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Challenges of Business Management in the 21st Century – Sustainability and/or Competitiveness?

PEER-REVIEWED
BOOK OF ABSTRACTS

11-12th June, 2026
Budapest, Hungary

**DRAFT
VERSION!!**

Editors: Róbert Magda, Mehrzad Abdi Khalife

**John von Neumann University Doctoral School of Management and
Business Administration, Budapest, Hungary**



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SUMMARY

The Book of Abstracts presents **125 accepted scholarly abstracts** submitted to the 14th International Conference on Management, *Challenges of Business Management in the 21st Century – Sustainability and/or Competitiveness?*, held in Budapest on 11–12 June 2026. The contributions address contemporary challenges and emerging directions in management science, with particular attention to the relationship between sustainability, competitiveness, digital transformation, and artificial intelligence. Key topics include business strategies and new business models, entrepreneurship and digitalization, human resource management, knowledge and innovation management, circularity, sustainable production, supply chain management, agribusiness, finance and financial digitalization, ESG, organizational communication, tourism, and regional development. The abstracts reflect interdisciplinary approaches and international perspectives, bringing together experienced researchers, young scholars, PhD students, and professionals to exchange knowledge, strengthen scientific cooperation, and explore practical and theoretical pathways for resilient and competitive organizations in a rapidly changing economic, technological, environmental, and social landscape.

Keywords: management, sustainability, competitiveness, digital transformation, artificial intelligence, ESG, innovation

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Enhancing Organizational Performance through Customer-Centric Marketing Strategies: The Role of Customer Mindset in the Food Industry

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Keywords: Customer-Centric Marketing, Customer Mindset, Organizational Performance, Food Industry, Customer Behavior

JEL Classification: M31, M10, L66

1 Introduction

In today's highly competitive and dynamic business environment, organizations are increasingly focusing on customer-centric marketing strategies to enhance their performance and achieve sustainable growth [1]. In recent years, the concept of customer mindset, which includes customer perceptions, attitudes, and behavioral intentions, has received growing attention in marketing and management research [4]. Customer mindset plays a key role in shaping how customers respond to marketing activities and how they develop relationships with firms [2]. However, despite the growing importance of both marketing strategies and customer mindset, there is still a lack of integrated studies that clearly explain how these factors interact to influence organizational performance, particularly in the context of the food industry. Therefore, the main objective of this study is to develop a conceptual framework that examines these relationships.

2 Material and Methods

This study adopts a conceptual and literature-based approach. It reviews and integrates existing studies on customer-centric marketing strategies, customer mindset, and organizational performance [1][4]. By analyzing prior research, the paper aims to develop a comprehensive framework that explains the relationships among these key variables. In addition, the study considers recent developments in sustainable and green marketing to provide a more updated perspective [3][5]. This approach allows for a deeper understanding of how marketing strategies influence customer mindset and how these factors contribute to organizational performance.

3 Results

The expected findings suggest that customer-centric marketing strategies have a significant positive effect on customer mindset [1][2]. In addition, customer mindset is expected to positively influence organizational performance by improving customer satisfaction, loyalty,

and engagement[4]. It is also anticipated that customer mindset will act as a mediator between marketing strategies and organizational performance, providing a clearer explanation of how marketing activities translate into business success. Furthermore, sustainable marketing strategies may strengthen this relationship by enhancing customer trust and long-term commitment[3][5].

4 Conclusions

This study contributes to the existing literature by offering an integrated model that connects marketing strategy, customer mindset, and organizational performance. It highlights the importance of considering customer perceptions and behaviors when designing marketing strategies. The findings are expected to provide useful insights for managers in the food industry to improve their decision-making processes and enhance organizational performance. Overall, this research emphasizes the role of customer mindset as a key factor in achieving sustainable competitive advantage.

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Language as a Cognitive Biasing Factor in Financial Decision-Making A Literature Review and Meta-Analysis

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Keywords: financial decision-making, cognitive bias, language, framing effect, metaphor, behavioral finance.

JEL Classification: D91, G41, Z13

1 Introduction

Financial decision-making is often modeled as a rational process; however, a substantial body of behavioral research demonstrates that judgments under risk are systematically influenced by cognitive biases. Within this literature, the role of language has received comparatively limited attention, despite the fact that language does more than transmit information. It structures categorization, highlights specific meanings, and shapes how uncertainty, time, and risk are mentally represented. This study investigates whether linguistic structure and wording function as biasing factors in financial choices. Particular attention is given to future-time reference, metaphorical framing, and gain–loss formulations in financial communication.

2 Material and Methods

The study applies a structured literature review combined with a meta-analytic synthesis of empirical studies published between 2010 and 2025. Relevant studies were selected from the intersecting fields of cognitive linguistics, behavioral economics, and financial psychology. The review focuses on three principal mechanisms: grammatical encoding of temporality and uncertainty, metaphor-based interpretation of financial processes, and linguistic framing effects in the presentation of equivalent financial information. The meta-analysis aggregates effect sizes from more than one hundred empirical studies in order to assess the overall magnitude and consistency of language-related effects on financial decisions.

3 Results

The review indicates that language affects financial decision-making through several converging pathways. First, differences in future-time reference are associated with saving behavior and intertemporal preferences, supporting the argument that grammar can influence how individuals evaluate future outcomes. Second, metaphorical expressions such as market movement and economic growth activate dynamic interpretive frames that shape perceived agency, volatility, and risk. Third, alternative verbal formulations of identical financial information lead to systematically different choices, particularly in situations involving gains, losses, and uncertainty. Across the analyzed studies, the pooled results suggest a statistically significant moderate effect of linguistic factors on decision quality, consistency, and risk

preference. Multilingual experimental evidence further indicates that these effects are partly culturally contingent while also reflecting more general cognitive mechanisms.

4 Conclusions

The findings support the view that language should be treated as an integral cognitive component of financial decision-making rather than as a neutral communication channel. By introducing language as a biasing factor, the study extends behavioral finance models and helps explain variation in risk perception, saving behavior, and choice consistency. From a practical perspective, the results highlight the importance of carefully designed financial communication, disclosure, and education. More precise and consciously framed language may reduce avoidable distortions in investor judgment and improve financial literacy interventions. Overall, the study argues for a broader decision-making framework in which linguistic and cultural context forms part of economic rationality.

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Money Attitude Scale the Structure of Financial Attitude Dimensions and Demographic Differences

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Keywords: attitude, factor analysis, gender differences, age, anxiety

JEL Classification: C38, C12, D91

1 Introduction

The aim of this research is to explore the depth-psychological and behavioural roots of the attitude dimensions of Power, Planning-Retention, Doubt and Anxiety as defined by the Money Attitude Scale (MAS). In modern societies, attitudes influence individual decision-making, financial decisions, financial behaviour and social interactions [1]. Based on the literature, it can be assumed that financial attitudes are organised around two distinct dimensions: an affective–emotional axis (uncertainty, anxiety) and a behavioural–self-control axis (planning, discipline), which contribute differently to financial decision-making. This duality also determines the internal structure of the MAS scale [2]. The research hypothesis posits that the older age group possesses a more stable self-assessment, with less anxiety and doubt, whilst younger generations are more prone to emotionally volatile reactions [3]. The examination of gender differences, meanwhile, assumed that differences arising from social roles may influence the structure of attitudes.

2 Materials and Methods

The Money Attitude Scale (MAS) questionnaire comprises 29 items and measures four main dimensions: power/prestige, saving/time, distrust and anxiety. The questionnaire was completed by 317 individuals, using a simple random sampling procedure [4]. The reliability of the scales was assessed using Cronbach's α values, which ranged from 0.72 to 0.89. PCA was used to explore the factor structure. The suitability of the factor analysis was confirmed by the KMO statistic (0.81) and a significant Bartlett's test ($p < 0.001$), indicating excellent factor suitability.

3 Results

The rotated factor structure yielded two clearly distinct dimensions. The first factor was loaded onto the items relating to Doubts and Anxiety (factor loadings: 0.86–0.87) and represented an affective–emotional uncertainty axis. The 'power' item showed a moderate correlation with this factor (0.55), suggesting that respondents interpret the concept of power primarily through the experience of a lack of control. The second factor was loaded onto the Planning–Maintenance item (0.96), which represents a pure behavioural self-control dimension. The correlation between the two factors was minimal ($r = 0.088$), confirming the independence of emotional

and behavioural attitudes. An examination of gender differences revealed that women achieved higher Power scores, which may contradict previous stereotypes suggesting that men generally possess a stronger sense of control. Men's experience of power is more moderate, which may indicate differences in self-perception patterns. Men's anxiety levels are statistically significantly higher than women's (Hedges' $g \approx -0.42$). This difference suggests that men experience greater emotional tension in decision-making and social situations. Women's lower anxiety may be consistent with their more stable emotional self-regulation. A comparison of age groups revealed that scores on the Doubt and Anxiety dimensions showed a gradual decline in older age groups, pointing towards emotional stabilisation. In contrast, the Planning–Maintenance dimension remained high and stable regardless of age, supporting its nature as a measure of behavioural self-control. Younger groups experience higher levels of self-assertion and control, whilst older groups show more restrained scores [5].

4 Conclusions

One of the most important findings of the study is that affective attitudes describing emotional uncertainty and anxiety do not necessarily go hand in hand with behavioural planning and financial discipline. The Doubt–Anxiety dimension may serve as a sensitive indicator of susceptibility to stress and emotional instability. Based on the distinction between these two factors, the effectiveness of financial education and interventions can be enhanced by treating elements aimed at reducing emotional uncertainty and strengthening behavioural discipline separately. Based on age-related trends, it is clear that anxiety-reducing and self-confidence-boosting programmes targeted at younger people may be effective, whilst for older people, developing stable planning skills may be the most effective way to ensure a better quality of life in old age, regardless of whether, as they grow older, they may feel they have already saved enough.

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Mapping the AI-Circular Economy landscape: evidence from a bibliometric analysis

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Keywords: circular economy (CE), Artificial Intelligence (AI), business performance, bibliometric analysis.

JEL Classification: O33, M21, Q01.

1 Introduction

Corporate adoption of circular economy (CE) remains limited. Artificial Intelligence (AI) offers capabilities to support circular strategies, but the literature on AI and CE is dispersed. Existing studies classify AI applications or link them to CE maturity stages [1], yet a strategic perspective connecting AI-enabled CE initiatives to business performance remains underdeveloped. This paper addresses this gap through a bibliometric analysis and strategic typology of AI-CE applications categorized by their intended business impact.

2 Material and Methods

A bibliometric analysis combined with a systematic literature review was conducted using the Scopus database (2020-2026). Search strings combined AI and CE terms. The initial search yielded 351 documents. After screening, 343 documents were analyzed using Biblioshiny. Analysis included annual scientific production, most cited documents, word cloud, and thematic mapping. For in-depth analysis, nine documents describing specific AI-CE applications were selected.

3 Results

The study revealed that AI-CE research is growing rapidly, with a 36.26% annual growth rate, but remains fragmented. Keyword analysis showed that AI is not yet a central conceptual driver. Thematic mapping confirmed that foundational themes revolve around broad CE and digitalization concepts, with no AI-specific or business performance themes appearing as basic or motor themes.

The analysis of in-depth applications resulted in a strategic framework with three zones for the classification of AI-CE applications: (1) Efficiency Optimizers, Business Model Enhancers, (3) Systemic Transformers. Zone 1 was dominated by CNN-based (Convolutional Neural Network) computer vision for waste sorting. Applications report measurable outcomes such as 21.2% improvement in sorting accuracy and 30% increase in efficiency [2, 3].

Zone 2 presented greater diversity of AI techniques like machine learning for dynamic pricing and demand forecasting, but performance measurement was less consistent. Zone 3 had limited empirical evidence; which means that the most disruptive applications remain conceptual or speculative, like the use of explainable and generative AI in CE context.

4 Conclusions

These findings indicate that AI-enabled circular strategies should be prioritized by strategic impact, confirming that Zone 2 and 3 applications deliver superior business outcomes. Methodologically, the study shows that bibliometric analysis can provide a rigorous basis for strategic typologies. In practice, the framework guides AI investment decisions. Future research should validate these findings empirically and focus on developing Zone 3 applications for a systemic transformation.

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Factors Influencing Capital Structure Under Economic Uncertainty

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Keywords: *capital structure, financing, indicators of capital structure, SMEs*

JEL Classification: *G32, G33, M10*

1 Introduction

The aim of our research is to explore the relationship between the capital structure of companies and business performance indicators such as ROE, ROA, liquidity indicators, as well as how corporate operating processes affect financial results. By striving to create an optimal capital structure, we assume that the sales revenue and profit of companies can be increased. The focus of the research is on Hungarian and Slovak small and medium-sized enterprises, which constitute a relevant sample due to their operational and financing characteristics, and thus regional differences are also taken into account. Our goal is to show whether an optimal capital structure can be demonstrated at all. The method of calculating the leverage effect is shown by the ROE/ROA formula.

2 Material and Methods

The relationship between financial leverage and firm performance has been extensively studied, yielding varied results across different contexts and methodologies [1], [2]. A recent comprehensive review was conducted for analyzing the impact of financial leverage on firm performance, emphasizing the trade-offs between debt and equity financing [3]. The findings highlight that while leverage can enhance profitability and growth, excessive debt introduces significant risks, particularly in developing economies. The impact of capital structure on firm performance was analyzed in Malaysia [4], framing their analysis under the trade-off and agency cost theories. Their results indicate that leverage improves firm performance up to an optimal point, beyond which the relationship turns negative, highlighting a nonlinear impact. A study [5] explored the influence of economic sentiment on the leverage-performance relationship. Their findings suggest that economic sentiment plays a significant role in corporate capital structure decisions, affecting the relationship between leverage and firm performance. Mutumanikam and Adelin [6] analyzed the impact of financial leverage on firm performance in emerging markets, focusing on publicly listed firms in countries like Indonesia, India, and Brazil. Their study found a nuanced relationship where leverage has both positive and negative effects on performance, depending on market conditions and firm characteristics.

Our research estimated the efficiency of 100 Hungarian and 100 Slovak SMEs, taking into account their impact on financial leverage. The period selected for the research is 2017-2022, due to the availability of economic and financial data. The primary sources of information on

the financial and economic situation were the financial statements of the selected companies, as well as information found in mostly free annual reports published on the Internet (www.e-beszamolo.im.gov.hu) (www.finstat.sk). The core business of the above-mentioned enterprises is transportation and warehousing. The performance of the companies is expressed in accounting performance indicators, primarily in return on assets (ROA), ROE and liquidity indicators.

3 Results

In the research, data were analyzed from 100 Hungarian and Slovak companies between 2017 and 2022 using a panel data methodology, with a particular focus on their financial structure. The use of a fixed-effects estimation procedure allowed us to take into account unobservable heterogeneity between companies. The model includes variables such as company size, profitability (ROA), sales data, and all additional data that can be extracted free of charge from the balance sheet and income statement.

Short-term economic expectations had a negative impact on the level of debt, which suggests that companies become more cautious in using external financing when the economic outlook is uncertain. Therefore, according to our observations, the conservative strategy was the dominant strategy for companies in the period under review.

4 Conclusions

The results of the study suggest that uncertainties in the economic environment have a significant impact on the financing decisions of SMEs, primarily by reducing their use of debt financing. In the case of Hungarian and Slovak companies operating in the transportation and warehousing sector, the cautious capital structure strategy shows that companies try to avoid excessive indebtedness in uncertain circumstances. This behavior also highlights that small and medium-sized enterprises strive to maintain their financial flexibility, so it would be advisable for economic policy makers to take measures that provide them with a stable and predictable financing environment.

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Digitalization Challenges in Industrial Fleet Maintenance: A Cost-Sensitive AI Framework

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Keywords: Digitalization, artificial intelligence, predictive maintenance, cost-sensitive learning, asymmetric penalties.

JEL Classification: C44, C45, C53, L62, M11

1 Introduction

AI-driven Predictive Maintenance (PdM) faces a critical business challenge: asymmetric penalties, where missed failures cost far more than false alarms. In the analyzed fleet, this follows a 50:1 ratio—500 units per failure versus 10 units per inspection [1, 3]. This paper addresses this digitalization challenge through four contributions: binary reformulation, distribution-aware feature selection, cost-proportional Graph Isomorphism Network (GIN) training, and cost decomposition analysis.

2 Material and Methods

The framework is evaluated on a large-scale industrial dataset [3, 4] of multivariate time series with non-homogeneous timesteps and discrete sensor readings. Lead-Lag transformations capture path volatility, and Visibility Graph algorithms convert univariate series into undirected graphs preserving trends and periodicity [5]. Normalization addresses scale differences; NaN values from counter resets (~3.4%) are replaced with zero. Healthy (Class 0) instances are randomly truncated to prevent the model from using sequence length as a proxy for healthy status.

The original 5-class proximity scale is reformulated as binary classification: Healthy (time-to-event ≥ 48 timesteps) versus Positive (Classes 1–4), forcing the objective function to prioritize avoiding 500-unit failure costs. Feature selection uses Wasserstein distance, Maximum Mean Discrepancy (MMD), and shape metrics through signature analysis with PCA [6], yielding 200–500 features that outperform the 2000+ raw feature baseline.

