Petr David, Hana Vránová (eds.)

PEF*net* 2025

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November 20, 2025
Extended Abstracts

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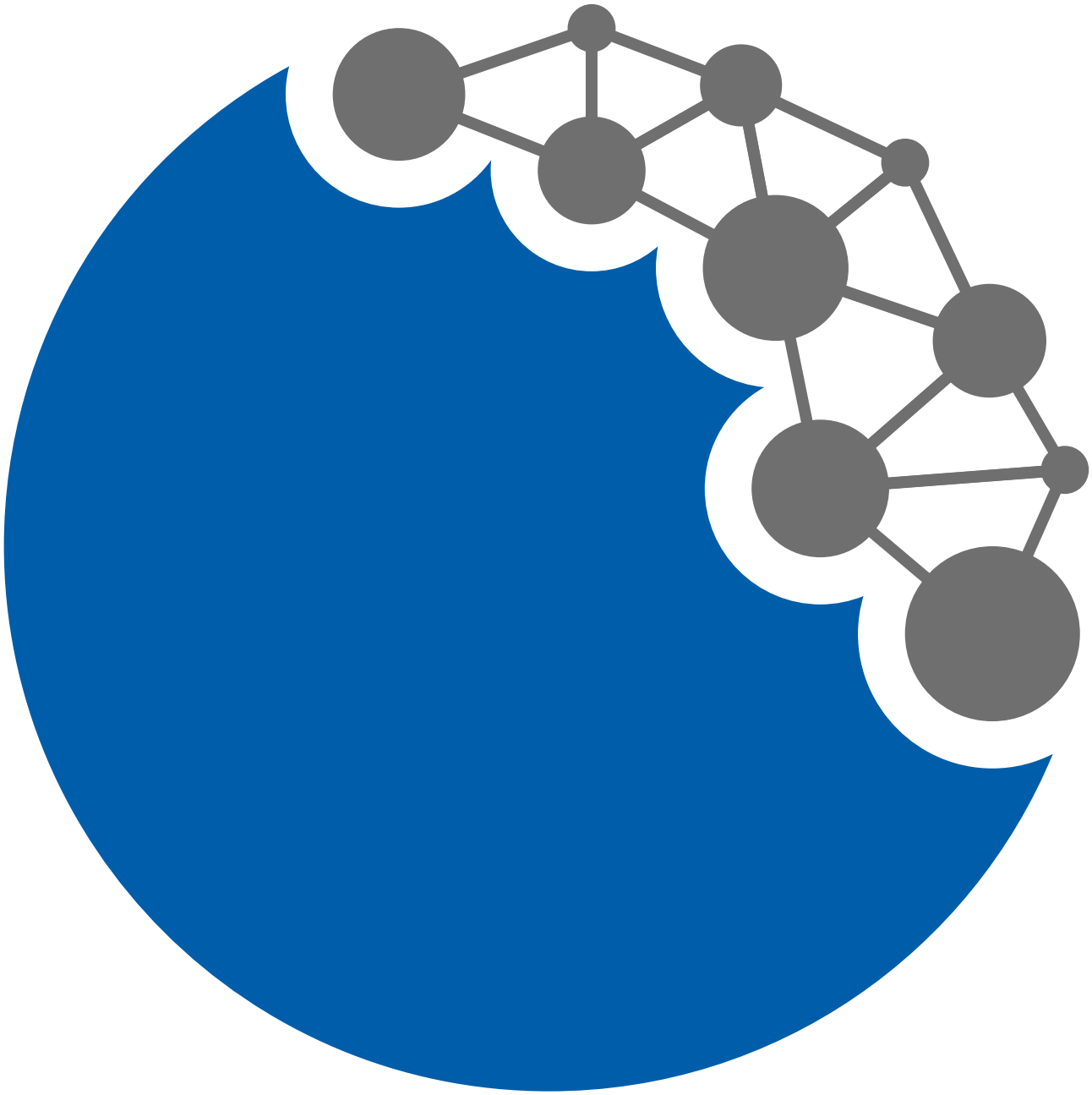

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CONTENTS

FOOD WASTE IN THE HOSPITALITY AND HOTEL INDUSTRY

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KEY WORDS

food waste, hospitality and gastronomy, customer preferences, sustainability

JEL CODES

Q01, L38

1 INTRODUCTION

Food waste is a major global challenge, accounting for nearly one-third of all food produced and contributing about 20% of global greenhouse gas emissions (FAO, 2019; Alsuwaidi et al., 2022). The hospitality sector is a significant contributor, with much of its waste avoidable, driven by guest behaviours, cultural tendencies, and operational inefficiencies such as overproduction and buffet concepts (Dolnicar et al., 2020; Okumus et al., 2020). In Czechia, despite growing awareness of sustainability, environmental measures in hotels and restaurants remain limited, highlighting a gap in achieving Sustainable Development Goal 12 (Scholz et al., 2024; United Nations, 2015). Effective strategies exist from nudges and education to food redistribution, but practical implementation is often hindered by managerial and structural barriers (Chawla et al., 2020; Reynolds et al., 2020). This study examines both accommodation providers' practices and customers' perceptions of sustainable gastronomy to identify drivers, barriers, and motivators for reducing food waste.

2 MATERIAL AND METHODS

This study used quantitative research in two areas: accommodation facilities and restaurant customers. The methods were developed based on a thorough review of the literature and previous studies on food waste and sustainability. To capture diversity, a quota sampling method was used, with quotas for accommodation facilities determined by type and size of facility, and quotas for restaurant customers based on gender. Participation in the research was voluntary and completely anonymous. The questionnaire was distributed to authorized persons in hotels and restaurant customers during the months of January to April 2025. Statistical methods and the importance and performance analysis (IPA) method were used to evaluate the results.

BARTLOVÁ, Veronika, and MÁJKOVÁ, Nikola. 2025. Food Waste in the Hospitality and Hotel Industry. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 5–6. Mendel University in Brno.
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3 RESULTS

The results of the research showed that sustainability in accommodation and catering is still a developing field that needs to be further addressed. In accommodation facilities, insufficient monitoring of food waste proved to be a key problem, which limits the ability to effectively design and evaluate measures to reduce waste. Buffet services, which lack sufficiently systematic management, proved to be the largest source of waste. Of the measures already in place, the most effective proved to be the option to pack leftover food to take away and to collect feedback from customers. In catering establishments, customers have been found to place emphasis on the ethical and environmental aspects of sustainability, such as the use of eco-friendly packaging, active reduction of food waste, and fair treatment of employees. These factors have a direct impact on the perception of a business's quality and attractiveness. Respondents identified limited availability and a lack of information about whether businesses can truly be considered sustainable as the biggest obstacles to the development of sustainable restaurants.

4 CONCLUSIONS

The study identified a low level of systematic food waste monitoring in Czech accommodation facilities, with only a small share of businesses keeping precise records. Most rely on approximate estimates, which limits their ability to optimise processes and implement effective waste-reduction measures. In comparison with international trends, Czech facilities lag behind in adopting modern monitoring technologies and staff training for environmental management. In gastronomy, customers associate sustainability mainly with social aspects, such as fair treatment and remuneration of employees, while environmental and dietary factors receive less attention. The main barriers to visiting sustainable restaurants are limited availability, higher prices, and insufficient communication. Strengthening transparent reporting, cooperation with anti-waste initiatives, and collaboration with local suppliers could enhance both environmental performance and consumer trust. More precise monitoring, digital tools, and clear communication are key to improving sustainability across the hospitality sector.

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AN EMPIRICAL ASSESSMENT OF PLS-SEM METHOD IN ENERGY ECONOMICS

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KEY WORDS

energy industry, latent variables, PLS-SEM, structural equation modeling

JEL CODES

C51, C52

1 INTRODUCTION

Traditional econometric approaches to modeling electricity demand have typically relied on regression-based techniques, often treating observed variables as directly measured and exogenous. However, many of the most important drivers of electricity consumption such as the broader concepts of "market conditions" or "climate factors" are inherently latent and multidimensional and can only be indirectly observed through a set of manifest indicators. Structural Equation Modeling (SEM) provides a powerful framework for capturing such complex relationships, allowing for the simultaneous estimation of measurement and structural models, and enabling the explicit modeling of latent constructs.

2 MATERIAL AND METHODS

The empirical analysis in this study is based on monthly data covering key variables relevant to household electricity consumption. The dataset includes observed values for average electricity price, average temperature, heating degree days, precipitation, and sunshine hours, alongside total household electricity consumption (Q). These variables were selected to capture both economic and climatic influences on demand. The data were obtained from publicly available national statistical sources and meteorological databases, ensuring consistency and comparability across the observed periods

In this work, the PLS-SEM method was used to analyze the relationships between factors influencing electricity consumption. PLS-SEM enables the simultaneous estimation of both the measurement and structural models, even when the data are not normally distributed or the sample size is relatively small. The mathematical foundation of PLS-SEM consists of two key components: the measurement (outer) model and the structural (inner) model. [1]

BAŤKA, Martin. 2025. An Empirical Assessment of PLS-SEM method in Energy Economics. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 7–8. Mendel University in Brno.
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3 RESULTS

Figure 1 presents the conceptual structure of the estimated PLS-SEM model. The model consists of three latent variables: Market conditions, Climate factors, and Demand drivers. The latent variable Market conditions is represented by a single observed indicator, the electricity price. The latent variable Climate factors is defined by four manifest variables: average temperature (avg_t), heating degree days (hdd), precipitation (rain), and sunshine hours (sun_h). The latent variable Demand drivers (interpreted as household electricity consumption) is measured by a single observed variable Q. The variable of GDP was removed from the final model due to its low impact on overall model accuracy and low results in several fit indicators.

The main result of the model shows a very high degree of explained variability in household electricity consumption. The coefficient of determination R^2 for the latent variable Demand drivers was 0.861, meaning the model explains 86.1% of the variability of this variable. This result can be considered exceptionally high, especially given the data range and the number of indicators involved.

A detailed look at the individual paths in the model structure reveals that climatic factors have a dominant influence on electricity demand. The standardized path coefficient from the Climate factors construct to Demand drivers reaches a value of 0.889, indicating a very strong positive relationship. This result confirms that seasonality, temperature extremes, and climatic conditions in general play a key role in determining household electricity consumption.

In contrast, the path from the Market conditions construct (represented here by the average electricity price) to Demand drivers has a value of −0.110. This effect is negative (suggesting that consumption may slightly decrease as prices rise), but its magnitude is substantially smaller compared to climatic factors. Thus, in the short term, the relatively low-price elasticity of electricity demand in households is confirmed.

The measurement model demonstrated high indicator quality and validity of the latent variables. The AVE (Average Variance Extracted) for the Climate factors construct was 0.537, and for both Demand drivers and Market conditions it was 1.000 (in these cases, the constructs had only one indicator, which is typical for AVE). All outer loadings were above or very close to the threshold of 0.5; only the indicators precipitation (−0.447) and sunshine (0.472) were weaker, but given the AVE and other validation criteria, these values are still acceptable.

4 CONCLUSIONS

This study confirms the effectiveness of PLS-SEM in explaining household electricity consumption and identifying key latent variables relevant to energy demand. The results show that climatic factors exert the strongest direct effect on residential electricity use, while the influence of market conditions, though statistically significant, is comparatively weak. The model demonstrates high explanatory power and robustness, supporting the use of PLS-SEM for this type of economic analysis. These findings underline the importance of prioritizing cli-mate-oriented measures in energy policy and suggest that economic instruments alone may be insufficient to achieve significant reductions in household electricity consumption. Future research should seek to broaden the scope of latent variables, including behavioral and socio-demographic factors, and test the generalizability of the results in other contexts and over longer time horizons.

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AFFILIATE MARKETING AS A GROWTH LEVER FOR SMES IN AFRICA: COMPARATIVE CASE STUDIES BETWEEN FRANCOPHONE AND ANGLOPHONE COUNTRIES

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KEY WORDS

affiliate marketing, digital marketing, SME performance, entrepreneurship, emerging economies

JEL CODES

M31, L26, O33

1 INTRODUCTION

Affiliate marketing has become one of the most effective digital marketing models for small and medium-sized enterprises (SMEs), enabling them to expand market reach and optimize budgets through performance-based remuneration. This model is particularly relevant in emerging economies, where financial constraints limit access to traditional advertising.

In Africa, however, the adoption of affiliate marketing is uneven. Anglophone countries such as Nigeria, Kenya, and South Africa have integrated affiliate programs into their digital marketing ecosystems, while francophone countries—including Senegal, Côte d'Ivoire, and Cameroon—lag behind. These differences stem from varying levels of digital infrastructure, government support, and entrepreneurial culture. The objective of this paper is to compare the adoption and effectiveness of affiliate marketing in anglophone and francophone Africa, and to identify the main barriers and opportunities for SMEs in both contexts.

2 MATERIAL AND METHODS

This study employs a comparative and documentary research design. It is based exclusively on secondary data drawn from peer-reviewed articles, institutional reports (World Bank, UNCTAD, OECD), and national digital economy strategies published between 2015 and 2024.

The analysis compares anglophone and francophone African countries using three dimensions:

1. Digital infrastructure and technological readiness;
2. Cultural and educational attitudes toward digital entrepreneurship;
3. Policy and institutional support for digital marketing adoption.

The sources were analyzed thematically and comparatively to identify structural patterns and contextual differences affecting the implementation of affiliate marketing.

BERTAL, Youness Filali. 2025. Affiliate Marketing as a Growth Lever for SMEs in Africa: Comparative Case Studies between Francophone and Anglophone Countries. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 9–10. Mendel University in Brno.
ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

3 RESULTS

The findings show a significant digital and cultural divide between the two regions:

- Anglophone Africa demonstrates greater maturity in affiliate marketing adoption. Countries like Nigeria and Kenya benefit from established payment systems (e.g., M-Pesa, Flutterwave), entrepreneurial dynamism, and English-language access to global platforms such as Amazon Associates or ClickBank. SMEs in these regions are more likely to measure ROI and integrate affiliate programs into their marketing mix.
- Francophone Africa, conversely, faces structural and behavioral barriers. Limited access to reliable payment systems, low digital literacy, and lack of institutional awareness restrict the diffusion of affiliate models. SMEs often depend on informal digital advertising and show skepticism toward online transactions.

However, emerging trends—notably influencer marketing, government initiatives for e-commerce, and the rise of youth digital entrepreneurs—suggest a gradual shift. Senegal and Côte d'Ivoire, for example, are beginning to integrate affiliate networks through social media and local e-commerce platforms.

4 CONCLUSIONS

This comparative study highlights that affiliate marketing can become a strategic growth driver for African SMEs if certain enabling conditions are met.

Key conclusions include:

- Digital infrastructure and payment reliability are prerequisites for affiliate marketing expansion.
- Digital literacy and training programs are crucial to increase awareness among francophone entrepreneurs.
- Public policy frameworks must explicitly include affiliate marketing within national digital strategies to encourage private-sector participation.

Bridging the gap between anglophone and francophone Africa requires coordinated efforts between governments, educational institutions, and the private sector. With adequate support, affiliate marketing could strengthen SME competitiveness, foster cross-border trade, and accelerate Africa's integration into the global digital economy.

