,274	0,003
R2 = 0,229		0,000

From Table 4, it was found that price attitude by choosing distribution channel are significant variables under p-value 0.05. An increase in financial literacy level causes an increase in price attitude by choosing distribution channel. Therefore, we do not reject hypothesis H1.

5. Conclusion

Young adults with higher levels of financial literacy are more likely to use online channels for financial advice on investments, insurance and taxes than those with lower levels of financial literacy. This pattern is likely to reflect the prevalence of investable assets among more educated and financially capable groups. It also shows that financial advice is a complement to, rather than a substitute for, financial literacy. It also shows confidence in digital technology. As individuals' financial literacy and capability increases, so does the sophistication of the automated tools they use.

Most respondents, 47.76% of men and 51.10% of women, prefer to buy financial products immediately. Those with lower financial literacy distrust AI tools and rarely use financial intermediaries. Increasing financial literacy could increase trust in online and AI tools. Further research is needed to assess the impact of distribution channels and pricing attitudes. The study also shows a positive relationship between price attitudes and financial literacy.

Further research is needed to better define, quantify and measure the impact of the use of financial product distribution channels. It would be beneficial to consider not only financial literacy, but also the digital literacy of consumers and their choice of distribution channels. It is possible to identify limitations in a small sample and it is therefore recommended that further research is conducted on a larger sample to allow comparisons across countries. It is important that researchers and policy makers understand and emphasise the importance of financial advice and the use of distribution channels by all users.

References

Achtziger, A. (2022). Overspending, debt, and poverty. *Current Opinion in Psychology, 46*, 101342.

Atkinson, A., & Messy, F. A. (2012). *Measuring financial literacy: Results of the OECD/International Network on Financial Education (INFE) pilot study*. OECD Publishing.

Bernanke, B. (2006). Monetary aggregates and monetary policy at the Federal Reserve: A historical perspective. *The Role of Money – Money and Monetary Policy in the Twenty-First Century*, 314.

Calcagno, R., Kraeussl, R., & Monticone, C. (2011). An analysis of the effects of the severance payment reform on credit to Italian SMEs. *Journal of Financial Economic Policy, 3*(3), 243-261.

Chalmers, J., & Reuter, J. (2020). Is conflicted investment advice better than no advice? *Journal of Financial Economics, 138*(2), 366-387.

Gerardi, K. (2010). *Financial literacy and subprime mortgage delinquency: Evidence from a survey matched to administrative data*. Diane Publishing.

Henager, R., & Cude, B. J. (2019). Financial literacy of high school graduates: Long- and short-term financial behavior by age group. Journal of Family and Economic Issues, 40(3), 564–575.

Kimball, M., & Shumway, T. (2006). Investor sophistication, and the participation, home bias, diversification, and employer stock puzzles. *Unpublished manuscript*, University of Michigan.

Krechovská, M. (2015). Financial literacy as a path to sustainability.

Lachance, M. E., & Tang, N. (2012). Financial advice and trust. *Financial Services Review, 21*(3), 209-226.

Lusardi, A., & Mitchell, O. S. (2011). Financial literacy around the world: An overview. *Journal of Pension Economics & Finance, 10*(4), 497-508.

Lusardi, A., & Mitchell, O. S. (2014). Financial literacy and financial sophistication in the older population. *Journal of Pension Economics & Finance, 13*(4), 347-366.

Lusardi, A., & Streeter, J. L. (2023). Financial literacy and financial well-being: Evidence from the US. *Journal of Financial Literacy and Wellbeing, 1*(2), 169-198.

Lusardi, A., & Tufano, P. (2009). Teach workers about the perils of debt. *Harvard Business Review, 87*(11), 22-24.

Remund, D. L. (2010). Financial literacy explicated: The case for a clearer definition in an increasingly complex economy. Journal of Consumer Affairs, 44(2), 276-295.

Saunders, M., Lewis, P., & Thornhill, A. (2009). Research methods for business students (5th ed.). Pearson Education.

Sekaran, U., & Bougie, R. (2003). Research methods for business (5th ed.): A skill building approach. Journal of Education Business, 68(5), 316-317.

Stango, V., & Zinman, J. (2007). Fuzzy math and red ink: When the opportunity cost of consumption is not what it seems. *Working Paper*, Dartmouth College.

Szilagyiova, S. (2015). The effect of payday loans on financial distress in the UK. *Procedia Economics and Finance, 30*, 842-847.

Utkus, S. P., & Young, J. A. (2011). *The role of target-date funds in 401(k) portfolios*. Vanguard Research.

Van Rooij, M., Lusardi, A., & Alessie, R. (2011). Financial literacy and stock market participation. *Journal of Financial Economics, 101*(2), 449-472.

Worthington, A. C. (2013). Financial literacy and financial literacy programmes in Australia. Journal of Financial Services Marketing, 18(3), 227-240.

Modern technology as a tool to support the responsiveness of public organizations

Karolina Szymaniec-Mlicka[*1]

[1]University of Economics in Katowice, Department of Public Management

Abstract: Stakeholders play a crucial role in public management due to the numerous and diverse formal and informal influences, including public opinion and interest groups, which significantly impact decision-making. Stakeholder theory, which emphasizes the importance of relationships and the interests of all stakeholders, is particularly relevant to public organizations. The ability to promptly and precisely address the requirements of citizens is of utmost importance for the success of the public sector. Modern technologies, such as artificial intelligence, big data, and digital communication tools, can help improve responsiveness by facilitating real-time feedback and efficient service delivery. A study involving 357 municipalities in Poland revealed elevated levels of trust and satisfaction among local councils and communities, with numerous managers actively seeking innovative solutions and valuing stakeholder engagement despite its challenges. It is imperative to invest in modern technologies in order to enhance the responsiveness and effectiveness of the public sector.

Keywords: stakeholders, public management, public organization, responsiveness

JEL classification: H75

Grant affiliation: Publication funded by the University of Economics in Katowice

1. Introduction

Managing a public organization is a complex process, during which managers are forced in their activities not only to strive for economic efficiency, but also to consider the social and political consequences of their actions. The public sector often fulfils commitments made to the electorate in the socio-economic sphere, as a result of which one of the fundamental dilemmas in the field of public management is deciding on the scope and hierarchy of activities. At the same time, the implementation of the tasks set by the state should be carried out using management methods that ensure that the organization operates in accordance with the principles of economic efficiency, organizational efficiency and social justice.

2. The importance of stakeholders in the management of a public organization

Public organizations are characterized by more external sources of formal influence, while at the same time they are highly fragmented. There is also a much greater diversification and intensification of external, informal influences on organizational decision-making (public opinion, interest groups) than in the private sector, and an increased demand by public organizations for the support of 'constituents'—customers or formal authorities (Rogers, 1981).

Given the distinctive features of public organizations outlined above, it is possible to point to stakeholder theory and its applicability to public organizations as an approach that contributes to the improvement of management processes in these organizations (Kusnanto).

* karolina.szymaniec-mlicka@uekat.pl

Jones and Wick point to the key assumptions of stakeholder theory (1999):

1. The organization interacts with many groups, or stakeholders;
2. Stakeholder theory focuses on the nature of relationships, both in terms of process and outcomes for the organization;
3. The interests of all legitimate stakeholders have intrinsic value, and none should dominate over the others.

The concept of stakeholders itself is not interpreted unequivocally in the literature. The best known, but also the most general, definition of stakeholders was developed by E. Freeman in 1984. According to this definition, a stakeholder is any person or group that can influence or is influenced by an organization (Freeman, 1984). Other definitions define stakeholders as risk-bearers or groups or individuals with a direct or indirect interest in an organization's activities in its efforts to achieve its goals (Frączkiewicz-Wronka, ed.2009). Obłój (2001) defines an organization's strategic partners as groups, institutions, or organizations that meet two conditions—they have a 'stake' in the organization's operations and can exert effective pressure on the organization. According to the model proposed by Mitchell, Agle and Wood (1997), stakeholders become relevant to managers if they possess three attributes: power, legitimacy and urgency.

The significant differences that exist between public and private sector organizations prompt us to identify stakeholders as a significant factor in the success of the management of public organizations. Stakeholder care is the most crucial element in the whole strategic management process because success in a public organization depends on satisfying key stakeholders. Satisfaction means satisfying those needs that are perceived as valuable in the individual stakeholder hierarchy. Such satisfaction means that they can (and often do) conflict with the economic objectives of the organization (Bryson, 2004).

There are views in the literature that public institutions are created and live by satisfying the interests of those groups that are influential enough to maintain the political reason of the organization. Thus, they secure the resources that flow with it (Rainey, 2009).

The great importance of stakeholders in the management of a public organization also stems from the fact that public organizations operate in a highly politicized environment. The political entanglement of public organizations forces managers to make decisions according to the logic of the political game, the specificity of which is the displacement of the traditionally understood rationality of decision-making by political rationality (Bryson, 2004). The choice of specific strategic options is dictated not by their actual evaluation, but by the bargaining power of the most influential stakeholders. The great importance of stakeholders for the activities of public organizations forces managers to develop the responsiveness of the organization. Responsiveness is understood as the rapid and accurate diagnosis of citizens' needs and the provision of public services that respond to those needs (Galązka-Sobotka, Kowalska, Frączkiewicz-Wronka et al., 2020). Vigoda (2002) defines responsiveness as the speed and accuracy with which an organization responds to changing requests for action or information. According to Ostrom (1975), public responsiveness reflects the ability to satisfy citizens' preferences. Responsiveness—the ability of public authorities to quickly identify and respond to emerging public management issues or dilemmas (Herbst, 2008). Responsiveness is the willingness and readiness of a public system or organization to listen to the needs of its users and make changes with them to meet those needs. It is based on values such as empowerment and respect for the dignity and autonomy of

citizens (Horizon project: Responsive) Making social services more open to the voice of citizens in Europe). In a rapidly changing world, especially regarding technological developments. It seems natural to reflect on the possibilities of using modern technology to improve the responsiveness of public organizations, and thus to respond more effectively to the needs expressed by its stakeholders. Modern communication channels allow public consultations to be organized remotely, making them more accessible to residents. Developments in technology also make it possible to automate the collection of feedback from residents or the reporting of municipal infrastructure failures. Public organizations can use big data to analyse social, economic and environmental trends, allowing for better planning and decision-making. For example, analysing social media data can help understand public sentiment and identify potential social problems before they become major crises. Furthermore, in crisis management, big data can help coordinate emergency response by analysing data from different sources in real time. Artificial intelligence (AI) is also being used in public administration to automate office processes, such as document processing or handling citizen queries. AI-based chatbots can answer citizens' queries around the clock, significantly increasing the accessibility and responsiveness of public services.

3. Responsiveness of public organizations in Poland—research results

The analysis of the literature on responsiveness enabled the research team to prepare a survey questionnaire addressed to local authority managers at the municipal level, i.e. to mayors and presidents. At the same time, the possibility was allowed for the mayor to delegate the completion of the questionnaire to an appropriate office employee who is competent to answer the survey questionnaire. The analysis of the literature on the subject allowed the research team to prepare a questionnaire survey addressed to the managers of local government units at the commune level, i.e. to mayors and presidents. At the same time, it was allowed for the mayor to delegate the completion of the questionnaire to an appropriate office employee who is competent to answer the questions contained in the survey questionnaire. 357 units were surveyed. The territorial distribution of the respondent group is shown in Table 1.