The primary model is a GIN with 15 message-passing layers and 912 hidden channels, with a Class 0 classification threshold of 0.6. Training gradients are cost-proportional to prioritize reducing high-cost errors [7]. The model is benchmarked against SOTA methods [4] and legacy baselines [8].

3 Results

The proposed GNN achieves a Total Operational Cost of 40,109.0, competitive with the SOTA of Kim & Kim [4] at 36,113.0. ROCKET [8] failed to reach baseline performance, likely due to noise and non-homogeneous sampling.

Method	Total Operational Cost	Status vs. SOTA
Kim & Kim [4] (SOTA)	36,113.0	SOTA Baseline
GNN (Proposed)	40,109.0	Strong Competitive
Script 11 Baseline	38,810.0	Surpassed by SOTA
ROCKET [8]	N/A	Below Baseline

Cost decomposition shows False Negatives at $33 \times 500 = 16,500$ units and False Positives at $2,618 \times 10 = 26,180$ units. Approximately 61.3% of operational costs come from false alarms, validating the risk-averse design: the model deliberately accepts minor-cost false alarms to avoid catastrophic failure costs.

4 Conclusions

This work addresses a key digitalization challenge in fleet business operations through an AI framework with four contributions: (i) binary reformulation aligning model objectives with asymmetric business economics; (ii) distribution-aware feature selection via Wasserstein and MMD metrics; (iii) cost-proportional GIN architectures capturing complex degradation signatures; and (iv) cost decomposition confirming the risk-averse profile. Future work will explore multilayered graph approaches to capture cross-correlations between distinct multivariate sensors.

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Ethical Consumption in Poland: Consumer Behavior and Socio-Demographic Determinants

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Keywords: consumption, ethical consumption, consumer, consumer behavior.

JEL Classification: E21, M31, Q01

1 Introduction

In discussions about sustainable development, themes emerge related to alternative forms of consumption as opposed to consumerism, aimed at reducing threats to the natural and social environment. One of these is ethical consumption, which refers to the practice of making purchasing decisions based on moral beliefs, emphasizing responsibility and awareness of the social, environmental, and political aspects of products [1]. By choosing consumption based on their moral convictions, consumers buy from socially responsible companies that uphold ethical and fair practices, striving for collective benefits over individual gains in the short term [2]. From the perspective of research on ethical consumption, it is important to define its dimensions. The most significant of these include the social, political, and environmental dimensions [3]. The social dimension involves the use of shared products, fair trade products, and purchasing goods from local producers. The political dimension includes the willingness to act toward justice and equality among people by using purchasing power to support political initiatives in this direction. The environmental dimension focuses on concern for the natural environment.

2 Material and Methods

The research objective was to identify the extent to which behaviors characteristic of ethical consumption occur in Poland. A survey method was applied, using the CAWI (Computer-Assisted Web Interviewing) online questionnaire technique. The study was representative of the adult population of Poles. A total of 1,081 respondents participated in the study, including 50% women and 50% men, aged 18–24 (7%), 25–34 (17%), 35–44 (20%), 45–54 (18%), and 55 and over (38%).

3 Results

The findings indicate that the most important dimension of ethical consumption is the social dimension (59% of respondents identified this dimension). Next in importance is the environmental dimension (57%), while the political dimension is relatively less significant (36%). Overall, the idea of ethical consumption is implemented to a moderate extent by consumers in Poland. To determine the impact of ethical consumption on consumer behavior, an analysis was conducted of the relationships between its dimensions and socio-demographic characteristics. The results reveal significant differences between variables, which made it possible to construct a profile of a socially responsible consumer.

Within the social dimension, respondents most frequently declared avoiding brands or products that benefit from the misfortune of their employees (63%). This aspect is particularly important for women, individuals aged 55 and over, those with secondary education, and residents of medium-sized cities with populations between 10,000 and 99,000.

The environmental dimension, related to the protection of the natural environment, is important for 57% of respondents. One of the key consumer behaviors characterizing this dimension is limiting consumption (food, energy, clothing, etc.) to what is truly necessary (64%). This is especially significant for women, individuals aged 55 and over, those with secondary education, and residents of cities with populations between 20,000 and 99,000.

The political dimension is the least frequently observed in the behavior of Polish consumers. An important behavior characteristic of this dimension is shopping in stores that promote fair trade (46%). This type of behavior is primarily declared by men, individuals aged 55 and over, those with primary education, and residents of rural areas.

4 Conclusions

In conclusion, ethical consumption in Poland constitutes an important, though still developing, element of consumer behavior. Its strongest manifestations are found in the social and environmental dimensions, reflecting growing awareness of social justice and environmental protection. The relatively weaker political dimension suggests that consumption is still rarely used as a tool for influencing systemic change. The findings also demonstrate that ethical consumption attitudes vary across socio-demographic groups, with gender, age, and education playing a key role in shaping responsible purchasing behaviors. This highlights the need for further consumer education and awareness-raising initiatives to strengthen understanding of the broader impacts of everyday consumption choices. In the context of sustainable development, ethical consumption emerges as a significant tool for mitigating the negative effects of consumerism. However, its further development requires not only individual consumer engagement but also support from public institutions and businesses, which—through transparency and responsible practices—can foster trust and encourage more conscious market decisions.

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The Role of a Leader in Workforce Reduction: The Importance of Offboarding in Conditions of Economic Uncertainty

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Keywords: offboarding, leadership, economic uncertainty, employee departure

JEL Classification: M12, M50

1 Introduction

In times of economic uncertainty, many organizations have to reduce employment. In such situations, the role of leaders becomes very important. They are responsible not only for managing current employees, but also for handling employee departures. Offboarding, understood as a structured process of ending cooperation with an employee, is becoming an important part of human resource management [1,2,5]. A well-managed offboarding process can reduce negative effects and influence the employer's image [1,4]. It is also important to manage communication properly and minimize conflicts during employee departure [2]. Exit interviews are another important element of the offboarding process, as they can help reduce employee dissatisfaction [3].

2 Material and Methods

The study is based on the results of original quantitative research conducted between February and March 2026 using an online survey questionnaire. A purposive sampling method was applied, and the participation criterion was employment in an organization where an employee departure had occurred within the last two years. A total of 215 respondents participated in the study. The main focus of the analysis was the role of the leader in the offboarding process, particularly in terms of their involvement, competencies, and actions taken during employee departure. The analysis included one-way ANOVA and the Chi-square test to examine relationships between respondent groups and their perceptions of leaders' competencies and actions in the offboarding process.

3 Results

The results indicate that the offboarding process is most often managed by the direct supervisor, as indicated by more than half of the respondents. At the same time, 36% of respondents pointed to the HR department, with this response being more common in large organizations. The analysis revealed differences in the level of leader involvement depending on the size of the organization. Higher levels of involvement were observed in larger companies, while lower levels were reported in smaller enterprises. The results also show variation in the way leaders communicate decisions about employee departure. This suggests the need to develop leaders' competencies in delivering difficult information. Furthermore, nearly 80% of respondents agreed that a leader's behavior during the offboarding process influences their perception of the employer. This confirms the important role of leadership in shaping the organization's image.

4 Conclusions

The study confirms that the leader plays a key role in the offboarding process, especially in conditions of economic uncertainty. Leader involvement and communication significantly influence employee perceptions and the employer's image, particularly during situations involving workforce reduction. The findings highlight the importance of leadership competencies in managing employee departure and ensuring a more structured and effective offboarding process. At the same time, they indicate that a lack of consistency in leader actions and communication may lead to negative employee experiences and weaken the organization's image. Therefore, the role of the leader should be considered a critical factor in shaping the quality of the offboarding process and its outcomes.

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Integration of ESG and Post-2020 Risk Factors into Corporate Investment Decision-Making: Evidence from Hungarian Companies

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Keywords: Investment appraisal, ESG, risk assessment, corporate finance.

JEL Classification: G31, M21, Q56

1 Introduction

In recent years, corporate investment decision-making has been increasingly challenged by a rapidly changing and uncertain economic environment. Across Europe, companies have faced disruptions such as the COVID-19 pandemic, supply chain breakdowns, and geopolitical tensions. However, the intensity of these impacts has not been uniform. Hungary has been particularly affected by high inflation and the resulting high-interest rate environment, which significantly influence corporate investment decisions.

At the same time, environmental, social, and governance (ESG) considerations have gained importance as determinants of long-term competitiveness. Despite these developments, corporate investment appraisal practices often lag behind in integrating both sustainability aspects and emerging risk factors.

The aim of this study is to explore how Hungarian companies evaluate investments, focusing on ESG integration and post-2020 risk factors, and to identify gaps supporting the development of a simplified, practice-oriented evaluation framework.

2 Material and Methods

The empirical analysis is based on a structured questionnaire survey targeting professionals directly involved in corporate investment decision-making, including CFOs, project managers, heads of controlling, and managing directors, ensuring high data reliability and quality.

The questionnaire consisted of thematic blocks covering company characteristics, investment appraisal practices, risk assessment methods, ESG considerations, and digitalization. It included both descriptive and attitudinal questions measured on Likert scales, enabling the analysis of practices and managerial perceptions.

The dataset was analyzed using descriptive statistical methods to identify dominant patterns in corporate investment behavior. Further research will extend the analysis by examining relationships between variables, including potential correlations between investment practices, risk perception, and ESG integration.

3 Results

The results reveal several consistent patterns in corporate investment appraisal practices.

Traditional financial methods dominate, particularly ROI/ROA and payback period, with NPV also widely applied, while advanced techniques remain marginal. Investment appraisal is only partially formalized, typically limited to larger projects, with smaller decisions often relying on managerial judgment.

ESG considerations are not yet fully integrated: although some firms consider or plan their inclusion, many do not incorporate them into formal evaluation frameworks. [1]

Post-2020 macroeconomic factors, especially inflation, interest rates, and liquidity constraints, have become key determinants, with cash flow considerations playing a central role. [3]

Risk assessment practices are heterogeneous. While scenario and sensitivity analyses are used, many firms rely on simplified or informal approaches, and projects are often rejected due to perceived risk despite favorable financial indicators. [2]

Digitalization remains limited, with spreadsheet-based solutions dominating and advanced tools underutilized. Respondents highlight that increased digitalization could significantly improve evaluation processes. The main barriers are lack of expertise and resource constraints.

4 Conclusions

The findings indicate that Hungarian companies have partially adapted to the changing environment, but significant gaps remain in investment appraisal practices.

Traditional financial metrics still dominate, while ESG integration, advanced risk assessment, and digitalization are underdeveloped. The increasing importance of post-2020 risks further emphasizes the need for more structured evaluation frameworks.

The research aims to support the development of a simplified, practice-oriented investment appraisal software solution, using the questionnaire results as input parameters. Such a tool could enhance decision quality and support more consistent and risk-aware investment decisions.

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The Relative Impact of Sustainability and Profitability on Investor Decision Making: Evidence from Capital Markets

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Keywords: ESG, Profitability, Leverage, Stock Return.

JEL Classification: G11, G32, Q56

1 Introduction

The idea of Environmental, Social, and Governance (ESG) has evolved over the past few decades into a key metric for assessing a business's non-financial performance and a crucial factor in making investment decisions. In addition to reflecting a firm's social and environmental responsibilities, ESG is regarded as an indication of long-term sustainability that might affect investors' assessments of risk and company worth. According to a number of studies, ESG performance can increase a company's profitability and value, which will draw attention from investors in the capital market [1]. Nonetheless, there is ongoing discussion in the scholarly literature regarding the connection between ESG and stock performance. According to some research, ESG can improve a company's reputation and lower extreme risks, which has a beneficial effect on stock returns [2]. Additionally, other research indicates that businesses with strong ESG performance typically produce greater stock returns, especially in specific economic circumstances like a crisis [3]. On the other hand, some research indicates that ESG has no discernible effect on stock returns, and in certain instances, it even exhibits an inconsistent or negative association [4]. This discrepancy suggests that there is still more to learn about how ESG affects investor choices.

However, conventional financial metrics like profitability continue to play a significant role in how investors evaluate a company's performance. Return on Equity (ROE), a common proxy for profitability, measures a company's capacity to make money for its owners and is closely linked to investment returns. According to earlier research, investors may prioritize profit criteria over sustainability considerations since financial performance can act as the main transmission mechanism connecting ESG to stock returns [5]. Additionally, the relationship between ESG, profitability, and stock returns may be impacted by firm risk characteristics like leverage. Leverage is a measure of how much debt a business uses in its capital structure and is frequently linked to increased financial risk. Depending on the company's degree of leverage, investors may react differently to ESG information in this situation. According to certain research, a company's risk level and ownership structure may have an impact on how ESG affects stock returns. This implies that the relationship between ESG and financial decisions may be moderated by leverage. Even though there has been a lot of study on ESG and stock returns, the majority of studies still concentrate on developed nations where ESG data is more readily available. In the meanwhile, there is still a dearth of research with inconsistent findings in developing nations like Indonesia. The importance of ESG in influencing investment

decisions is less evident in emerging economies since investors are typically more focused on short-term profitability than sustainability [6].

In light of this environment, the study's objectives are to assess how ESG and profitability affect stock returns and investigate the function of leverage as a moderating factor in the Indonesian capital market. It is anticipated that this study would help shed light on the question of whether profitability or sustainability concerns have a greater influence on investor choices, particularly in emerging nations.

2 Material and Methods

This work employs panel data regression techniques in a quantitative manner. Companies listed on the Capital Market over a number of time periods make up the study sample. Return on Equity (ROE) serves as a proxy for profitability, while ESG factors are quantified using a disclosure index based on the company's sustainability reports. Leverage is employed as a moderating variable and is calculated using the debt-to-equity ratio. The dependent variable is stock returns.

3 Results

This study is expected to show whether ESG or profitability has a more dominant influence on stock returns in emerging markets. Furthermore, it is anticipated that leverage will influence how strongly or weakly ESG and stock performance are correlated. Investor reactions to ESG disclosures are likely to differ between companies with high levels of leverage and those with low levels.

4 Conclusions

This research is expected to provide an empirical contribution to the literature on sustainable investment, particularly in the context of developing countries. In addition, this study also provides an understanding of the role of leverage in moderating the relationship between ESG, profitability, and stock returns. The results of the study are expected to be considered by investors, companies, and policymakers in integrating sustainability aspects into investment decision-making.

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The economic role of dual higher education in reducing labour market inequalities in Hungary

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Keywords: dual education, labour market inequalities, youth employability, regional disparities.

JEL Classification: I23, J24, R11

1 Introduction

The Hungarian labour market has undergone profound economic and social transformation in recent decades, resulting in persistent regional disparities, structural youth unemployment, and significant skill mismatches [1]. Technological change, Industry 4.0, and globalization have created new employment opportunities, but they have also increased employer demand for practice-oriented and adaptable competences. In this context, dual higher education, which combines academic studies with structured workplace training, has become an increasingly important instrument for improving labour market integration. This study examines the economic role of dual education in reducing labour market inequalities in Hungary, with particular attention to regional disparities, youth employability, and the relationship between competitiveness and inclusive development. The topic is closely related to the conference focus on competitiveness, sustainability, and contemporary management challenges [2,3].

2 Material and Methods

The paper is based on a review of the relevant Hungarian and international literature and on a descriptive analysis of Hungarian labour market and regional development patterns [1,2]. Its theoretical framework draws on human capital theory, macroeconomic labour market models, and the literature on structural unemployment. The analysis focuses on the mismatch between the competences provided by education and those required by employers, especially in the transition from school to work [3,4]. It also considers the territorial distribution of dual training opportunities and the differences in firm participation across Hungarian regions. This approach makes it possible to interpret dual education not only as an educational model, but also as an economic mechanism influencing employability, productivity, and regional development [5,7].

3 Results

The literature indicates that dual education improves employability primarily by accelerating labour market entry, reducing recruitment and induction costs for firms, and enhancing the practical preparedness of graduates. Students participating in dual programmes are more likely to acquire job-relevant skills, become familiar with organisational routines and technologies, and move more smoothly into stable employment. From the company perspective, dual education supports workforce planning, lowers hiring risks, and contributes to productivity and organisational flexibility [5,7].

At the same time, the Hungarian case reveals strong territorial inequalities in access to dual education. The system is most developed in Western Hungary, especially in counties with strong industrial bases, multinational firms, and dense supplier networks, where companies are able to provide high-quality training placements and long-term employment perspectives [1,7]. In contrast, in less developed eastern and southern regions, limited corporate capacity, weaker technological infrastructure, and lower levels of institutional cooperation restrict access to dual programmes [1,5]. As a result, the benefits of dual education are concentrated in regions that are already economically stronger.