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A FRAMEWORK FOR DEVELOPING AND EVALUATING TRUSTWORTHY RAG-BASED AI AGENTS IN THE PUBLIC SECTOR

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[1]*Mendel University in Brno, Czech Republic*

KEY WORDS

retrieval-augmented generation (RAG), public sector, qualitative evaluation, user trust

JEL CODES

O33, H83, D83

1 INTRODUCTION

Public sector organizations face a major challenge in providing citizens with accessible and accurate information from complex and heterogeneous data sources. While Large Language Models (LLMs) offer a potential solution through conversational AI, their inherent limitations, such as factual inaccuracies ("hallucinations") and static knowledge, make them unsuitable for direct deployment where trust and reliability are paramount. The Retrieval-Augmented Generation (RAG) architecture mitigates these issues by grounding LLM responses in verifiable external documents [1][2]. However, the success of RAG systems is critically dependent on two often-overlooked areas: the quality of the data ingestion pipeline and the methodology used for their evaluation. Naive data processing can lead to a loss of semantic context, and standard quantitative metrics fail to capture the real-world impact on service quality and user trust [3]. This paper addresses these gaps by proposing a comprehensive framework for the design and, most importantly, the qualitative evaluation of trustworthy RAG agents tailored for the public sector.

2 MATERIAL AND METHODS

This research introduces a six-stage methodological framework designed to guide the development of robust RAG agents. The framework covers: 1) Scope Definition, 2) Data Acquisition, 3) Data Ingestion and Preprocessing, 4) Vector Storage and Indexing, 5) RAG Core Configuration, and 6) Qualitative Evaluation. The core technical innovation lies within the third stage, where we propose context-aware chunking. This method utilizes a LLM (gpt-4-turbo) to analyze the semantic structure of official documents (regulations, directives) and segment them into logical units. Crucially, this process propagates hierarchical context (chapter and section headings) into each data chunk, preserving its original meaning and preventing the semantic fragmentation common to standard chunking techniques.

To validate this framework, we conducted a case study by implementing a prototype AI agent for the Prague 6 municipality. The system's architecture is built on a PostgreSQL database with the pgvector

GONO, Andrej. 2025. A Framework for Developing and Evaluating Trustworthy RAG-based AI Agents in the Public Sector. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 11–13. Mendel University in Brno. ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

extension, and it employs a hybrid retrieval strategy combining sparse (keyword) and dense (semantic) search.

To evaluate the prototype, we employed a mixed-methods approach with a dominant qualitative component, involving two participant groups: citizens ($n = 12$) and municipal officials ($n = 5$). Citizens engaged in scenario-based testing while using the Think-Aloud Protocol [4], allowing us to capture their cognitive processes and user experience in real-time. Both groups participated in in-depth, semi-structured. Data was analyzed using Thematic Analysis to identify recurring patterns and insights.

3 RESULTS

The qualitative analysis of our study yielded four primary themes. The first, "From Information Retrieval to Problem Resolution," revealed that citizens perceived the agent not as a mere search tool, but as a problem-solving assistant. By synthesizing information into direct answers, the agent reduced the cognitive load on users compared to traditional website.

The second theme, "Trust Through Traceability," supported our hypothesis that transparent source attribution is critical for user trust. Participants highlighted the value of source links in each answer, stating that this verifiability was essential for their confidence.

Third, the theme of "Augmentation, Not Replacement" emerged from interviews with municipal officials. They did not view the agent as a threat but rather as a tool to augment their capabilities. They identified its potential to filter out repetitive inquiries, allowing them to focus on more complex citizen issues, and to serve as a knowledge base for themselves.

Finally, the theme of "Conversational Friction and the Potential for Voice" identified limitations in the text-only interface, particularly for users with lower digital literacy. This highlighted a strong user preference for a future multi-modal interface, including voice.

4 CONCLUSIONS

This research demonstrates that the successful deployment of AI agents in the public sector hinges on more than just technological implementation. It requires a data-centric approach and a commitment to evaluating the system's real-world impact on users. Our proposed framework provides a replicable pathway for achieving this. The context-aware chunking method proved effective in preserving the semantic integrity of complex documents, leading to higher-quality information retrieval. Furthermore, our qualitative evaluation framework successfully captured nuanced insights into user trust, service quality, and administrative efficiency that would be invisible to standard quantitative metrics. The findings confirm that trustworthy AI in government is achievable when transparency and user-centric design are placed at the core of the development process.

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THE MISSING TRADE: HOW CROSS-BORDER TRADE GAPS REVEAL THE EUROPEAN VAT PROBLEM

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KEY WORDS

cross-border VAT fraud, value-added tax (VAT), VAT gap, shadow economy, tax collection, policy nad governance, economic sectors

JEL CODES

H26, C33

1 INTRODUCTION

In the European Union, Value Added Tax (VAT) accounts for almost 30% of total government revenue, emphasizing the importance of its efficient collection [1]. Despite this, VAT revenue is heavily compromised by evasion issues. A major obstacle for effective VAT collection in the EU is the challenge posed by cross-border international trade. Although such trade is a significant economic contributor, it also expands the avenues for cross-border VAT fraud, exacerbated by the zero-rating of EU exports. This study intends to propose and empirically explore less examined mechanisms that affect the VAT gap, particularly cross-border VAT fraud, as evidenced by the discrepancies in international trade data, referred to as the "trade gap" or "TG." Our research seeks to provide fresh insights into tax policy and administration by analyzing the concept of "Import of Tax Morale" through Foreign Direct Investment. Specifically, it investigates whether foreign subsidiaries owned by entities from countries with low corruption levels can positively influence the tax compliance environment of the host country, thereby reducing cross-border VAT fraud. This study investigates a novel pathway through which international business practices affect local tax behaviors. Additionally, we will examine the aggregation of cross-border VAT fraud by sector, categorized according to NACE 2 Revision. By exploring these mechanisms, our research aims to deliver a more comprehensive understanding of the factors influencing the VAT gap and cross-border VAT fraud, especially within the realm of international economic activities.

2 MATERIAL AND METHODS

Trade discrepancies should not be quickly interpreted as indications of fraudulent behavior. These variances could represent the complex trade costs arising from different valuation methods. For example, export prices are recorded on a Free on Board (FOB) basis, while import prices include the additional factors of Cost, Insurance, and Freight (CIF) [2].

HASÍKOVÁ, Iva, and HANOUSEK, Jan. 2025. The Missing trade: How Cross-border Trade Gaps Reveal the European VAT problem. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 13–14. Mendel University in Brno. ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

Consequently, it is a common occurrence for export values to surpass import values.

Our empirical models are designed to integrate inherent trade costs and unintended errors, such as misclassification of goods and re-exports, through methodologies established by previous studies, such as Javorcik & Narciso [3]. These models incorporate country fixed effects and have been tested under various specifications. Complementing the baseline OLS regression, a logit model was employed as a robustness check. For this purpose, the model's explanatory variable was transformed into a binary format, according to the formula:

$$\text{Bin TG sec } X_{it} = \begin{cases} 1, & \text{TG sec } X_{it} > 10\% \\ & \vee \text{ TG sec } X_{it} < -10\% \\ 0, & -10\% \leq \text{TG sec } X_{it} \leq 10\% \end{cases}$$

The binary variable equals 1 for significant trade gaps and 0 when the gap is negligible, potentially resulting from unintended errors.

3 RESULTS

Our approach confirms, that trade gap is not mainly driven by the difference between CIF and FOB, but it could be used as indicator of cross-border fraud. For this reason, we use shadow economy as base of illegal tax behaviour. Basically our approach will confirm this formula:

$$\text{TG}_{it} = f(\text{shadow economy}_{it})$$

In another step, we use the trade gap as an explanatory variable of the VAT gap to decompose the VAT gap. We use several specifications to confirms our results.

4 CONCLUSIONS

Our study further illuminates the less examined aspects, such as the breakdown of the VAT gap and the impact of import tax morale via FDI. However, FDI plays a significant role in widening a country's VAT gap, thus adversely affecting VAT compliance. This underscores an additional source of substantial cross-border VAT fraud. Our analysis indicates that a key element contributing to the VAT gap is the absent TG, implying that a significant share of cross-border VAT fraud is accountable for the overall lack of VAT compliance.¨

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SAFEGUARDING CRITICAL INFRASTRUCTURE: A SYSTEMATIC REVIEW OF CYBERSECURITY IN THE WATER SECTOR

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KEY WORDS

cybersecurity, water sector, critical infrastructure, literature review

JEL CODES

K24, L95

1 INTRODUCTION

The water sector is a fundamental component of the national critical infrastructure. Water utilities not only supply water for domestic consumption but also serve essential institutions such as hospitals and other industrial sectors. Over the past decades, the sector has undergone significant digital transformation, transforming processes from water quality monitoring to supply chain management. However, recent cyberattacks have revealed persistent vulnerabilities within water systems, highlighting the need for enhanced cybersecurity frameworks and guidance that enable professionals to manage such threats effectively (Sowby et al., 2025), especially considering that water utilities are often local small businesses. The purpose of this study is to explore the state of cybersecurity in the water sector, examine insights from existing literature and identify research gaps.

2 MATERIAL AND METHODS

A systematic literature review was conducted using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology to make an appropriate selection and analysis of sources. Scholarly articles, books, and reports were retrieved from the Web of Science (WOS) and Scopus databases, using the keywords “cybersecurity” and “water sector”, “waterworks” or “water systems”. VOSviewer software was used to perform keyword co-occurrence analysis to identify related topics and thematic clusters. The reviewed studies examined conceptual models and case studies illustrating the relationship between cybersecurity and water utilities, providing a comprehensive foundation for proposing targeted interventions to enhance cybersecurity within the water sector.

HAVELKOVÁ, Helena, and NOVOTNÁ, Veronika. 2025. Safeguarding Critical Infrastructure: A Systematic Review of Cybersecurity in the Water Sector. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students*, pp. 15–16. Mendel University in Brno. ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

3 RESULTS

The systematic literature review identified 72 relevant publications, excluding studies focused on maritime, agricultural, or unrelated water treatment contexts that, although sharing similar keywords, fell outside the research scope. Covering the period from 2021 to 2025, the review revealed three principal thematic areas. The first concerns the digital transformation, where the adoption of innovative technologies, advanced sensors, and interconnected infrastructures, such as connecting IT and OT due to the cost-lowering, is reshaping operational processes, decision-making, and system management practices (Eliades et al., 2024). The second theme highlights cyber threat detection, prevention, and resilience mechanisms, emphasising the growing role of AI and machine learning, which is rather complicated due to the existing cybersecurity risks of these new technologies (Moraitis et al., 2023). The third theme focuses on governance, policy, and organisational adaptation, encompassing institutional coordination and regulatory frameworks that support long-term cybersecurity resilience and effective incident response (Tuptuk et al., 2021).

4 CONCLUSIONS

This study highlights the importance of researching cybersecurity in the water sector, which forms a crucial part of the national critical infrastructure. The constant digitalisation of water systems has improved efficiency, monitoring, and decision-making, but has also broadened the threat landscape, exposing utilities to increasingly complex cyber risks. The literature review shows that, compared to other sectors of critical infrastructure such as energy, cybersecurity research on water systems remains limited, particularly in the areas of threat detection, governance, and resilience planning. These gaps emphasise the need for focused research, practical cybersecurity frameworks, and clear policy guidance to help water utilities, many of which are small or local, better manage digital risks. Strengthening cybersecurity in this sector requires not only technical innovation but also collaboration between academia, industry, and public authorities to ensure the protection and continuity of safe and reliable water services.

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SENTIMENT AND EMOTION ANALYSIS ON SOCIAL MEDIA FOR MARKETING CAMPAIGNS

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KEY WORDS

sentiment analysis, emotion analysis, social networks, marketing campaign, digital marketing, natural language processing, CRISP-DM, Facebook, data analysis, user interaction

JEL CODES

M31, O33

1 INTRODUCTION

Social media have become a key marketing channel, allowing companies to engage with audiences and shape brand perception in real time. The effectiveness of this communication depends on understanding users' emotional responses to content, making sentiment and emotion analysis valuable tools for optimizing digital strategies. This study applies the CRISP-DM methodology to the design of a Facebook marketing campaign, combining data collection, preprocessing, and modelling to examine how emotional and sentiment features influence user engagement. The results provide practical recommendations for data-driven communication that better resonates with target audiences and improves the overall performance of social media campaigns.

2 MATERIAL AND METHODS

The methodological framework of this study followed the CRISP-DM process model, comprising six iterative phases: business understanding, data understanding, data preparation, modelling, evaluation, and deployment. In the initial phase, business goals were defined using the SMART framework and supported by SWOT, persona, and competitor analyses to identify target audiences and strategic positioning [1, 2, 3]. Public Facebook posts from selected companies were collected using the Apify Facebook Posts Scraper and processed in Python 3.11 and Microsoft Excel, including text cleaning, normalization, and creation of derived variables. Emotions were classified using the Emotion_RoBERTa_czech6 model, while sentiment detection employed a fine-tuned RobeCzech-base model [4]. Statistical tests such as Shapiro–Wilk, Kruskal–Wallis and Dunn's post-hoc [5] were conducted in Past 4.15 to verify relationships between emotional and sentiment categories and engagement metrics (likes, comments, shares). In the deployment phase, an XGBoost model was applied to predict post performance and to formulate a data-driven marketing strategy.

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3 RESULTS

The analysis of public Facebook posts collected from competing companies revealed that the type of post has a statistically significant effect on user engagement, particularly on the number of likes. Using the Emotion_RoBERTa_czech6 and fine-tuned RobeCzech-base models, the dominant emotions and sentiment of each post were identified; however, no direct relationship between sentiment or emotional polarity and engagement levels was confirmed. The XGBoost model was applied to predict the probable interaction rate for each proposed post, supporting the creation of a three-month publication plan. Based on these findings, a consistent content strategy was designed, including specific post proposals and data-driven predictions of their potential performance.

4 CONCLUSIONS

The study demonstrated the potential of sentiment and emotion analysis as supportive tools in the design of social media marketing campaigns. Although no direct relationship between emotional tone or sentiment polarity and engagement level was confirmed, the analysis showed that the type of post significantly affects user interaction, particularly in the number of likes. By integrating Czech-language NLP models and predictive methods within the CRISP-DM framework, a three-month publication plan was developed, supported by XGBoost-based predictions of post performance. These results highlight the practical value of data-driven approaches for structuring and optimizing social media communication strategies.

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THE IMPORTANCE OF ONBOARDING BEFORE TESTING VR APPLICATIONS

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KEY WORDS

virtual reality, teaching, education, spatial data, user experience

JEL CODES

C88, L86

1 INTRODUCTION

Immersive virtual reality (VR) has demonstrated potential as a learning tool across various educational domains, such as biology, hypsography, and engineering. It allows students to practically explore concepts that are otherwise taught theoretically and are often difficult to simulate in the real world. Several studies [1, 2, 3] have examined the effects of immersive VR on learning outcomes, engagement, and skill development. Some experiments include prior training but do not examine its impact on students. We believe that giving students more time to spend in virtual reality can help them become more comfortable with the environment and may impact learning effectiveness, as suggested by findings from previous studies [4, 5]. This study evaluates whether the length of prior training supports a more effective and positive learning experience.