Table 1. Sample structure by province (percentage (%) and number (n))

c	%	n
Lower Silesia	9.52%	34
kujawsko-pomorskie	5.60%	20
Lublin	7.28%	26
Lubuskie	3.08%	11
Lodz	7.84%	28
Małopolskie	7.28%	26
mazowieckie	12.32%	44
Opolskie	3.64%	13
Podkarpackie	5.32%	19
Podlaskie	3.92%	14
Pomeranian	4.76%	17
Silesia	6.44%	23
Świętokrzyskie	4.76%	17
Warminsko-Mazurskie	4.48%	16

Wielkopolskie	8.12%	29
zachodniopomorskie	5.60%	20
Total	100.00%	357

Source: Own study

The largest percentage of municipalities were in the Mazowieckie voivodeship, followed by Dolnośląskie and Wielkopolskie. In terms of the type of municipality represented by the respondent, 21% (76 municipalities) were urban municipalities, 50% (177 municipalities) were rural municipalities and 29% (104) were rural-urban municipalities. By job position, among the 357 respondents – 79 (22%) held the position of mayor, 93 (26%) the position of mayor and 185 (52%) others. There were no mayors among the respondents. The vast majority of respondents (68%) were over 46 years of age. The gender structure of respondents was as follows – 53% of respondents were female, 47% male. The predominant education among respondents was tertiary education (99.4%). Respondents were asked to rate how much they agreed with the statements in the questionnaire. Ratings were made on a 5-point Likert scale: 5 – agree; 4 – rather agree, 3 – neither agree nor disagree, 2 – rather disagree, 1 – disagree.

The vast majority of respondents answered in the affirmative (tend to agree / agree).

1. The municipal council trusts and supports the administrative decisions taken and is satisfied with the results of its work (over 90% of responses)
2. Members of the local community believe that the municipality/city office where I work is carrying out its tasks correctly (over 90% of responses)
3. Almost 90 per cent of respondents believe that residents are aware of their needs.
4. 86% of respondents indicated that residents and other stakeholders are a source of constructive ideas in the annual budget process
5. 80% of respondents indicated that their knowledge and experience is sufficient to identify residents' needs. 61% of respondents indicated that their knowledge and experience was sufficient to identify residents' needs without consultation.
6. 49% of respondents indicated that too much time spent on consultation with residents and other stakeholders reduces the effectiveness of the office
7. 52% of respondents indicated that undertaking consultations with residents and other stakeholders could lead to negative evaluations of the results of the action by residents and other stakeholders
8. 87% of respondents indicated that decisions made because of consultations with residents and other stakeholders allow actions to be taken that are more relevant to the needs revealed.
9. Effective engagement of residents and other stakeholders requires a lot of time and effort (85% of respondents), but the benefits of the process outweigh the costs (63% of respondents)
10. 84% of respondents indicated a difficulty in effectively meeting the expectations of residents and other stakeholders.

11. Some 95% of respondents gave a positive assessment of the effectiveness of officials in working with residents and other stakeholders
12. 90% of respondents seek innovative solutions
13. More than 90% of respondents indicated that they often or always welcome suggestions from residents and other stakeholders to improve the delivery of public services
14. Almost 91% of respondents indicated that they often or always work to solve the problems of residents and other stakeholders by consulting them using various communication channels (telephone, e-mail, etc.).
15. 83% of respondents indicated that they were satisfied with most of their responses to suggestions from residents and other stakeholders
16. 83% of respondents I often or always make sure that the expectations of residents and other stakeholders are considered in the preparation of the annual budget
17. 84% of respondents often or always hold discussions with residents and other stakeholders in the budget preparation process
18. 73% of respondents indicated that they often or always use public participation tools when working on their budget

4. Conclusion

Modern technologies are powerful tools that can significantly increase the responsiveness of public organizations. Artificial intelligence, the Internet of Things, big data and blockchain offer a wide range of opportunities to respond more quickly and efficiently to citizens' needs. Investment in these technologies is key to the future of an efficient and responsive public sector. Promisingly for the wider use of modern technology in public organizations are the survey results indicating that 90 per cent of respondents managing municipalities are looking for innovative solutions. In addition, research carried out by a research team in which the author of this article participated concerning digitization in the management of a public organization indicates that respondents (municipal managers) have a positive attitude towards digitization and modern digital tools. This improves the management process of the organization and increases the quality of services provided (Szymaniec-Mlicka), 2023).

The management of public organizations is a delicate balance between ensuring economic efficiency, achieving social justice, and responding to the needs of diverse stakeholders. The research findings underscore the critical role of stakeholders in the success of public organizations. The high levels of engagement with stakeholders—such as community members and interest groups—illustrate the importance of maintaining strong, responsive relationships that align organizational goals with the needs and expectations of those it serves.

One of the key takeaways from this research is that public managers overwhelmingly recognize the value of stakeholder input in enhancing the quality of public services and decision-making processes. The survey results reveal that public officials actively welcome suggestions from stakeholders, view their input as constructive in budget processes, and make concerted efforts to address community needs. However, challenges remain, particularly in managing the time and resources required for

effective stakeholder engagement, as noted by 49% of respondents who believe excessive consultation can impede office effectiveness.

The findings also highlight the growing potential for modern technologies to improve responsiveness in public organizations. The increasing use of AI, big data, and digital communication platforms provides a promising avenue to streamline stakeholder engagement, allowing for faster and more efficient feedback loops. Many public managers are already seeking innovative technological solutions to improve the quality of service, and this presents an opportunity to scale such initiatives further.

Implications for Practice:

1. Enhanced Stakeholder Engagement: Public organizations must continue to prioritize stakeholder management, ensuring that the needs of residents and other groups are integrated into decision-making processes. This can be formalized through more structured public participation tools, ensuring that key stakeholders are consistently involved in strategic planning and service delivery decisions.
2. Technological Investments: To meet the growing expectations for responsiveness, public organizations should invest in digital technologies such as AI-driven platforms, big data analytics, and digital consultation tools. These innovations can enable public managers to respond more quickly and accurately to stakeholders' needs while optimizing resource use.
3. Balancing Consultation with Efficiency: While engagement with stakeholders is critical, public managers should seek a balance to prevent consultation processes from becoming overly time-consuming. Implementing streamlined consultation protocols, leveraging technology, and creating clear guidelines for when and how consultations are conducted can help in this regard.
4. Capacity Building for Public Officials: As modern technologies and public consultation become more integral to public management, there is a need to ensure that public officials have the necessary skills and tools to use these systems effectively. Training and development programs should be implemented to enhance their technological and stakeholder management capabilities.

In conclusion, the research highlights the evolving role of stakeholders in public organizations and the importance of leveraging both engagement strategies and modern technologies to improve responsiveness. By adopting a more dynamic, tech-driven approach to stakeholder management, public organizations can better meet the diverse needs of the communities they serve, while maintaining operational efficiency.

References

Bryson, J. M. (2004). What to do when stakeholders matter: Stakeholder identification and analysis techniques. *Public Management Review, 6*(1), 21-53. https://doi.org/10.1080/14719030410001675722.

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.

Gałązka-Sobotka, M., Frączkiewicz-Wronka, A., Kowalska-Bobko, I., Kelm, H., & Szymaniec-Mlicka, K. (2021). HB-HTA as an implementation problem in Polish health policy. *PLoS One, 16*(9), e0257451 https://doi.org/10.1371/journal.pone.0257451.

Herbst, J. (2008). O kategorii "responsywności" władzy i o pewnym warunku responsywności władzy w Polsce. *Zarządzanie Publiczne / Public Governance, 4*(6), 91-107.

Jones, T., & Wicks, A. (1999). Convergent stakeholder theory. *Academy of Management Review, 24*(2), 206-221. https://doi.org/10.5465/amr.1999.1893929.

Kusnanto, H. (n.d.). Principal-agent and stakeholder approaches in decentralized health care: The Indonesian case. *Research Paper 198, Takemi Program, Harvard School of Public Health*.

Mitchell, R. K., Agle, B. R., & Wood, D. D. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who or what really counts. *Academy of Management Review, 22*(4), 853-886. https://doi.org/10.5465/amr.1997.9711022105.

Ostrom, E. (1975). The design of institutional arrangements and the responsiveness of the police. In L. N. Rieselbach (Ed.), *People vs. Government: The Responsiveness of American Institutions* (pp. 13-41). Indiana University Press.

Frączkiewicz-Wronki, A., & Austen, A. (Eds.). (2009). *Przywództwo w ochronie zdrowia. Idee i instrumenty*. Wolters Kluwer.

Rainey, H. G. (2009). *Understanding and managing public organizations* (4th ed.). Jossey-Bass.

Rogers, D. (1981). Managing in the public and private sectors: Similarities and differences. *Management Review, 70*(5), 14-19.

Szymaniec-Mlicka, K. (2023). Digitalisation in the management of a public organisation. *Scientific Papers of Silesian University of Technology. Organisation and Management Series*, (177), 461-470 https://doi.org/10.29119/1641-3466.2023.177.36.

Vigoda, E. (2002). From responsiveness to collaboration: Governance, citizens, and the next generation of public administration. *Public Administration Review, 62*(5), 527-540. https://doi.org/10.1111/1540-6210.00235.

Practical skills and competitiveness of university graduates for the digital era.

Miriam Takáčová [1*], Zuzana Chodasová[2]
[1]Slovak University of Technology in Bratislava, Institute of Management, Bratislava, Slovakia
[2]Slovak University of Technology in Bratislava, Institute of Management, Bratislava, Slovakia

Abstract: In the context of the complexity and uncertainty of today's business environment, continuous innovation is the only way for a company to thrive. The prerequisites for innovation, in terms of human and financial resources, are lower in Slovak companies compared to other EU member countries. Quality human resources and capital for implementing innovative ideas are lacking, which underscores the crucial role of the education system in ensuring the competitiveness of our university graduates in the global environment. Institutions providing formal education should take into account new trends and prepare students for future job requirements, as the impact of robotics, automation, and digitization on the labor market in Slovakia gradually reshapes job roles. The selection of competencies and skills that are currently in high demand in the job market we summarized based on the latest surveys. To successfully position individuals in the competitive job market, the article also highlights future trends in practical competencies and skills over the next six years.

Keywords: education, hard skills, soft skills, digital skills, digital literacy

JEL Classification: I25, O15, O33

Grant affiliation: The article was written as part of the solution to the grant task KEGA nr. 011STU-4/2022, Creation of an education model supporting increasing the competences of students of a non-economically focused university in the field of innovative, entrepreneurial thinking and business support.

1. Introduction

In today's business environment, more and more activities are undergoing a certain form of transformation from analog to digital space. Information systems, the internet, and cloud services provide companies with broader options for storing and managing corporate data (Habrat, 2020), which in turn changes the skill requirements for employees. The National Strategy for Digital Literacy in the Slovak Republic and the action plan for the years 2023-2026 also consider it crucial to recognize the importance of digital skills and incorporate their development into education, both for children from an early age and for adults through quality lifelong learning. Acquiring digital skills should be accessible to all residents of Slovakia, regardless of age, education, or affiliation with disadvantaged population groups (Ministry of Investments, Regional Development and Informatization of the Slovak Republic, 2022).

The ability of an individual to professionally succeed now depends on the alignment of their skills with the demand for skills in the job market (Mráz et al., 2023), and this is not limited to the territory of the Slovak Republic alone. For example, at the pan-European level, it is desirable to achieve basic digital skills for at least 80% of the adult population in the EU by 2030 (Kešelová et al., 2022). Several new skills are becoming standard today, which were previously the domain of a narrow group of specialists a few years ago. In this overview article, we define the skills that are currently most in demand in the job market and estimate the development of necessary skills for the future. In recent times, Slovakia

* Corresponding author's email: miriam.takacova@stuba.sk

has primarily focused on foreign investors who guarantee employment growth in various sectors of the country. However, we are beginning to face a shortage of qualified workforce, which should primarily be a product of our education system, as discussed in the mentioned contribution. Competitiveness, a fundamental attribute of success for any business in the current market environment, exerts continuous pressure for improvement and radical changes in all contexts where a company operates. Innovations play a significant role in competitiveness, especially in the context of globalization, and are generally considered an accelerator of the economy along with high-quality human capital.

2. Skills for the future

The skills needed for the future are illustrated by a survey by the National Union of Employers in the Slovak Republic, which focused on the expected most important skills by 2030. Figure 1 ranks skills in order of importance (the more points, the more important the skill) and this representation reflects the necessity of human resources to have digital literacy and soft skills, not only for the present, but especially for the next 6 years (Lednárová Dítětová et al., 2021).