4 Conclusions

The paper concludes that dual education is an effective instrument for improving youth employability and supporting business competitiveness, but in its current form it cannot by itself eliminate regional labour market inequalities in Hungary [1,2,3,4]. Its equalising effect depends on broader development conditions, including firm participation, regional infrastructure, and policy incentives [5,6,7]. Therefore, the expansion of dual education should be embedded in a wider regional development strategy that supports SMEs, strengthens university–industry cooperation, and improves access to quality training opportunities in lagging regions [5,7]. In this sense, dual education can contribute both to competitiveness and to more balanced regional development, but only if its institutional and territorial foundations are broadened.

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Sustainable Development in Hospitality: Trends and Practical Strategies in Hungary

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Keywords: sustainability, hospitality, new trends, practical solutions

JEL Classification: food quality and food safety management

1 Introduction

The operation of the hospitality industry is closely related to the use of environmental resources, food supply chains and the economic stability of local communities. The integration of the principles of sustainable development is therefore not only an ethical or environmental issue, but also a key factor in long-term competitiveness. In Hungary, the hospitality industry has undergone significant structural transformation in the past decade, which has further strengthened the need for sustainable operation. The operation of the hospitality industry is closely related to the use of natural resources, food supply chains and the economic stability of local communities. [6.] Global environmental problems such as climate change, biodiversity loss and resource depletion are increasingly drawing attention to the sustainability responsibility of the hospitality industry. The concept of sustainable development has become a defining guideline in most economic sectors in recent decades. In the case of hospitality, this represents a particularly complex challenge, as economic, environmental and social aspects are all at play. [4.] [5.]

2 Material and Methods

A mixed methodological approach was used in the research. The study uses a quantitative research method, complemented by qualitative elements. The quantitative approach allows for an empirical examination of the prevalence and economic impacts of sustainable hospitality practices, while the qualitative elements serve to explore the experiences and interpretations of businesses in more depth. The target population of the research is hospitality businesses operating in Hungary, including restaurants, cafes, patisseries and other catering establishments. The inclusion criteria were that the given business had been operating for at least one year and that the questionnaire had to be filled out by a person in a managerial or ownership position. These criteria ensure that the respondents had adequate insight into the business's operations and strategic decisions. [3.]

3 Results

A total of 150 people completed the questionnaire as part of the quantitative research. The vast majority of respondents regularly use catering services: 62% visit restaurants or other catering establishments at least weekly, while 38% visit restaurants or other catering establishments

occasionally. When asked about the importance of sustainability, 71% of respondents said that it was important or very important for them that a catering establishment operates in an environmentally conscious manner. 19% held a neutral position, while only 10% indicated that sustainability did not influence their decisions. The results show that environmental and social responsibility plays a significant role in the development of consumer attitudes. [1.] [2.]

4 Conclusions

Based on current research, it can be clearly demonstrated that sustainability is not only of paramount importance from an environmental and ethical perspective, but is also increasingly appearing as an economic and strategic factor in the catering industry. Integrating sustainability into restaurants offers restaurants the opportunity to not only reduce their carbon footprint but also gain a competitive advantage in the long term. Studies show that sustainable practices - such as sourcing locally, implementing strategies to reduce food waste, using eco-friendly packaging, and expanding plant-based offerings - not only have environmental benefits, but also generate economic returns. However, the barriers to implementing sustainable solutions, especially for smaller businesses, require appropriate support and partnership systems.

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Balancing ESG Dimensions for Sustainable Competitive Advantage: Evidence from European Union Economies

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Keywords: ESG, sustainable competitiveness, natural capital, human capital, composite index

JEL Classification: O44, Q01, C43

1 Introduction

Over the past few decades, competitiveness has mostly been evaluated using standard economic indicators such as productivity, growth, and investment. This perspective, however, does not fully capture the contribution of human capabilities and natural resources to long-term economic outcomes, as highlighted in resource-based and sustainability-oriented studies [1,2,4]. At the same time, sustainability has gained increasing attention in Europe, where environmental and social conditions are becoming more closely linked to economic performance and development paths through initiatives such as the European Green Deal and circular economy policies [5,6].

2 Material and Methods

This study applies a quantitative approach based on secondary macroeconomic data collected primarily from Eurostat for the 27 European Union member states covering the period 2010–2024 [3]. The final dataset includes 405 observations and examines how environmental, social, and economic ESG-related factors jointly influence sustainability-oriented competitiveness. Resource productivity, measured as the ratio of GDP to domestic material consumption, is used as a proxy indicator for sustainable competitiveness because it reflects the efficiency with which economies transform material resources into economic value while limiting environmental pressure [3,7]. The analysis includes indicators related to circular material use, greenhouse gas emissions, renewable energy, employment, tertiary education, GDP per capita, and R&D expenditure. Descriptive statistics, Pearson correlation analysis, and multiple linear regression techniques are applied to assess the relationships among these variables.

3 Results

The findings indicate that countries with stronger economic performance and higher circular material use tend to achieve higher levels of resource productivity, suggesting that economic development and circular economy practices contribute positively to sustainability-oriented competitiveness [4,8]. By contrast, greenhouse gas emissions negatively influence resource productivity after controlling for broader ESG-related factors.

The results also show that renewable energy has a significant negative short-term relationship with resource productivity, potentially reflecting transition costs, infrastructure investments, and structural adjustment processes associated with energy transformation [9]. In addition, the

effects of R&D expenditure and tertiary education are statistically insignificant in the regression model, suggesting that their influence may emerge indirectly or over longer time horizons.

4 Conclusions

This study provides a more integrated perspective on competitiveness by bringing together environmental, social, and economic ESG-related dimensions within a single analytical framework. It shows that long-term sustainable competitiveness depends not only on economic strength but also on environmental efficiency and circular economy practices.

The results offer practical implications for policymakers, suggesting that more coordinated strategies focused on resource efficiency, circular economy development, and sustainability transition policies can better support long-term and stable economic development.

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AI Literacy under the EU AI Act: From Regulation to Organizational Practice

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Keywords: AI Act, AI literacy, organizational learning, HRM, digital transformation

JEL Classification: L20, L53, J24

1 Introduction

The European Union's AI Act should be considered as a milestone in the regulation of digital technologies and artificial intelligence. It is focused on risk-based approach and protection of fundamental rights (European Commission, 2024). The regulation's key aspect is the AI literacy, which grants the knowledge and skillset enabling to understand, interpret and address the responsibly using AI systems (Long & Magerko, 2020).

Article 4 of the AI Act requires providers and users of AI systems have to take appropriate steps ensuring their employees have a sufficient level of AI literacy (European Commission, 2024). This regulation, however, does not exactly specify what this literacy should stand for: exact content, proficiency levels or implementation phases. Likewise, it does not have the standardized criteria for the particular training design or assessment.

The lack of specificity creates many ways for interpretation, hence carries uncertainty for the organizations, especially in the areas of human resource management and organizational learning. Despite the AI Act has sound expectations for corporate compliance, there is still a shortage of research on how these requirements are materialized into exact training and development initiatives (OECD, 2021).

This study seeks to identify this gap by assessing how the AI literacy is reflected in publicly available corporate organizational practices and identifying the key challenges emerging with the implementation phase.

2 Material and Methods

The study has both qualitative and exploratory research design, applying the a review of available literature and also addressing document analysis. It's primary objective is to identify gaps between the AI literacy requirements in the AI Act and the practices we can observe in publicly available corporate organizational materials.

The research begins with an examination of relevant international literature, with a particular focus on AI governance and on conceptual frameworks related to AI literacy and digital competencies (Long & Magerko, 2020).

Then, we apply the qualitative analysis of publicly available documents of European corporate and regulatory materials, including the national-level guidelines. The purpose investigate how AI literacy is reflected here, with special emphasis on training practices, competency frameworks, and the assessment methods.

Finally, the findings are evaluated against the expectations set by the AI Act (European Commission, 2024), aiming the identification of key gaps and laid down the conceptual framework.

3 Results

While AI governance and its ethical constitutions are already becoming widely established among European organizations, the structured implementation of AI literacy at organizational level is still not convenient.

Corporate organizations are making significant efforts to regulate the usage of AI, applying key focus on ethical principles, risk management and compliance.

Based on a preliminary analysis of publicly available European practices it can be concluded that the expectations of proper AI use are getting rather clear. However, these are not necessarily in line with competency models neither the formalized training systems or assessment methods.

The above has the indication there is an identified gap between regulatory expectations versus the pace of organizational implementation. It is not just a temporal lag but also reflects a deeper, structural lack of alignment.

4 Conclusions

AI literacy is not limited to regulatory compliance. It carries strategic importance of organizational capability hence influences long-term competitiveness and adaptability.

The gap between expectations in the AI Act versus the current organizational practices underlines that the development of AI literacy systems will be in focus for the upcoming years.

This study contributes to a deeper understanding of this area and provides a foundation for further empirical research.

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Comparative Implementation of International Sustainability and Accounting Standards in V4 Countries

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Keywords: sustainability, accounting, ESRS, IFRS, V4 countries

JEL Classification: M41, M48, Q56

1 Introduction

Corporate sustainability reporting fundamentally transforms practices under international accounting standards. The EU directive establishes CSRD requirements [1] and provides detailed ESRS disclosure framework [2]. IFRS application is mandated to ensure financial transparency [3]. Despite uniform EU regulatory framework, Visegrád Group countries (Czech Republic, Hungary, Poland, Slovakia) apply divergent national implementation approaches [1]. This study, prepared within my PhD research at John von Neumann University, systematically examines these implementation differences and their impact on corporate competitiveness, with particular emphasis on regional harmonization needs.

2 Material and Methods

The research employs comparative research methodology analyzing both regulatory documents and corporate sustainability reports across V4 countries [1]: - Regulatory transposition analysis examining national CSRD legislative implementation differences [1] - Corporate reporting analysis of 2024 sustainability and integrated reports from V4 listed companies - Ongoing 2025 reporting data collection (abstract submission date: 2026.04.20) Qualitative content analysis methodology for systematic comparison of national implementation practices according to ESRS 1-2 double materiality requirements [2]. The methodology enables identification of connections between regulatory differences and corporate practices.

3 Results

Preliminary findings indicate Hungary and Slovakia met CSRD transposition deadlines by 2024 [1], while Poland and Czech Republic implementations remain delayed. Hungarian large corporations prepare comprehensive ESRS E1 climate-related disclosures fully integrated with IFRS financial reporting requirements [3]. In contrast, Polish companies produce weaker scope 3 emissions reporting [2]. Content analysis reveals significant differences in key materiality assessment parameters across 2024 corporate reports, complicating cross-border comparability [1][2]. Analysis of available 2025 reports confirms persistence of these implementation gaps, also affecting regional investor decision-making.

4 Conclusions

Despite identical EU regulatory framework, divergent V4 national implementations of sustainability standards [1], ESRS technical requirements [2] and IFRS financial reporting

obligations [3] undermine uniform corporate reporting practices and regional competitiveness. The research recommends V4-level policy harmonization focusing on ESRS-IFRS integration, developing common regional guidelines and standardized reporting templates. This would enhance cross-border comparability, increase investor confidence and strengthen V4 countries' corporate ESG performance in global competition.

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Regenerative Rural Development and the Active Aging Index: The Role of Regenerative Nudging in Fostering Silver Stewardship

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Keywords: Active Aging Index (AAI), Regenerative Nudging, Silver Stewardship, community entrepreneurship, choice architecture

JEL Classification: Q01, J14, R58

1 Introduction

The aging and depopulation of rural areas in Central and Eastern Europe are not merely demographic issues; they also lead to complex socio-economic crises in lagging rural areas, in more developed urban agglomerations, and at the national level. In depopulating rural areas, this leads to a drastic decline in human resources and the disintegration of local economies. Traditional policies often focus solely on retaining or attracting young people, while treating the older generation merely as passive recipients of care - and thus as the source of the problem - which further deepens dependency and isolation. In contrast, the paradigm of regenerative urban development views older adults as “Silver Stewards” [1] who take responsibility for their own well-being and the vitality of their community, while actively participating in the local economy. The central question of the study is how local governments and communities can use the tools of choice architecture [2] to shape the urban environment so that an active lifestyle becomes the default choice, the norm. Furthermore, the study examines how employment - one of the core domains of the Active Aging Index [3] - can be strengthened at the local level by increasing participation in community-based enterprises [4].

2 Material and Methods

The research's theoretical framework is provided by the methodology of the Active Aging Index (AAI) [3] and the theory of “nudging” from behavioral economics [2]. The study provides a critical analysis of the AAI components, comparing it with other indicators such as the Global AgeWatch Index (GAWI) [5] and the Healthy Ageing Index (HAI) [6], and proposes adapting the index at the municipal level, using the village of Alsómocsolád as a case study.

The study focuses on the AAI's Employment domain and proposes refinements to an online pilot questionnaire survey (n=38) conducted in 2025 for methodological validation. The questionnaire examined the attitudes and motivations of older adults toward community-based enterprises [4]. The author plans to ground future research in a one-year qualitative field study (participant observation and in-depth interviews) in the Avnø Oasis ecovillage in Denmark, where she intends to examine the practical effects of permaculture design tools [1] (e.g., Scales of Permanence) and the practical effects of sociocratic governance on activity in old age.

3 Results

The study's preliminary findings revealed that a significant proportion of older adults desire to contribute to society [4]; therefore, a rural community struggling with depopulation can view this age group as a resource if it applies the tools of choice architecture and nudging [2]. The study introduced the concept of “Regenerative Nudging,” which links individual well-being (health maintenance) with community benefits (community enterprises) [7]. Testing of the questionnaire confirmed that the measurement tool itself can function as a form of nudging: while completing the questionnaire, respondents became aware of the concept of volunteering and the potential of the Silver Stewardship, which can trigger a positive shift in attitude. The theoretical model (Virtuous Cycle) outlined in the research visualizes how the spiral of rural decline (Vicious Cycle) can be reversed through the conscious, choice-based development of the AAI domains (Employment, Social Participation, Independent Living) [3].

4 Conclusions

The key to the success of regenerative rural development lies not only in infrastructure development, but also in the conscious restructuring of the decision-making architecture [2]. The spread of the “Silver Stewardship” [1] approach reduces the social burden on local governments, alleviates the shortage of human resources, and improves the quality of life at the individual level. According to the proposed model, local governments must function as “decision architects,” where existing innovations, community spaces, and flexible cooperative forms create a regenerative ecosystem [7]. The research phase in Denmark is expected to confirm that small-community-level self-organization and regenerative nudging are more effective tools for preserving rural resilience and creating a regenerative settlement and community than purely economic incentive-based strategies.

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From Long Waves to Large Models: Reframing Artificial Intelligence as a Management Challenge

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Keywords: Artificial intelligence, K-waves, technology adoption, management paradigm

JEL Classification: B25, E32, O33

1 Introduction

Artificial intelligence (AI) is portrayed as the defining technological transformation of the decade, yet its organisational impact is uneven. Over 80 per cent of large firms have launched AI initiatives, but only about 5 per cent report measurable returns [7]. This gap revives a recurring question: does technology drive structural cycles, or are outcomes radically contingent on organisational factors? The 1926 Kondratyev-Oparin debate at the Moscow Conjecture Institute [2] frames this tension most sharply. We use it as a lens for asking whether AI constitutes a management problem, and of what kind.

2 Material and Methods

The study is a narrative conceptual review triangulating three literatures: the long-wave tradition (Kondratyev–Oparin [2], Perez [3]); the economics of AI, including Brynjolfsson et al.'s productivity J-Curve [4], Acemoglu's skeptical estimates [1] and the AI productivity paradox; and organisational adoption research (TAM [5], UTAUT, TOE; systematic reviews [6]), anchored in the MIT NANDA report [7]. The streams are mapped onto structural-cyclical (Kondratyevian) and contingent-organisational (Oparinian) narratives and synthesized.

3 Results

Kondratyev's endogenous interpretation of long waves [2], later extended by Perez into a theory of techno-economic paradigms [3], treats cycles of 40-60 years as outcomes of clustered innovations that reorganise industries, infrastructures and managerial doctrines. A growing literature places AI, alongside biotechnology and IoT, at the core of a sixth Kondratyev wave: an installation phase of speculative financing and hype, followed by a deployment phase in which complementary institutions, new managerial doctrines and workforce restructuring determine whether the technology's potential is realised. On this reading, AI adoption is not an isolated firm-level decision but a structural transition for which management must position the organisation at paradigm level. Oparin's 1926 rebuttal, however, pressed a methodological objection that retains striking contemporary force: Kondratyev's statistical techniques imposed periodic structure on series that did not theoretically warrant it, and applying the same method to post-1914 data produced qualitatively different cycles [2]. Transposed to AI, this critique resonates with recent evidence that productivity gains are concentrated among the top few per cent of adopters [7], and with Acemoglu's estimate of roughly 0.5 per cent cumulative productivity gains over a decade [1], which is a figure that sits uneasily with cycle-deterministic

narratives. The Oparinian lesson is that aggregate regularities may mask highly contingent, organisation-specific pathways. These two readings are not merely historical positions but recur in the present debate. Solow's 1987 observation that the computer age was visible everywhere except in the productivity statistics has been explicitly revived as the AI productivity paradox, and the productivity J-Curve of Brynjolfsson, Rock and Syverson [4] offers a partial reconciliation: complementary intangible investments (workflow redesign, retraining, governance) depress measured output for years before eventually lifting it, implying a structural lag of 20-40 years consistent with earlier general-purpose technologies. The MIT NANDA finding that 95 per cent of enterprise GenAI initiatives deliver no measurable P&L impact [7] is therefore less a failure narrative than early-J-Curve evidence, interpretable through either the Kondratyevian or the Oparinian lens. Taken together, the review suggests that AI is a bifurcated management problem. At the macro level it calls for strategic positioning within a paradigm shift, in the Kondratyevian mode. At the micro level it requires organisational complementarities, skill formation, change management, governance and trust, in the Oparinian mode. Classical adoption models such as TAM and UTAUT [5, 6] capture the micro layer but under-theorise paradigm shifts, while long-wave and techno-economic paradigm frameworks [3] do the reverse. The same bifurcation surfaces in the current disagreement between Brynjolfsson's long-run optimism [4] and Acemoglu's short-run skepticism [1], which structurally mirrors the 1926 controversy, suggesting that the Kondratyev-Oparin debate represents a recurring pattern in how economies interpret transformative technologies rather than a historical curiosity.