2 MATERIAL AND METHODS

This study was conducted with university students of water engineering who were randomly assigned to two groups differing in the length of VR training. The experiment consisted of two parts: a training session and a learning unit.

During the training session, both groups completed predefined tasks in the Google Earth VR environment. The first group had a limited time of 5 minutes to complete the tasks, without being informed of this restriction in advance, while the second group was given more time and could freely explore the environment afterwards. After the session, participants took a 10-minute break and completed the Perceived Competence Scale (PCS) questionnaire.

The training part was followed by the learning unit, in which students interacted with several 3D scenes in our VR application focused on water management. They were asked to perform practical tasks, such as measuring the width of a water channel and analyzing its behavior under different flood conditions.

After completing the learning unit, participants filled out three additional questionnaires: the NASA Task Load Index (TLX), the User Experience Questionnaire (UEQ), and the Perceived Cognitive, Affective, and Psychomotor Learning Test (CAP). Each questionnaire consisted of a series of statements rated by participants using a six- or seven-point Likert scale.

CHYLÍKOVÁ, Eliška, NEDĚLOVÁ, Markéta, PISAŘOVIC, Ivo, PROCHÁZKA, David, and LANDA, Jaromír. 2025. The Importance of Onboarding Before Testing VR Applications. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 19–20. Mendel University in Brno.
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3 RESULTS

PCS results showed that participants with longer prior VR exposure scored slightly higher on three of the four items, specifically their ability to perform VR tasks, complete them successfully, and achieve goals while interacting in VR. TLX results indicated that the short-training group perceived the tasks as less mentally and physically demanding, less hurried, and experienced lower stress and frustration. In the UEQ, the long-training group rated the application as more understandable, exciting, and predictable. Finally, CAP results showed that long-training participants reported higher abilities in organizing material, producing study guides, applying hands-on skills, and reflective thinking, whereas the short-training group scored slightly higher in self-reliance. Both groups showed comparable results in their ability to critique instructional texts, demonstrate practical skills, and show changes in attitude toward flood-related subject matter.

4 CONCLUSIONS

The results of this study suggest that the length of previous VR training influences students' overall experience in VR. Extended training enhanced confidence, perceived competence, and engagement, though it was associated with slightly higher perceived workload. Future studies may examine these effects with larger, more diverse samples and longer intervals between training and learning to optimize outcomes.

Overall, providing a short onboarding session prior to VR experiments may help improve participants' performance and ensure more consistent results.

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AUGMENTED REALITY ON IOS FOR GUIDING NOVICE USERS THROUGH MAINTENANCE TASKS

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KEY WORDS

augmented reality, manuals, immersive learning, mobile apps

JEL CODES

C88, L86

1 INTRODUCTION

Augmented reality is a technology which has been used many times in the past for maintenance or assembly tasks [1, 2]. The use of AR can leverage the work of people in various conditions by having a possitive effect on cognitive load, reducing it by only displaying the relevant information to the user at time [3]. This can be especially useful when users are required to learn some new skills related to tasks they are doing for the first time.

To make the use of AR more available, mobile phones can be used. LiDAR is the technology that is used for 3D recognition of objects using laser pulses on Apple's mobile devices [4]. An important factor to consider is whether such technology is robust enough for use in production applications. In this paper, we aimed to assess the usability of 3D AR manuals for maintenance tasks in comparison with the use of standard 2D manuals, as well as in terms of object recognition reliability on Apple devices.

2 MATERIAL AND METHODS

We conducted an experiment with users to compare the use of AR manuals for performing a maintenance task with the use of 2D manuals. For this experiment, an AR application for the iOS platform was developed. Before developing the application, Apple's 3D object recognition framework was tested in order to assess its usability for production use cases. For the 2D manuals, a simple mobile application was developed including text and images, with the option to switch between individual steps.

Participants were asked to perform a task of changing filament of a 3D printer on their own, while they have no previous experience with 3D printers at all. They were divided into two groups, where the first group was given a 2D manual opened on a mobile phone, which is a typical setup user would do if they need to do something for the first time without any guidance from another person. The second group was given a mobile device with an AR manual opened. The 2D manual consisted of text and photos of the real printer, with arrows pointing on the specific parts of it. The 3D manual included the same text and a camera-like area, which the user pointed at the real 3D printer. Depending on which

CHYLÍKOVÁ, Eliška, ZEJDA, Martin, PISAŘOVIC, Ivo, PROCHÁZKA, David, LANDA, Jaromír, GONO, Andrej, and ŠMERDA, Tomáš. 2025. Augmented Reality on iOS for Guiding Novice Users Through Maintenance Tasks. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 21–22. Mendel University in Brno. ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

step the user was performing, a 3D object of arrow pointed at the specific part of the printer, adjusting itself based on the user's and printer's position. The procedure of changing the 3D printer's filament consisted of seven steps and the application guided the user through each one. After users completed the required subtask, they were asked to confirm that they had finished it and could continue. After finishing the whole task of changing the filament, users were asked to fulfill a questionnaire to obtain subjective data on their user experience.

3 RESULTS

The reliability assesment of Apples's 3D recognition framework consisted of several tests involving scanning different types of objects in multiple environmens, varying lighting conditions, and backgrounds of the scanned object. The results showed that there is approximately 5 cm error in scanning, which does not represent a concern for the intended use case of maintenance tasks on medium-sized objects.

In the experiment, all participants managed to complete the task without any major problems. In the questionnaires, users from the group that used the 2D manual suggested rephrasing several texts and adding more images or videos for more clarity. Users from the group that worked with the 3D AR manual rated positively the presence of arrows pointing at the real object. A limitation identified when using this approach was the need to hold the mobile device aiming at the real printer the whole time for the arrows to be visible, which can be a little physically incovenient.

4 CONCLUSIONS

In order to compare classical 2D manuals and 3D manuals using augmented reality, the usability of 3D recognition on Apple devices was examined, mobile application was developed and experiment with users was conducted. According to observation of the users during the experiment, we found out that users using AR seemed to work in a continual way, identifying the correct parts of the printer and then performing the required actions. Oppositely, users that read instructions from the 2D manual had to repeatedly shift their sight from the manual to the printer and back in order to identify the correct part of the printer to work with. Based on the observation and the results from questionnaires, we assume that the cognitive load of the users is decreased when performing maintenance with the help of an AR manual, compared to using a 2D manual.

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HIGH-TECH COMPANIES AND VALUE CREATION IN REGIONAL INNOVATION SYSTEMS

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KEY WORDS

regional innovation system, high-tech, value-added, regional development

JEL CODES

O10, R11

1 INTRODUCTION

The high-tech sector represents a group of economic activities that utilize advanced technologies, require substantial investments in innovation and research, and often generate above-average value-added [1]. In the context of regional development, it has been increasingly emphasized that regional competitiveness depends not only on traditional factors such as infrastructure or labor force, but also on innovation performance — the ability of regions to transform innovation potential into measurable economic outcomes [2]. Within innovation systems, so-called orchestrators or intermediaries — such as innovation centers, incubators, or science parks — play an important role in coordinating, facilitating, and governing innovation activities. These organizations integrate resources, foster collaboration, and strengthen relational ties among firms, academia, and the public sector [3]. Economic performance of regions can be measured through value-added, which reflects how effectively regions transform entrepreneurial and innovation activities into tangible economic output. However, what remains unclear is how these intermediary institutions actually contribute to value creation, and whether their effect differs according to the level of regional development and innovation maturit [4]. This study focuses on the dynamics of value creation in high-tech sectors, considering differences in regional development levels, and outlines a framework for further empirical research on this topic.

2 MATERIAL AND METHODS

This study focuses on the analysis of Czech regions at the NUTS III level, aiming to examine the development of value-added (VA) generated by high-tech companies between 2002 and 2022. High-tech firms were identified based on their NACE codes, following the OECD classification of high-technology manufacturing and knowledge-intensive services. The firms were extracted from the CRIBIS database, and their financial data were processed using profit and loss statements. The accounting value-added was calculated as the sum of revenues from the sale of products, goods, and services minus consumed purchases and materials (intermediate consumption). A time series of value-added was constructed for each region over the period 2002–2022. The analysis focused on changes in the growth trajectories of VA before and after the establishment of regional innovation centers. In the next stage,

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the research will employ an econometric approach using the Difference-in-Differences (DiD) method to evaluate the causal impact of these innovation centers on the dynamics of regional value creation. Furthermore, regression analysis will be applied to reveal the determinants of value-added growth and to examine potential regional heterogeneity in these effects.

3 RESULTS

The analysis of accounting value-added (VA) reveals significant regional disparities and temporal trends over the period 2002–2022. Overall, the data confirm the concentration of high-tech value creation in economically advanced regions, particularly in the South Moravian Region, which has been a national innovation leader since the early 2000s. However, when examining the dynamics of growth, the results indicate that peripheral and structurally transforming regions (such as Moravian-Silesian and Ústí nad Labem) have experienced a more pronounced increase in value-added following the establishment of regional innovation centers. These regions show an evident upward shift in their growth trajectory, suggesting that the newly established innovation intermediaries may have contributed to activating innovation processes and firm competitiveness. In contrast, more mature and innovation-saturated regions demonstrate a stable or only moderately growing trend. These preliminary results suggest that the role and impact of innovation intermediaries may vary depending on regional development stages — from stimulation and activation in peripheral regions to consolidation and specialization in advanced ecosystems.

4 CONCLUSIONS

The results indicate that regional disparities in value creation within the high-tech sector persist across Czech regions, yet the establishment of innovation intermediaries appears to have stimulated stronger growth in previously lagging areas. In contrast, innovation-mature regions show signs of stabilization rather than further acceleration, suggesting different roles of innovation centers depending on the stage of regional development. In the next phase of research, econometric modeling will be applied to quantify these relationships more precisely.

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ECONOMIC AND POLITICAL INTERACTIONS SHAPING MIGRATION IN CENTRAL ASIA: THE CASE OF UZBEKISTAN

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KEY WORDS

Central Asia, Uzbekistan, migration, globalization, international relations, political economy

JEL CODES

F22, F59, F63, O15, O53

1 INTRODUCTION

This paper presents preliminary results from an ongoing study currently under review in Central Asia Affairs. The research analyses the relationship between international political relations and population migration in Uzbekistan as a representative case of political and economic transformation within Central Asia. The aim is to evaluate how changes in political strategy and state openness influence migration and demographic trends.

2 MATERIAL AND METHODS

The research is grounded in theories of international relations like realism, neoliberalism, and constructivism and theories of migration, particularly the functionalist and historical-structural perspectives. These theories explain the transformation of Uzbekistan's geopolitical position from a relatively isolated state to one that is increasingly open to international cooperation. Realism offers insight into the period of political closure and autarky before 2016, characterized by isolationism and centralized governance (Bell, 2017). Neoliberal and constructivist theories provide the framework for understanding Uzbekistan's gradual shift toward international openness, economic cooperation, and diplomatic re-engagement with neighboring states. Migration theory, specifically the aspirations–capabilities model (De Haas, 2021), connects these political and economic shifts to the mobility of the population, revealing how internal transformations influence migration intentions and patterns (Arango, 2000). A key conceptual contribution of the paper is the operationalization of state openness as a multidimensional phenomenon comprising economic, political, and social dimensions.

The methodological concept of the paper is based on constructing an openness index composed of representative indicators for each of the five pillars. Economic openness is measured by the economic globalization index and his types. Tourism and determining the development of the number of tourists in a given country and openness of foreign policy through the share of exports in GDP. These 3 pillars are very closely linked because they all relate exclusively to the economic zone, but they can also be separated as follows. Political openness includes the Human Development Index (HDI), Democracy Index, Freedom Index, World Peace Index, and Political Rights Index. Social openness is represented primarily by population migration. The openness index was calculated as the arithmetic mean of all indicators to demonstrate the degree of openness of

KRÁL, Tomáš, and PÍŠA, Jan. 2025. Economic and Political Interactions Shaping Migration in Central Asia: The Case of Uzbekistan. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 25–26. Mendel University in Brno. ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

the state and its evolution between 2010 and 2023. The quantitative analysis uses data from international databases such as Our World in Data, Freedom House, Vision of Humanity, and Human Development Reports, as well as the Uzbek Statistical Office. The aim is to show how international relations theories can influence migration in a given country by changing the thinking of the government. It involves using individual elements of a given theory. If it is proven that the change in the method of government had an impact on all other pillars, this automatically implies a change in the social pillar of migration.

3 RESULTS

The results reveal a clear and measurable increase in all five openness dimensions following 2016. Economically, Uzbekistan experienced a steady growth in GDP and in the share of exports in GDP, driven mainly by foreign investments from China and South Korea. The rise in tourism from 1.3 million visitors in 2016 to nearly 6 million in 2023 reflects both improved accessibility and a deliberate policy of economic diversification. Politically, the Democracy Index and Freedom Index improved by roughly 25–30%, indicating a shift toward a semi-liberalized model. Although the country remains formally autocratic, the reintroduction of moderate political pluralism and the relaxation of media censorship represent fundamental structural changes. In the social dimension, migration patterns demonstrate a gradual reduction in net emigration and a stabilization of the population. Migration outflows toward Russia have declined, while remittance inflows remain significant. The reduction of outward migration suggests growing domestic opportunities and confidence in political reforms. The openness index as a composite measure increased by approximately 40% between 2010 and 2023. This supports the assumption that internal liberalization and international engagement are mutually reinforcing processes. These findings also demonstrate the interplay between soft power and economic diplomacy (Burchill & Linklater, 2013). The combination of economic incentives and political reforms positions Uzbekistan as a key node between East and West (Silvan, 2020).

4 CONCLUSIONS

Uzbekistan provides a unique case of a state transitioning from isolationism to controlled openness while maintaining political stability. The applied openness index proved to be an effective tool for quantifying this transformation and linking it with demographic trends. The research highlights that state openness can serve as a proxy indicator of political modernization and social transformation. The relationship between migration and openness reflects how improved governance and economic liberalization reduce the incentive for outmigration and promote circular migration. The results also suggest that similar processes could be expected in other Central Asian states undergoing partial liberalization, such as Kazakhstan or Kyrgyzstan. Future research will extend this model to a regional comparative analysis and further refine the statistical framework by including multivariate regressions and geospatial visualization of migration patterns.

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CLASSIFYING FOREST TYPES USING MULTIMODAL OPEN REMOTE SENSING DATA

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KEY WORDS

remote sensing, machine learning, forestry, supervised learning

JEL CODES

C63

1 INTRODUCTION

Forests are highly complex ecosystems that provide essential ecological services, including carbon sequestration, hydrological regulation, soil stabilization, and biodiversity conservation [1]. Monitoring and mapping these functions is fundamental for sustainable management. Traditional field-based inventories remain accurate but are resource-intensive, limited in spatial coverage, and often impractical for large or inaccessible areas [2]. As a result, remote sensing has emerged as a critical tool in forestry and ecological research, enabling large-scale, repeatable, and cost-effective monitoring [3].

Recent advances have demonstrated the potential of combining diverse remote sensing data sources. Multispectral and radar imagery, along with derived features such as vegetation indices, canopy height models, and texture metrics, can provide complementary information about forest structure and composition [2]. When integrated, these multimodal datasets enhance classification accuracy, particularly in heterogeneous environments where single data sources may be insufficient [4].