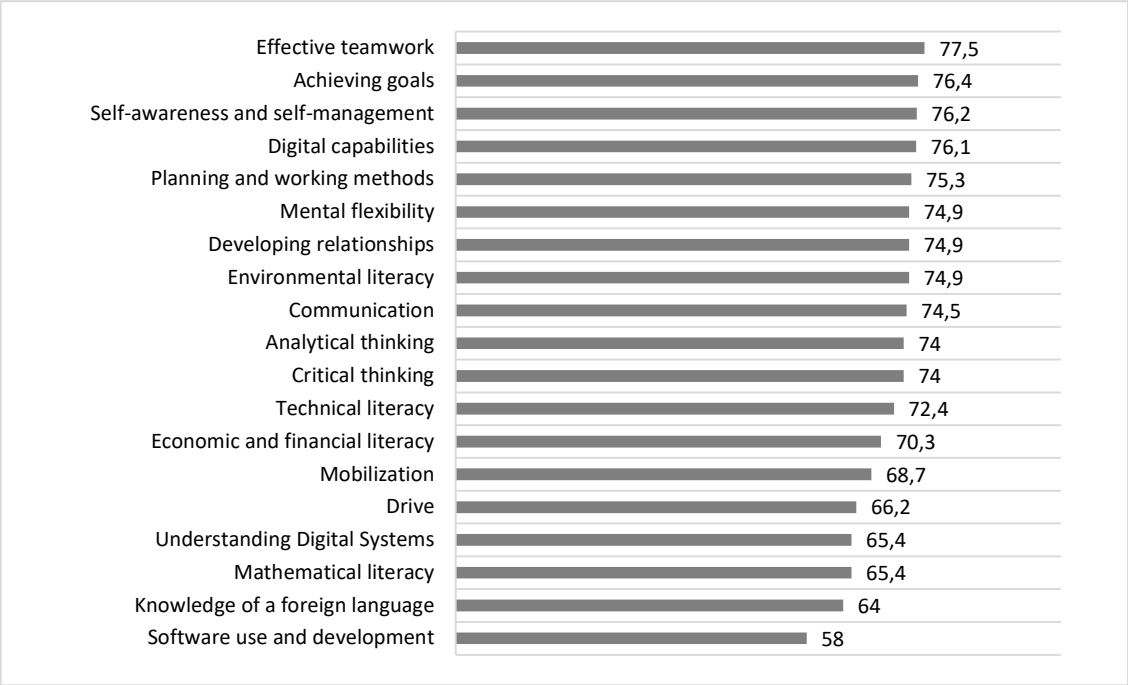


Figure 1: Skills in order of importance by 2030

The current practice is marked by the rise of digitization, automation, and robotics (Kešelová et al., 2022). From history, we know that the creation of new jobs has always been associated with the decline of older ones, as advanced technologies replace them in economies (Kotíková et al., 2019). In general, the easiest to automate work is routine manual work, the worst automatable work is non-routine knowledge work (Kotíková et al., 2019; Reljic et al., 2023). Therefore, in order to avoid a situation where automated systems replace us in the labor market, it is essential to know the trends (Thornhill-Miller et al., 2023) and requirements that are in demand and have a low level of automation

risk. The Business Alliance of Slovakia conducted a survey from which we were interested in the areas in which graduates enter practice least prepared (Figure 2). According to the findings, graduates are the least prepared in the areas of so-called soft skills (Business Alliance of Slovakia, 2019).

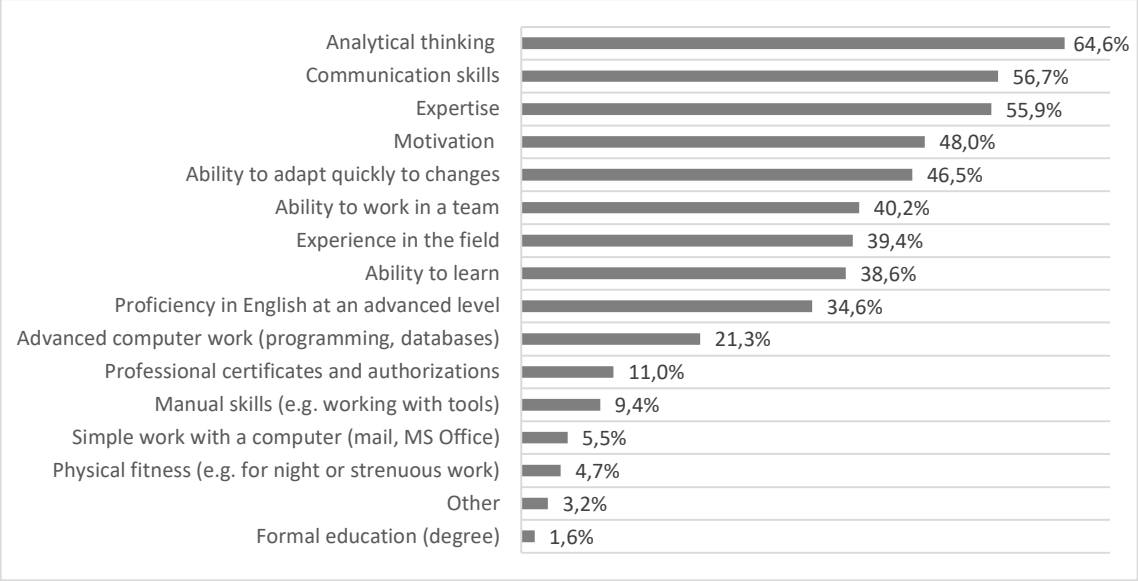


Figure 2: Areas where graduates enter practice least prepared

According to the World Economic Forum (2020), a especially combination of soft skills and digital skills can be included in the list of the 10 most important skills of the future:

- Analytical thinking and innovation.
- Active learning and learning strategies.
- Complex problem-solving.
- Critical thinking and analysis.
- Creativity, originality and initiative.
- Leadership and social influence.
- Technology use, monitoring and control.
- Technology design and programming.
- Resilience, stress tolerance and flexibility.
- Thinking, problem solving and imagination.

The OECD adds self-regulation, empathy, and collaboration to this list (Organisation for Economic Co-operation and Development, 2023).

3. Research methodology

Individuals who possess more comprehensive knowledge and skills, can think and make decisions in broader contexts, and are willing to continuously learn, will be more successful in the job market. Narrow specialization in a single field will give way to the demand for “T-shaped professionals” (Kotíková et al., 2019). As shown in the Figure 3, these professionals combine deep expertise in one area (the vertical bar of the “T”) with broad knowledge across multiple disciplines (the horizontal bar) (Kršák & Závodný, 2018). Additionally, skills such as communication and critical thinking are crucial. The ability to think interdisciplinarily is a prerequisite for innovation. Given the interconnectedness of technologies, production processes, and the entire value chain, individuals must navigate the entire system.

In the field of higher education, collaboration between universities and companies is emphasized, allowing them to quickly respond to projects originating from universities (Kešelová et al., 2022).

However, the pace of changes in skill requirements outstrips the ability of educational systems to keep up. According to a survey by the Institute for Labour and Family Research (Kešelová et al., 2022), companies consider two self-help approaches to address changing workforce requirements in the future:

- In-house Training on New Technologies: This method is the most common way companies plan to address changing workforce requirements. It applies to both regular employees and managers, spanning production and administrative roles.
- Requalification: Companies also consider requalification as a frequent approach to adapt to future workforce demands.

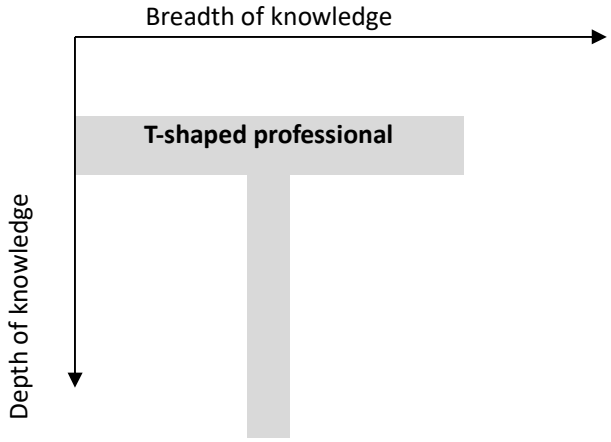


Figure 3: Schematic representation of the requirements for a system worker

According to businesses planning to invest in education, requalification should primarily focus on information technology (IT). This includes both general IT skill development and specific digital technologies such as Big Data processing, cloud computing, data storage, software solutions for production management, and data security. Additionally, companies recognize the need for education in research and development, occupational safety and health, quality management, economics, sales and procurement, as well as training related to professional competence updates, soft skills, and foreign languages (Kešelová et al., 2022). The importance of acquiring and mastering soft skills is further supported by research conducted by the Center for Scientific and Technical Information of the Slovak Republic based on a request from the higher education section of the Ministry of Education, Science, Research, and Sport of the Slovak Republic. Notably (Table 1), the skills considered crucial for hiring graduates vary across different employer sectors. Public sector employers prioritize graduates based on their field of study, communication skills, and educational level. In contrast, private sector employers value competencies such as communication skills, the specific field of study, and practical experience gained during studies (Filčák, 2022).

In collaboration between employers, employee representatives, and relevant public authorities, it is essential to review curricula or introduce new study programs to prepare graduates for high-demand professions. These programs should focus on developing skills related to renewable energy sources in the energy sector, advanced and digital technologies in industry (Mráz et al., 2023).

Table 1: Skills needed for job search

	Public sector	Private sector
Completed level of education	**79,60%**	46,50%
Completed field of study	**89,20%**	**68,90%**
Completed study programme	72,40%	50,20%
Completind a study abroad	10,60%	16,60%
Experience in the field acquired during studies	41,70%	**60,90%**
Work gained abroad	13,40%	31,60%
Study results	21,60%	12,30%
Information technology skills	51,40%	57,10%
Foreign language proficiency	30,40%	48,90%
Communication skills, indepencence ("soft skills")	**83,10%**	**81,60%**

Recent research highlights the importance of involving secondary-level students in forms of dual education, bridging theory with practice. Currently, students in fields such as mechanical engineering and the automotive industry (accounting for over 52% of students) and electrical engineering are primarily engaged in this system. However, other industrial sectors lag behind, particularly logistics and agriculture. It's crucial to recognize that practical experience requires well-prepared graduates, even at the secondary education level.

4. Innovative forms of education

Regarding the implementation of a knowledge-based economy, especially in the field of innovation, Slovakia lags behind other European countries, ranking among those with the weakest innovation activity. The pandemic has underscored the complexities of the global economy and its impact on business management decisions (Kajanová and Musilová, 2023). Companies increasingly seek not only more effective performance management but also higher-quality human capital to remain competitive. Emphasizing innovative approaches to higher education and preparing students for entrepreneurship is essential. These approaches enhance companies' competitiveness in a changing business environment. By improving the quality of education for graduates from technical and economic universities and preparing them for entrepreneurship, we address the challenges of the current economic situation.

By implementing innovative forms of education, schools can better equip students with the skills, knowledge, and mindset necessary to excel in their future entrepreneurial endeavors. These approaches prepare students to be proactive, creative, and adaptable professionals across various business domains, potentially positively impacting relevant industries. By incorporating such teaching methods and principles into curricula, educators can better prepare students for the dynamic and multidisciplinary nature of real-world challenges. These approaches allow students to develop critical skills, think innovatively, and make informed decisions as future professionals in all fields.

Integrating innovative approaches, such as experiments, simulations, or games, into higher education can be a powerful tool for preparing students to effectively apply their knowledge in real professional situations. By providing practical experiences, fostering collaboration, and supporting critical skills, these methods offer a unique and valuable approach to higher education while preparing students for

real-world practice. Human resources play a significant role in driving innovation, and the availability of highly skilled and educated employees remains a key input for innovation within business entities.

5. Conclusion

The nature of work is changing due to the implementation of technological innovations, especially in the field of Artificial Intelligence (AI). Based on currently available selected information, artificial intelligence can currently help us in organizations for example with screening resumes of job applicants, through which the human resources department can find a suitable candidate for a vacant position in a shorter time (SAP) or saving time by creating product descriptions using generative artificial intelligence (Lamanna, 2023). The examples of AI in business systems mentioned so far are just a samples of what will ultimately relieve employees of boring, repetitive, and error-prone activities and can instead focus on activities that require a creative and sophisticated approach.