4 Conclusions

The Kondratyev-Oparin debate remains a productive lens for AI management. Both readings are partially right: AI's diffusion is plausibly part of a long-wave paradigm shift, yet outcomes depend radically on firm-level choices and intangible complements [4, 7]. Research should integrate both levels; practitioners should resist both cycle-determinism and short-termism and invest in the intangible complements that historically determine whether a general-purpose technology delivers.

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Greenwashing and Consumer Responses in the Food Sector A Literature Review and Research Agenda

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Keywords: greenwashing, consumer response, food sector, literature review.

JEL Classification: M31, D12, Q13

1 Introduction

Green claims proliferate in food markets, where labels, packaging and sustainability cues strongly shape consumer judgment. At the same time, greenwashing can erode trust, increase confusion and distort purchase intention. Although greenwashing has become a major topic in sustainability and marketing research, existing reviews remain broad, while food-specific, consumer-focused synthesis is still limited. This paper aims to systematize what is known about the effects of greenwashing on consumers in food-related contexts and to identify the main theoretical, methodological and variable-related gaps that should guide future research. The review is designed to support a later empirical study in a Central and Eastern European setting, with special relevance for Romania.

2 Material and Methods

The study applies an integrative literature review approach. It synthesizes recent Scopus-based review material and selected empirical studies dealing with greenwashing, consumer response, purchase intention and food or organic food consumption. The analysis prioritizes studies located at the intersection of greenwashing, consumer decision making, food-sector marketing and theory-based behavioural research, with particular emphasis on the post-2020 period. The reviewed literature was grouped into five analytical categories: conceptualization and measurement, theoretical frameworks, methodologies, core consumer variables and food-sector specific contexts. This structure makes it possible to distinguish what is already known from what still remains weakly theorized or weakly measured.

3 Results

Five major gaps emerge. First, conceptual fragmentation persists: definitions vary considerably, and many studies still measure perceived greenwashing rather than objectively verifiable deceptive claims. Second, the theoretical base is dispersed. Stakeholder theory, signaling, trust-risk models, value-based approaches and SOR logic appear in the literature, but the Theory of Planned Behavior is only weakly connected to greenwashing-specific constructs. In particular, prior greenwashing exposure, trust erosion, skepticism and label credibility are seldom integrated into TPB-based explanations of food purchase intention. Third, methods are narrow. The field is dominated by cross-sectional surveys with SEM or regression, while experiments, longitudinal designs, netnography and mixed-method studies remain scarce. Fourth, the food context is still too narrow: research focuses mainly on organic or eco-labelled products, with limited attention to processed foods, beverages, retailer brands, packaging claims and digital

food marketing. Fifth, key consumer variables are rarely modelled together, especially certification credibility, green confusion, perceived risk, environmental knowledge, price sensitivity, health consciousness and emotional reactions such as anger or disappointment. A further weakness is the limited representation of emerging and post-socialist markets, which constrains the contextual validity of current findings.

4 Conclusions

The review shows that research on greenwashing and consumer response in the food sector is growing, but remains conceptually fragmented and empirically uneven. Its main contribution is a focused research agenda for future food-marketing studies. For a next empirical step, Romania represents a relevant Central and Eastern European context, where TPB can be extended by perceived greenwashing, green trust, prior greenwashing experience and certification credibility. Managerially, the findings suggest that food companies should avoid vague environmental claims and rely on transparent, verifiable communication across labels, packaging and digital channels. Academically, the field would benefit from more context-sensitive, theory-integrated and methodologically plural research designs.

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Experiences of Digital VAT Control Mechanisms in the Evolution of the VAT Gap in Selected EU Countries

The Role of Electronic Fiscal Devices (EFDs) and the Expansion of Transactional Transparency

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Keywords: VAT gap, digital taxation, e-invoicing, EFD, tax transparency

JEL Classification: H21, H26, H83

1 Introduction

The VAT gap related to value-added tax represents one of the key fiscal and tax policy challenges within the European Union, measuring the difference between theoretically expected and actually collected revenues. Over the past decade, the expansion of digital technologies has provided new tools for tax administration, particularly in the form of Electronic Fiscal Devices (EFDs). These systems enhance transparency by enabling real-time or near real-time access to transaction-level data, thereby reducing opportunities for tax evasion (European Commission, 2025; OECD, 2023). The aim of this study is to examine the extent to which these tools contribute to the evolution of the VAT gap under different institutional and regulatory environments.

2 Material and Methods

The research applies a qualitative and comparative approach based on European Commission VAT Gap reports, as well as relevant empirical and policy-oriented studies. The analysis focuses on Hungary, Italy, Poland, Romania, and the Czech Republic, examining the operation of e-invoicing systems, real-time reporting frameworks, online cash registers, and other digital control mechanisms. Special attention is given to the extent and temporal development of transactional transparency across B2B, B2G, and B2C segments.

3 Results

The results of the comparative analysis indicate that the effectiveness of digital VAT control mechanisms is closely related to the extent and integration of transactional transparency. Hungary represents a complex and highly integrated system, where the combined use of online cash registers and the Online Invoice system has led to significant improvements in tax compliance (Benedek et al., 2017; 2022). Recent empirical evidence suggests that the impact of these tools is particularly strong among smaller firms (Ván et al., 2025). In Italy, the mandatory e-invoicing system is characterised by a high degree of centralisation, which demonstrably contributes to the reduction of VAT fraud (Heinemann, 2023). Poland follows a

gradual transition model, where increasing digitalisation improves the efficiency of tax collection (Brodzka, 2025). In Romania, the example shows that partially implemented systems may have limited effects due to institutional and implementation constraints (European Commission, 2023). The case of the Czech Republic highlights that regulatory instability may reduce the effectiveness of digital systems (Zídková, 2014).

4 Conclusions

The study concludes that digital VAT control mechanisms are capable of exerting a meaningful impact on the evolution of the VAT gap when implemented in an integrated manner within a stable institutional and regulatory framework. The extent of transaction-level transparency is a key determinant of effectiveness; however, technological solutions alone are not sufficient. Institutional capacity and regulatory consistency are equally important. Future research directions include strengthening interoperability between systems and further developing data-driven tax enforcement models (European Commission, 2022).

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Sustainability as Constraint or Competitive Advantage? *Strategic Responses of Firms to Geo-economic Pressures*

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Keywords: geo-economics, corporate sustainability, firm strategy, strategic management

JEL Classification: F23, F51, L21, M14, Q56

1 Introduction

The green economic transition is no longer simply an environmental issue but also an important tool in international economic and political competition. Sustainability regulations in developed economies have an increasingly significant geo-economic impact (Bradford, 2020; 25-66) as they influence market access and corporate operations (Farrell & Newman, 2019; 43). Companies therefore do not shape their strategies independently but adapt to complex regulatory, market (economic) and power (geopolitical) pressures, particularly in Southeast Asia. The author of the study believes that little research examines this geo-economic correlation at the corporate level; therefore, the aim is to explore how these external constraints and opportunities manifest in corporate strategies and how they shape their adaptation.

2 Material and Methods

The research employs a qualitative, comparative case study methodology. The aim of the study is to explore how sustainability regulations – as geo-economic instruments – influence corporate adaptation strategies. The analysis focuses on export-oriented companies based in the Southeast Asian region that operate in different sectors and are affected in divergent ways by international sustainability requirements. The companies were selected through targeted sampling, which include cases particularly relevant for examining the phenomenon in focus: the geo-economic impacts of sustainability regulations and the ensuing businesses' strategic adaptation patterns. The comparative analysis of the case studies is conducted along uniform criteria, with particular regard to:

- the type and kind of regulatory pressure (e.g. EU requirements),
- the categories of corporate responses and adjustments (adaptation, innovation, supplier restructuring etc.), as well as
- an examination of the extent to which sustainability requirements are perceived as external constraints or strategic opportunities.

3 Conclusions

Corporate strategies are not merely posited as mechanisms for market adaptation – the operation of businesses is not organised solely along the profitable/unprofitable dichotomy, which functions as the principal binary code of the economic subsystem – but as responses that take shape within the frameworks defined by the geo-economic and regulatory environment (Matthijs & Meunier, 2023). Sustainability is not merely an environmental requirement or a trendy “individual choice” approach any more, but increasingly a regulatory factor (Büthe & Mattli, 2011; 28) and a condition for market entry, that is to say, a geo-economic determinant (Blackwill & Harris, 2016; 22). These sustainability expectations, in turn, also impact global competitiveness.

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Artificial Intelligence in the Financial Industry: A Systematic Literature Review

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Keywords: artificial intelligence, finance, automation, banking.

JEL Classification: C02, C45, C60

1 Introduction

The Fourth Industrial Revolution is well underway, bringing the widespread adoption of artificial intelligence (AI). Its impact on the global economy is similar to the electricity or internet. In my study, the focus is on the role of AI in the financial sector. This sector is particularly sensitive to such innovations, as data processing and forecasting lie at the core of its operations. The purpose of this paper is to provide a comprehensive overview of the development of AI, its main directions and the possibilities of its applications in finance.

2 Material and Methods

This study applies a systematic literature review combined with bibliometric analysis to identify, evaluate, and structure the most relevant academic contributions and industry insights. The dataset was compiled from leading international scientific databases, including Scopus, Web of Science, and Google Scholar, supplemented by selected industry reports to ensure practical relevance.

The research follows a secondary research design, enabling a comprehensive examination of existing artificial intelligence approaches and their applications within the financial sector. In addition to the qualitative synthesis of the literature, a bibliometric analysis was performed using VOSviewer to map the intellectual structure of the field. This approach allowed for the visualization of key research trends, co-authorship networks, keyword co-occurrences, and thematic clusters.

3 Results

The bibliometric analysis conducted using VOSviewer reveals several well-defined structural patterns within the literature on artificial intelligence in the financial sector. Based on co-authorship and co-citation networks, the field appears to be moderately fragmented, with a few dominant research clusters primarily originating from the United States, China, and Western Europe. These regions show the highest publication output and strongest collaborative linkages, indicating their leading role in shaping the academic discourse.

Overall, the results suggest that research on AI in the financial sector is both rapidly expanding and increasingly interdisciplinary. While strong thematic concentrations exist around forecasting, risk management, and fraud detection, emerging areas such as explainable AI and ethical considerations are gaining significant attention, pointing toward future research directions.

4 Conclusions

The study examined the role of artificial intelligence in the financial sector through a systematic literature review complemented by bibliometric analysis. The results highlight that AI-related research in finance is rapidly expanding and characterized by well-defined thematic areas, particularly in forecasting, risk management, and fraud detection. At the same time, the growing emphasis on advanced techniques such as deep learning and explainable AI reflects the increasing complexity and maturity of the field.

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Sustainable Regional Development and Competitiveness in Central Europe: The Role of Governance, Innovation, and Clusters

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Keywords: sustainable regional development¹, governance², innovation³, cluster dynamics⁴.

JEL Classification: R11, O31, H70

1 Introduction

This worldview has strengthened the significance of place-based strategies that are sensitive to regional assets and limitations [1][3]. It is generally accepted that innovation is among the key factors in the transformation of the regions, particularly in the cases, when knowledge networks, absorptive capacity, and smart specialization strategies are successfully built [4][5]. Simultaneously, the quality of governance is conclusive in coordination of actors, policies, and proper utilization of development resources [6][7]. In this sense, the context of Central Europe, especially Hungary and Poland is very useful in the analysis of the impact of governance, innovation and cluster dynamics on sustainable regional development outcomes [2][8].

2 Material and Methods

In this research, a qualitative comparative research design has been utilized, which is grounded on a thorough examination of scholarly literature and policy reports. The analysis looks at the quality of governance, the ability to innovate, and cluster dynamics as key drivers of sustainable development in the region. The choice of Hungary and Poland as comparative case studies is because they have undergone a post-socialist transformation and EU integration experience and they have differences in institutional performance and regional policy enforcement [7][9]. Sources of secondary information are peer-reviewed journal articles, OECD reports, and European Commission publications. Thematic analysis is employed to find out shared trends involving institutional capacity, coordination of policies, regional systems of innovation, and territorial inequalities. To meet the research objective, the two countries are compared and theoretical and policy evidence is synthesized to explain the way in which governance arrangements determine the effectiveness of innovation and clusters-based development strategies in Central Europe [6].

3 Results

- The quality of governance is a decisive factor on the performance of regional strategies on development especially in the areas of policy coordination, institutional capacity as well as resource allocation [6][7].

- More importantly, the greater the alignment of innovation systems with local capabilities, knowledge networks and place-based policy structures, the more they are a source of regional competitiveness [4][5].
- Cluster dynamics contribute to the level of cooperation, dissemination of knowledge, and productivity, nevertheless, their effectiveness in the long-term perspective is conditioned by the assistance of strategic governance and constant adaptation [8][10].
- In Hungary and Poland, constant territorial disparities suggest that economic convergence is not enough without enhanced regional institutions and policy application that is context-sensitive [9][1].

4 Conclusions

The results suggest that economic growth by itself is not enough to achieve balanced development in the territorial level unless there are powerful institutions and well-coordinated regional policies [7][9]. Policymakers should support integrated development models to strengthen regional resilience and competitiveness of regions in the face of future economic and sustainability issues [6][8].

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Connection between freight transportation modes and GDP in the Visegrád Group

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Keywords: GDP forecast, transportation performance, economic growth, regression analysis, freight transport industry

JEL Classification: E27, F17, R40

1 Introduction

The relationship between freight transport and gross domestic product is a recurring topic in the context of economic growth. Across the world, numerous studies examine how transport and the opportunities it creates affect local and regional economies. [1, 2, 3, 4] However, these studies typically cover shorter time periods.

The present study uses Eurostat data from 2008 to 2024 to examine whether freight transport indicators are suitable for forecasting GDP.

2 Material and Methods

During the study, the relationships between the gross domestic product (GDP) of four countries and the volumes and performance of the most widely used freight transport modes (rail, road, and inland waterway) were examined.

The required data were extracted from the Eurostat database for the period 2008-2024. Data processing was performed using R.

The data analysis was conducted in two stages: first, for the full period from 2008 to 2024.

The data were analysed using linear regression for each country and transportation mode, accounting for both volume and performance. In addition to the goodness of fit, Spearman's rank correlation coefficient was also determined. The final assessment of the relationship's reliability between GDP and the examined transport modes was based on the combined evaluation of these two results.

3 Results

Based on Eurostat data from 2008 to 2024, various relationships of differing strength and quality can be identified between GDP and different modes of transport in Poland, Czechia, Slovenia, and Hungary.

In Poland, strong, highly significant correlations are observed across all transport modes. The most suitable indicator for GDP forecasting is road freight transport performance ($R^2 = 0.7153$, Spearman $\rho = 0.9632$). In addition, rail freight transport performance shows a strong relationship with road freight transport volume and with inland waterway transport performance (negative correlation), indicating strong and very strong associations. Inland waterway freight transport also shows a strong relationship and a strong negative correlation with GDP. Rail

freight transport volume, however, shows only a weak relationship and is therefore not suitable for forecasting.

In Czechia, the volume and performance of inland waterway transport show the strongest relationship with GDP. These indicators exhibit a strong relationship and a strong negative correlation. Road freight transport shows only a moderate relationship: its volume is strongly correlated, while its performance is moderately correlated with GDP. Rail freight transport shows a weak relationship in both indicators and is therefore not suitable for forecasting.

In Slovakia, the volume of inland waterway freight transport shows a very strong relationship and an extremely strong negative correlation with GDP. In contrast, in terms of performance, it shows a strong relationship and a strong negative correlation. All other indicators show weak relationships and are therefore not suitable for forecasting.

In Hungary, the most useful indicator is inland waterway freight transport performance, which shows a moderate relationship and a moderate negative correlation with GDP ($R^2 = 0.4416$, Spearman $\rho = -0.4114$). All other indicators show either weak relationships or weak correlations and are therefore not suitable for forecasting.