Nevertheless, forest type classification often remains limited to broad distinctions, such as coniferous versus broadleaved stands, or dominant genera. This limitation is largely due to challenges such as spectral overlap between species, high variability within classes, and limited availability of reliable ground reference data [5]. Yet, sustainable management frequently requires more detailed ecological stratifications of forests. Addressing this need, the present study aims to train a machine learning model based on sixteen ecologically meaningful categories in the Masaryk Forest in Křtiny that reflect these key environmental gradients.

2 MATERIAL AND METHODS

The Masaryk Forest is classified following the official Czech forest typology, which organizes forest types based on ecological and habitat characteristics relevant for management. While the system originally distinguishes 57 types, we merged them into 16 broader ecological categories to enable practical application in machine learning classification.

A multimodal dataset of 156 features was compiled, including a 1 m Canopy Height Model, Sentinel-1 and Sentinel-2 spectral bands, vegetation indices, texture metrics, topographic variables, and NASA SRTM elevation data. All remote sensing data were processed and extracted using Google Earth Engine [6].

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A reproducible machine learning pipeline was then developed using Extreme Gradient Boosting (XGBoost) model [7] to classify the forest types. The workflow included data preprocessing, feature engineering, class balancing, model training, and evaluation. Experiments were conducted with Python open-source libraries, including XGBoost, Scikit-learn, NumPy, Pandas, Rasterio, and GeoPandas.

3 RESULTS

The 5-fold cross-validation confirmed strong and consistent model performance. Mean precision, recall, and F1-scores exceeded 80% for most classes, with several classes achieving over 90% in both precision and recall, demonstrating high discriminative power. Overall accuracy was stable at ∼88%, with a very low standard deviation (0.11%), indicating reliable generalization across folds. High macro-averaged scores highlighted balanced performance among classes, while high weighted averages reflected the class distribution within the dataset. The most informative predictors were radar texture, vegetation indices, and terrain variables.

4 CONCLUSIONS

In this study, we developed a reproducible machine learning pipeline to classify forest types using multimodal remote sensing data, including optical, radar, and topographic features. The XGBoost model achieved consistently strong predictive performance, with reliable calibration and stable results across cross-validation folds. These findings build on earlier research demonstrating the benefits of combining SAR and optical imagery, particularly when enhanced by terrain information. Our open and reproducible workflow provides a scalable framework for biodiversity monitoring, conservation planning, and large-area forest mapping.

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CONSUMER MOTIVATIONS AND BARRIERS TO RE-USE

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KEY WORDS

sustainable behaviour, consumer behaviour, re-use, motivation, segment

JEL CODES

D12, M31, Q56

1 INTRODUCTION

Linear models of production and consumption are unsustainable, as products are often discarded prematurely and end up in landfills or incinerators (Kircher, 2021). The circular economy offers a framework for reducing waste and improving resource efficiency, with re-use as a key strategy to extend product lifespans and lower environmental impact (Singh & Ordoñez, 2016). Consumers play a vital role in this transition, as their attitudes and behaviours shape material flows and business practices (Lopes et al., 2023). Yet, the post-purchase phase—including re-use—remains underexplored (Vidal-Ayuso et al., 2023). Low awareness and sensitivity to greenwashing highlight the need for transparent, educational communication (Lopes et al., 2023). A successful shift to circularity requires not only technical solutions but also cultural and organisational change, driven by active consumer engagement (Fortuna & Diyamandoglu, 2017). This paper aims to identify the motivations and barriers perceived by consumers in relation to the adoption of re-use practices within their consumer behaviour.

2 MATERIAL AND METHODS

Data on consumers' perceived motivations, barriers and attitudes towards to re-use principles and waste prevention in consumer behaviour were collected through a representative questionnaire survey involving 500 respondents from the Czech Republic. The survey was conducted in the autumn of 2025 using the CAWI (Computer-Assisted Web Interviewing) method. To ensure the representativeness of the sample, quota variables were applied, specifically gender, age, and highest level of education attained. Respondents evaluated their attitudes through scale-based questions. A seven-point scale was used, with a value of 7 representing the highest level of agreement with the given statement. The data were analysed using descriptive statistical methods and cluster analysis, which was employed to segment consumers based on their motivations barriers to re-use in consumption.

3 RESULTS

Although consumers across age groups expressed positive attitudes towards repairs, re-use, and sustainable consumption, their actual behaviour remains limited. Most respondents purchase second-hand goods only occasionally (41.8%) or several times a year (27.8%), while 17.2% never do so. Moreover,

KUNDRÁTOVÁ, Michaela, BLAŽEKOVÁ, Lenka, KUNCOVÁ, Gabriela, CHOVANCOVÁ, Silvie, and BALÁKOVÁ, Irena. 2025. Consumer Motivations and Barriers to Re-use. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 29–30. Mendel University in Brno.
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76% have never visited a re-use centre, indicating low awareness and engagement. Despite the limited use of re-use centres, respondents reported a tendency to repair household equipments before purchasing new ones (M = 5.75). They also agreed that re-use effectively prevents waste generation (M = 4.79). However, behavioural intentions—such as planning to visit a re-use centre—remain weak (M = 3.38), reflecting insufficient information and low social norms. Consumers are primarily motivated by favourable prices and the originality of products when considering re-use and second-hand purchases. Price advantages tend to outweigh environmental concerns. The least motivating factors include emotional attachment, such as nostalgia or the story behind items, and recommendations from acquaintances. Major barriers include hygiene concerns and doubts about product quality.

Cluster analysis identified four distinct consumer segments: motivated but cautious (6%), price-oriented (31%), sceptics (14%), and realists (49%), each differing in their levels of motivation and trust. The smallest but most value-driven segment (Cluster 1) offers substantial potential for market development, particularly through improving awareness and overcoming barriers. In contrast, the largest group (Cluster 4) represents an ideal target audience for sustainability communication. For the second cluster, it would be appropriate to emphasise price advantages, ease of purchase, and practical benefits, which could motivate these consumers towards more sustainable behaviour. The third cluster (Cluster 3) can be characterised as a group of sceptics, for whom it would be advisable to focus on building trust and improving perceptions of second-hand product quality.

4 CONCLUSIONS

The findings show that although most participants express positive attitudes towards the principles of the circular economy, product repair, and resource re-use, their actual behaviour does not yet fully reflect these values. The majority of respondents stated that they buy second-hand products rarely, and a considerable share reported that they never do so. More than three-quarters of respondents have never visited a re-use centre. The key factor behind this low level of participation is primarily the lack of awareness about the existence and functioning of re-use centres, which is also reflected in limited behavioural intentions. Motivations related to environmental and social aspects recede into the background, while economic factors remain the main driver of purchase decisions. A significant barrier is also consumers' distrust and concerns regarding the quality and hygiene of the offered products. The results of the cluster analysis show that the consumer population is not homogeneous but consists of four distinct groups differing in their levels of agreement with motivational and barrier-related factors associated with second-hand purchases. Overall, although the potential for broader public engagement in circular consumption is evident, its realisation will depend on more effective communication, education, and trust-building in the operation of re-use centres.

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FROM SIGNALS TO OUTCOMES: EVIDENCE FROM SLOVAKIA

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KEY WORDS

electricity prices, event study, energy policy, carbon costs

JEL CODES

C32, G14, Q41, Q48

1 INTRODUCTION

Electricity prices in Europe have become increasingly volatile over the past decade, reflecting shifts in fuel costs, the integration of renewable energy sources, regulatory interventions, and supply shocks (Pavlík et al., 2025; Cevik, 2025). The 2021–2022 energy crisis revealed this vulnerability, as wholesale prices in Central Europe surged more than fourfold before the outbreak of the war in Ukraine, driven by tight gas supply and rising carbon costs (CSIS, 2022). Although Slovakia relies on nuclear generation, its electricity prices remain strongly exposed to external dynamics through integrated wholesale markets (Janda, 2018).

The EU Emissions Trading System (EU ETS) and natural gas markets are key factors in determining price formation. Rising carbon costs and the expansion of renewable energy sources explain much of the volatility observed since 2015 (Caporin et al., 2021; Pavlík et al., 2025). Cross-border spillovers further amplify this dependence, with crises such as the war in Ukraine intensifying synchronized price spikes across Europe (Do et al., 2023). This paper contributes to the literature by examining how announcements and realized shocks affect Slovak electricity prices, showing that realized disruptions generate more substantial and persistent effects than announcements.

2 MATERIAL AND METHODS

The dataset covers daily Slovak wholesale electricity prices, demand, and supply from January 2015 to January 2025. To capture external drivers, it also includes natural gas, coal, and oil prices, as well as EU ETS allowance prices, EU temperature, and electricity prices from neighboring markets such as Germany, France, Norway, and the Czech Republic. Data were obtained from market operators and established energy statistics providers.

All variables were transformed into first differences to ensure comparability and avoid spurious correlations. The analysis applies the event study methodology, where expected returns are estimated using regression models that account for both domestic fundamentals and cross-border effects. Abnormal returns are calculated as deviations from expected values and aggregated into cumulative abnormal returns. An estimation window of 60 trading days and an event window of ±15 days were used to capture both anticipatory effects and delayed market responses.

KURJAK, David. 2025. From Signals to Outcomes: Evidence from Slovakia. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 31–32. Mendel University in Brno.
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3 RESULTS

The analysis shows that Slovak electricity prices are primarily driven by external factors rather than domestic demand or supply. Regression estimates confirm the substantial pass-through of natural gas and carbon costs, as well as near one-to-one dependence on prices in neighboring countries, highlighting the high degree of market integration. The event study further reveals that announcements generate modest and temporary effects, while realized shocks cause much stronger and more persistent price adjustments. Early nuclear-related events had only a limited impact, whereas the Russia–Ukraine war and the shutdown of Nord Stream 1 in 2022 triggered unprecedented price spikes above EUR 600/MWh. These disruptions demonstrated the forward-looking nature of electricity markets, where expectations are priced in rapidly, yet realized shocks still reinforce volatility. Overall, the findings confirm that Slovak electricity prices, despite the dominance of nuclear generation, remain highly vulnerable to fluctuations in European gas and carbon markets, as well as cross-border spillovers.

4 CONCLUSIONS

The study reveals that Slovak electricity prices are primarily influenced by external market conditions, with natural gas, carbon costs, and cross-border spillovers being the dominant drivers. Announcements, such as the European Green Deal, generated only modest and short-term reactions, whereas realized shocks, including the war in Ukraine and the shutdown of Nord Stream 1, caused dramatic and persistent price increases. These findings confirm that even in a nuclear-based system, Slovakia cannot avoid exposure to European market volatility. The results underscore that credible policy communication alone is insufficient to stabilize markets during crises, and that effective risk management necessitates addressing actual supply disruptions. For energy-intensive firms, the evidence highlights the importance of hedging against fuel, carbon, and geopolitical risks in an integrated electricity market.

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HUMAN RESOURCE COMPETENCIES IN THE AUTOMOTIVE INDUSTRY 4.0 – QUALITATIVE RESEACH (GERMANY)

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KEY WORDS

automotive industry, technological change, human capital, labor management

JEL CODES

L62, O33, J24, M54

1 INTRODUCTION

Digital transformation has progressed from an incremental modernization effort to a systematic restructuring of industrial production and organizational life (Colombrari et al., 2023). Among the sectors most affected, the automotive industry exemplifies the opportunities and tensions of this transformation, and the relationship between technology and human labour is redefined (Giacosa et al., 2022). The conducted qualitative research at hand, which is conducted in Germany, emphasizes the pressing need for automotive manufacturers (OEMs), including as well Tier 1, Tier 2, and Tier 3 suppliers – to address arising competency gaps in their corporate development towards Industry 4.0 – and beyond.

2 MATERIAL AND METHODS

As part of a larger extensive research with regard to the required human resource competencies in the automotive Industry 4.0, this part of the research concentrates on a qualitative research (expert interviews) of the German automotive market. Experts for the interviews were defined as individuals possessing specialized, experience-based knowledge that enables them to perform analytical and strategic tasks autonomously and with methodological rigor (Trinzeck, 2009), deriving from OEMs, suppliers in the automotive industry, automotive consulting firms, and academic colleagues of universities holding specifically an automotive chair in order to maintain a clear and narrowed-down focus on the automotive industry as such. Semi-structured interviews were chosen in order to provide a balanced framework, enabling in-depth exploration while maintaining a thematic consistency across the interviews (Gill et al., 2008). The (fully) transcribed interviews were subjected to qualitative content analysis following the methodological principles outlined by Mayring (2010). MAXQDA (version 24) was chosen as a standard software for data management, coding, and comparative analysis (Kuckartz & Rädeliker, 2019).

MANNING, Gert, and STOJANOVÁ, Hana. 2025. Human Resource Competencies in the Automotive Industry 4.0 – Qualitative Reseach (Germany). *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 33–35. Mendel University in Brno. ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

3 RESULTS

The fifteen expert interviews that were evaluated provided subtle details of how the workforce is redefining competencies in the era of Industry 4.0 in the automotive industry. Through open and axial coding (MAXQDA 24), these were analyzed, resulting in 657 coded segments, which were subsequently organized in subject areas such as competencies and skills, education and training, regional differences (e.g., Western Europe, Eastern Europe, Germany, and U.S.A.), and organizational change. Taken together, these data illustrate the gradual but decisive transition of the industry from hardware-focused to software-driven production and management environments. Next to the expected increasing need for programming skills, data analytics, and the ability to handle complex information flows, it became clear that purely technical know-how alone will no longer be sufficient. A recurring idea across several coded categories was that lifelong learning has become a prerequisite for employability. Experts furthermore described a marked cultural shift within organizations, where curiosity, willingness to learn, and openness to change have become key selection and development criteria. Another interesting result has been that many participants expressed that current university curricula are not keeping pace with the rapid technological development in the field and the link between academia and industry is urgently needed, resulting in including relevant topics such as data science, software engineering, system thinking, cybersecurity, intercultural awareness, and ethical responsibility in digital contexts.

4 CONCLUSIONS

The qualitative study at hand provides an empirically grounded understanding of how Industry 4.0 is reshaping the competency landscape of the automotive industry. Drawing on insights of 15 German experts, the findings reveal that the future automotive workforce must combine technical proficiency (software related skills, data analytics, IT-security) with adaptive (willingness to learn, change of mindset, flexibility), cognitive (analytical, problem solving, system thinking) and interpersonal skills (communication, emotional intelligence, intercultural competence). Furthermore, the transition toward software-defined vehicles, data-driven processes, and AI-supported operations underscores the need for agile, learning-oriented, and digitally fluent employees. These results contribute to the conceptualization of Human Capital 4.0 by translating theoretical assumptions into observable practice within the key automotive industrial domain.

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THE ECONOMIC CONSEQUENCES OF VALUATION STANDARD UPDATES ON STOCK RETURNS: AN EMPIRICAL ANALYSIS OF IFRS 13, IVS, RICS, AND IPMS

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KEY WORDS

fair value, stock return, valuation standards, IFRS 13

JEL CODES

G320, G120

1 INTRODUCTION

Fair value valuation has become a fundamental interest to regulators and the financial market in the evaluation of companies operating in the real estate market, especially after the implementation of accounting standards IFRS 13. Despite the increasing harmonization of accounting standards, the link between accounting regulation (IFRS 13) and valuation frameworks (IVS, RICS, IPMS) remains understudied. The residential real estate markets are particularly sensitive to changes in valuation approaches, as the estimation of FV often involves subjective assumptions (Level 3 inputs) and the expertise of external valuators and auditors. This paper contributes by exploring the joint effects of FV standard updates, both regulatory accounting (IFRS 13) and valuation (IVS, RICS, IPSM), into a unified analytical framework. It provides one of the first empirical examinations of how the combined implementation of these standards affects the stock returns of listed real estate companies.