The more we need to focus on developing interpersonal skills. This is crucial to maintain „humanity" despite technological progress. Additionally, it should serve as a basis for updating educational content in curricula and study programs at universities. Supporting the development of skills, competencies, and abilities according to labor market demands is essential to prepare competitive graduates across all qualification levels. Digital literacy, combined with soft skills, is currently integral. Those who embrace new technologies and learn to utilize them will have an advantage in the job market. Let's not forget, first of all, competences in the field of cooperation, managing change, critical, informatic and analytical thinking, the ability to learn, mastery of a language other than Slovak, or communication skills. For example, the informatic thinking is very good for creativity and innovation, as it encourages us to find new ways to approach problems and use technology to improve processes and outcomes.

Furthermore, lifelong learning is an automatic and natural path for the current and future population of Slovakia. However, a significant challenge faced by Slovakia and the entire EU in the field of innovation is the inability to fully leverage and disseminate research and development results, translating them into economic and societal value. The gap between research outcomes and practical application remains substantial, and the shortage of high-quality human capital in the labor market exacerbates this issue.

References

Business Alliance of Slovakia. (2019, February 6). *According to entrepreneurs, the education system in Slovakia is bad.* https://www.alianciapas.sk/podla-podnikatelov-je-na-slovensku-zly-vzdelavaci-system/

Filčák, T. (2022). *Final report from the employer survey. Final report of the project Employability of Slovak University Graduates on the Labour Market for the Employer Survey.* Centre of Scientific and Technical Information of the Slovak Republic. https://www.cvtisr.sk/buxus/docs//VS/absolvent/2022/Zamestnavatel_zaverecna_sprava.pdf

Habrat, D. (2020). Legal challenges of digitalization and automation in the context of Industry 4.0. *Procedia Manufacturing, Volume 51,* 938-942. https://doi.org/10.1016/j.promfg.2020.10.132

Organisation for Economic Co-operation and Development. (2023). *Future of education and skills 2030. OECD learning compass 2030. A series of concept notes.* [Brochure]. https://issuu.com/oecd.publishing/docs/e2030-learning_compass_2030-concept_notes?fr=xKAE9_zU1NQ

Kajanová, J. & Musilová, M. (2023). Educating leaders in the context of the COVID-19 pandemic and its impact on mental health. *Maneko*, *Volume 15, Nr: 2/2023*, 101–110. DOI: 10.61544/mnk/DTCX6408

Kešelová, D., Bednárik, R., Gerbery, D. & Ondrušová, D. (2022). *The impact of robotization, automation and digitization on the labor market in the Slovak Republic. Results of an empirical survey.* Institute for Labour and Family Research. https://ivpr.gov.sk/vplyv-robotizacie-automatizacie-a-digitalizacie-na-trh-prace-v-sr-vysledky-empirickeho-prieskumu-daniela-keselova-rastislav-bednarik-daniel-gerbery-darina-ondrusova-2022/

Kotíková, J., Kraus, A. Modrá, J., Šťastnová, P., Váňová J. & Víšek, P. (2019). *Impacts of digitization, automation and robotization on the labour market, education and social systems*. *Document research.* Research Institute for Labour and Social Affairs. https://katalog.vupsv.cz/fulltext/vv_008.pdf

Kršák, E. & Závodný, P. (2018). *IT projects and their management*. Žilina: University of Žilina

Lamanna, Ch. (2023, March 6). *Introducing Microsoft Dynamics 365 Copilot, the world's first copilot in both CRM and ERP, that brings next-generation AI to every line of busines.* Microsoft. https://blogs.microsoft.com/blog/2023/03/06/introducing-microsoft-dynamics-365-copilot/

Lednárová Dítětová, L., Hrnčiar, M., Cíbiková, N., Čierna, Z., Pálová, V., Škodová, M., Varačka, M. & Vittek, J. (2021). *Skills for the future of a competitive job market in Slovakia. Analysis*. National Union of Employers. https://www.ruzsr.sk/media/e5cec396-eadc-477a-8129-ea8802226211.pdf

Ministry of Investments, Regional Development and Informatization of the Slovak Republic. (2022). *National Digital Skills Strategy of the Slovak Republic and Action Plan for 2023 – 2026.* https://mirri.gov.sk/wp-content/uploads/2023/01/NSDZ-a-AP.pdf

Mráz, V., Jerga, M. & Holičková, N. (2023). *Skills analysis in transition regions*. Institute of Digital and Development Policies. https://mirri.gov.sk/wp-content/uploads/2023/05/Anal%C3%BDza-zru%C4%8Dnost%C3%AD-v-transformuj%C3%BAcich-sa-regi%C3%B3noch.pdf

Reljic, J., Cirillo, V. & Guarascio, D. (2023). Regimes of robotization in Europe. *Economics Letters*. *Volume 232*. https://doi.org/10.1016/j.econlet.2023.111320

SAP. *SAP Business AI in the area of Human Resources*. Retrieved September 12, 2024, from https://www.sap.com/sk/products/artificial-intelligence/human-resources.html

Thornhill-Miller, B., Camarda, A., Mercier, M., Burkhardt, J.-M., Morisseau, T., Bourgeois-Bougrine, S., Vinchon, F., El Hayek, S., Augereau-Landais, M., Mourey, F., Feybesse, C., Sundquist, D., Lubart & T. (2023). Creativity, Critical Thinking, Communication, and Collaboration: Assessment, Certification, and Promotion of 21st Century Skills for the Future of Work and Education. *Journal of Intelligence*, 11(3):54. https://doi.org/10.3390/jintelligence11030054

World Economic Forum. (2020). *The future of jobs. Report*. World Economic Forum https://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf

Project Manager Competence - Trends and Reality in Czech Small and Medium-Sized Enterprises

Štěpánka Uličná *[1]

[1]I Czech Technical University, Faculty of Mechanical Engineering, Department of Management and Economics, Prague, Czech Republic

Abstract: Project management has become a key factor for companies to thrive in an increasingly competitive environment. International project management standards highlight the growing importance of the soft skills of project managers.

This paper presents a contradiction between the practice of the best companies and project management standards and the reality of Czech medium-sized manufacturing companies focused on engineering. Based on 159 interviews with project managers and project team members in 85 firms between 2022 and 2023, I show that there is an overemphasis on the technical competencies of project managers over the soft competencies. This discrepancy is likely to lead to project delays, poor planning, problems with stakeholders, and overall, less successful projects.

Keywords: Project Manager Competences, Czech SMEs, Soft Skills in Project Management, Project Management Standards
JEL classification: L21, D91, M10

1. Introduction

In today's highly competitive environment, project management has become a key factor for companies to thrive. International project management standards highlight the growing importance of the soft skills of project managers. According to Crawford's (2005) research, soft skills such as communication, teamwork and leadership are essential to the success of project managers. This paper reveals the discrepancy between the best firms' practices and standards of project management and the reality of Czech medium-sized manufacturing firms focused on engineering.

Based on 159 semi-structured interviews with project managers and project team members in 85 firms conducted between 2022 and 2023, I present that there is an overemphasis on technical competencies of project managers over soft competencies. This discrepancy is likely to lead to project delays, poor planning, problems with stakeholders, and overall less successful projects.

The aim of this paper is not only to reveal this contradiction but also to propose strategies to overcome it. Effective development of soft skills of project managers in Czech medium-sized engineering companies is necessary to better respond to current trends and market needs.

2. Theoretical background

2.1. Definition of project manager competencies

Project manager competencies are defined in different ways in the literature, focusing on technical, behavioral and contextual aspects. International standards such as IPMA (International Project Management Association) Competency Baseline and PMBOK Guide (Project Management Body of

* Corresponding author's email: Stepanka.ulicna@fs.cvut.cz

Knowledge) provide structured approaches to these competencies and highlight their importance for successful project management.

2.2. Competency frameworks

The IPMA defines the competencies of a project manager within the IPMA Competency Baseline (ICB), which includes three areas: technical, behavioral and contextual competencies. Technical competencies include the knowledge and skills required for project management, such as planning, risk management and project control. Behavioral competencies focus on soft skills such as communication, team leadership and conflict resolution. Contextual competencies include understanding the organization, its environment and stakeholder relationships.

The PMBOK Guide, developed by the Project Management Institute (PMI), also provides a structured approach to project manager competencies. It has undergone significant changes in its seventh edition. It focuses on the principles and performance domain of the project. They provide a framework for effective project management and emphasize the promotion of project teamwork, achieving success through a focus on value, stakeholder engagement, quality outputs and the ability to adapt to changing conditions. There is a strong emphasis on project outcomes and value. The aim is to ensure that projects deliver value to the organization through customer satisfaction, the creation of new products or services and process improvement. These changes reflect the need for flexibility and the ability of project managers to adapt to different development approaches such as traditional, agile, hybrid and others.

2.3. The Role of Soft Skills in Project Management Success

Crawford (2005) in his study "Senior management perceptions of project management competence" emphasizes the importance of soft skills for successful project management. According to his research, soft skills such as effective communication, teamwork and leadership are crucial to the success of project managers. Crawford identifies that while technical skills are important, it is essential that project managers also develop their soft skills to achieve high performance.

Müller and Turner (2010) in their paper "Leadership competency profiles of successful project managers" examine the competencies of project managers from a leadership perspective. The authors identify that successful project managers exhibit specific competency profiles that include not only technical skills, but also the ability to inspire and motivate a team, communicate effectively, and resolve conflict.

Crawford and Pollack (2007) in their study "How generic are project management knowledge and practice?" analyze the extent to which project management knowledge and practice are universal. The authors point out that although there are general principles that apply across different projects, the specific competencies of a project manager can be strongly influenced by project context, industry sector and cultural factors.

Research and international standards such as IPMA Competency Baseline and PMBOK Guide highlight the importance of a comprehensive set of competencies for project managers, including technical, behavioral and contextual skills. Crawford (2005) and other authors such as Müller and Turner (2010) point to the key role of soft skills in achieving success in project management. This expanded approach to defining competencies highlights the importance of not only technical knowledge but also the ability to communicate effectively, lead a team and adapt to changing conditions.

3. Research Methodology

In order to achieve the objective of this study, it was necessary to obtain data regarding the importance of project managers' competencies in Czech medium-sized firms focused on manufacturing in the field of engineering. Between 2022 and 2023, I conducted training sessions in manufacturing companies with a total of 520 participants. During these trainings and workshops, I took the opportunity to discuss which project manager competencies the participants perceived as important. At the end of each course, participants completed a questionnaire with questions focused on the success of their projects and the causes of the problems they encountered.

For this study I used only 159 questionnaires that have been completed by project managers or project team members who went on to manage other work packages and had to communicate with other project members. This data was collected through a combination of semi-structured interviews and online questionnaires at the end of the project management training sessions conducted. Thus, I obtained primary data directly from the field.

The questionnaire contained a total of 10 questions, of which 7 could be answered on a scale (100%, 75%, 50%, 25%, 0%) and 3 questions were closed (Yes, No). This approach allowed to obtain quantitative and qualitative data on the competencies of project managers and their impact on project success.

The aim of the study was to analyze which competences of project managers are considered key in Czech manufacturing companies and to identify whether more emphasis is placed on technical competences at the expense of soft skills. The data obtained from the questionnaires were then analyzed to reveal the most significant relationships between project managers' competencies and project success. The results of this analysis provide valuable insights for improving the training and development of project managers in the Czech engineering industry.

4. Research Analysis and Discussion

4.1. Hypothesis formulation

In line with the scientific aim of this study, the following hypothesis was formulated: H1: There is a difference between the perceived importance of expertise in project managers and its actual impact on project success. This hypothesis is based on the assumption that although project managers may perceive technical and professional knowledge as crucial, the actual causes of project failure may lie more in the lack of soft competencies and ineffective use of basic project management tools.