4 Conclusions

The study found a measurable relationship between freight transport and GDP in countries with strong industrial production and manufacturing sectors. However, within the Visegrad Group countries, no single common freight transport indicator can be identified for GDP forecasting that could be used for all of them.

Nevertheless, for each examined country, at least one indicator can be identified that shows a moderate to extremely strong relationship with GDP.

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EXAMINING FINANCIAL STRESS CAUSED BY CLIMATE CHANGE AMONG AGRICULTURAL ENTERPRISES, WITH A FOCUS ON LAVENDER GROWERS

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Keywords: lavender, climate change, financial stress

JEL Classification Q13, Q54, R51

1 Introduction

Climate change represents one of the most significant challenges of the 21st century, with considerable economic implications even in the short term. Agricultural and food industry enterprises are particularly exposed to physical climate risks such as droughts, floods, and hailstorms, which can lead to substantial production losses and income instability. In addition to direct losses, climate change also contributes to increasing production costs, including water usage, fertilizers, pesticides, and seeds.

The growing importance of financial preparedness in managing climate-related risks highlights the role of financial literacy. Financial literacy enables enterprises to make informed financial decisions and to develop strategies that enhance resilience and long-term sustainability. The aim of this research is to explore how agri-food enterprises, with a specific focus on lavender growers, are financially prepared to cope with climate-related stress.

2 Material and Methods

The research is based on both secondary and primary data sources. A comprehensive literature review was conducted using international and domestic scientific databases to establish the theoretical background and support the development of the research framework.

Primary data collection was carried out using a questionnaire survey targeting agricultural and food industry enterprises in Hungary. The study applies the OECD (2020) methodology to assess financial literacy, which evaluates three main dimensions: financial knowledge, financial behavior, and financial attitudes.

Special attention was given to enterprises operating in the lavender sector in the Balaton region. These include businesses engaged in various activities such as primary production, processing, event organization, and direct sales.

3 Results

The findings indicate that the financial preparedness of Hungarian agri-food enterprises for climate-related stress varies significantly. Many enterprises face considerable financial challenges due to climate impacts, particularly those lacking structured financial strategies and risk management practices.

The analysis reveals that limited financial awareness and insufficient planning increase vulnerability to climate-induced risks. Enterprises with higher levels of financial literacy demonstrate better adaptability and are more capable of implementing effective financial solutions.

The case of lavender growers in the Balaton region provides additional insights. Lavender production has become increasingly significant in recent years, not only as an agricultural activity but also as part of tourism and value-added product development. Despite its growing importance, the sector shows varying levels of financial preparedness, especially in managing climate-related risks.

4 Conclusions

The study highlights the critical role of financial literacy in enhancing the resilience of agri-food enterprises to climate change. Improving financial knowledge, behavior, and strategic planning can significantly reduce the negative economic impacts of climate stress.

The findings suggest that targeted financial education and the development of adaptive financial strategies are essential for strengthening the competitiveness and sustainability of agricultural enterprises. The lavender sector, as an emerging and regionally important industry, requires particular attention in this regard.

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Analysis of Freshwater Consumption and Wastewater Generation in Paint Shop Operations: A Techno-Economic and Management Perspective

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Keywords: water consumption, freshwater, wastewater, paint shop.

JEL Classification: Q25, L60, M11

1 Introduction

Water scarcity and sustainability resource management have become critical challenges worldwide, with the manufacturing sector facing increasing pressure to reduce freshwater footprint (UN World Water Development Report 2023, n.d.), and practically in processes involving surface treatment and paint shop operations.

Industrial wastewater from paint shop areas is difficult to treat due to its heterogenous nature and pollutant load, and while conventional physiochemical processes are widely used for compliance purposes, they often fail to achieve water quality suitable for internal reuse (Nair K et al., 2021). This situation underscores the need for more sustainable water management strategies aimed at reducing freshwater demand, minimizing environmental footprint, and enhancing circular water use within production systems (Karkou et al., 2024).

Techno-economic and environmental studies suggest that industrial water reuse and recycling can reduce freshwater abstraction and wastewater discharge while supporting resilient resources use (Gulamussen et al., 2019).

This study investigates freshwater consumption and wastewater generation in an agricultural manufacturing company, focusing on the paint shop as a dominant resource-consuming unit.

2 Material and Methods

The study discusses water consumption patterns in an agricultural manufacturing company. Using Minitab software to analyze four years (2022-2025) of operational data, including freshwater extraction, paint shop water consumption, wastewater generation, and painted surface areas. Statistical analysis was conducted using regression and correlation methods to identify relationships between production activities and water use.

In addition to a focused assessment of the freshwater treatment process based on monthly data (2024-2025) evaluated water losses associated with filtration and reverse osmosis system, offering a range for further improvements.

3 Results

The results confirm that the paint shop is responsible for more than 70% of total freshwater consumption during peak production periods. A strong positive correlation ($r = 0.777$) was

identified between painted surface area and freshwater consumption, with a quadratic regression model explaining approximately 66-68% of the variance.

Significant water losses were observed in the treatment process, exceeding 50% due to filtration and backwashing (self-cleaning circulation) operations. These losses increase relatively with production volume, highlighting inefficiencies in the current system.

From an economic perspective, these inefficiencies represent sustainable hidden costs related to water extraction, treatment, and discharge, while also increasing environmental compliance burdens.

4 Conclusions

The study demonstrates that paint shop operations are a critical point for both environmental impact and operational cost optimization. The strong relationship between production activity and water consumption enables predictive management approaches for resource planning.

Reducing water losses through improved filtration efficiency and implementing water recycling systems can significantly decrease freshwater demand and wastewater discharge. From a management perspective, integrating water efficiency into operational strategies supports both sustainability goals and cost competitiveness.

These findings highlight the importance of combining technical analysis with economic and managerial considerations to achieve sustainable industrial water management.

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Decentralisation Reforms in Ukraine under Crisis Conditions: Challenges for Regional Development and Fiscal Sustainability

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Keywords: fiscal decentralisation, local budgets, regional development, intergovernmental fiscal relations, spatial disparities

JEL Classification: H70, H72, R12

1 Introduction

Fiscal decentralisation in Ukraine has undergone significant transformation since the launch of reform in 2014, becoming a key mechanism for strengthening local governance and financial capacity of territorial communities [1]. Under wartime conditions, decentralisation has acquired strategic importance as a tool for maintaining the stability of local public finance systems and ensuring the provision of essential public services [2]. At the same time, crisis conditions have led to a partial reconfiguration of the budget system, reflected in the strengthening of the role of the central government. In particular, the share of central government revenues increased to over 87%, while the share of local budgets declined to below 13%, indicating a shift towards fiscal recentralisation.

The aim of this study is to analyse the transformation of fiscal decentralisation in Ukraine under wartime conditions, with a particular focus on spatial changes in the distribution of local budget revenues and expenditures, as well as their implications for regional development and fiscal sustainability.

2 Material and Methods

The research is based on a combination of comparative, statistical, and structural analysis. The empirical component relies on the assessment of revenues and expenditures of consolidated regional budgets of Ukraine for 2022 and 2025, with a focus on changes in their structure and regional distribution. In addition, a macro-level analysis of the distribution of financial resources between central and local levels of government is incorporated to identify broader trends in the evolution of intergovernmental fiscal relations.

A spatial approach is applied to distinguish between regions with different levels of war-related risk, enabling the identification of differentiated fiscal dynamics across frontline and rear territories.

3 Results

The results demonstrate substantial structural and spatial transformations in Ukraine's public finance system. During the analysed period, local budget revenues increased by approximately

32%, while expenditures grew by nearly 52%, reflecting a significant intensification of fiscal pressures on local governments [3].

At the macro level, the findings confirm a clear trend towards fiscal recentralisation. The share of central government expenditures increased to nearly 88%, while the share of local spending declined to about 12%, indicating a growing concentration of financial resources at the national level.

Additionally, the reallocation of personal income tax from military personnel to the central budget has had a significant impact on local public finances. In 2025, local budgets are estimated to have lost approximately 13% of their potential revenues due to this policy change. At the regional level, a clear spatial asymmetry has emerged. In studies [4; 5] was argued that frontline regions experienced a sharp decline in their role in revenue generation, accompanied by disproportionately high expenditure growth driven by security needs, infrastructure recovery, and support for internally displaced persons. In contrast, relatively safe regions, including the capital city Kyiv, demonstrate increasing shares in total local revenues, reflecting the relocation of economic activity and population flows.

These dynamics indicate the formation of a dual structure of fiscal development, combining centralisation at the national level with increasing differentiation of financial sustainability at subnational level. This tendency reflects a shift from a relatively balanced decentralised model towards a more centralised and spatially differentiated fiscal system.

4 Conclusions

The study confirms that fiscal decentralisation has enhanced the adaptive capacity of local governments; however, wartime conditions have led to partial recentralisation of financial resources and growing spatial disparities. The widening gap between revenue capacity and expenditure needs, particularly in frontline regions, highlights the need for strengthening equalisation mechanisms and improving the coordination of intergovernmental fiscal relations.

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The Evolving Role of Quality Management Systems in SMEs

Digitalization, Artificial Intelligence, and Strategic Value Creation

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Keywords: quality management, SMEs, digitalization, artificial intelligence, sustainability, business management system

JEL Classification: M21

1 Introduction

This paper explores the evolving role of Quality Management Systems (QMS) in small and medium-sized enterprises (SMEs) in the context of digitalization, sustainability, and innovation, with particular attention to the emergence of data-driven and AI-supported decision-making. The study is based on an in-depth interview with a senior manager of a Hungarian based manufacturing or service provider SME's. The aim of the research is to examine how QMS can move beyond a traditional compliance-oriented function and become an active component of business management and strategic decision-making in resource-constrained environments.

2 Material and Methods

The research applies a qualitative methodology using a semi-structured in-depth interview. Interview topics included the dynamic use of QMS, its integration with the Business Management System (BMS), the role of digital data collection, and the potential and practical application of advanced analytics, such as predictive maintenance and AI-based pattern recognition in production and quality data.

3 Results

The findings indicate that the examined QMS has gradually evolved into a strategic management tool. Real-time production and quality data, supported by partially automated and AI-assisted analyses, contribute to waste reduction, cost optimization, and faster managerial decision-making. At the same time, the results highlight that artificial intelligence and digital technologies create value only when they are built on stable, standardized processes; AI alone cannot compensate for poorly designed workflows.

4 Conclusions

The paper concludes that QMS can provide sustainable competitive advantage for SMEs when implemented as a digitally enabled, sustainability-oriented, and AI-supported decision support system closely aligned with corporate strategy.

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Sustainability or Competitiveness? Reframing Vehicle Electrification through Emission Evidence and Supply-Chain Economics

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Keywords: vehicle electrification, sustainability economics, emission measurement, FTIR, circular economy.

1 Introduction

Sustainability transition in automotive is often described as a conundrum: the question is: does a better environmental performance come at the cost of competitiveness? The environmental governance of ICE vehicles has historically been governed by increasingly stringent limits on tailpipe pollutants, fuelling significant progress in combustion and exhaust after-treatment. From a sustainability economics perspective, however, there is diminishing marginal return for this trajectory because with each compliance increase comes reliance upon a greater complexity, material-intensive and, generally, costly technology to treat emissions only at the point of use. This paper employs technical emissions measurement of a diesel engine as a diagnostic of these structural limits, and interprets the results through sustainability economics and supply-chain theory to argue that the expected trade-off is largely internal to the combustion paradigm, with electrification reframing it.

2 Material and Methods

Measurements were performed on an engine dynamometer using a six-cylinder turbo-diesel engine (V6 TDI, EVO3, engine code 059Q) fitted with a production after-treatment train (DOC, DPF, urea-dosed SCR and ammonia slip catalyst). Exhaust composition was recorded with an AVL SESAM Fourier-transform infrared (FTIR) analyser, which resolves regulated and non-regulated species simultaneously and in real time. The sampling head was mounted immediately upstream of the SCR–DPF housing, and 31 cross-sectional sampling points were measured across six angular positions, with sample lines thermally conditioned (about 191 °C) to prevent condensation. Four steady-state operating points spanning low-to-high load and exhaust temperature ($T_3 = 240\text{--}582\text{ °C}$) were defined; at each, CO_2 , NO_2 , NH_3 , SO_2 and the non-regulated by-products N_2O and isocyanic acid (HNCO) were quantified. The combustion data are drawn from the author's prior experimental work [4]; the electrification comparison is developed analytically from the published literature.

3 Results

Overall, over the four operating points the six species have their highest, partially opposing, peak readings. CO_2 rises in a steady fashion with load (about 49,700 to 109,600 ppm), because it is the thermodynamic product of combustion and cannot be removed downstream. Ammonia slip and isocyanic acid (HNCO) also rise with load (NH_3 roughly five-fold), which is explained

by oversupply of reagents at high load. In contrast, NO₂ is non-monotonic, peaking at intermediate temperature (about 164 ppm) and decreasing to the far extremes, and N₂O is highest at cold / low load and decreases with load increase. Further spatial mapping at the SCR inlet revealed that local NO_x-reduction efficiency was highly variable across the catalyst face. Due to the species peak-induced response occurring for different conditions, the treatment of chemically opposed reactions across the entire operating envelope in a single after-treatment train is not feasible: there is no operating point at which all species are minimized at the same time.

4 Conclusions

The FTIR evidence demonstrates that combustion emissions are structurally challenging to control: while species peak under conflicting conditions, compliance can only be obtained by incrementing system complexity that adds precious-metal and ceramic content, calibration effort and cost, and a diminishing environmental payoff. Electrification alters the form of the problem, not its details, instead shifting the environmental cost upstream to electricity generation and battery manufacture — fewer, larger, visible nodes that may be monitored, decarbonised and centrally managed. The bottleneck in the battery supply chain is the circular economy (recycling, second-life use and closed-loop flows), which achieves over a period of both operational and sustainable performance improvement through implementation, and firm-level evidence that circularity is linked to sustainable performance and competitiveness [1, 2]. At the system level, therefore, sustainability and competitive performance are more closely related to each other rather than competing priorities. The analysis is constrained by its single-engine, steady-state nature and its analytical (and not primary) handling of the electrification side; future work should generalize to transient and on-road conditions and to total-cost-of-ownership analysis.

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AI Awareness and Perceptions Among HR Professionals in Ghana: Understanding Adoption Drivers, Risks, and Ethical Concerns

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Keywords: Artificial Intelligence, HRM, Ghana, AI adoption, ethics, perceptions, digital transformation.

JEL Classification: J24, M15, O15, 033

1 Introduction

Artificial Intelligence (AI) is redefining the functional and strategic landscape of Human Resource Management (HRM), enabling automation, predictive analytics, and enhanced decision-making capabilities (Alsaif & Aksoy, 2023; Mahabub Basha et al., 2025). While the global discourse increasingly frames AI as a strategic enabler of organizational performance, its adoption remains uneven, particularly in developing economies where structural constraints persist.

In Ghana, AI adoption in HRM is shaped by infrastructural limitations, skill deficits, and organizational readiness challenges (Simon et al., 2025; Owor et al., 2025). Although awareness of AI is increasing, it is frequently characterized by limited practical engagement, resulting in a disconnect between perceived potential and actual implementation.

2 Material and Methods

This study employed a quantitative cross-sectional survey design to examine AI awareness, perceptions, and adoption intentions among HR professionals in Ghana. Data were collected online from 184 respondents, using a structured questionnaire with Likert-scale items ranging from 1 (strongly disagree) to 5 (strongly agree). The instrument captured key constructs including AI awareness (familiarity, exposure, and training), perceived benefits (efficiency, decision-making, service quality), perceived risks (e.g., cost, bias, privacy concerns), and organizational adoption factors (infrastructure, management support, and investment in digital technologies). A non-probability sampling approach, combining convenience and purposive techniques, was used to target relevant HR practitioners across different organizational contexts (public, private and multinational sectors).

The collected data were analyzed using descriptive statistics, correlation analysis, and multiple regression techniques.

3 Results

The findings reveal a structural paradox: although perceived usefulness of AI is high, adoption remains low due to organizational constraints. Contrary to dominant TAM-based assumptions, individual-level factors (awareness and perceived benefits) exhibit weaker explanatory power, while organizational variables specifically digital investment, infrastructure, training, and leadership support emerge as the primary determinants of adoption intention. The study advances AI adoption literature by demonstrating that in developing economy contexts, organizational readiness overrides attitudinal drivers, thereby extending TAM through a

context-sensitive TOE integration. The results highlight the need to reposition AI adoption as a structurally conditioned process rather than purely a behavioral outcome.

4 Conclusions

This study examined the level of AI awareness, perceptions, and adoption intentions among HR professionals in Ghana, with particular attention to the relative influence of individual and organizational factors. The findings indicate that while awareness of AI is moderate, perceptions of its benefits especially in terms of efficiency, decision-making, and service quality are strongly positive. This aligns with prior research suggesting that perceived usefulness remains a central driver of technology acceptance (Davis, 1989; Venkatesh et al., 2003; Marler & Boudreau, 2017).