2 MATERIAL AND METHODS

A quantitative panel data approach was employed, covering 45 publicly traded residential real estate firms (900 quarterly observations) over 2019–2023. Data were sourced from Orbis, Bloomberg, and firms' annual reports. The quarterly stock return presents the dependent variable. Key independent variables contain implementation dummies for IFRS 13 and valuation standards IVS, RICS, IPMS; FV input levels; type of valuator and auditor. The analysis used fixed effects panel regression models, with robust standard errors clustered at the firm level. The Hausman test confirmed the appropriateness of the fixed-effects specification. Three model frameworks were applied:

- Model 1: effect of FV and valuation standard updates on stock returns
- Model 2: moderating role of auditor/valuator reputation
- Model 3: method-specific and company-specific effects (DCF, Income Approach, Knight Frank, Savills, CBRE)

NĚMCOVÁ, Jana. 2025. The Economic Consequences of Valuation Standard Updates on Stock Returns: An Empirical Analysis of IFRS 13, IVS, RICS, and IPMS. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 35–36. Mendel University in Brno.
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3 RESULTS

The empirical results indicate a generally negative market response to the implementation of updated fair value and valuation standards. Following the adoption of IFRS 13, RICS 2022, and IPMS 2023, residential real estate firms experienced a moderate decline in stock returns, suggesting that the increasing precision and scope of fair value regulation may have introduced additional uncertainty into investors' expectations.

Contrary to the theoretical assumption that higher transparency enhances market confidence, the evidence suggests that extensive disclosure requirements may instead encourage more conservative investor behavior. Firms providing less detailed information on Level 3 inputs reported comparatively better market performance, implying that partial opacity may reduce perceived estimation risk.

Furthermore, the analysis revealed a differentiated role of auditors and valuators. Companies audited by large international audit firms tended to show slightly lower post-implementation stock returns, which may reflect a cautious interpretation of new standards. In contrast, the involvement of a highly reputable valuation firm appeared to have a positive reputational effect on investor sentiment.

No systematic differences were observed between valuation methods (DCF vs. Income Approach), and firm-specific characteristics such as market capitalization or enterprise value did not substantially influence the results.

4 CONCLUSIONS

The paper analyzed the impact of implementing the updated IVS, IPMS, RICS valuation standards, and IFRS 13 accounting standard through stock returns and supplemented by an examination of the role of auditors, valuers, and subjective inputs in the fair value property valuation process. These findings indicate that the financial market places significant importance on the reputation of auditors and valuers, particularly during periods of regulatory change. We conclude that the reaction of the financial market depends not only on the regulatory framework itself, but above all on who implements it and how subjective inputs are communicated. The study thus expands the knowledge about the functioning of fair value and its role in the process of creating market credibility and firm performance.

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DESIGNING AN ARCHITECTURE FOR LEARNING MANAGEMENT SYSTEM FOR VIRTUAL REALITY

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KEY WORDS

virtual reality, metaverse, immersive learning, learning management system

JEL CODES

C88, L86

1 INTRODUCTION

Virtual reality (VR) represents a rapidly advancing technology with substantial potential to transform learning and training processes. Despite the proliferation of numerous domain-specific VR educational applications (human anatomy, astronomy etc.), a comprehensive learning management system (LMS) tailored for VR-based instruction remains largely absent. As various meta-analyses on the use and potential of VR in education clearly indicate, the majority of currently used applications are referred to as silos. These solutions are designed with a specific purpose in mind. As stated in the works [1], [2] and [3], this architecture is well-suited for teaching facts or processes that remain constant over time. An analysis of human body anatomy can serve as a useful example of such a domain. For instance, the applications Human Anatomy VR for Institutions (`https://meta.com`) and Body Map (`https://www.mai.ai`) have been successful applications for Meta VR glasses.

Conversely, many teachers aspire to continuously update their learning materials in response to evolving industry standards or identified areas for enhancement. This is a common behavioral pattern called Incremental construction. [4] Therefore, there is a need for an educational platform that has the capability of a CMS or LMS. This platform should allow users to prepare VR courses using a no-code approach. Furthermore, the solution should utilize open standards to circumvent the issue of vendor lock-in. Content creators can easily transfer all types of media – text, images, and videos – to a variety of platforms using a common CMS or LMS, with minimal effort and without significant technical challenges. This can present a significant challenge, particularly in the context of virtual reality.

2 MATERIAL AND METHODS

We conducted a thorough review of standards that can be used for open architecture, allowing exchange of created content even between different learning or content management systems. The primary focus of the meeting was on establishing standards for the description and exchange of 3D objects and for describing 3D scenes. We used Unreal Engine, provided by Epic, for the experimental implementation of the VR application. Unreal Engine directly supports XR. [5] Our testing field included

NGUYEN, Nicolas, PROCHÁZKA, David, CHYLÍKOVÁ, Eliška, LANDA, Jaromír, PISAŘOVIC, Ivo, NEDĚLOVÁ, Markéta, and MICHENKA, Adam. 2025. Designing an Architecture for Learning Management System for Virtual Reality. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 37–38. Mendel University in Brno. ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

courses that utilized spatial data, such as hydrology. This objective was intentional because visualizations based on spatial data have significant demands on computation resources. We conducted a series of experiments, concluding with a qualitative evaluation of the learning capabilities with experts from the field of hydrology. After identifying the issues, the system was redesigned and tested repeatedly until it met all of the teachers' basic requirements.

3 RESULTS

We selected the 3D Tiles standard [6] for our scene description due to its comprehensive feature set, which includes capabilities for streaming spatial data, achieving optimal web performance, and providing support for various spatial coordinate systems. We implemented the VR application using the Cesium for Unreal plug-in, which facilitates the integration of 3D tiles content into Unreal Engine VR applications. [7] During the iteration process, it was determined that additional interactive elements could not be incorporated directly into the 3D Tiles scene. Therefore, we used a combination of embedded passive elements and interactive ones that are added to the VR scene later by the Unreal Engine. These interactive elements are defined using a JSON file that is passed to the VR application.

4 CONCLUSIONS

Currently, there is no open standard that can fully address the needs for interactive learning tutorials in VR. Nonetheless, the majority of content can be prepared outside the VR application and stored using open standards for scene description. Subsequent interactive elements can also be defined outside the VR application. The functionality of this system is limited in scope, a limitation shared by all content and learning management systems. This approach can lead to significant improvements in the long-term maintenance and related costs of these materials.

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BEYOND TPB: PREDICTORS OF GEN Z'S INTENTION TO PURCHASE SPORTS GOODS

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KEY WORDS

theory of planned behavior, experiential value, generation Z, purchase intention, Sports goods

JEL CODES

M31, D91, Z20

1 INTRODUCTION

The Theory of Planned Behavior (TPB) is one of the key frameworks used to explain consumer purchase intentions. It assumes that behavior is a direct result of the individual's intention to perform a specific action. Intention is determined by three independent constructs: attitude toward the behavior, subjective norm, and perceived behavioral control. Attitude reflects the individual's positive or negative evaluation of the behavior, subjective norm represents perceived social pressure to perform or not perform it, and perceived behavioral control describes how easy or difficult the behavior is considered to be, taking into account past experiences and anticipated obstacles. The flexibility of TPB allows the model to be extended with additional constructs [1].

Recent studies suggest that experiential or hedonic value may serve as a strong predictor of behavioral intention, often exceeding traditional cognitive determinants. This experiential component reflects emotional engagement, enjoyment, and personal meaning associated with the behavior [2,3]. Generation Z, defined as individuals born between 1997 and 2012, represents a cohort deeply immersed in the digital world [4]. For this generation, emotional experience, authenticity, and personal involvement play a crucial role in purchasing and consumption decisions [5].

This contribution aims to test an extended TPB model including the construct of Experiential Value and identify the key determinants influencing Generation Z's intention to purchase sports products.

2 MATERIAL AND METHODS

Data for the analysis were collected through a quantitative survey conducted from December 2024 to March 2025 using the CAWI method (Computer-Assisted Web Interviewing). The sample consisted of 400 respondents from Generation Z. The questionnaire included questions and statements focused on respondents' relationship to running, factors influencing the choice of running products, and the attitudes and values of Generation Z, based on the Theory of Planned Behavior (TPB) extended by the variable Experiential Value. Most of the questions were closed-ended and measured using a 7-point Likert scale.

To examine the influence of the determinants defined by the TPB on purchase intention and actual behavior related to sports products, structural equation modeling (PLS-SEM) was applied using SmartPLS 4.1.1. The original TPB model and the extended model were subsequently compared.

OPÁLKOVÁ, Martina, and PŠURNÝ, Michal. 2025. Beyond TPB: Predictors of Gen Z's Intention to Purchase Sports Goods. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 39–40. Mendel University in Brno. ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

3 RESULTS

In the basic TPB model, the strongest predictor of purchase intention was attitude toward the behavior, also positively affecting actual behavior. Subjective norms influenced intention and, to a lesser extent, behavior, while perceived behavioral control had the strongest effect on actual behavior and a moderate effect on intention, consistent with Ajzen's theory. The intention–behavior relationship was the strongest in the model. The model explained 47% of behavior variance and 34% of intention variance.

In the extended model, Experiential Value had the strongest direct effect on behavior and also positively influenced intention and perceived behavioral control. Attitude influenced intention and subjective norms, while its direct effect on behavior was negligible. Subjective norms continued to affect intention, perceived control, and behavior. The extended model showed slightly higher explanatory power, demonstrating that incorporating experiential value enhances predictive ability.

4 CONCLUSIONS

Based on the analysis, the results show a shift from purely rational consumer behavior models toward frameworks that include emotional and social determinants [6]. Subjective norms and perceived behavioral control positively influence attitudes and purchase intentions [7]. Experiential value significantly affects both intention and actual behavior, often stronger than traditional cognitive predictors [2,3].

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A COMPREHENSIVE MULTI-SPECIES DATASET OF Z-DNA-FORMING GENOMIC REGIONS FOR AI MODEL DEVELOPMENT

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KEY WORDS

Z-DNA, non-B DNA, alternating R/Y motifs, CpG islands, promoter proximity, dataset curation, GC-matched negatives

JEL CODES

C63, C81, C88

1 INTRODUCTION

Z-DNA is a left-handed DNA conformer linked to gene regulation and genome dynamics, yet genome-wide maps remain sparse and assay-biased. Human studies using Z -ADAR1 [1] pull-down and Zaa ChIP-seq [2] report contrasting centromeric versus promoter-centric landscapes, underscoring the need for a standardized resource for modeling. We address this by compiling a compact, well-annotated, multi-species dataset of Z-DNA regions and rigorously matched negatives tailored for AI workflows [3, 4].

2 MATERIAL AND METHODS

We curated positives from two sources. Experimentally mapped sites harmonized to a common build, and predicted sites from motif scans and established databases. Predicted loci include genome-wide Non-B DB Z-motifs [5] and sequence-model calls from Z-DNABERT [4] and DNA Analyser (Z-DNA Hunter) [6]. All entries carry explicit evidence labels. Negatives are 200-bp windows GC- and length-matched to positives. They are excluded from any Z-motif neighborhood and other non-B elements, and verified by re-scanning to remove hidden alternations. Each instance is annotated with coordinates, motif type/length, GC%, CpG, promoter/TSS distance, repeats, chromatin marks, conservation, and a credibility level.

3 RESULTS

The dataset comprises roughly 200k positives (≈800 experimental) and ∼600k negatives across twelve species, with >50% of positives from non-human genomes. Human contributes ∼60k unique positives after merging sources. Positives are strongly promoter-proximal and CpG-enriched, and 98% of promoter-mapped peaks overlap an alternating motif, confirming concordance between motif discovery

PETROVIČ, Michal. 2025. A Comprehensive Multi-Species Dataset of Z-DNA-Forming Genomic Regions for AI Model Development . *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 41–42. Mendel University in Brno. ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

and in vivo data. CG repeats dominate in primates, while CA/TG repeats are relatively more frequent in several non-primate taxa. The median alternating-core length is ∼15 bp.

4 CONCLUSIONS

This standardized, extensible dataset reconciles divergent experimental maps, distinguishes evidence strength, and provides hard negatives and rich context features. It is immediately usable for training and benchmarking sequence and context-aware predictors of Z-DNA genome-wide and for comparative analyses of promoter biology and motif usage across species.

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WHO WINS, WHO LOSES? OFFSHORING AND TECHNOLOGICAL CHANGE IN THE EU LABOR MARKET

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KEY WORDS

internationalization, intangible assets, labor, employment, EU

JEL CODES

F16, J31, O33

1 INTRODUCTION

Production in most economies, including the EU and particularly the Central and Eastern European (CEE) countries, has become highly internationalized. Global value chains enable firms to relocate production stages across borders, mainly through offshoring and outsourcing. In the CEE region, the automotive sector dominates, characterized by rapid technological adoption, high automation, and a relatively low share of domestic value added. Alongside international production, technological change driven by growing investments in intangible assets is reshaping labor demand. This paper examines how the combined effects of offshoring and intangible-driven technological change afeects employment across skill levels, comparing older EU member states with newer CEE economies.

2 MATERIAL AND METHODS

This study examines the relationship between offshoring, technological change, and employment across 20 industries in the EU countries over the period 2008–2020. The empirical analysis is based on harmonized data from the EUKLEMS & INTANprod and OECD TiVA databases. Offshoring intensity is measured following the approach of Feenstra and Hanson (1999), defined as the share of imported intermediate goods in total inputs, adopting a broad measure encompassing all industries. OECD data enable consistent identification of intermediate inputs, facilitating the distinction between offshoring and domestic outsourcing. Labor is categorized into three skill levels—low-, medium-, and high-skilled—according to the ISCED classification. Technological change is captured through intangible capital measures, including software and databases, R&D, and economic competencies. The latter are further disaggregated into brand, organizational capital, and training components to provide a detailed characterization of intangible investment. All intangible variables are expressed as intensities relative to total hours worked, in line with Gravina and Foster-McGregor (2024).

The empirical framework builds on the translog cost function, which allows for flexible substitution among inputs. The function is extended to incorporate both offshoring and domestic outsourcing, as

STELMAKH, Karina, and ĎURČOVÁ, Júlia. 2025. Who Wins, Who Loses? Offshoring and Technological Change in the EU Labor Market. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 43–44. Mendel University in Brno. ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

well as capital decomposition to account for skill-biased technological change. Labor and material inputs are treated as flexible, while capital inputs are considered quasi-fixed. Employment shares of low-, medium-, and high-skilled labor serve as the dependent variables. The system of employment share equations is estimated jointly using the Seemingly Unrelated Regressions (SUR) method, which accounts for contemporaneous correlation of error terms across equations and enhances estimation efficiency.