4.2. Data collection methodology

The questionnaire used was distributed to Czech medium-sized manufacturing firms in the field of engineering during training and workshops I conducted in 2022-2023. The questionnaire focused on the competencies of project managers and the success of their projects. The survey results revealed a fundamental disconnect between what project managers consider to be the most important competencies and what they actually use in practice.

4.3. Results on competence perception

The results show that 68% of respondents said that knowledge and experience in the field were most important to them. This means that most project managers perceive technical expertise as a key factor for successful project management. Technical competencies such as planning and risk management

came second with 23%. In contrast, soft competencies, which include skills such as people management and effective communication, were considered most important by only 9% of respondents. This relatively low proportion suggests that soft skills are not sufficiently valued, even though they are proving essential in practice. Figure 1 shows how project managers rate the importance of these competencies.

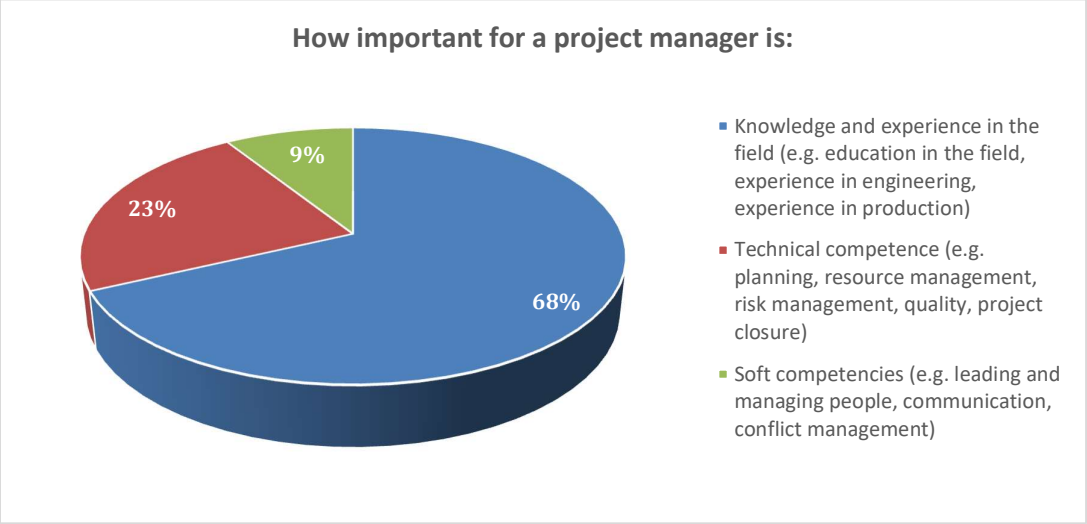


Figure 1: The importance of competences from the point of view of project managers

4.4. Soft skills in practice

Paradoxically, despite the low ranking of soft competencies in terms of importance, these competencies were identified as the most important in the daily practice of project managers. This fact suggests that although project managers prefer technical skills in theory, in real practice they realize that the success of projects depends to a large extent on their ability to communicate effectively, lead a team and resolve conflicts. 49% of the project managers interviewed confirmed that soft skills are the most important skills needed in practice. This can be seen in Figure 2 - What competencies do you use the most?

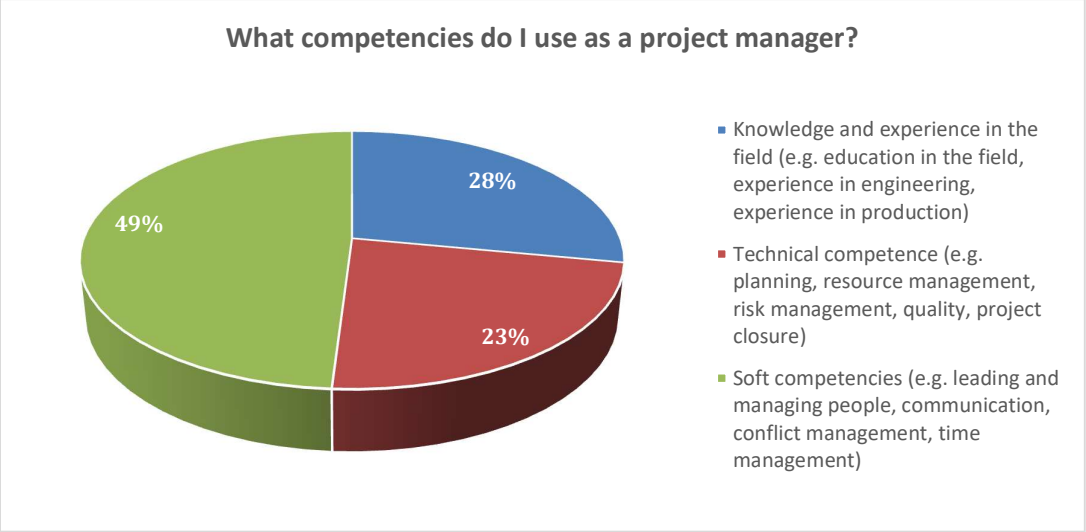


Figure 2: The most used competences from the project manager's point of view

4.5. Project success and failure

Another significant finding is that almost 56.8% of the managers surveyed rate their projects as unsuccessful. This alarming figure points to deeper problems in project management that cannot be ignored.

When asked what causes potential project failure, only 5% of respondents answered that lack of expertise was the main cause. This result is in direct contrast to their perception of the importance of expertise, suggesting that the real causes of project failure lie elsewhere. The analysis revealed that the main causes of project failure lie in the lack of soft skills and the failure to use basic project management tools. How project managers rated the success of their projects can be seen in Figure 3.

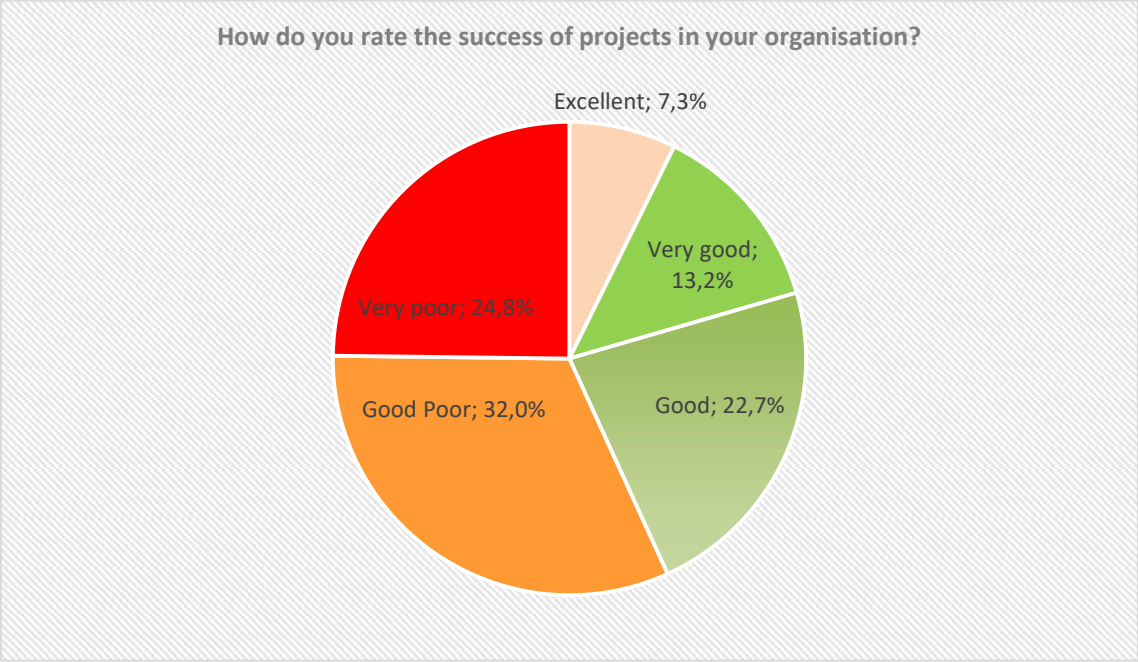


Figure 3: Evaluation of project success by project managers

4.6. Practical application of project management tools

Although project managers claimed to know and apply project management tools such as WBS (Work Breakdown Structure), Gantt chart, project charter, WBS Dictionary to define quality, time and cost parameters, practical application of these tools was often insufficient. This suggests that there is a gap between theoretical knowledge and their practical application, leading to problems in project management.

4.7. Conclusion and recommendations

These findings suggest that expertise is undoubtedly perceived as an important competency of a project manager. However, project failure is caused by underdeveloped levels of soft competencies and failure to use basic project management tools. This discrepancy suggests the need to focus more

on the development of soft skills in project managers and to ensure their effective application of project management tools.

4.8. Implications for Czech Manufacturing Firms

To achieve greater project success, it is crucial for Czech manufacturing companies to focus on training and coaching focused on soft competencies. This focus should include practical training in communication, team leadership, conflict resolution and other soft skills that are essential for successful project management. Ensuring that project managers not only know but also effectively use basic project management tools could contribute significantly to better project planning, monitoring and control. This approach could contribute significantly to higher project success rates and improved overall performance of manufacturing companies in the Czech Republic.

5. Conclusion

In conclusion, the existence of a discrepancy between the perceived importance of expertise and the actual impact of soft competencies on project success points to the need to rethink approaches to project manager development. The results of this study suggest that although project managers perceive technical expertise as crucial, project success is more influenced by the ability to communicate effectively, lead a team and resolve conflict.

It is clear that insufficient soft skills and ineffective use of basic project management tools are the main causes of project failure. It is therefore essential that Czech manufacturing companies focus their efforts on training and coaching that develops the soft skills of project managers. Practical training in communication, team leadership and conflict resolution should be a priority to increase project success.

We suggest that companies should not only ensure that project managers have theoretical knowledge of project management tools, but also that they apply this knowledge effectively in practice. This approach could significantly contribute to better planning, monitoring and controlling of projects, thereby increasing their success and the overall performance of manufacturing firms in the Czech Republic.

Further research should focus on a deeper analysis of how specific soft skills affect project success and on identifying the most effective training and coaching methods. It is also important to explore how to create an environment that fosters the development of these skills, for example through self-managed teams, trust policies and harnessing the innovative potential of staff.

If these potentials are not exploited, traditional approaches and an overemphasis on technical expertise may continue to prevent projects from achieving higher success rates. Therefore, it is crucial that management focuses on promoting soft competencies and creating a work environment that is able to respond effectively to new challenges and adapt to change.

References

Crawford, L. (2005). Senior management perceptions of project management competence. *International Journal of Project Management*, 23(1), 7-16. https://doi.org/10.1016/j.ijproman.2004.06.005

Crawford, L., & Pollack, J. (2007). How generic are project management knowledge and practice? *Project Management Journal*, 38(1), 87-96. https://doi.org/10.1177/875697280703800109

International Project Management Association (IPMA) (2015). *IPMA Individual Competence Baseline Version 4.0*. IPMA. Retrieved from http://products.ipma.world/wp-content/uploads/2016/03/IPMA_ICB_4_0_WEB.pdf

Müller, R., & Turner, R. (2010). Leadership competency profiles of successful project managers. *International Journal of Project Management*, 28(5), 437-448. https://doi.org/10.1016/j.ijproman.2009.09.003

Project Management Institute (PMI) (2021). *A Guide to the Project Management Body of Knowledge (PMBOK Guide)* (7th ed.). PMI.

Carvalho Alvarenga, J., Rezende, D. A., Freitas Barbosa, G., & Soares, C. A. P. (2020). Project manager competencies and their influence on project success: A hierarchical model. *International Journal of Project Management*, 38(2), 195-209. https://doi.org/10.1016/j.ijproman.2019.09.007

Willingness to Pay for Water Protection and Improvement Among Residents of China's Direct-Administered Municipalities

Veronika Vaseková[1]*

[1]Palacký University Olomouc, Faculty of Arts, Department of Asian Studies, Olomouc, Czech Republic

Abstract: This paper examines the attitudes and behaviours of Chinese residents and foreigners in Direct-Administered Municipalities of China towards improving water quality in their cities. Through a survey conducted among residents, three key questions were asked regarding their willingness to contribute financially to water quality improvement on an annual basis (willingness to pay); the activities that individuals would be willing to give up to help in this effort; and the extent of volunteer work that residents would be willing to invest in water quality improvement initiatives. The findings shed light on the public's views and willingness to engage in water quality improvement efforts and offer valuable insights for policy makers and stakeholders involved in environmental management.