A key contribution of this study lies in demonstrating that organizational factors exert a stronger influence on AI adoption than individual-level perceptions. Variables such as digital investment, employee training, infrastructure availability, and top management support were found to be the most significant predictors of adoption intention. These findings reinforce the explanatory strength of the Technology Organization Environment (TOE) framework (Tornatzky & Fleischer, 1990) and suggest that, in this context, technology adoption is primarily shaped by organizational readiness rather than individual willingness.

These results further suggest that existing technology adoption models require contextual adaptation when applied to developing economies. Specifically, the findings highlight the need to shift from perception-driven explanations toward structurally grounded frameworks. From a practical perspective, the study underscores the importance of investing in digital infrastructure, workforce capability development, and leadership alignment. Without these foundational elements, positive attitudes toward AI are unlikely to translate into meaningful adoption.

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Adoption motivation of New Technologies in Agriculture: the case of Soil Bacterial Preparations

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Keywords: Sustainability, Agriculture, Soil health, Adoption, Farmers, Policy, Climate

JEL Classification: O14, O32, Q12, Q16

1 Introduction

Climate change, the increasing frequency of drought periods, and regulatory frameworks of the European Union [4] are compelling farmers to become more open to the adoption of new technologies. This trend is also supported by the scientific literature: the growing demand for healthy food systems, coupled with extreme weather conditions, makes the transition to sustainable production increasingly urgent. At the same time, there is limited domestic research examining how this pressure is perceived by Hungarian farmers. However, international evidence suggests that producers guided by an ecological mindset and those more receptive to technological innovation tend to adopt microbiological solutions more rapidly, whereas traditionally conventional farmers do so at a slower pace. This topic warrants further investigation in the Hungarian context as well.

Soil bacterial preparations are one possible response to these challenges. These microbial inputs are promoted as tools that may support nutrient cycling, improve soil biological activity, enhance fertilizer efficiency, increase water retention, and strengthen resilience to climatic stress [5]; [6]. However, their effectiveness may depend on soil type, weather conditions, crop system, product quality, and application practices [3]; [7]. Farmers' confidence in these products is therefore shaped not only by environmental concerns, but also by perceived costs, uncertainty about long-term benefits, access to trustworthy information, and confidence in product claims [9]; [12]; [9]; [8].

2 Material and Methods

This study employed Q-methodology to collect data on farmers' subjective perspectives regarding soil bacterial preparations (SBPs). Q-methodology, originally developed by [11] and further elaborated by Brown (1986), is particularly suited to capturing and analyzing individual viewpoints. It integrates both qualitative and quantitative elements; however, it is primarily classified as a qualitative research method due to its focus on the subjective nature of attitudes and opinions. Q-methodology uses a forced distribution that requires participants to compare and rank statements relative to one another. By systematically revealing clusters of shared perspectives, Q-methodology provides valuable insights into how individuals with diverse backgrounds perceive complex issues [2]. Its capability to produce evaluable results from relatively small participant samples makes it especially advantageous in agricultural contexts, where farmers often have limited availability for extensive data collection. The core

components of Q-methodology are the Q-sort procedure for data collection and the subsequent Q-factor analysis for data evaluation [11]; [2]; [1].

The study asked 20 farmers from Tolna County. The Q-set consisted of 23 statements concerning soil bacterial preparations and related agricultural issues. The statements were developed from three sources: previous literature on microbial products and sustainable farming, insights from farmers, and policy discussions related to agricultural sustainability. The aim was to include a broad range of possible views, including supportive, skeptical, economic, environmental, practical, and regulatory perspectives.

3 Results

By segmenting respondents into three distinct factors (F1, F2, and F3), we can better understand the diversity of beliefs, attitudes, and practices that shape farmer decision-making. The three viewpoints are interpreted as F1: Practical soil-oriented adopters, F2: Climate-conscious economic pragmatists, and F3: Credibility-sensitive cautious adopters. These labels are interpretive: they refer to shared patterns in how farmers ranked the statements, not to fixed or homogeneous farmer categories.

F1 farmers demonstrate a strong commitment to soil stewardship and a clear belief in the importance of climate change adaptation. They view natural fertilizing agents, soil-friendly agrotechnical measures, and, to a moderate extent, bacterial preparations as meaningful routes to improve soil health and resilience.

F2 farmers are confident in microbial soil amendments, believe that adoption does not hamper normal operations, and perceive Hungarian soils as sufficiently degraded to warrant the use of innovative practices. They strongly recognize climate change as an ongoing challenge and appear keen to address it through advanced agronomic solutions.

Farmers in F3 could be described as pragmatic technology adopters. They recognize the importance of trusting a product's scientific foundation but are less convinced by broad sustainability claims.

4 Conclusions

It is important to emphasize that the adoption of microbiological preparations and innovation extends beyond the agricultural sector, serving broader societal and ecological objectives. The scientific literature highlights that the sustainable enhancement of soil biological productivity contributes to halting soil degradation and achieving climate change targets, while also supporting the production of healthy food without compromising production efficiency. From a corporate perspective, incentives may include market development measures that provide discounts or guarantees to farmers who apply biological soil conditioners. This aligns with the findings of [6], which underline that the diffusion of sustainable innovations critically depends on appropriate incentive systems (such as subsidies and market-based offers) and the role of corporate innovation partners.

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Integrating Economic and Social Impacts into Sustainable Ragweed Control Decisions

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Keywords: ragweed control, sustainable management, externalities, cost-benefit analysis, *Ambrosia artemisiifolia*

JEL Classification: Q51, Q57, Q18, I18, H23

1 Introduction

Ragweed (*Ambrosia artemisiifolia*) represents one of the most significant invasive plant species in Europe, posing serious environmental, agricultural, and public health challenges. Its spread leads to considerable economic losses in agriculture, while its highly allergenic pollen contributes to increasing healthcare costs and broader societal burdens [1]. Management decisions are still frequently based on short-term efficacy and direct treatment costs, while the wider economic and social consequences [2] of different control options are only partially considered.

2 Material and Methods

The study is designed as a comparative, territory-specific assessment of chemical, mechanical, and biological (bioherbicidal) control options. Relevant literature is identified using the Elicit search tool, complemented by scientific databases (e.g., Scopus, Web of Science) to collect peer-reviewed studies on ragweed control methods and their impacts. Field observations and planned experiments are conducted in the Danube–Tisza Interfluvium across arable land, horticultural areas, protected natural sites, and urban green spaces. The evaluation is supplemented with secondary data on public health burdens, land-use restrictions, and economic consequences. Effectiveness is assessed using indicators such as ragweed cover, plant density, regeneration, and soil seed bank dynamics [3]. The economic analysis follows a cost–benefit approach, including direct costs (materials, labour, machinery) and selected external effects such as avoided yield loss and reduced exposure risk. The outcome is a decision-support matrix ranking feasible interventions by land-use type.

3 Results

The ongoing doctoral research indicates that a single "best" ragweed control method is unlikely to exist across all territory types. In arable settings, chemically supported [4] integrated solutions may remain competitive because of their rapid impact, but their relative advantage narrows when repeated application needs and environmental risks are considered. In protected

areas and urban green spaces, biological solutions are expected to gain relevance because legal and ecological restrictions limit chemical use.

4 Conclusions

Sustainable ragweed management requires decisions that simultaneously consider biological effectiveness, economic efficiency, and social consequences. Existing research primarily focuses on technical efficiency, while the analysis of social and economic impacts is less emphasized and fragmented; a more comprehensive exploration of these aspects could be supported by a future bibliometric analysis conducted using VOSviewer software.

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The role of Payments for Forest Ecosystem Services Schemes in enhancing sustainability, competitiveness and ecotourism in private forestry

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Keywords: forest ecosystem services, payment schemes, ecotourism

JEL Classification: Q23, Q26, Q28

1 Introduction

This study aims to examine how Payments for Forest Ecosystem Services (PES) can affect the economic situation of private forest owners and how they may improve their competitiveness, with a particular focus on ecotourism development. The research relies on literature and policy sources. The various types of programs were examined in light of the EU Commission's guidelines on PES [1] as well as through literature reviews and research based on case studies, with a focus on their role in providing ecosystem services. [5] The analysis also reviews European best practices and their potential for adaptation in the Hungarian context in the field of forest ecotourism. [5] The results highlight how these systems can strengthen the non-economic (social and recreational) functions of forests. [5]

2 Material and Methods

This study is based on key policy documents of the European Commission, including the "Guidance on the Development of Public and Private Payment Schemes for Forest Ecosystem Services" and the report "Payment Schemes for Forest Ecosystem Services – Support for Implementing the New EU Forest Strategy for 2030". [1] [4] In addition, case studies provided by Forest Europe and other relevant literature were analysed. The research applies a qualitative approach based on literature review and comparative analysis of selected European best practices with a focus on applicability to Hungarian forest management. [2]

3 Results

The results show that PES are becoming increasingly common in Europe, providing financial incentives to support sustainable forest management and the multifunctionality of forests. [1] Based on the European best practices examined, these schemes can contribute to the diversification of private forest owners' income, thereby increasing their competitiveness. [1] At the same time, their operation and effectiveness vary across countries, and they often focus on a single ecosystem service. [1] The results highlight the importance of stable financing, an appropriate regulatory framework, and cooperation among stakeholders. In many cases, the models examined could be adapted in Member States where mature systems have not yet been established (such as Hungary) particularly with regard to the development of forest ecotourism. [2]

4 Conclusions

The main conclusions suggest that PES schemes can play a key role not only as an additional income source but also as a strategic tool for strengthening the multifunctional use of forest. In this study the author focuses on the social-recreational functions (ecotourism). Their application can contribute to the development of forest-based ecotourism and to improving the competitiveness of private forest owners, while reflecting country-specific conditions. There are good examples in many countries, however, regarding the development of ecotourism, successful projects can be identified in Denmark, Norway, Finland, and Croatia. [2] [3]

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Tool-Based Balanced Scorecard Mapping of Succession Planning: Lessons from Large Firms for SME Application

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Keywords: succession planning, Balanced Scorecard, management control, small and medium-sized enterprises (SMEs)

JEL Classification: M10, M41, D22

1 Introduction

Succession planning in small and medium-sized enterprises (SMEs) is typically approached as a human resource or ownership-related issue, while the effects of leadership or generational transition permeate the entire organizational operation. Decision-making mechanisms, the stability of operational processes, trust in customer relationships, and the distribution of organizational knowledge are all affected during succession, therefore its evaluation cannot be reduced exclusively to financial performance indicators (Berns & Klarner, 2017). This study is based on the assumption that succession planning can be interpreted as a complex set of interventions, whose effects are realized through interrelated chains of organizational tools and implementation steps (Fernández-Aráoz et al., 2015). The objective of the research is to examine how, through selected and scientifically documented leadership transition cases of large corporations and multinational companies, organizational tools and solution patterns can be identified that when interpreted along the perspectives of the Balanced Scorecard provide guidance for designing succession planning toolsets across different organizational situations, maturity levels, and leadership characteristics. To achieve this, the study applies an extended Balanced Scorecard-based strategic map augmented with a tool-level perspective, which not only defines strategic objectives and performance indicators but also explicitly links them to implementation steps and underlying organizational instruments (Kaplan & Norton, 2001).

2 Material and Methods

The methodology is based on a systematic literature review, complemented by an analytical presentation of selected large-firm leadership transition cases, including Microsoft, Nestlé, General Electric, and IBM. These cases serve as analytical illustrations to explore how individual succession-related tools are capable of generating specific effects, how they can be linked to different Balanced Scorecard perspectives, and which structural similarities can be identified across diverse organizational contexts (Kaplan & Norton, 1992). In addition, the study examines through the constructed strategic maps the outcomes of the compound effect chains generated by the combined application of succession-related tools.

3 Results

The results indicate that a tool-based strategic map developed from a specific corporate example can effectively support the structuring of succession planning decisions, particularly in situations where the applicable toolset must be determined across different sectors, organizational maturity levels, or firm sizes. The analysis suggests that succession practices applied by large corporations differ from those of SMEs not in their content, but primarily in their degree of formalization. With appropriate adaptation, these practices may contribute to a smoother leadership or generational transition and help mitigate the risk of impairing financial objectives during the succession process.

4 Conclusions

The study concludes that the application of a tool-based Balanced Scorecard strategic map provides a suitable framework for the structured interpretation of succession planning effect mechanisms, especially in contexts where organizational settings, maturity levels, and leadership characteristics vary. The analyzed large corporate and multinational leadership transition cases highlight that key succession tools—such as knowledge transfer mechanisms, the formalization of decision-making processes, and management control instruments—exhibit structural similarities regardless of firm size, while their level of formalization differs substantially across organizational contexts.

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SAS Modernisation for Banks, Insurers & Financial Institutions

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Keywords: SAS modernization, cloud-native analytics, data lakehouse, model risk governance, financial AI migration.

JEL Classification: M15, G21, G32

1 Introduction

Financial institutions face accelerating pressure in 2025 to modernize legacy SAS-based analytics infrastructures amid surging AI adoption, cloud rationalization, and stringent regulatory demands for model transparency and risk governance [5], [6]. Historically, SAS served as a defining technological pillar of financial analytics, particularly excelling in risk calculation models, data quality control routines, and the generation of regulatory reports [8]. However, legacy architectures built on SAS—especially SAS 9 and mainframe-based deployments—increasingly confront limitations arising from deficiencies in scalability, agility, and innovation, which no longer align with modern IT strategies [9]. This study addresses this imperative by evaluating the strategic, technical, and regulatory factors enabling financial institutions to migrate from legacy SAS-based environments to cloud-native data platforms optimized for scalability, AI integration, and model governance [1], [3].

2 Material and Methods

This research synthesizes contemporary evidence on successful SAS-to-cloud transitions by comprehensively reviewing industry reports, regulatory guidelines, and case studies [4], [7]. The methodology focuses on delineating strategic pathways that integrate technical refactoring with organizational change management. Through this systematic evaluation, the study identifies best practices, cost frameworks, and risk mitigation strategies underpinning successful migrations. It critically examines how traditional SAS deployments confront modern demands for real-time processing, elastic resource allocation, and explainable AI workflows, and how new platforms address these challenges [2], [10].

3 Results

The analysis reveals that modern data platforms, leveraging cloud elasticity, enable the dynamic scaling of resources necessary to manage fluctuating loads in risk management, fraud detection, and capital calculation processes [10]. These cloud-native ecosystems offer unified handling of diverse structured and unstructured data sources and deliver cost-efficiency advantages through pay-per-use models. Furthermore, transitioning to lakehouse architectures resolves inherent SAS limitations, such as monotonous batch-oriented processing and vendor lock-in, by consolidating business reporting, advanced analytics, and AI model training onto a single platform [2]. Modern platforms also directly support stringent model risk governance by

incorporating embedded model documentation, continuous performance monitoring, and detailed audit trails, which are essential for meeting the latest supervisory expectations for transparent AI decision logic [4].

4 Conclusions

The migration from legacy SAS environments to modern data platforms is not merely a technological substitution, but a holistic organizational transformation that requires strategic planning, change management, and workforce upskilling. Embracing cloud-native, AI-ready data architectures has evolved into a strategic necessity for financial institutions aiming to sustain innovation and competitive advantage [5], [7]. This digital evolution ensures elasticity, large-scale machine learning execution, stringent security controls, and secure organization-wide collaboration, effectively preparing institutions for future market challenges and evolving regulatory frameworks [6].

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Trust, Communication and Knowledge Sharing and their Effect on the Success of Wineries

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Keywords: knowledge sharing, trust, communication, wineries, SMEs.

JEL Classification: M1, M10

1 Introduction

Knowledge sharing has become increasingly important for businesses, including those in agriculture, since technological development has accelerated competition. Organizations that are able to transform data into usable knowledge can gain considerable competitive advantage, which is also true in the wine sector. From a knowledge management perspective, wineries typically operate as SMEs, where knowledge processes have specific characteristics. SMEs often manage knowledge informally and spontaneously rather than through formalized systems, while decision-making is centralized and strategic planning is frequently neglected by limited resources and time (Desouza – Awazu, 2006; Durst – Edvardsson, 2012). At the same time, trust and communication within and between SMEs play a key role in the efficiency of knowledge sharing (Killingsworth, Xue & Liu, 2016; Nanduri - Rincón, 2026). The main objective of this study was to explore how trust and communication influence knowledge management in Hungarian and Slovak wineries, and whether these factors contribute to their success.

2 Material and Methods

Primary data collection was carried out using a structured questionnaire survey and follow-up qualitative interviews. The sample included 239 wineries from Hungary and Slovakia, covering all major wine regions. To test the relationships between trust, communication, knowledge sharing and the feeling of being successful, path analysis was applied using regression-based modelling. In the models, trust and communication were exogenous variables, knowledge sharing as a mediating endogenous variable, and subjective success as the dependent variable. Subjective success was measured through respondents' self-evaluation compared to other wineries in their region, based on several indicators. Two path analyses were carried out: one focusing on relationships within wine regions, and another focusing on wineries working with similar technologies.