3 RESULTS

Previous studies suggest that offshoring contributes to employment upgrading by reducing the share of low-skilled labor. Descriptive statistics confirm that offshoring has increased across EU countries over the last decade, accompanied by a decline in low- and medium-skilled labor and growth in high-skilled employment. This paper examined how offshoring and skill-biased technological change, represented by intangible capital investments, affect labor market trends in the EU-27. Employment shares were estimated using equations derived from a translog cost function, with intangible capital disaggregated into software and databases, R&D, economic competencies, brand, organizational capital, and training. Results indicate that offshoring reduces low-skilled employment while increasing high-skilled employment, whereas intangible capital generally favors high-skilled labor and displaces low-skilled workers. Medium-skilled labor benefits selectively from R&D, organizational capital, and training, but may be negatively affected by brand-related investment.

Robustness check shows that the effects of offshoring and intangible capital differ between CEE-11 and EU-15 countries, contributing to labor market polarization across skill levels. In CEE-11 countries, offshoring primarily displaces low-skilled labor, whereas in EU-15 countries, medium-skilled labor is more affected. Intangible capital, particularly R&D and economic competencies, benefits high-skilled workers in both regions but has a stronger impact on employment upgrading in EU-15.

4 CONCLUSIONS

The results of this study show that offshoring reduces employment shares of low-skilled labor while increasing opportunities for high-skilled workers, with intangible capital investments amplifying these effects. These findings highlight the need for targeted policy measures, such as skill-upgrading programs, to enhance workforce adaptability and mitigate labor market polarization. Future research should investigate sectoral and occupational-level effects, distinguishing between manufacturing and service offshoring to capture heterogeneity across jobs and industries. Such analyses will provide more precise guidance for policymakers and firms navigating the ongoing internationalization of production and technological change.

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APPLICATION OF LLM IN HIRING: A SYSTEMATIC REVIEW

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KEY WORDS

large language models, recruitment, resume screening, candidate selection

JEL CODES

J64, C45

1 INTRODUCTION

The ability of Large Language Models (LLMs) to generate, understand and reason with natural language has garnered attention from both researchers and industry professionals across diverse fields. Due to its inherent language-intensive nature, recruitment is especially vulnerable to their incorporation [1]. They are increasingly being integrated across various stages of the hiring process from automating resume screening, generating job descriptions, supporting interviews till assisting with candidate assessments [2], [3], [4]. LLMs address long-standing limitations in traditional recruitment systems by facilitating semantic matching, summarization, and interactive capabilities that reduce manual effort and enhance scalability [2], [5], [6]. However their swift integration has also raised concerns about fairness and transparency in hiring practices [7]. Although existing studies highlight notable gains in efficiency they also underscore risks such as algorithmic bias and opacity in decision-making [8]. This review synthesizes recent literature on the use of LLMs in recruitment to evaluate their current strengths, limitations, and associated ethical implications.

2 MATERIAL AND METHODS

This study follows the PRISMA guidelines to perform a systematic literature review on applications of LLM in hiring. Search strategy included key terms such as 'LLM', 'ChatGPT', 'Generative AI', 'Human Resources', 'Recruitment', 'Talent Acquisition' and related others to gather peer-reviewed articles and reviews from 2018–2025 indexed in Scopus database. A CRAAP-based evaluation (Currency, Relevance, Authority, Accuracy, Purpose) was applied to filter and determine their importance to the topic. Of 275 initially identified studies, 34 were selected for the review. The review then categorizes findings into four stages of the hiring namely (1) Resume Screening and Matching, (2) Job Description, (3) Candidate Assessment and Interview Simulation, and (4) Fairness and Bias during Hiring.

TRIPATHI, Arpit, TRIPATHI, Ankit, MISHRA, Pawan Kumar, TRENZ, Oldřich, and DAŘENA, František. 2025. Application of LLM in Hiring: A Systematic Review. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 45–46. Mendel University in Brno.
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3 RESULTS

LLMs are transforming recruitment by enabling context-aware resume screening, automated decision support, and adaptive job description generation. Methods such as embedding models like Resume2Vec, graph-enhanced matching systems, and hybrid AI–human evaluators outperform traditional keyword-based Applicant Tracking Systems in accuracy and efficiency. Fine-tuned models (e.g., Flan-T5) also show superior performance in debiasing and skill extraction compared to prompt-only techniques. Multimodal and hybrid AI–human assessment frameworks now integrate linguistic, acoustic, and visual cues for skill prediction and automated scoring for candidate evaluation. However, concerns around reliability, dataset bias and regulatory compliance persist. Persistent gender, racial, and institutional biases across models which are only partially mitigated by post-processing or fairness-constrained training highlight the absence of standardized evaluation frameworks.

4 CONCLUSIONS

Existing studies indicate that integrating LLMs into various stages of hiring delivers gains in efficiency, scalability, and personalization across various hiring stages. However challenges still persist especially around bias amplification, explainability and regulatory compliances. Future work should emphasize more on standardized fairness evaluation and real-world validation to ensure impartial deployment in labor markets.

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PUBLIC COUNTRY-BY-COUNTRY REPORTING AND INTERNATIONAL BUSINESS RESEARCH

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KEY WORDS

country-by-country reporting (CbCR), multinational enterprises (MNEs), multinationality, geographic reporting

JEL CODES

F23, H26, M41

1 INTRODUCTION

The way multinational enterprises (MNEs) disclose the geographic distribution of their operations carries important implications for international business (IB) research. These disclosures form the empirical foundation for metrics of multinationality, influence studies on the multinationality–performance relationship, and are vital for the empirical analysis of key theoretical concepts, such as the liability of foreignness (LOF). Despite this importance, most reporting standards have historically blurred rather than clarified the spatial structure of MNE operations.

This paper examines the shift from discretionary IFRS 8 segment reporting to mandatory Country-by-Country Reporting (CbCR). While firms and tax authorities keep CbCR data private, the upcoming EU public CbCR regime will publicly release standardized, country-level data starting with fiscal years from June 2024, accessible from late 2025. Using Vaněk's framework [1], the paper argues that public CbCR marks a significant methodological shift for IB scholarship.

2 MATERIAL AND METHODS

The paper employs a conceptual and comparative analysis, grounded in a review of reporting standards, regulatory regimes, and existing academic literature, to assess the changing landscape of geographic disclosure. The analysis draws upon multiple formal reporting regimes.

The material reviewed includes the historical standard IAS 14 Segment Reporting (introduced 1981, revised 1997), which mandated reporting based on a risk-return framework. The primary focus is on IFRS 8 Operating Segments (effective 2009), which employs the "management approach." This approach requires disclosure based on internal reporting structures, which have historically led to reduced geographic transparency and to the grouping of operations into aggregated segments or a residual "Other Foreign" category. The paper analyzes the details of OECD's BEPS Action 13, which has required private CbCR submissions to tax authorities since 2016. Importantly, the study examines EU Banks CbCR (CRD IV, 2013) as a precedent, and the EU Public CbCR Directive (2021/2101), which mandates

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public disclosure for large MNEs operating within the EU and designated non-cooperative jurisdictions. Australia's public CbCR (Act No. 138, 2024) is also included for comparative purposes, highlighting its narrower geographic scope focused on Australia and specified tax-haven jurisdictions. The voluntary standard GRI 207: Tax 2019 is also referenced, as 207-4 outlines expectations for voluntary public CbCR, providing the most comprehensive coverage for certain variables.

These regimes are compared based on mandatory status, public accessibility, geographic disaggregation, and data structure. This shows mandatory public CbCR as the first system to provide standardized, country-level data across industries. Vaněk's five-aspect framework evaluates how public CbCR reshapes multinationality measurement. The framework shows that granular data can overcome previous limits and support metric innovation, including multidimensional indices such as Asmussen's MIRGO [2].

3 RESULTS

Drawing on the five-aspect framework, CbCR transforms multinationality measurement by:

- Theory: Enhancing the empirical testing of internationalization theories by providing detailed country-level data, which allows for more precise metrics that reflect concepts like the LOF and country-specific advantages.
- Dimension: Enabling the computation of sophisticated multidimensional indices such as MIRGO and spread measures like entropy indices, which were previously limited by data scarcity. This systematic integration of host-country effects accounts for heterogeneity and improves the validity of composite metrics.
- Indicators: Introducing new fiscal indicators at the country level, such as corporate income tax accrued and taxes paid, which help reveal profit-shifting practices.
- Segmentation: Allowing scholars to move beyond crude continental aggregates to examine empirically grounded regions and facilitate testing of the optimal geographic aggregation dimension.
- Format: Enabling the creation of more precise and empirically supported MNE archetypes by using detailed country-level data to define firm types based on actual geographic spread and strategic scope.

4 CONCLUSIONS

The paper concludes that mandatory public CbCR addresses limitations of previous standards, notably transparency issues from IFRS 8. The EU Public CbCR Directive lays the foundation for rigorous, transparent research on MNEs by mandating consistent, publicly available, country-level data. This shift enables the development of advanced multinationality indicators, such as MIRGO, improves the empirical testing of theories, such as LOF, and introduces fiscal variables to analyze tax strategies. Removing the "Other Foreign" segment allows detailed intra-regional analysis. CbCR data raise the question of how to define regions, enabling empirical tests of traditional geographic, institutional, or cultural borders against firms' footprints. Despite its breakthrough, public CbCR has limitations: partial coverage, fewer variables than voluntary standards, and no central public database. Without global adoption, empirical findings remain geographically limited.

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ENERGY EFFICIENCY FOR ALL: THE NEW GREEN SAVINGS LIGHT

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KEY WORDS

new green savings light, energy poverty, grant schemes

JEL CODES

Q58, I38

1 INTRODUCTION

Research into the energy efficiency of buildings has highlighted significant economic, social, and environmental impacts. Improving energy efficiency can promote economic growth, social development, and reduce environmental harm [1]. Investments in energy efficiency are essential for lowering greenhouse gas emissions. Buildings offer considerable potential for energy savings and emission reductions. Greater energy efficiency in buildings can increase GDP and employment, although impacts may vary across sectors and income groups [2]. In Germany, progress in energy efficiency in housing has led to conflicts due to rising costs and the displacement of low-income residents, emphasising the need to address distributional justice during energy transitions [3]. Subsidies for building renovations targeted at low-income households are an effective solution. The new Green Savings Light scheme provides advanced subsidies for smaller-scale renovations—such as partial insulation, installing renewable energy sources, green roofs, and water management systems. Low-income households can now access grants of up to CZK 250,000 for home insulation.

2 MATERIAL AND METHODS

The research used data on recipients of the new Green Savings and the new Green Savings Light schemes, which are available directly on the official website. The data was only accessible for applications to the new green savings light scheme until 19 February 2025, but even so, there are tens of thousands of recipients. The data also includes the applicant's municipality. Individual districts were assigned to municipalities to better understand the areas where subsidies for low-income households are utilised. The data was processed in Excel and visualised using online tools. Descriptive statistics described the data, and the results were compared with those for the standard New Green Savings Scheme.

3 RESULTS

Under the New Green Savings Light programme, 97,171 applications were submitted and paid out. Of these, the highest number, specifically 2,704, came from the Frýdek-Místek district in the Moravian-Silesian Region. The lowest number, 342, originated in the Most district in the Ústí nad Labem Region. The average support amount was 122,000 CZK. The highest payout per application was 250,000 CZK,

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paid in 3,285 cases. Compared to the New Green Savings Program, where the average payout was more than double at approximately 274,000 CZK, the number of applicants was slightly lower at 87,450. The district with the most applicants was Prague in the Central Bohemian Region, with 5,441. The second highest was Frýdek-Místek in the Moravian-Silesian Region, with only 2,594 applications. The lowest number, 306, was from the Jeseník district in the Olomouc Region. The maximum payout was nearly CZK 2 million in Hodonín, South Moravian Region.

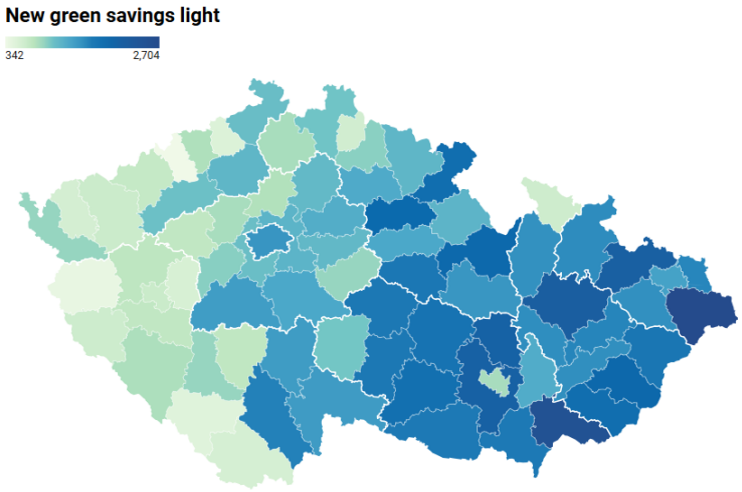

Fig. 1: Number of successful applicants across districts

4 CONCLUSIONS

The findings confirm that both programmes have reached a large number of recipients across the Czech Republic, with noticeable regional differences in participation and support levels. However, the comparison with the broader New Green Savings programme shows that the average subsidy in the Light scheme is significantly lower. These results highlight the importance of maintaining and expanding such targeted subsidy programmes to ensure an equitable and inclusive energy transition. A surprising finding is the relatively low number of applicants for grants for low-income households in the Ústí nad Labem Region, where the highest number of excluded communities is located. The reason may be insufficient information among citizens about the possibility of this financial support. In the future, it might be appropriate to focus financial assistance more on this area. Continued monitoring of regional uptake and socioeconomic effects will be essential to evaluate long-term benefits and to adjust policy measures for improved efficiency and fairness in future subsidy schemes.

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USING GENERATIVE SMALL LANGUAGE MODELS FOR SUMMARIZING FINANCIAL TEXTS IN LOW-RESOURCE ENVIRONMENTS

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KEY WORDS

language models, generative language models, summarization, natural language processing, financial articles

JEL CODES

O33, J24

1 INTRODUCTION

Small language models (SLMs), compared to large language models (LLMs), offer more accessible state-of-the-art solutions in the field of artificial intelligence, a much lower computational footprint, and reduced inference costs. While a common assumption is that the limited capacity of SLMs could negatively affect summary quality—especially long and complex texts—recent research has largely debunked this concern.

In our case with consumer-grade graphics cards (see `https://finance.yahoo.com/` and `https://seekingalpha.com/`) through pipelines consisting of contextual prompts and need for structured outputs is crucial having sustainable solution independent on external services. Given our large volume of data, on-premises models enable us to achieve similar results as external APIs. The costs of external services can be unpredictable due to their costs per token pricings. We can leverage our local infrastructure, which offers us far better long-term financial efficiency.

2 MATERIAL AND METHODS

Research was conducted in order to assess the viability of SLMs. The methodology towards this literature review was finding out how performant SLMs are compared to LLMs.

Xu et al. [1] took a more practical approach evaluating 19 SLMs using a predefined set of datasets, models, and evaluation frameworks on news articles. The study benchmarks various LMs on metrics like relevance, coherence, and factual consistency, finding that top performers in the range of 3B achieve quality comparable to much larger 70B LLMs while producing more concise summaries.