Keywords: environmental management, environmental perception, water improvements, water protection, willingness to pay

JEL classification: Q01, Q25, Q50

Grant affiliation: IGA_FF_2024_028

1. Introduction

Environmental research plays an important role in understanding and mitigating the challenges posed by deteriorating natural resources (Jhariya et al., 2022). As one of the world's most populous countries and a global economic powerhouse, China faces immense pressure on its water resources due to industrialization (Li et al., 2019), urbanization (Luo et al., 2023), and agricultural demands (Lai, 2017). The environmental research provides crucial insights into the state of water quality, identifies pollution sources, and evaluates the effectiveness of mitigation strategies (Vaseková, 2022).

Public perception and participation are integral components of effective environmental management. Understanding how residents perceive water quality issues and their willingness to contribute to improvement efforts is essential for crafting effective policies and initiatives (Chen, 2019). Previous studies have underscored the significance of socioeconomic factors, such as income and education, in shaping public attitudes towards environmental conservation (Peng et al., 2018; Zheng et al., 2019). Moreover, the level of satisfaction with governmental actions and the perceived effectiveness of environmental policies significantly influence public willingness to pay (Jiang et al., 2019; Shang et al., 2012). These insights highlight the interconnectedness between public perception, policy efficacy, and environmental outcomes.

This study complements previous literature by focusing on the comparison of WTP among Chinese and foreigners living in directly administered cities. In addition, it also focuses on willingness to volunteer (WTV), an important line of research as it reveals the potential for leveraging volunteer initiatives but

* Corresponding author's email: veronika.vasekova01@upol.cz

also highlights the level of environmental education. This study presents the preliminary results of research that seeks to answer two research questions, namely, what is the difference between Chinese and non-Chinese residents in China's directly governed cities in their willingness to contribute financially and non-financially to water conservation, and how do the situations differ across these cities.

2. Methods

2.1. Survey design

The results of this study are based on data from a larger survey on the perceptions of water and water-related risks among residents of direct-administered municipalities of China. The research is based on a psychometric approach to environmental risk perception (Fischhoff et al., 1978; Slovic, 2000). Participants were asked to state the highest amount they would be willing to pay (WTP) for a theoretical enhancement in the provision of the good (Day & Mourato, 1998). This WTP approach enables decision makers to gauge and predict consumer demand for better services (Pattanayak et al., 2006). Additionally, questions regarding their willingness to volunteer, as related concept (Ando et al., 2020), were included in this study. Participants were asked following three questions: 1) How much CNY would you be willing to pay annually if you knew that you would be contributing to improving water quality in your city? 2) How many hours of volunteer work would you be willing to invest annually in activities to improve water quality in your city? 3) What activities would you be willing to reduce if you knew it would help improve water quality in your city?

2.2. Data collection and analysis

Data collection has been ongoing since May 2023 and the research is still ongoing. In the case of this study, these are preliminary results. The Qualtrics questionnaire platform is used to collect data, which can be used in China compared to other tools. The questionnaire is distributed in Chinese and English versions for each direct-administered municipality. Descriptive statistics is used in the case of this study.

2.3. Sample characteristics

Table 1 presents demographic characteristics of foreign and Chinese residents across four major cities in China: Beijing, Tianjin, Shanghai, and Chongqing. The data includes mean age, age standard deviation, minimum and maximum ages, sex distribution, and average duration of residence in the city. The sample comprises both male and female participants, with ages ranging from early 20s to mid-70s. Foreign residents generally show shorter average durations of city residence compared to their Chinese counterparts. The table provides a comparative overview of demographic patterns between foreign and local populations in these urban centres.

Table 1: Sample characteristics

	Beijing		Tianjin		Shanghai		Chongqing	
	Foreign.	Chinese	Foreign.	Chinese	Foreign.	Chinese	Foreign	Chinese
Age (mean)	39	42	30	33	43	38	34	34
Age st. d.	11	11	6	6	9	9	9	8
Min. age	24	20	20	22	35	23	22	24
Max. age	74	65	50	43	66	51	57	52

Sex	37 M 8F	28 M 12 F 1 non-binary	37 M 12 F	26 M 2 F	42 M 6 F	14 M 8F	29 M 5 F	14 M 7 F
Residence in city (years, mean)	9	24	4	24	11	19	5	21

3. Results

3.1. Willingness to pay for water improvements

Table 2 presents a comprehensive analysis of the willingness to pay for water improvements across four major Chinese municipalities: Beijing, Tianjin, Shanghai, and Chongqing. The data compares responses from both foreign and Chinese residents, offering insights into the varying perspectives on water quality investments.

When examining the willingness to pay, interesting patterns emerge across the cities. Foreign residents in Shanghai demonstrated the highest mean willingness to pay at 2049 CNY, followed closely by those in Beijing at 1021 CNY. Among Chinese residents, however, Beijing took the lead with a mean of 1715 CNY, surpassing Shanghai's 1206 CNY. Tianjin and Chongqing consistently showed lower willingness to pay for both foreign and Chinese respondents. This difference may be due to the fact that respondents in Tianjin and Chongqing are on average younger in age and do not have the income to contribute higher amounts. More students were included in the Tianjin sample.

The data also highlights significant variability in individual responses, as evidenced by the high standard deviations across all cities and groups. This variability is particularly striking in Shanghai, where the standard deviation reached 4596 CNY for foreign residents and 2275 CNY for Chinese residents. Such wide ranges in responses underscore the diverse economic capacities and personal valuations of water quality improvements among urban dwellers.

It's worth noting that a small portion of respondents explicitly stated their unwillingness to pay for water improvements. This sentiment was slightly more prevalent among Chinese residents, particularly in Beijing and Tianjin. Additionally, some respondents, especially foreigners in Shanghai, expressed uncertainty by selecting the "do not know" option, indicating a potential need for more public education on water quality issues and proposed improvements.

When considering the overall means that include all participants (with non-numerical responses counted as 0), the willingness to pay generally decreased. However, Beijing maintained the highest overall mean for both foreign (747 CNY) and Chinese (1248 CNY) residents, reinforcing its position as a city where water quality improvements are relatively highly valued.

Table 2: Willingness to pay for water improvements in China's direct-administered municipalities

Willingness to pay								
	Beijing		Tianjin		Shanghai		Chongqing	
	Foreign.	Chinese	Foreign.	Chinese	Foreign.	Chinese	Foreign.	Chinese
Not replayed	10	22	14	14	7	6	15	11
Do not know	1	1	2	2	4	2	0	2
Unwilling to pay (explicitly mentioned)	5	7	3	3	3	2	1	1
Other answers	5	1	3	0	5	0	2	3
Number of answers with amount in CNY	30	24	33	12	28	17	23	11
Mean (those who are willing)	**1021 CNY**	**1715 CNY**	**677 CNY**	**214 CNY**	**2049 CNY**	**1206 CNY**	**496 CNY**	**643 CNY**
St. deviation	1998	3272	1251	277	4596	2275	660	611
Min	10	20	20	20	100	100	5	10
Max	10000	10000	5000	1000	25000	10000	3000	2000
Mean (all participants)[1]	**747 CNY**	**1248 CNY**	**545 CNY**	**151 CNY**	**1434 CNY**	**976 CNY**	**439 CNY**	**516 CNY**
St. deviation all participants[1]	1761	2880	1152	251	4009	2153	640	578

[1] All participants who answered this question. Non-numerical responses are counted as 0.

3.2. Willingness to volunteer

Table 3 provides a comprehensive overview of the willingness to volunteer for water protection efforts across four major Chinese municipalities: Beijing, Tianjin, Shanghai, and Chongqing. The data presents a comparative analysis between foreign and Chinese residents, offering valuable insights into civic engagement and environmental consciousness in these urban centres. The results reveal a generally higher willingness to volunteer among foreign residents compared to their Chinese counterparts across all four cities. This trend is particularly pronounced in Shanghai, where foreign residents who expressed willingness to volunteer were prepared to commit an average of 83 hours, more than double the 39 hours offered by Chinese residents. Similarly, in Tianjin, foreigners were willing to volunteer for an average of 78 hours, compared to 50 hours for Chinese residents.

Interestingly, the data shows considerable variability in the amount of time individuals were willing to commit. The standard deviations are notably high, especially among foreign residents. For instance, in Shanghai, the standard deviation for foreigners reaches 203 hours, indicating a wide range of commitment levels. This variability suggests that while some individuals are prepared to dedicate significant time to water protection efforts, others may have more limited availability or differing levels of engagement.

The maximum volunteering hours reported by some respondents are remarkably high, with one foreign resident in Shanghai indicating a willingness to volunteer for up to 1000 hours. Such outliers,

while potentially skewing the mean, also highlight the presence of highly committed individuals within the community. When considering all participants, including those who provided non-numerical responses (counted as 0 hours), the mean willingness to volunteer naturally decreases. However, the trend of higher commitment from foreign residents persists. Tianjin stands out in this regard, with foreign residents showing the highest overall mean of 60 hours, compared to 34 hours for Chinese residents.

It is worth noting that a small but significant number of respondents explicitly mentioned their unwillingness to volunteer. This sentiment was more prevalent among foreign residents, particularly in Shanghai, where 12 foreign respondents explicitly stated they were unwilling to volunteer. This contrasts with the generally higher willingness to volunteer among foreigners and may indicate a polarization of attitudes within the expatriate community. The "Not replayed" and "Do not know" categories also provide insight into the level of engagement with the survey. The relatively high numbers in the "Not replayed" category across all cities suggest that water protection volunteering might not be a topic of immediate interest or understanding for a substantial portion of both foreign and Chinese residents.

Table 3: Willingness to volunteer to protect water in China's direct-administered municipalities

Willingness to volunteer								
	Beijing		Tianjin		Shanghai		Chongqing	
	Foreign.	Chinese	Foreign.	Chinese	Foreign.	Chinese	Foreign.	Chinese
Not replayed	15	14	12	15	9	5	14	12
Do not know	1	1	1	1	1	0	2	0
Unwilling to volunteer (explicitly mentioned)	5	3	4	2	12	0	1	1
Other answers	6	4	4	2	1	1	4	4
Number of answers with amount in hours	26	21	31	11	23	21	20	11
Mean (those who are willing)	**57 hours**	**37 hours**	**78 hours**	**50 hours**	**83 hours**	**39 hours**	**52 hours**	**46 hours**
Std.	88	36	123	61	203	38	79	42
Min	1	1	1	0.2	2	3	1	5
Max	365	100	500	200	1000	144	320	100
Mean (all participants)[1]	**39 hours**	**27 hours**	**60 hours**	**34 hours**	**52 hours**	**37 hours**	**39 hours**	**32 hours**
St. deviation all participants[1]	77	35	113	55	164	38	71	41

[1] All participants who answered this question. Non-numerical responses are counted as 0.

3.3. Pro-environmental behaviour – change of habits

Both foreigners and Chinese citizens across these cities showed a willingness to engage in water conservation activities. Foreigners often pointed to reducing daily water usage in personal habits, such as showering and washing cars. However, many expressed uncertainty about specific actions, highlighting a need for increased education and clear guidance on effective water-saving practices.

Chinese respondents generally showed a broader understanding of water conservation's importance, focusing on reducing industrial pollution, waste management, and limiting the use of chemicals and pollutants. This indicates a higher level of awareness and a proactive approach to conservation measures among local residents. The willingness of both foreigners and Chinese citizens to limit various activities for water conservation in Beijing, Tianjin, Shanghai, and Chongqing underscores the potential for significant improvements in water management through public participation. However, the variance in specific actions and the uncertainty among many respondents suggest that more robust educational campaigns and clear guidelines are essential to maximize the impact of these conservation efforts.