3 Results

The findings confirm that trust and communication have a statistically significant and substantial effect on the level of knowledge sharing among wineries. Within wine regions, trust and communication together explained more than 45% of the variance in knowledge sharing (Adjusted R²=0.448). Trust had a stronger standardized effect ($\beta=0.535$) than communication ($\beta=0.206$), highlighting the central role of interpersonal and inter-organizational trust in

facilitating knowledge transfer. Regarding success, the results show that knowledge sharing and trust contribute positively, although their explanatory power remains limited. In the within-wine region model, trust had a weak but significant direct effect on success ($\beta=0.198$), while knowledge sharing also showed a weak significant effect ($\beta=0.197$). Communication did not directly influence success perceptions. Overall, the combined explanatory power of trust, communication and knowledge sharing on subjective success was low (Adjusted $R^2=0.071$), suggesting that success is largely determined by further external or internal factors beyond the scope of our model. In the model examining wineries with similar philosophies, communication did not show significant effects. Trust remained the dominant driver of knowledge sharing ($\beta=0.385$), while knowledge sharing remained the only significant predictor of success ($\beta=0.215$). These results support the argument that SMEs' knowledge management processes rely heavily on tacit knowledge exchange embedded in trust-based relationships rather than formalized systems (Durst et al., 2023).

4 Conclusions

The research demonstrates that trust is the most influential factor supporting knowledge sharing in wineries, and communication plays a secondary but still relevant role, which depends on the relational context. Trust, communication and knowledge sharing contribute to success, but only to a limited extent, suggesting that the feeling of success in wineries is shaped by other factors. The results support SME-focused knowledge management literature, suggesting that informal and relationship-based knowledge exchange is central in SMEs (Durst – Edvardsson, 2012; Coyte et al., 2012). For wineries, strengthening trust-based cooperation networks may be more effective than investing in formal knowledge management systems. Future research could deal with financial performance indicators to test whether the identified relationships also contribute to economic success.

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Robots in the Hospitality Industry: Trends, Experiences, and Future Prospects Focusing on Japan

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Keywords: service robots, hospitality industry, Japan

JEL Classification: Z3 Tourism Economics, Z32 Tourism and Development

1 Introduction

Advances in robotics and artificial intelligence over the past decade and a half have had a significant impact on the hospitality industry. The number of studies covering the use of service robots in tourism and hospitality has also grown steadily [1].

2 Material and Methods

Based on several hundred pieces of literature on the subject, current research trends and future research directions are emerging. The proportion of specific case studies is relatively low, and the studies indicate that while the use of robots in hospitality is a dynamically developing field, it is not yet fully mature [2].

3 Results

Japan is a global leader in robotics, a country that stands out not only in terms of the development of service robots but also in terms of their areas of application. The world's first robot-operated hotel opened here in 2015 [3].

Highlighting Japan's leading role in innovation, this presentation/study/paper examines the impact of service robots on key areas of tourism management, with a particular focus on guest experience, service quality, operational efficiency, and human resource management [4].

4 Conclusions

The research findings indicate that service robots have significant potential in the hospitality industry, particularly in Japan, where social and economic conditions are conducive to their use. An important finding for tourism management is that service robots have a place in the hospitality industry, but rather than full automation, they should be used only for specific tasks, and in the future, the issue of integrated human-robot collaboration must become a priority area.

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Bundling Strategies and Brand Equity in Telecommunications: Value Creation or Customer Lock-In?

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Keywords: Bundling, brand equity, telecommunications, customer lifetime value, switching costs

JEL Classification: M31, L96, G32

1 Introduction

Telecommunications markets in Europe, and particularly in Central and Eastern Europe, have reached a mature and highly saturated stage, where competition is increasingly driven by customer retention rather than acquisition. In this oligopolistic environment, service bundling—defined as the integration of mobile, fixed broadband, television, and digital services into a single offer—has become a dominant strategic tool.

Bundling effectively reduces churn and increases average revenue per user (ARPU), its impact on long-term brand equity remains ambiguous. This paper addresses a critical research gap by examining whether bundling strategies contribute to genuine consumer value and brand equity development, or primarily function as customer lock-in mechanisms through increased switching costs.

The study focuses on the Hungarian telecommunications market as a representative case of a converging CEE environment and aims to integrate marketing and financial perspectives by linking bundling strategies to customer lifetime value (CLV), churn dynamics, and brand perception indicators.

2 Material and Methods

The study applies a mixed-method approach to capture both the financial and perceptual dimensions of bundling strategies.

In the quantitative phase, secondary market data from the Hungarian telecommunications sector (2024–2026) are analyzed, including reports from the National Media and Infocommunications Authority (NMHH) and financial disclosures of major service providers (Magyar Telekom, Yettel, Vodafone/4iG). The analysis focuses on the relationship between bundling adoption and key performance indicators such as customer lifetime value (CLV), average revenue per user (ARPU), and churn rates. In the qualitative phase, comparative case studies are conducted to examine the structure of bundled offerings, loyalty programs, and integrated marketing communication strategies. To capture consumer perceptions, the study incorporates survey-based measurements of brand equity dimensions (e.g. perceived value, trust, and loyalty), following established frameworks by Aaker (1991) and Keller (1993). The relationships between bundling intensity, switching costs, and brand-related outcomes are further analyzed

using structural equation modeling (SEM), allowing the identification of direct and indirect effects between financial and perceptual variables.

3 Results

The expected results suggest that bundling strategies have a dual impact on firm performance and brand equity.

First, it is anticipated that higher levels of service integration will be positively associated with increased customer lifetime value (CLV) and reduced churn rates, confirming the short-term financial benefits of bundling.

Second, the analysis is expected to reveal that the positive impact of bundling on brand equity is mediated by perceived value and transparency. In cases where bundling enhances convenience and service synergies, it contributes to genuine brand loyalty. However, when bundling primarily increases switching costs without clear consumer benefits, it is likely to generate “calculated loyalty” rather than emotionally driven brand attachment.

Third, the SEM analysis is expected to demonstrate that switching costs act as a moderating variable between bundling intensity and brand perception. High switching costs may strengthen retention metrics while simultaneously weakening trust and long-term brand equity.

These findings aim to differentiate between value-driven bundling strategies and lock-in-based approaches, providing a more nuanced understanding of their impact on both financial performance and brand strength. The study therefore contributes to the literature by conceptually separating value-driven and lock-in-driven bundling strategies and linking them to both financial and perceptual performance outcomes.

4 Conclusions

The findings highlight the strategic trade-off between short-term financial performance and long-term brand equity in telecommunications markets. While bundling remains an effective tool for increasing customer retention and revenue stability, its long-term success depends on its ability to create genuine consumer value rather than relying on switching barriers.

From a managerial perspective, telecommunications companies should design bundling strategies that emphasize transparency, flexibility, and real service synergies. From a financial and controlling perspective, traditional CLV models should be extended to incorporate brand perception variables, as reliance on lock-in mechanisms may conceal long-term risks.

From a regulatory perspective, the results underline the importance of balancing market efficiency with consumer autonomy in increasingly concentrated telecommunications markets. Future research should explore the role of AI-driven personalized bundling and its implications for consumer decision-making and perceived fairness.

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Comparative analysis of companies' digital maturity levels within the V4 countries

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Keywords: Digitalization, V4 countries, , ICT tools, data protection

JEL Classification: Entrepreneurship, small business management and digitalization

1 Introduction

Digitalization has by now become deeply embedded in the corporate processes. To ensure the long-term competitiveness, continuous development and adoption of digitalization and automation are essential. This phenomenon is not just limited to Hungary, but it affects companies' life cycles globally as well. At the same time, it is necessary to ensure the proper storage of digitalized data to mitigate the risk of cyberattacks, thereby protecting the employees' personal data as well as strictly confidential internal corporate information (Beregi). In my research, I examine the impact of digitalization on the Visegrád Four, namely companies operating in Hungary, the Czech Republic, Poland, and Slovakia. I compare these countries by analyzing the level of digitalization across companies of different sizes, as well as the financial and IT literacy of employees (Beregi).

Digitalization and data protection extend broadly across the companies and their internal processes. Many companies use large volumes of ICT tools, making employee education essential, as insufficient awareness of potential risks may result in breaches of data protection regulations. From a data security perspective, finance, accounting, and human resources departments are among the most critical functional areas within organizations (Kovács).

2 Material and Methods

My primary research question focuses on the extent to which digitalization is present within companies in the V4 countries. Furthermore, I examine the challenges associated with corporate data retention. The research is supported by the Digital Economy and Society Index (DESI) report published by the European Union, which not only provides a comparative analysis of all Member States but also offers detailed country-specific reports highlighting the distinctive characteristics of each nation (DESI 2024).

The Digital Economy and Society Index (DESI) is a composite index developed by the European Commission, consisting of a series of reports that assess and rank the digital performance of EU Member States. Its primary objective is to monitor, on an annual basis, the level of digital development across the Union using a range of business-related indicators. The DESI framework is structured around four key dimensions: digital skills, digital infrastructure, the digital transformation of businesses, and the digitalization of public services (DESI 2024).

3 Results

The results of this research provide a comparative analysis of the countries over the past 15 years. Firms were categorized into two groups: those employing between 10 and 249 employees, and those with more than 249 employees. Overall, the highest levels of digital maturity are found in the Czech Republic and Poland, followed by Hungary, while Slovakia ranks lowest (DESI 2024, Eurostat).

4 Conclusions

Cybercrime can be effectively countered through financial and digital literacy. One of the most effective tools for crime prevention is a well-developed financial culture. In addition to adequate financial knowledge, appropriate financial behavior and attitudes are also necessary. Due to the rapidly developing digitalization, online goods and services have come to the forefront. The development of related skills has received significant emphasis across all age groups (Sárközy).

Since the Czech Republic and Poland ranked at the top, it would be advisable to consider adapting the systems operating in these countries to Hungary as well (Sárközy).

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Biodiversity as Critical Infrastructure: Implications for Supply Chains and Competitiveness

From a Transport Hubs to Data Centers: Why Ecological Risks Remain Underpriced

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Keywords: biodiversity risk, supply chains, infrastructure, AI, natural capital

JEL Classification: Q57, Q54, and R42

1 Introduction

As businesses increasingly rely on both physical and digital infrastructure to sustain global supply chains, biodiversity risks embedded within these systems remain largely underrecognised in management decision-making. While climate risks have gained prominence, biodiversity continues to be treated as a secondary concern despite its direct implications for economic performance and competitiveness.

Recent research shows that biodiversity loss generates both physical and transition risks affecting productivity, regulation and market outcomes [1]. However, its integration into corporate and financial decision-making remains partial and inconsistent. This paper argues that biodiversity is best understood as critical infrastructure underpinning supply chains, and that its risks are systematically underpriced.

2 Material and Methods

The study adopts a conceptual and comparative analytical approach, combining literature review with illustrative case analysis across three infrastructure types:

1. The Strait of Hormuz as a benchmark for well-priced geopolitical risk
The Panama Canal as an example of ecological dependency in global trade
Emerging AI infrastructure, particularly data centres, as a growing source of resource pressure.
2. The analysis is complemented by consideration of emerging frameworks, including the Corporate Sustainability Reporting Directive and the Taskforce on Nature-related Financial Disclosures [3].

3 Results

Three key findings emerge. First, biodiversity underpins both traditional and emerging infrastructure. The Panama Canal illustrates how freshwater availability from surrounding ecosystems directly constrains global shipping capacity. Similarly, AI infrastructure introduces increasing dependencies on water and energy systems, linking digital expansion to ecological limits.

Second, ecological risks are systematically underpriced. While geopolitical risks, such as disruptions in the Strait of Hormuz, are rapidly reflected in markets, biodiversity-related risks remain weakly integrated into financial and operational decision-making. Unlike geopolitical disruptions, which may be addressed through political or diplomatic intervention, ecological degradation, such as the loss of forest systems supporting the Panama Canal water needs, can take at least decades to restore, creating longer-term constraints on infrastructure performance.

Third, supply chains are the main pathway through which biodiversity risks affect business operations, including access to freshwater resources on which AI data centres rely. As most corporate impacts and dependencies on nature occur within value chains, procurement and supplier management functions are critical for identifying and managing these risks, yet often lack adequate data and tools [4].

4 Conclusions

Biodiversity is transitioning from a sustainability concern to a determinant of infrastructure resilience and business competitiveness, yet current frameworks fail to capture its systemic role. This paper proposes reframing biodiversity as infrastructure, rather than as an external environmental factor.

This shift highlights the need to integrate biodiversity into supply chain management, infrastructure planning and corporate strategy, and to align technological innovation, including AI development, with ecological constraints. Improving data systems and embedding biodiversity into decision-making are essential to ensure resilient supply chains and sustained competitiveness.

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Artificial Intelligence in Zoo Animal Welfare Assessment

From Monitoring Tool to Ethical and Management Decision Support

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Keywords: artificial intelligence, zoo animal welfare, ethical management, decision support, social legitimacy

JEL Classification: Q57, O33, M15

1 Introduction

Assessing animal welfare is a fundamental element of modern zoological institutions' operations and holds not only ethical but also economic and social significance. Zoos' long-term sustainability increasingly depends on their ability to ensure and credibly demonstrate high welfare standards, which directly influence their social legitimacy ("license to operate"). [1] Traditional welfare assessment methods rely primarily on manual behavioral observations, which are time-consuming, subjective, and temporally limited. The diversity of species and housing conditions further complicates standardized monitoring. [2] Artificial intelligence (AI), especially computer vision and machine learning, enables continuous, non-invasive data collection and analysis. However, an important question is whether AI can support not only measurement but also the ethical and managerial interpretation of welfare. [3]

This study examines AI as both a monitoring and a decision-support tool for zoo animal welfare.

2 Material and Methods

The study is based on a narrative literature review of AI-based animal monitoring systems across zoos, livestock farming, and companion animals.

The analysis follows three dimensions:

1. technological capabilities (behavior detection, individual identification),
2. interpretive and ethical limitations (linking behavior to welfare states),
3. management and social implications (decision support and legitimacy).

A conceptual framework was developed that distinguishes between measurement, interpretation, and decision-making levels.

3. Results

AI systems significantly improve welfare monitoring by enabling continuous observation, early detection of issues, and more objective data analysis. [4] They can identify behavioral patterns and enhance efficiency. However, their interpretive capacity is limited. Animal welfare is multidimensional, and behavioral data alone are insufficient without physiological and environmental context. [5]

This limitation is critical from an ethical perspective, as welfare assessment involves value-based judgments that AI cannot fully capture. Thus, AI cannot replace human expertise. Its

main potential lies in decision support: improving efficiency, reducing labor needs, and mitigating risks. Additionally, AI can enhance transparency by providing data-driven evidence of welfare performance, strengthening public trust and social acceptance.

4 Conclusions

AI has strong potential for zoo animal welfare systems, but it currently functions mainly as a monitoring tool. A key challenge is bridging the gap between measurement and interpretation. Animal welfare is not only a technical issue but also a determinant of ethical and social legitimacy. AI can contribute to transparency and sustainability, but responsible use requires further development. Future research should focus on species-specific models, multimodal data integration, and explainable, ethically informed AI systems.

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Analysis of ESG rating frameworks relevant to insurers using a case study

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Keywords: insurance, ESG rating, reporting, sustainability

JEL Classification: G22 (Insurance; Insurance Companies; Actuarial Studies), M14 (Corporate Culture; Diversity; Social Responsibility)

1 Introduction

In the EU the CSRD aims to provide stakeholders with clear, comprehensive, and standardized sustainability data, ensuring that insurers are held accountable for their role in promoting sustainability. The activities of ESG rating providers are crucial in creating real transparency. In 2026, the ESG ratings has become more regulated and distinct. Following the ESMA (European Securities and Markets Authority) oversight rules that took full effect this year, these providers are now more transparent about their methodologies, allowing for a sharper comparison [3].

The aim of this paper is to provide an overview of the ESG rating frameworks relevant for insurers, and also to demonstrate them in practice through a case study.

2 Material and Methods

We have collected, analyzed and compared the relevant ESG rating frameworks, especially:

- CDP (Carbon Disclosure Project)
- MSCI ESG Ratings
- Sustainalytics' ESG Risk Ratings
- ISS ESG Corporate Ratings
- VÖNIX-VBV Austrian Sustainability Index.

We have also studied the international scientific papers [1], [4] and other industry reports [2] and practical guides, although the available literature is very limited, because of the new and relatively narrow nature of the research area.

In order to prepare the case study, we have analyzed the sustainability reports of selected insurers from an ESG rating perspective.

3 Results

Different ESG rating methods have different focuses and partly also different goals [5]. As a result of research and analysis, we present the main features of each methodology, point out the differences between them and compare them in a transparent way.

Through publicly available assessments of the insurers selected in the case study, we demonstrate how the ESG standards and preparedness of individual companies become transparent and comparable for investors and all interested parties.