Nguyen et al. [2] introduced a comprehensive survey about SLMs highlighting their increasing relevance due to their high efficiency and minimal computational requirements, which makes them ideal for deployment on devices with limited resources.

Three papers [3, 4, 5] highlight similar results, enhancing the bright future of SLMs. An interesting finding from these papers is the importance of prompt engineering. Prompt structure, length and

VAVŘINA, Jan, and PŘICHYSTAL, Jan. 2025. Using Generative Small Language Models for Summarizing Financial Texts in Low-Resource Environments. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students*, pp. 51–52. Mendel University in Brno. ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

examples in prompt were mentioned as important aspects.

However, in low-resource environments, there is still a clear limitation in computational resources for running these models, for example LM's memory is limited by available computational memory.

In our case, the texts from the dataset contain a lot of crucial information. Each text could contain mentions about tradable companies and/or cryptocurrencies and their possible connection that could give valuable insight to a potentional trader. In the following experiments, we will use the data in a setting that aims to summarize these articles over specific time intervals (e.g., daily, weekly, or monthly periods). Main aspect being to find the main points and correlations for these tradable companies and cryptocurrencies. Each text of the article is sent along with the prompt to create a structured summary in JSON.

3 RESULTS

The mentioned papers and performed experiments confirm that SLMs are highly capable and efficient contenders in the AI field, offering a solution for low-resource environments compared to resource heavy LLMs. The key results showcase a promising future for SLMs since the best-performing models achieve summarization quality comparable to that of 70B LLMs, positioning them as viable and effective alternatives for resource-constrained environments.

4 CONCLUSIONS

The established hypothesis was validated, SLMs are viable option in today's standards even in lower and higher resourced environments. The paper shows comparable results for LLMs and SLMs even for older models.

This research created a foundation for future improvements and experiments that could be made focusing on current models with modern architecture and implementing an agentic approach on the summarization field which will be part of the continued research. Upon further progress of this topic, I will continue with the research as a part of my diploma thesis.

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FOOD WASTE IN THE HOSPITALITY INDUSTRY: SYSTEMATIC LITERATURE REVIEW OF INTERVENTIONS AND THEIR EFFECTIVENESS

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KEY WORDS

food waste, hospitality industry, hotels, interventions, sustainability

JEL CODES

Q53, L83, C93

1 INTRODUCTION

Food waste is one of the greatest environmental and economic challenges of our time. In the hospitality and tourism industries, it occurs primarily in establishments offering buffets or all-inclusive dining, where the desire to keep tables constantly full often leads to overproduction and following waste. This problem is deepened by seasonal demand, the heterogeneity of guests, and increasing demand for diversity in the offerings. The aim of this article is to analyze scientific studies dealing with interventions to reduce food waste in the tourism sector and to evaluate their effectiveness according to the type of intervention, target group, and geographical context. The result is a summary of findings to help effectively guide future measures and practical strategies for reducing food waste in accommodation and catering facilities.

2 MATERIAL AND METHODS

The review is based on a combination of systematic and targeted searches of scientific articles published between 2013 and 2024 that focus on reducing food waste in hotels, resorts, and restaurants. The main database was ScienceDirect, supplemented by Google Scholar. Only peer-reviewed studies with a specific intervention and measurable results were included. For comparison, the studies were classified into three categories: behavioral, organizational, and technological interventions. The target group (guests, staff, or a combined approach), geographical distribution, and type of facility were also monitored. A total of ten empirical studies meeting the selection criteria were evaluated.

VEČEŘOVÁ, Marie, SAMUHEĽOVÁ, Lenka, and PITROCHA, David. 2025. Food Waste in the Hospitality Industry: Systematic Literature Review of Interventions and Their Effectiveness. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 53–54. Mendel University in Brno.
ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

3 RESULTS

The analysis showed that the most frequently tested and most effective strategy is behavioral intervention, which influences guests behavior through minor adjustments to the environment, such as reducing the size of plates, visual implications, or educational signs at buffets. These interventions led to a 20–35% reduction in food waste without negatively impacting guest satisfaction (Kallbekken & Sælen, 2013; Dolnicar et al., 2020). Organizational measures (e.g., staff training, adjustments to food replenishment, inventory planning) have resulted in an 18–30% reduction in waste and longer-term effects thanks to staff involvement in operations management (Okumus et al., 2020; Coşkun et al., 2023). Technological interventions (monitoring, weighing, transparent containers) improve process measurement and control and lead to increased employee accountability, although their direct short-term impact tends to be lower (Chawla et al., 2020; Ioannou et al., 2022). Overall, it has been confirmed that the best results are achieved by combining behavioral, organizational, and technological approaches, which together strengthen the sustainability of operations while delivering economic benefits.

4 CONCLUSIONS

The results of the review show that effective reduction of food waste in tourism requires a systematic approach linking guest behavior, operational management, and the use of technology. Simple behavioral interventions bring short-term success, but their long-term sustainability depends on staff education and systematic waste monitoring. The combination of these approaches is key to achieving the goals of the circular economy and sustainable development. For hotels and restaurants, regular staff training, the introduction of measurement systems, and, above all, the creation of an environment that naturally motivates guests and employees to consume responsibly can be recommended. At the same time, the overview shows that research into food waste in tourism remains fragmented and geographically unbalanced. There is a lack of uniform measurement methodologies, long-term analyses of the effectiveness of interventions, and studies from less represented regions, including Central Europe. Future research should focus on standardizing methods, monitoring long-term impacts, and broader practical application of findings in order to create a comprehensive framework for food waste management in the hospitality industry.

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SUPPORTING EXPATRIATES IN THE CZECH REPUBLIC: THE CONTRIBUTION OF NGOS TO CROSS-CULTURAL ADJUSTMENT

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KEY WORDS

cross-cultural adjustment, expatriates, non-governmental organizations

JEL CODES

M12, M14

1 INTRODUCTION

Expatriates' cross-cultural adjustment is a complex and gradual process that requires sustained interpersonal engagement, institutional support, and culturally sensitive interventions (Kim, 2001; Deardorff, 2009). On 1 January 2021, an amendment to Act No. 326/1999 Coll. introduced Chapter XIIIa – Integration of Foreigners, mandating adaptation and integration courses for selected nationals from third countries traveling to the Czech Republic, which became effective. This course aims to facilitate the social, cultural, and economic integration of expatriates within a one-year timeframe, once they have received a residence permit. However, the requirement applies only to those expected to integrate long-term, excluding economic migrants whose residence is deemed temporary or "non-integrative." This exclusion is problematic, as economic migrants often face significant adjustment challenges but are denied access to formal integration support due to the nature of their work permits (Trlifajová & Hurrle, 2011, Jelínková et al., 2014). An expectation prevails that the employers of economic migrants located in the Czech Republic are responsible for facilitating and supporting the expatriates' cross-cultural adjustment.

2 MATERIAL AND METHODS

This study employs a qualitative research methodology to explore the implementation of the Czech state-mandated adaptation and integration course, migrant inflows, and public attitudes toward migration, with a particular focus on the role of NGOs in facilitating cross-cultural adjustment and complementing institutional integration efforts by addressing existing systemic gaps. The course, as a migration policy instrument, is critically examined in relation to established theoretical frameworks on cross-cultural adjustment. To achieve the stated research objectives, a triangulated methodological framework was employed, integrating three complementary data collection strategies to ensure analytical depth and validity. First, secondary data were systematically gathered to facilitate an abovementioned comparative analysis. Second, a structured literature review was conducted in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol. Third, building upon insights derived from the preceding phases, we conducted 14 in-depth interviews with representatives of selected Czech NGOs actively engaged in migrant integration, followed by the application of the Delphi method through 4 semi-structured interviews with the relocation service providers offering cross-cultural training programs.

ZACHOVÁ, Daniela, and KŘEČKOVÁ KROUPOVÁ, Zuzana. 2025. Supporting Expatriates in the Czech Republic: The Contribution of NGOs to Cross-Cultural Adjustment. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 55–56. Mendel University in Brno.
ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

3 RESULTS

The findings reveal that the adaptation and integration course, while formally embedded in Czech migration policy, lacks practical accessibility and relevance for many migrants, particularly economic ones (Trlifajová & Hurrle, 2011). Due to the exclusion of economic migrants based on the temporary nature of their residence permits, a significant portion of the foreign workforce remains outside the scope of formal integration mechanisms, despite facing substantial adjustment challenges. This policy gap undermines broader labor market objectives, as insufficient cultural orientation and legal awareness can hinder workplace stability, productivity, and long-term retention (Kim, 2001). Migrants often attend the course too late, after the most critical phase of adjustment, which limits its effectiveness in supporting early-stage labor integration. Additionally, the threat of repeated fines for non-compliance introduces punitive elements that may discourage participation and increase administrative burdens. Public opinion, which favors conditional residence and cultural assimilation, further complicates the integration landscape and may indirectly shape restrictive migration policies. NGOs thus serve as essential actors in compensating for these policy shortcomings, offering tailored support that complements governmental efforts and directly addresses the needs of economic migrants (Baršová & Barša, 2020, Čada, 2014).

4 CONCLUSIONS

The research revealed that while the Czech Republic has established a legal framework for migrant integration, its practical implementation remains fragmented and uneven. The adaptation and integration course, though mandatory for selected third-country nationals, suffers from limited accessibility, reduced instructional depth and voluntary delayed enrollment by migrants. This delay often results in migrants attending the course while the most critical phase of cross-cultural adjustment has already occurred, diminishing its practical relevance. Furthermore, the exclusion of economic migrants from the course due to the nature of their residence permits highlights a significant policy gap. Interviews with NGOs and relocation providers confirmed that migrants often face bureaucratic hurdles, language barriers, and a lack of tailored support - unless such services are proactively financially supported by their employers. These findings highlight the crucial role of NGOs in addressing institutional gaps and emphasize the need for more inclusive, timely, and culturally sensitive integration strategies—such as extending the duration of adaptation and integration courses and transferring responsibility for mandatory courses to specialized NGOs.

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CONNECTING AI AND BLOCKCHAIN: A CASE STUDY OF A DIGITAL CERTIFICATES PLATFORM

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KEY WORDS

artificial intelligence, blockchain, digital certificates, smart contracts

JEL CODES

O33, J24

1 INTRODUCTION

Existing centralized systems for managing certificates face fundamental challenges. These include vulnerability to fraud, falsification, and inefficiency associated with manual verification. These inefficiencies not only reduce trust but also represent a significant administrative load for institutions and employers. In response to these issues, solutions have emerged in recent years in the form of digital certificates, which represent a modern and secure way to verify education and professional qualifications in today's society. However, the security of digital certificates can be taken to the next level by leveraging blockchain technology, which, thanks to its decentralized and immutable nature, offers a robust base for creating a transparent and secure ecosystem for certificate management [1]. If we add AI to this, we get a system with high user-experience.

Current research is increasingly focused on the synergistic integration of blockchain with artificial intelligence (AI), which promises to overcome the limitations of both technologies. As Witt (2024) point out, the main benefit lies in the complementary relationship, where blockchain ensures data integrity, privacy, and decentralization, while artificial intelligence provides the ability to process, analyze, and use this data for intelligent decision-making [2]. Blockchain thus solves one of the fundamental problems of AI. The need for trustworthy and verifiable data for training models, thereby reducing the risk of manipulation and bias. Conversely, AI can optimize and automate processes on the blockchain that would otherwise be static and rigid. Despite this potential, the two technologies are still in a relatively early stage of convergence and require further exploration and systematization [3].

Existing studies, such as the overview by Salah et al. (2019), have already mapped out the wide range of blockchain applications for AI, including the creation of decentralized data marketplaces, increasing the transparency of AI models, and securing their lifecycle [4]. These works have laid the theoretical groundwork, but they often focus on general frameworks or specific domains such as finance or healthcare, and less on concrete implementations in the field of digital credentials. The goal of this work is therefore to build on these insights and propose a concrete architecture for a digital certificate management system that fully uses the synergistic potential of both technologies. This article presents a conceptual model that not only uses blockchain for secure certificate issuance and verification, but also integrates two layers of artificial intelligence. The first for automating bulk certificate issuance and the second for creating an intelligent recommendation system that actively matches verified holder skills with relevant job opportunities. With this approach, we seek to bridge the gap between theoretical concepts and practical application and demonstrate how the combination of AI and blockchain can transform static certificates into dynamic tools for career development.

2 MATERIAL AND METHODS

The methodology of this work consists in proposing a conceptual framework for integrating blockchain and artificial intelligence with the aim of creating a decentralized system for verifying digital credentials. We describe an architecture where blockchain ensures the security and independent verifiability of digital certificates. AI provides the basis for automated processes and intelligent data analysis. The goal is to enhance the efficiency of certificate management and improve their usefulness.

ZÁKLASNÍK, Martin, GONO, Andrej, FALDÍK, Oldřich, FARANA, Radim, and TRENZ, Oldřich. 2025. Connecting AI and Blockchain: A Case Study of a Digital Certificates Platform. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 57–58. Mendel University in Brno.
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3 RESULTS

The proposed system is designed as a multi-layered architecture that combines a decentralized trust foundation with artificial intelligence modules for automation and intelligent analysis. The base layer consists of a blockchain network [5] that serves as an immutable and transparent platform for veryfing digital credentials [1]. The system uses open standards from W3C like Verifiable Credentials and Decentralized Identifiers (DID) for the representation of certificates, which is in line with the principles of self-sovereign identity. In compliance with the GDPR, no personal data is stored on the public blockchain, only the document hash and DID.

Two main artificial intelligence modules are implemented above this base layer. The first module, designed for automated certificate issuance, is designed as an AI agent capable of autonomously extract and structure data from input sources such as student databases or CSV files. After validating and standardizing the data, the AI agent initiates a call to a specific function in the smart contract, such as issueCredential(), which starts the on-chain process of creating new certificates. This ensures more accurate certificate issuance without the need to manually rewrite students into certificates and also saves time.

The second module is a smart job recommendation system. This system is based on machine learning models and its job is to analyze the skills and qualifications extracted from the user. The matching methodology combines linguistic feature extraction and semantic embeddings for a deeper understanding of the relationships between the skills listed in the certificates and the requirements specified in job advertisements. The system connects to external job portals via API, from which it obtains data on open positions. It then compares the user's profile with these positions and generates personalized recommendations based on the degree of match.

4 CONCLUSIONS

The implementation of the proposed system is expected to achieve several key results that directly address the limitations of current certification processes. First, the deployment of an AI agent for automated certificate issuance will lead to an increase efficiency and scalability. It is expected to reduce the administrative workload and operating costs for educational institutions. A process that previously required hours of manual work will now be possible to complete in a matter of minutes. It will also minimize the risk of human error when entering data, which will contribute to greater precision in the issuance of credentials.

The biggest benefit is the transformation of the certificate from a static document into a dynamic career tool. The system actively links their verified skills to opportunities in the labor market, thus increasing their employability.