4. Discussion and conclusion

This paper provides valuable insights into the complex landscape of public opinion regarding water quality investments in China's major cities. The varying levels of willingness to pay across cities and between foreign and Chinese residents likely reflect a combination of factors, including local water quality perceptions, economic conditions, cultural differences, and individual priorities. The substantial variability in responses also highlights the importance of considering diverse perspectives when formulating water management policies and improvement initiatives in urban China. While foreign residents generally show a higher willingness to volunteer more hours, there is significant variability within both foreign and Chinese communities. These findings underscore the importance of targeted outreach and education programs to boost community involvement in water protection efforts. Moreover, the data suggests that there may be untapped potential for volunteer engagement, particularly among highly committed individuals, which could be leveraged to enhance water protection initiatives in these urban areas.

It is important to note several limitations of this study and to emphasize its preliminary nature. First of all, the sample size for this research is strikingly small, especially when divided into four major cities and further divided into groups of foreigners and Chinese residents. This limited sample size severely limits the generalizability of the findings and may not accurately represent the broader population of these urban centres. The small sample size also increases the susceptibility of the results to outliers and individual variation that may disproportionately affect the means and standard deviations. This is reflected in the wide range of observed willingness to pay and number of volunteer hours, especially among foreigners. The findings should therefore be interpreted with caution and considered indicative rather than definitive. Another limitation is the possibility of self-selection bias. Participants who chose to respond to the survey may have a pre-existing interest in water quality issues, which may bias the results towards a higher willingness to pay and volunteer. This bias could overestimate the general population's involvement in water protection initiatives. Although this study offers interesting preliminary insights into attitudes towards water conservation in major Chinese cities, its findings should be considered exploratory. They point to potentially significant trends and differences that merit further investigation in larger and more representative samples.

References

Ando, A. W., Cadavid, C. L., Netusil, N. R., & Parthum, B. (2020). Willingness-to-volunteer and stability of preferences between cities: Estimating the benefits of stormwater management. *Journal of Environmental Economics and Management, 99*, 102274. https://doi.org/10.1016/j.jeem.2019.102274

Chen, A. 陈阿江. (2019). Huanjing wuran ruhe zhuanhua wei shehui wenti “环境污染如何转化为社会问题” (How environmental pollution becomes a social issue), you xueshu de sixiang **有学**术的思想 (Exploration and Free Views), 8, 140–149.

Day, D. H., & Mourato, S. (1998*). Willingness to pay for water quality maintenance in Chinese rivers.* CSERGE Working Papers (WM 98–02). Centre for Social and Economic Research on the Global Environment (CSERGE).

Fischhoff, B., Slovic, P., Lichtenstein, S., Read, S., & Combs, B. (1978). How safe is safe enough? A psychometric study of attitudes towards technological risks and benefits. *Policy Sciences, 9*(2), 127–152. https://doi.org/10.1007/BF00143739

Jhariya, M. K., Meena, R. S., Banerjee, A., & Meena, S. N. (Eds.). (2022). *Natural Resources Conservation and Advances for Sustainability*. Elsevier. https://doi.org/10.1016/C2019-0-03763-6

Jiang, D., Bai, D., Yin, Z., & Fan, G. (2019). Willingness to Pay for Enhanced Water Security in a Rapidly Developing Shale Gas Region in China. *Water, 11*(9), 1888. https://doi.org/10.3390/w11091888

Lai, W. (2017). Pesticide use and health outcomes: evidence from agricultural water pollution in China. *Journal of Environmental Economics and Management, 86*(C), 93–120. https://doi.org/10.1016/j.jeem.2017.05.006

Li, J., See, K. F., & Chi, J. (2019). Water resources and water pollution emissions in China’s industrial sector: A green-biased technological progress analysis. *Journal of Cleaner Production, 229*, 1412–1426. https://doi.org/10.1016/j.jclepro.2019.03.216

Luo, Z., Su, X., Deng, Y., Deng, Z., Yang, S., Luo, X., Chen, J., Shi, L., & Chen, H. (2023). Insight into the pollution characteristics of road and roof runoff in Changsha, China. *Environmental Science and Pollution Research, 30*(25), 67608–67620. https://doi.org/10.1007/s11356-023-27146-3

Pattanayak, S. K., Berg, C., Yang, J. C., & Houtven, G. V. (2006). *The Use of Willingness to Pay Experiments: Estimating Demand for Piped Water Connections in Sri Lanka.* World Bank Working Paper. Washington, D.C. World Bank.

Peng, Z. Y., Zhang, L. L., Yin, J. X., & Wang, H. (2018). Study of impact factors of willingness to pay regarding water reserve of South-to-North Water Diversion Project in Beijing based on Bayesian network model. *Journal of Cleaner Production, 184*, 569–578. https://doi.org/10.1016/j.jclepro.2018.02.263

Shang, Z., Che, Y., Yang, K., & Jiang, Y. (2012). Assessing Local Communities’ Willingness to Pay for River Network Protection: A Contingent Valuation Study of Shanghai, China*. International Journal of Environmental Research and Public Health, 9*(11), 3866–3882. https://doi.org/10.3390/ijerph9113866

Slovic, P. (2000). *The perception of risk.* Earthscan Publications.

Vaseková, V. (2022). How do people in China perceive water? From health threat perception to environmental policy change. *Journal of Environmental Studies and Sciences, 12*(3), 627–645. https://doi.org/10.1007/s13412-022-00773-x

Zheng, H. X., Nie, F. Y., Zhang, L. B., Qu, C. H., & Shen, S. R. (2019). Differentiated WTP for improvement of water quality in Miyun Reservoir, Beijing. *Desalination and Water Treatment, 168*, 193–200. https://doi.org/10.5004/dwt.2019.24215

Nanorobots in the medical world

Zdenek Vrba*, Tereza Vozárová[2], Leopold Tanner[3], Peter Staněk[4]

[1] Institute for Medical Humanities, First Faculty of Medicine, Charles University, Prague, Czech Republic

[2] Institute for Medical Humanities, First Faculty of Medicine, Charles University, Prague, Czech Republic

[3] The Faculty of Business Administration and Management, dpt. of Economic Theories, Czech University of Life Sciences Prague, Czech Republic

[4] Slovak Academy of Science, Bratislava, Slovak Republic

Abstract: Nanotechnology is characterized by the targeted manipulation of individual atoms to create substances or materials with unconventional properties. Nanorobotics has the potential to achieve things that are impossible for traditional robots. We are subject to the wave of technological possibilities offered by science, and under the great idea of doing good, we decided, as humanity, to intervene in our development. At the same time, it is necessary to monitor the application of nanorobots not only from a medical but also from an ethical point of view.

Keywords: Nanorobotics, Nanotechnology, Ethical humanity, You & I relationship, medical applications, targeted therapy.

JEL classification: Z130, I150, H150

1. Introduction

Nanorobotics is a field that deals with developing, producing, and applying nanometer-sized robots. This paper explores whether nanorobots represent a futuristic concept or a near-reality by analyzing current scientific advances and their applications in various fields, particularly medicine. It investigates the technological advancements necessary for nanorobots to function, including power, production, and safety aspects. Furthermore, the ethical and societal implications of nanorobots are also discussed. Nanotechnology is characterized by the targeted manipulation of individual atoms to create substances or materials with unconventional properties. From a bioethical point of view, we are trying to penetrate subatomic particles, where energy goes to particles and waves. Nanorobotics has the potential to achieve things that are impossible for traditional robots. We are subject to the wave of technological possibilities that science offers, and under the great idea of doing good, we decided, as humanity, to intervene in our development. What is it, how is it going, and can it still be stopped? Moreover, where will it end? Will a new human race emerge? Are we ready for this from an ethical point of view?

2. Methodology

This paper is based on a systematic review of current literature, focusing on peer-reviewed articles published between 2010 and 2023 in databases such as PubMed, IEEE Xplore, and ScienceDirect. The inclusion criteria included studies discussing both theoretical and practical aspects of nanorobots, especially their applications in the medical field. Sources were chosen based on relevance to the research question, credibility, and publication in peer-reviewed journals. The search terms used were "nanorobots," "nanotechnology in medicine," "robotics applications," and "nanotechnology ethics."

* Corresponding author's email: "vrba@1az.cz"

We investigate the inventive potential of transfer from primary to applied research in medical science.

3. Nanorobot - what is it?

We already use robotic tools. Miniaturization has brought us to the dimensions of microrobots, which are approx. 1-100 µm (a micrometer is a thousandth of a millimeter), and an optical microscope is still enough for them. We assemble the microrobot simply in the classic top-down way (from top to bottom), where individual parts are produced, for example, by laser machining from a "bigger" piece of material. But a nanorobot, or "machine," 1,000x smaller in size? Something artificially built and functional that has the size of a virus in the body or even smaller? Nanorobots are such a small technology that they can only be seen with an electron microscope. So why do we need them? Nanorobots have several advantages over microrobots. They are much smaller and lighter, allowing them to move in environments that are too small or inaccessible for microrobots. They are also much more powerful, allowing them to perform tasks that are too difficult for traditional robots. We will most often divide nanorobots into organic and inorganic and analyze their details based on the principle of their production.

4. Implementation of nanorobots

4.1. Energy for running a nanorobot

Let us eliminate the classic idea of a battery or a drop of fuel. If only for the reason that a drop of fuel would have the size of hundreds of nanorobots. For industrial applications, the most suitable is a solar drive, electrical energy supplied in the form of induction, ultrasound, or magnetic field; we can also use movement in the human body. However, we have other sources of energy. In the human body, we can find glucose or urea (urea) in the blood, which is just a matter of the mechanism used for this energy. However, there are also many risks here, as the drive designs using these substances produced hydrogen or hydrogen peroxide as a residual component. However, the nanorobot developed by Prof. Martin Pumera from CEITEC (Kim, 2022) uses hydrogen peroxide for his drive. In other words, a certain small amount of hydrogen peroxide makes the robot move, but an increased amount kills or seriously damages the wearer of the nanorobot (meaning a person). Drives based on enzymatic processes are promising. Scientists can understand how to power micro and nanodevices using reaction processes if they understand the biological engines of living cells (Aggarwal, 2022).

4.2. Production

Nanorobots are assembled oppositely to microrobots, i.e., down-top. You need components that are often just individual atoms, and their assembly will occur chemically or by mechanical impulse. In the case of organic nanorobots, or bio-nanorobots, they are created by combining viral and bacterial DNA cells. Diamond structures and synthetic proteins are used to make inorganic nanobots. In medical applications, this creates an obstacle of toxicity, which is solved by encapsulating the robot, thereby reducing its chances of being destroyed by the body's self-defense mechanism (Sun, 2023). The nanorobot above from CEITEC is made of gold and is encased in a silver shell of 60 nanometers. This is an enormously technologically demanding and expensive process at the moment.

4.3. Nanorobot drive types

In industrial applications, we have the principles of gravity drive, magnetic or electric field, solar drive or ultrasound. But in the human or animal body, where the environment is dense, concentrated,

salty, in the bloodstream under a strong current, some sci-fi ideas like a ship's propeller cannot be used. Nature has a drive for bacteria or eukaryotes that is ideal for nanorobots, and that is the flagellum. Although the bacterium uses a rotating circular motion, the eukaryotic flagellum only moves from one side to the other (something like a paddle)

4.4. Control / Programming

For now, nanorobots are difficult to control because they are so small and move so fast. Memory capacity is low. Glucose-based nanorobots move randomly and need to be controlled in a complex manner. Using urea as an energy source, the nanorobots move in only one direction. (Liang, 2019). The control of nanorobots is also important because most applications expect movement in a flock or swarm of at least a thousand nanorobots, and depending on the type of application, even more.

4.5. Safety

It is necessary to ensure that nanorobots are safe for human health and the environment. If we place it in the bloodstream, it is in a dynamic environment under the pressure of impending collisions with the molecules and cells present. At the same time, the nanorobot itself must not damage the environment in which it moves (Pal et al., 2018). Considered applications for cutting out tumors that have grown into healthy tissue, for example the human brain, but also for breaking a chip/implant on which there is a life-threatening addiction (Ali et al., 2017).

4.6. Disposing of the nanorobot

For industrial applications, it is possible to go with the concept that we download it from the current process, or use it for another purpose, or their destruction or self-destruction. However, in the case of use in the medical world, we are interested in their biodegradability (Jeon et al., 2019). That is, the ability to deactivate and dismantle after a predetermined period and completion of the task (Go et al., 2020). This functionality has already been tested in laboratory animals for tumor intervention.

4.7. Application of nanorobots in industry

Nanorobots will be used here to produce new materials, repair infrastructure and clean the environment, produce lighter and stronger materials, repair damaged structures, or remove pollution from water (Urso et al., 2023). The Chemical Institute of Fluminense Federal University has created a nano valve consisting of a reservoir covered with a cap, where dye molecules are placed and can escape uniformly whenever the cap is opened (Shivalkar et al., 2021). This gadget is also natural, made of silicon dioxide (SiO2), beta-cyclodextrins, and organometallic molecules, and should be used in therapeutic applications.

5. Medical Applications of nanorobots

The medical application of nanorobots is wide. From diagnosis of diseases to surgical procedures, not only surgical or plastic, to targeted treatment of diseases and regenerative medicine.

5.1. Treatment of diseases

The application of nanorobots is mostly offered in areas connected with necessary creative activity and substitutes for mechanical skills. A great deal of research is being done in dentistry, where they perform orthodontic treatments such as turning or aligning teeth, cleaning canals and other similar orthodontic care procedures, which are otherwise very painful and stressful for both the doctor and

the patient. These applications have been possible due to the polymeric materials available today, which include bio nanocomposites prepared with polymers, such as biocompatible collagen, alginate, silk, poly (lactic acid), poly (glycolic acid), poly (lactic-co-glycolic acid), and poly (caprolactone) (Saha, 2009). Nanorobots could enhance medical procedures, like invasive surgery, monitoring patients with ongoing body function needs, and improving care quality through early detection of serious diseases (Freitas, 1999). Patient screening would enhance readiness for neurosurgery, early-stage cancer identification, and blood pressure control in patients with heart issues.

5.2. Nanorobots for drug delivery

Nanorobots can be designed to bind to specific cells or tissues. Micro/nanorobots with directional motion and drug delivery potential have been well demonstrated in vitro studies. Drug delivery is usually achieved in the gastrointestinal tract in an acidic environment (Gao et al., 2014). This can treat diseases that only affect certain types of cells or tissues. Nanorobots can deliver drugs directly to target cells or tissues. This can be advantageous for treating tumors or other diseases that are difficult to treat by other means (Hu, 2016). Thus, there is more research on gastrointestinal tract drug delivery than in other fields. Esteban-Fernández de Ávila et al. designed a Mg-based microrobot loaded with clarithromycin (CLR) to treat mice with gastric infection (Mei, 2011). Gold nanoparticles, used as model drugs, were successfully retained in the stomachs of mice by microrobot at a rate more than three times higher than that of the orally administered NP group. In gastric tissue, the acidic environment is usually used to achieve drug delivery, such as promoting the movement of nanorobots by hydrogen produced by the reaction of metals and hydrogen ions. H. pylori-infected mice were orally administered with microrobots to treat gastric infection. The results showed that the CLR-loaded microrobots group reduced approximately 1.8 orders of magnitude of the H. pylori burden than the negative control group (treated with deionized water or microrobot without CLR). In addition to the therapeutic effect, the authors demonstrated the safety and non-toxicity of this system in mice..

5.3. Nanorobots can be used to deliver drugs directly to cancer cells

This may be more effective and less toxic than traditional cancer treatments. In vivo, cell transport is widely used in stem cell therapy. Magnetic field-driven 3D micro/nanorobot porous structure is an ideal strategy for precisely delivering stem cells to therapeutic sites for tissue repair. Li et al. designed microrobots with a porous spherical burr-like structure to deliver HeLa cells to nude mice in vivo. MC3T3-E1 fibroblasts and mesenchymal stem cells (MSCs) cultured on culture plates with the same coating as the microrobot (Ni and Ti) for 1, 3, and 5 days confirmed the safety of the microrobots. This 3D microrobot was biocompatible but not biodegradable. Jeon et al. also designed a porous 3D microrobot with a similar structure (Pak et al., 2011). Research is currently being conducted using nanorobots to target cancer cells based on a mechanical principle. Nanorobots are being designed to destroy cancer cells selectively. It is a different procedure than targeted biological treatment or chemotherapy transport.

5.4. Nanorobots for regenerative medicine

Nanorobots can promote the regeneration of damaged tissues or organs. It can be used to treat injury, disease, or aging. Nanorobotics has the potential to transform medicine. Nanorobots can be used to treat serious diseases that are currently incurable. They can also prevent disease and improve people's health and well-being.

It repairs damaged tissues, such as bones, muscles, or nerves. This may lead to new treatment options for injuries and illnesses. The life-altering role is treating spinal cord and nerve damage injuries. The regeneration of axons using enriched scaffolds and the improvement of nerve reconnections is feasible with nanotechnology. Axon surgery has been demonstrated to be effective with a 40 nm diameter nano knife, which aided in the individual manipulation of axons (Abeer, 2012). The movement of axons under precise control was achieved by a process known as dielectrophoresis; this method uses electric fields to control and move objects in surgical fields. Once the axons are positioned by this process, an electrofusion technique is used to fuse the ends of the axons. Other techniques used for fusion include laser-induced cell fusion or polyethylene glycol.

6. Conclusion

Nanorobots hold promise in combating common diseases and enhancing physical and mental abilities. Their dynamic characteristics are still being explored due to the intricate task of engaging with cells, presenting a notable challenge. Integrating small motors and propulsion mechanisms in these minuscule devices is crucial for their movement at the nanoscale. Additionally, the development of nano-sensors is essential. Despite the seeming impossibility, research groups are working on a biomimetic approach to achieving this goal. Collaboration across diverse disciplines may lead to the realization of nanorobotic applications in medicine by overcoming manufacturing hurdles.

Challenges in designing and developing nanorobots and their potential medical applications, envisioning a future where nanorobotics becomes a valuable medical tool. With rapid advancements in nanorobot technology, breakthroughs are anticipated in both research and market availability. Recent progress includes the creation of robots that are smaller than human hair and can maneuver precisely under the influence of a magnetic field. These nanorobots could be used for drug delivery, tumor treatment, or plaque removal. Efforts are ongoing to design nanorobots for ocular administration, providing sustained therapeutic effects to combat diseases caused by abnormal blood vessel growth. Shortly, humans may benefit from a network of miniature diagnostic and therapeutic robots within their bodies to maintain internal health.

References

Ali, J., Cheang, U. K., Martindale, J. D., Jabbarzadeh, M., Fu, H. C., & Jun Kim, M. (2017). Bacteria-inspired nanorobots with flagellar polymorphic transformations and bundling. *Scientific Reports*, *7*(1). https://doi.org/10.1038/s41598-017-14457-y

Abeer, S. Future medicine: Nanomedicine. JIMSA 2012, 25, 187–192.

Aggarwal, M., & Kumar, S. The Use of Nanorobotics in the Treatment Therapy of Cancer and Its Future Aspects: A Review. *Cureus*. https://doi.org/10.7759/cureus.29366

Freitas, R. A. (1999). *Nanomedicine, volume I: basic capabilities* (Vol. 1, pp. 210-219). Georgetown, TX: Landes Bioscience.

Gao, W., Pei, A., & Wang, J. (2012). Water-Driven Micro

motors. *ACS Nano*, *6*(9), 8432-8438. https://doi.org/10.1021/nn303309z

Go, G., Jeong, S. -G., Yoo, A., Han, J., Kang, B., Kim, S., Nguyen, K. T., Jin, Z., Kim, C. -S., Seo, Y. R., Kang, J. Y., Na, J. Y., Song, E. K., Jeong, Y., Seon, J. K., Park, J. -O., & Choi, E. (2020). Human adipose–derived mesenchymal stem cell–based medical microrobot system for knee cartilage regeneration in vivo. *Science Robotics*, *5*(38). https://doi.org/10.1126/scirobotics.aay6626

Hu, M., Ge, X., Chen, X., Mao, W., Qian, X., & Yuan, W. -E. (2020). Micro/Nanorobot: A Promising Targeted Drug Delivery System. *Pharmaceutics*, *12*(7). https://doi.org/10.3390/pharmaceutics12070665

Jeon, S., Kim, S., Ha, S., Lee, S., Kim, E., Kim, S. Y., Park, S. H., Jeon, J. H., Kim, S. W., Moon, C., Nelson, B. J., Kim, J. -young, Yu, S. -W., & Choi, H. (2019). Magnetically actuated microrobots as a platform for stem cell transplantation. *Science Robotics*, *4*(30). https://doi.org/10.1126/scirobotics.aav4317

Kim, J., Mayorga-Martinez, C. C., & Pumera, M. (2022). Microrobotic photocatalyst on-the-fly: 1D/2D nanoarchitectonic hybrid-based layered metal thiophosphate magnetic micromachines for enhanced photodegradation of nerve agent. *Chemical Engineering Journal*, *446*. https://doi.org/10.1016/j.cej.2022.137342

Liang, Z., Teal, D., & Fan, D. (2019). Light programmable micro/nanomotors with optically tunable in-phase electric polarization. *Nature Communications*, *10*(1). https://doi.org/10.1038/s41467-019-13255-6

Mei, Y., Solovev, A. A., Sanchez, S., & Schmidt, O. G. (2011). Rolled-up nanotech on polymers: from basic perception to self-propelled catalytic microengines. *Chemical Society Reviews*, *40*(5). https://doi.org/10.1039/c0cs00078g

Pak, O. S., Gao, W., Wang, J., & Lauga, E. (2011). High-speed propulsion of flexible nanowire motors: Theory and experiments. *Soft Matter*, *7*(18), 8169-8181.

Pal, M., Somalwar, N., Singh, A., Bhat, R., Eswarappa, S. M., Saini, D. K., & Ghosh, A. (2018). Maneuverability of Magnetic Nanomotors Inside Living Cells. *Advanced Materials*, *30*(22). https://doi.org/10.1002/adma.201800429

Saha. (2009). Nanomedicine: Promising Tiny Machine for the Healthcare in Future-A Review. *Oman Medical Journal*. https://doi.org/10.5001/omj.2009.50

Shivalkar, S., Gautam, P. K., Verma, A., Maurya, K., Sk, M. P., Samanta, S. K., & Sahoo, A. K. (2021). Autonomous magnetic microbots for environmental remediation developed by organic waste derived carbon dots. *Journal of Environmental Management*, *297*. https://doi.org/10.1016/j.jenvman.2021.113322

Sun, Z., Liang, J., Liu, K., Feng, X., Wu, Y., Zhao, Y., Liang, Q., Wu, J., Li, H., & Zhai, T. (2023). Building intercalation structure for high ionic conductivity via aliovalent substitution. *Science Bulletin*, *68*(11), 1134-1142. https://doi.org/10.1016/j.scib.2023.05.007

Urso, M., Ussia, M., & Pumera, M. (2023). Smart micro- and nanorobots for water purification. *Nature Reviews Bioengineering*, *1*(4), 236-251. https://doi.org/10.1038/s44222-023-00025-9

KNOWCON 2024
Knowledge on Economics and Management
Conference Proceedings

www.knowledgeconference.upol.cz

Editors: Michal Müller, Pavla Slavíčková

Responsible Editor: Otakar Loutocký
Layout: Michal Müller, Pavla Slavíčková

The contributions did not go through the language and grammar correction and the authors' formal rules were fully respected.

Published by Palacký University Olomouc
Křížkovského 8, 771 47 Olomouc
www.vydavatelstvi.upol.cz

First Edition

Olomouc 2024

VUP 2024/0476
DOI: https://doi.org/10.5507/ff.24.24465524
ISBN 978-80-244-6552-4 (online: iPDF)

Not for sale