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STRIVING FOR HARMONY, FINDING STRESS: THE REALITY OF DIGITAL WORK IN MULTINATIONAL COMPANY

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KEY WORDS

technostress, multinational company, digital transformation

JEL CODES

J24, O33

1 INTRODUCTION

Over the last decade, we have witnessed an unprecedented acceleration of digital transformation, especially in the financial service and manufacturing industries, driven by the COVID-19 pandemic [1] and the proliferation of novel digital tools [2], significantly impacting our private and professional lives. While these developments have enhanced efficiency and reduced cognitive workload [3], they have also introduced an undeniable downside known as technostress [4]. This pilot study explores how office employees of a Liechtenstein-based family company, specialising in niche industrial products with international operations, navigate this evolving working environment. We aim to (a) identify the presence of technostress among office employees in the manufacturing industry, (b) examine the statistical significance of subgroup differences (gender, age, country of origin) in relation to technostress, and (c) validate its multidimensional structure of technostress.

2 MATERIAL AND METHODS

The pilot study, conducted in cooperation with a Liechtenstein-based company, employed a field research approach. The research instrument consisted of a 17-item Likert-type questionnaire, which included questions related to the phenomenon studied, technostress, and socio-demographic characteristics of respondents. The paper-format questionnaire was administered anonymously between May 27 and June 26, 2025, at the Liechtenstein headquarters and its subsidiary companies in Slovakia, Italy, Finland, and the USA.

The inclusion criteria were defined as follows: (a) being at least 18 years of age, and (b) utilising information and communication technologies on a daily basis at work. Initially, 72 office employees participated in the pilot study. However, only 63 completed questionnaires were accepted for analysis due to incomplete responses.

The compiled data were analysed using SPSS. Non-parametric tests, such as the Mann–Whitney U test and the Kruskal–Wallis test, were performed. Subsequently, exploratory factor analysis (EFA) (Varimax rotation, Kaiser normalisation) was conducted. Lastly, a hierarchical cluster analysis (complete linkage, rescaled distances) was carried out.

ŽÁKOVÁ, Bianka, and KŘEČKOVÁ KROUPOVÁ, Zuzana. 2025. Striving for Harmony, Finding Stress: The Reality of Digital Work in Multinational Company. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students*, pp. 59–60. Mendel University in Brno. ISBN 978-80-7701-061-0 (print), ISBN 978-80-7701-062-7 (online ; pdf).

3 RESULTS

The pilot study in the multinational corporation headquartered in the Principality of Liechtenstein examined how the office employees are affected by constant exposure to technology, focusing on gender, age, and country of origin.

Gender differences: The Mann–Whitney U test showed statistically significant differences between male and female office employees for Q13 (p-value = 0.036) and Q17 ($p = 0.014$), with women reporting higher levels of impact.

Age differences: The Kruskal–Wallis test indicated statistically significant differences between age groups, with older generations reporting more substantial adverse effects on workload and quality of work life (Q14, $p = 0.042$).

Country of origin: A significant difference was observed between countries (Liechtenstein, Slovakia, and Other) for Q16 ($p = 0.043$), with respondents from other countries reporting being more affected than their counterparts in Slovakia and Liechtenstein.

Subsequently, an EFA was performed, yielding a six-factor solution that explained 67.79% of the variance. Based on item content, the following factor labels were assigned: (a) Techno-overload, (b) Techno-invasion and workload, (c) Techno-strain, (d) Techno-anxiety and resistance, (e) Techno-insecurity, and (f) Techno-interruption.

Furthermore, the cluster analysis revealed item groupings that mirrored the structure identified through EFA, reinforcing the extracted dimensions' reliability.

4 CONCLUSIONS

Firstly, these findings from this pilot study not only confirm the presence of technostress among office employees but also demonstrate that it is not uniformly experienced. This underlines the significance of contextual factors such as gender, age, and country of origin. These results underscore the need for tailored organisational strategies to support employee well-being in increasingly digital work environments. Finally, research validates the multidimensional nature of the phenomenon under investigation.

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COMPETING IN THE DIGITAL AGE: INNOVATION, PRESSURE, AND ORGANISATIONAL WELL-BEING

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KEY WORDS

technostress, university students, digital transformation, Czech Republic

JEL CODES

I23, J24, O33

1 INTRODUCTION

Rapid digitalisation, accelerated by the COVID-19 pandemic and the diffusion of AI and data-intensive tools, has reshaped our quotidian lives [1][2]. In the Czech Republic, substantial public and private investments are expanding digital capabilities across education and industry [3] [4] [5]. This study examines how future leaders, students who already operate in a workplace environment with digital demands, experience technostress. We deliberately conceptualise full-time and part-time students as emergent employees who face persistent connectivity, platform proliferation, and frequent updates. We aim to (a) identify subgroup differences (gender, study type, age) in technostress and (b) validate its multidimensional structure in this context.

2 MATERIAL AND METHODS

This study employed a field research design at the Prague University of Economics and Business using a validated survey to examine how constant technology influences future leaders. Data were collected with a 17-item Likert-type questionnaire on technostress, complemented by socio-demographic information. The questionnaire was distributed in paper format to full-time students and online to part-time students between 28 April and 15 June 2025.

A total of 100 students were invited to participate, of whom 86 completed the questionnaire adequately for inclusion. The inclusion criteria required participants to (a) be at least 18 years of age, (b) report daily use of technology, including personal computers, smartphones, or tablets, and (c) have a current employment status.

Analyses were performed in SPSS. First, non-parametric tests (the Mann–Whitney U test and the Kruskal–Wallis test) were employed. Second, an exploratory factor analysis (EFA) (Varimax rotation, Kaiser normalisation) was performed. Finally, a hierarchical cluster analysis (complete linkage, rescaled distances) was conducted.

3 RESULTS

ŽÁKOVÁ, Bianka, KŘEČKOVÁ KROUPOVÁ, Zuzana, ŘEZANKOVÁ, Hana, and KLOUDOVÁ JIŘIČKOVÁ, Václava. 2025. Competing in the Digital Age: Innovation, Pressure, and Organisational Well-Being. *PEFnet 2025 – 29th European Scientific Conference of Doctoral Students,* pp. 61–62. Mendel University in Brno.
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This study examined the effects of constant technology use on students at the Prague University of Economics and Business, focusing on gender, study type, and age. Non-parametric tests revealed meaningful subgroup differences, such as:

Gender differences: The results (Q8, $p = 0.021$; Q10, $p = 0.008$; Q13, $p = 0.014$) indicate that women are more affected than men by certain aspects of technostress. They reported higher levels of physical discomfort, sleep disturbances, and anxiety, reflecting stronger sensitivity to the physical and psychological consequences of technology use. In contrast, men showed slightly higher tendencies toward reduced concentration and performance, although these were not statistically significant.

Type of students: Significant differences (Q16, $p = 0.043$) also emerged between full-time and part-time students. Full-time students reported being more strongly influenced by constant notifications and the pressure to respond immediately, suggesting that higher daily exposure to technology in their studies intensifies technostress.

Age differences: Generational patterns revealed that older students are more affected by workload, quality-of-life impairment, and the need to sacrifice additional time to keep up with new technologies, compared to younger ones (Q3, $p = 0.024$; Q7, $p = 0.039$).

Sampling adequacy supported factor analysis (KMO=0.792). EFA yielded a four-factor solution explaining 61% of variance: (a) Tech strain, (b) Workload pressure, (c) Tech intrusion, and (d) Change resistance.

Moreover, the cluster analysis produced item groupings aligned with the EFA structure, supporting the robustness of the extracted dimensions.

4 CONCLUSIONS

These findings confirm that technostress is not experienced uniformly but varies across demographic and situational factors. Gender, study type, and age shape how technology use is perceived and experienced. Furthermore, EFA results demonstrate that technostress is a multidimensional phenomenon. Recognising these differences can help universities and organisations design tailored strategies to support digital wellbeing and mitigate the risks of technostress.

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SETTING SUBSIDY CONDITIONS TO SUPPORT SUSTAINABLE INVESTMENTS IN TRANSPORT

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KEY WORDS

transport sustainability assessment, subsidy policy, ESG index, sustainability indicator

JEL CODES

R42, Q58

1 INTRODUCTION

The transport sector is a significant polluter of the environment. One of the tools supporting the achievement of climate neutrality is subsidies (including support for sustainable transport). The conditions of subsidies in transport do not focus only on the economic value of the investment but also include the social and environmental aspects of the investment. Policymakers at various levels are asking themselves how to set up evaluation frameworks, criteria and what methods to use to assess the sustainability of investments. Efforts are underway within the EU to harmonise these criteria and methods, including for projects (co-)financed from EU funds. Reporting (use) of some criteria and methods is mandatory for the disbursement of EU funds; some remain at the level of recommendations. It is up to each EU country to decide with what degree of bindingness it will require the given criteria and methods.

One of the indicators of the success of countries in the field of sustainability are the so-called ESG indices (ESG scores). The Risk Watch Initiative ESG Index [1] was used to assess the relationship between the level of mandatory subsidy requirements and the level of sustainability of individual countries. Efforts to assess the sustainability of transport at the national level can also be found [2].

2 MATERIAL AND METHODS

The aim of this paper is to present the objectives and partial results of the research, which aims to assess:

1. Whether there is a difference in the required level of binding requirements for subsidies in individual EU countries.
2. Whether there is a relationship between the ESG score of selected EU countries, which is used to assess the achieved level of sustainability at the individual country level (dependent variable), and the level of binding requirements for assessing the social and economic benefits of projects supported by subsidies (independent variable).
3. To propose recommendations for setting binding criteria and methods within the framework of subsidy requirements.

The criteria and methods used in the grant requirements of selected countries and listed in the EU methodologies were obtained in particular from

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the European Commission Regulation No 480/2014, the European Commission Implementing Regulation No 2015/207, Regulation (EU) No 1303/2013 of the European Parliament and of the Council, Regulation (EU) 2021/1058 of the European Parliament and of the Council and from the grants and methodologies of selected EU Member States.

The level of bindingness of the requirements was assessed on a scale of 1–5 (5 – mandatory with scenarios, 4 – mandatory, 3 – mandatory for large projects, 2 – mandatory for certain projects, 1 – recommended).

Ordinary least squares (OLS) and weighted least squares (WLS) methods were used to identify the relationships between the level of bindingness of the monitored criteria and methods for assessing transport infrastructure and the ESG index of the given countries. Multicollinearity of variables was detected using the VIF test.

3 RESULTS AND CONCLUSIONS

When analyzing and comparing regulations, methodologies, etc., it was found that economic and environmental criteria are usually prioritized in subsidy requirements (on average, they reach a higher level of binding requirements) compared to social criteria. This is in line with findings from the scientific literature [3][4]. Quantitative indicators are preferred over qualitative indicators in EU subsidy titles and requirements, which is also evident in the scientific literature. For example, the indicator of comfort and quality of transport reaches the lowest level of binding requirement in subsidy conditions.

The research results so far point not only to a strong link between the setting of subsidy conditions and the level of sustainability measured using the ESG index (WLS; $R^2 = 97.6\%$), but also to which subsidy criteria and methods should be tightened (e.g. risk matrix, assessment of comfort and quality of transport, assessment of regional impacts of the investment, impact on secondary markets, sustainability analysis) and, conversely, for which criteria and methods it is possible to reduce the level of stringency of requirements (climate emissions criterion).

Central European countries (Czech Republic, Slovakia) have worse results not only in the area of sustainability (measured by the Risk Watch ESG index), but also in the area of transport sustainability [2]. As the analysis and comparison of subsidy conditions of selected countries showed, countries with a worse ESG score usually also have less stringent subsidy conditions in the area of supporting sustainable investments in transport.

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ESG INTEGRATION STRATEGIES AS GREEN FINANCE VEHICLES IN AGRI-FOOD INDUSTRY

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KEY WORDS

ESG reporting, green finance, ESRS standards, agri-food industry

JEL CODES

M29, Q01, Q56, Q58

1 INTRODUCTION

The growing global population and rising living standards are driving demand that significantly affects the scope of agricultural production. Permanent grasslands and forests are being converted into arable land, which reduces the soil's ability to sequester carbon and negatively impacts the provision of ecosystem services. There is a high potential for further development of investments in agriculture, where financial returns for investors can be combined with positive social and environmental impacts. Finding a balance between the ongoing changes in Europe, the interests of stakeholders, and broader societal objectives remains a major challenge.

In recent years, the European Union has been developing approaches focused precisely on this crucial issue of sustainability as a "green pathway" for companies in the agri-food industry. These transformations, together with the growing interest in investments with positive environmental and social impacts, are fostering the expansion of green finance. Investors can play a key role in addressing global challenges, supporting sustainability, and reducing the negative effects of climate change. Their active engagement in the agricultural and food supply sectors can contribute to a more efficient and sustainable food production system while enabling them to achieve their financial objectives.

This study builds upon the theoretical foundations of ESG reporting in EU member states and analyses its current implementation, with particular attention to the new legislative package Omnibus I and its challenges. Special focus is devoted to sectors related to the food supply chain, relevant legislation, and the communication of EU institutions with professional chambers and enterprises obliged to implement ESG reporting.

2 MATERIAL AND METHODS

This paper adopts a descriptive and analytical approach based on a review of current European Union legislation and policy documents related to ESG reporting. The analysis focuses on the recent "quick fix" adopted by the European Commission to the first set of European Sustainability Reporting Standards (ESRS), which aims to reduce administrative burdens and increase reporting certainty for companies starting in the 2024 accounting period [1]. The study particularly examines how these legislative adjustments, including transitional exemptions and simplified disclosure requirements, affect companies

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in the agri-food industry. The analysis builds on secondary data and recent European Commission communications, emphasizing the implications of the Omnibus I legislative package for enterprises in the food supply chain.

3 RESULTS

In 2025, the Stop-the-Clock Directive was proposed, aiming to postpone the mandatory ESG reporting obligations under the ESRS framework for companies in the second and third reporting waves to the financial years 2027 and 2028. The Omnibus I package introduced a set of technical adjustments across the CSRD, CSDDD, EU Taxonomy, and CBAM frameworks. These changes generally increase the reporting thresholds and reduce the number of required data points. The overall goal of Omnibus I aligns with the EU Competitiveness Compass strategy, which aims to simplify regulations, enhance competitiveness, and stimulate investment. In October 2025, the European Parliament rejected the mandate to begin negotiations on the Omnibus I proposal, which aimed to simplify ESG reporting and due diligence rules for companies, amid concerns that such reforms could weaken sustainability standards. The Parliament announced that it will vote on a revised version on November 13, 2025, delaying the legislative process and prolonging uncertainty surrounding the EU's sustainability regulatory framework [2].

In parallel with these legislative developments, the Net-Zero Banking Alliance (NZBA) announced its dissolution following the withdrawal of several major global banks. The main reasons behind these exits include shifting political environments and changing global motivations regarding climate commitments. The retreat of such a major voluntary financial coalition underscores the growing importance of EU regulatory frameworks (CSRD, ESRS) in ensuring credible green finance and transition funding within the food value chain. For the agri-food sector, which relies on transition finance aimed at sustainable production, resource efficiency, and emission reduction, this development highlights the need for reliable ESG data and a stable regulatory environment to attract and maintain sustainable investment flows [3].

4 CONCLUSIONS

The current developments in EU sustainability legislation and global financial commitments highlight uncertainty in the transition toward credible green finance. For the agri-food industry, the postponement of ESG reporting obligations and the dissolution of voluntary climate alliances emphasize the need for robust regulatory frameworks, transparent data, and consistent implementation.

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