4 Conclusions

The ESG rating frameworks aim to turn partly qualitative data into quantitative signals that can be used to price insurance, value stocks, and manage global risk.

Major insurers measure themselves using multiple ESG rating frameworks, as each method has a different focus. The combination of these assessments using different methods gives a good total picture of the company and makes it transparent in which aspects the company's level of development is in terms of ESG.

Effective comparison of individual insurers can be prepared based on ratings made using the same framework.

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Examination of the relationship between ESG and corporate performance based on the Web of Science database

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Keywords: ESG, corporate performance, industry 4.0, bibliometric analysis, sustainability

JEL Classification: M14, Q56, L25

1 Introduction

ESG is a set of environmental, social and governance frameworks. In the global manufacturing industry, this system is no longer just an ethical commitment. It creates a basic condition for long-term economic competitiveness. The research aimed to explore how sustainability aspirations appear in the international literature and how they affect corporate performance. I pay special attention to technological innovations, primarily Industry 4.0 solutions, which form a bridge between ESG goals and financial efficiency through digitalization and data-driven decision-making.

2 Material and Methods

The methodological basis of the research is a systematic bibliometric analysis. I processed 1792 relevant publications extracted from the Web of Science database and their metadata. I used the VOSviewer software to analyze the data, and I performed keyword co-occurrence network analysis and centrality tests. During the visualization, I created Network, Overlay and Density maps to identify the most important nodes of the scientific field, the relationships between clusters and the development of the research field over time.

3 Results

The results of the network analysis are clear. The core of the research examined is the circular economy and sustainability. The figures in Table 1 also support this. In modern literature, sustainability and corporate performance already go hand in hand. They simply cannot be separated.

Table 1: The most important keywords of the bibliometric network (N=1792)

Key word	Occurrences	Tie Strength (TLS)
Circular Economy	573	811
Sustainability	285	524
Recycling	173	256
Sustainable Development	127	216
Industry 4.0	24	131

Source: authors' own elaboration using VOSviewer data processing (2026)

The timelines point to the important fact that although the foundations of sustainability have been written about for a long time, the latest trends, i.e. 2023 and 2024, are clearly about Industry 4.0. This proves that technology is now our most important tool. Artificial Intelligence and various sensors help us to accurately measure and improve ESG performance. The heat map also confirms this: the circular economy is at the center. This is where all technical innovations start, which ultimately directly improve the efficiency of companies.

4 Conclusions

The findings of this study suggest that the nexus between ESG metrics and corporate success is heavily mediated by technological maturity. In the manufacturing sector, innovation serves as the critical link aligning green objectives with long-term profitability. Industry 4.0 solutions do not merely enhance the accuracy of sustainability reporting; they facilitate optimal resource allocation, which translates into direct cost reduction and a distinct competitive advantage. The future clearly belongs to AI-based systems. These digital solutions will define how we measure and manage sustainability in the years to come.

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The Effects of the Middle East Conflict on the Hungarian Labor Market in the Tourism

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Keywords: Labor market, geopolitical situation, digitalization, hotel industry

JEL Classification: Z32, J21, J24

1 Introduction

Recent geopolitical tensions, particularly the Middle East conflict, have had a significant impact on global tourism flows and economic stability [1]. The tourism sector is highly sensitive to international crises, as they influence travel demand, security perceptions, and mobility patterns [2]. In Hungary, these indirect effects have contributed to fluctuations in tourism demand and posed new challenges for the labor market, including uncertainty in employment and operational planning.

This study examines the labor market situation in the Hungarian tourism sector in the context of geopolitical instability, with a special focus on adaptability and resilience [3]. Particular attention is given to the role of digital technologies, especially artificial intelligence (AI), in supporting cost optimization and revenue maximization under uncertain conditions. The research hypothesis suggests that digital solutions can enhance the flexibility and efficiency of tourism enterprises facing external shocks [4], [5].

2 Material and Methods

The research employs a mixed-method approach, combining secondary data analysis with qualitative primary data collection. Secondary sources include statistical reports, industry analyses, and academic literature on the impact of geopolitical conflicts on tourism and labor markets.

Primary research consists of structured interviews with key stakeholders, including hotel managers, tourism professionals, and industry experts, focusing on their responses to recent geopolitical challenges and their adoption of digital solutions [6]. The collected data is analyzed using thematic content analysis to identify key trends, risks, and adaptive strategies in the tourism labor market.

3 Results

The findings indicate that geopolitical instability, such as the Middle East conflict, indirectly affects the Hungarian tourism sector through changing travel patterns, declining demand from certain regions, and increased uncertainty in business operations. It should be noted that the emerging situation is causing an energy crisis, which also significantly affects tourism as an economic sector. These factors contribute to more flexible but also more fragile employment structures.

Digital technologies, particularly AI-driven automation and data analytics, play a crucial role in mitigating these challenges. Businesses that have invested in digital tools demonstrate greater adaptability, improved demand forecasting, and more efficient resource allocation. However, several barriers remain, including skills shortages, financial limitations, and organizational resistance to technological change. While AI can optimize labor costs and operational processes, human interaction continues to be essential in delivering high-quality tourism services.

4 Conclusions

The research confirms that external geopolitical shocks significantly influence the tourism labor market, even in countries not directly involved in the conflict. The Hungarian tourism sector must therefore prioritize adaptability and resilience in response to global uncertainties, significant decline in inbound tourism from Israel.

Digital transformation, particularly the application of AI, represents a key tool for enhancing labor market flexibility and business performance. Organizations that embrace innovation are better positioned to manage risks and maintain competitiveness.

At the same time, successful adaptation requires targeted workforce development and supportive policy frameworks to address the digital skills gap. Future research should further explore long-term geopolitical impacts and identify best practices for integrating digital solutions into tourism labor management under conditions of ongoing uncertainty.

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Artificial Intelligence and Audit Decision-Making: Efficiency, Quality, and Skepticism

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Keywords: Artificial Intelligence, auditing, decision-making, audit quality, professional skepticism

JEL Classification: M42, O33, C55

1 Introduction

Artificial intelligence (AI) is increasingly influencing the financial and auditing professions. Traditional audit methods often face difficulties when processing large and complex datasets, while AI-based technologies can support faster and more efficient data analysis. Previous studies have highlighted the growing role of machine learning, data analytics, and predictive models in audit processes (Issa et al., 2016; Kokina & Davenport, 2017). AI can contribute to anomaly detection, fraud identification, and risk assessment, potentially improving audit quality and efficiency. However, the use of AI in auditing also raises concerns regarding auditors' professional judgment and skepticism. Explainable AI and human oversight therefore remain important issues in the profession (Zhang et al., 2022). The aim of this research is to examine how AI influences audit decision-making, with particular focus on efficiency, audit quality, and professional skepticism across different experience levels. While prior studies examined AI adoption and audit analytics, less attention has been paid to how AI influences auditors' professional skepticism and decision-making across different experience levels.

2 Material and Methods

The paper combines a literature review with a proposed empirical research design focusing on AI-supported audit decision-making. The literature review focuses mainly on recent studies related to AI adoption in auditing and audit analytics (Seethamraju & Hecimovic, 2023; Kokina et al., 2025). The proposed empirical research is intended to involve practicing auditors. The study is planned as a survey and experiment-based investigation comparing AI-assisted and traditional audit decision-making processes. The research will examine decision-making efficiency in terms of time and accuracy, as well as audit quality through error identification and risk assessment. In addition, the study will investigate the role of professional skepticism in AI-supported audit environments. Both junior and senior auditors will be included in the sample in order to explore differences related to professional experience.

3 Expected Results

Based on the existing literature, artificial intelligence is expected to improve efficiency in auditing by automating repetitive tasks and enabling faster processing of financial data (Appelbaum et al., 2017). AI-supported systems may also enhance audit quality through

improved anomaly detection and predictive analytical capabilities. At the same time, the impact of AI on professional skepticism appears to be more complex. While AI can support auditors by providing broader evidence and analytical insights, excessive reliance on automated outputs may reduce critical evaluation and professional judgment. Differences may also emerge across experience levels. Junior auditors are expected to rely more strongly on AI-generated results, whereas senior auditors may combine AI insights more effectively with their professional expertise and skepticism.

4 Conclusions

The increasing use of AI tools is gradually changing audit workflows and auditors' decision-making processes. Although AI can significantly improve efficiency and analytical capabilities, it may also increase the risk of over-reliance on automated systems. The expected findings of this research may contribute to a better understanding of the relationship between AI technologies and human judgment in auditing. The study may also support the development of future auditor training programs and regulatory frameworks. Despite technological advancements, professional judgment and skepticism are likely to remain essential elements of audit decision-making.

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Decentralized Innovation for Sustainability: Blockchain Applications in Finance, Governance and Reporting

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Keywords: Blockchain technology, sustainability, ESG, green finance, supply chain management.

JEL Classification: O33, Q56, G18

1 Introduction

Blockchain technology is increasingly recognized as a tool that can improve sustainability performance, transparency and organizational efficiency. Its decentralized structure, immutable data storage and programmable transactions support more reliable ESG reporting, reduce information asymmetry and strengthen traceability across business processes [1], [6], [9]. Recent literature highlights blockchain applications in sustainable finance, environmental governance and corporate reporting [2], [3], [8]. However, concerns regarding energy consumption, scalability and regulatory readiness continue to limit broader implementation [9], [13].

2 Material and Methods

The study applies a focused literature review methodology. The selected publications were grouped into four main application areas: supply-chain management, sustainability systems, sustainable finance, and accounting and controlling.

The analysis primarily relies on systematic reviews, conceptual studies and bibliometric research [1], [2], [8], [10]. Particular attention was paid to recurring themes such as transparency, automation, trust, regulatory compliance and energy efficiency [4], [7], [13].

3 Results

The review demonstrates that blockchain can create value in multiple sustainability-related areas.

In supply-chain management, blockchain improves traceability and verification of environmentally responsible sourcing while reducing fraud and transaction costs [5], [14]. At the macro level, blockchain supports decentralized sustainability systems, including peer-to-peer energy trading and carbon-credit tracking [4], [11], [15].

In sustainable finance, blockchain strengthens ESG reporting, improves transparency and reduces greenwashing risks [2], [6]. It also enables innovative financial models such as tokenized assets and decentralized finance solutions that may broaden access to sustainable investments [12].

In accounting and controlling, blockchain enables more reliable audit trails, real-time reporting and automated compliance mechanisms, thereby improving accountability and stakeholder trust [3], [16].

Despite these advantages, the environmental footprint of energy-intensive blockchain systems remains a significant challenge [9], [13].

4 Conclusions

Blockchain has significant potential to support sustainable management by improving transparency, automation and distributed trust across organizational processes.

Its practical success, however, depends on the development of energy-efficient infrastructures, interoperable standards and supportive regulatory frameworks.

Future research should focus on empirical validation of sustainability outcomes and sector-specific applications, particularly regarding environmental impact and financial performance [8], [13].

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Public–Private Dynamics in Climate Finance: Evidence from Nigeria

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Keywords: Climate finance, public finance, private investment, Nigeria, crowding-in.

JEL Classification: Q54, Q56, G28

1 Introduction

Climate finance has become increasingly important in global efforts to address climate change, particularly in developing economies where financial and institutional constraints limit large-scale environmental investment (UNFCCC, 2021, and Popp et al, 2022). In many African countries, including Nigeria, public funding and international climate support continue to dominate climate-related financing, while private sector participation remains relatively weak. Yet achieving long-term climate and energy transition goals will require much stronger private investment.

The objective of this study is to examine whether public climate finance in Nigeria encourages private sector investment through crowding-in effects or discourages it through crowding-out dynamics. The paper also explores how institutional quality, policy consistency, and governance structures shape the relationship between public and private climate finance.

2 Material and Methods

The study adopts a qualitative and analytical research approach based on secondary data obtained from climate finance reports, policy documents, and international databases covering the period from 2010 to 2025. Data were drawn from institutions such as the Climate Policy Initiative, OECD, World Bank, IMF, and Nigerian government policy reports.

The analysis focuses on trends in public and private climate finance flows, institutional arrangements, and policy frameworks influencing investment decisions. Particular attention is given to the role of regulatory credibility, project governance, and investment risk in shaping private sector participation in climate-related projects.

3 Results

The findings show that climate finance in Nigeria remains heavily dependent on public and international sources, while private sector participation is still limited and uneven (Buchner et al, 2023). Public finance has supported several climate and energy transition initiatives, but its ability to mobilize private investment depends largely on institutional and policy conditions (AfDB, 2023).

The analysis indicates that investors respond not only to the availability of public funding but also to the credibility of government policies and the quality of project governance (CPI, 2025 and Okafor, 2024). In situations where regulatory frameworks are unstable or project selection processes lack transparency, private investors tend to reduce participation despite the presence of public financial support.

The study further finds that crowding-in effects are relatively weak because institutional risks, policy inconsistency, and financial uncertainty continue to discourage long-term private investment. In some cases, poorly coordinated public interventions may unintentionally crowd out private capital by increasing uncertainty or distorting market incentives.

4 Conclusions

The effectiveness of climate finance in Nigeria depends not only on the amount of public funding available but also on the broader institutional and regulatory environment. Strengthening governance systems, improving policy consistency, and reducing investment risks are essential for mobilizing greater private sector participation in climate-related investment.

The study contributes to the growing debate on public–private climate finance interactions by providing country-specific evidence from Nigeria and highlighting the importance of institutional credibility in attracting private capital for sustainable development and climate transition goals.

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Supply Chain Finance and Circular Economy Performance among Manufacturing SMEs in Ghana: The Moderating Roles of Green Innovation Capability and Supply Chain Digitalization

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Keywords: Supply Chain Finance, Circular Economy Performance, Green Innovation Capability, Supply Chain Digitalization, SMEs, Ghana

JEL Classification: B17, B27

1 Introduction

Manufacturing SMEs in Ghana face increasing pressure to reduce waste, improve resource efficiency, and strengthen environmental performance, yet many operate under severe financing, technology, and capability constraints. Circular economy performance offers a practical route to sustainable competitiveness because it emphasizes reuse, recycling, recovery, and efficient resource utilization. Supply chain finance (SCF) has therefore gained relevance as a mechanism that can reduce liquidity pressure, improve working capital, and support supplier transactions, allowing firms to invest in cleaner production and circular practices. Prior studies show that SCF improves financial and operational outcomes in supply chains, while circular economy practices enhance sustainability performance and long-term competitiveness (Wuttke et al., 2013; Xu et al., 2018; Geissdoerfer et al., 2017). However, access to finance alone may not produce circular outcomes unless firms also possess the capability to transform resources into eco-innovations and the digital systems required for coordination and traceability. Green innovation capability reflects the firm's ability to develop cleaner products, greener processes, and environmentally beneficial routines, whereas supply chain digitalization improves visibility, transparency, and information exchange across supply chain partners (Xie et al., 2019; Ivanov et al., 2019; Bag et al., 2021). This study therefore proposes that SCF positively affects circular economy performance and that this effect becomes stronger when green innovation capability and supply chain digitalization are high

2 Materials and Methods

The study adopts a quantitative, cross-sectional survey design focused on manufacturing SMEs in Ghana. Respondents will be drawn from finance, procurement, operations, production, and supply chain functions because these managers possess direct knowledge of financing practices, innovation activities, and digital systems. Data will be collected through a structured questionnaire using validated items from prior literature and measured on a five-point Likert scale. Supply chain finance will be operationalized through supplier financing support, receivables-based arrangements, payment flexibility, and the extent to which financing improves liquidity and transaction continuity. Circular economy performance will be measured with indicators such as waste reduction, material reuse, recycling efficiency, and resource

productivity. Green innovation capability will capture the firm's ability to introduce eco-friendly products, cleaner processes, and sustainable innovations, while supply chain digitalization will reflect the use of digital tools for information sharing, process integration, traceability, and real-time decision-making. Data analysis will be conducted using Partial Least Squares Structural Equation Modeling. The measurement model will be assessed through Cronbach's alpha, composite reliability, average variance extracted, and HTMT, while the structural model will test direct and moderating effects using bootstrapping, path coefficients, and explained variance.

3 Expected Results

SCF has a positive and significant effect on the circular economy's performance among manufacturing SMEs in Ghana. Firms with stronger SCF arrangements report greater investment in circular practices, better material efficiency, and improved environmental outcomes. Green innovation capability also strengthens this relationship by enabling firms to convert financial resources into cleaner technologies, process redesign, and eco-friendly products. In the same way, the supply chain moderates the relationship by improving coordination, transparency, traceability, and monitoring across the chain. Taken together, these results suggest that circular performance depends not only on access to finance but also on complementary innovation and digital capabilities that enable financed initiatives to be implemented effectively.

4 Conclusions

The study indicates that SCF can support circular economy performance in Ghanaian manufacturing SMEs, but its effectiveness is contingent on internal green innovation capability and supply chain digitalisation. Theoretically, the study integrates financial, innovation, and digital perspectives into one framework for explaining circular outcomes in SMEs. Practically, it suggests that managers and policymakers should complement SCF initiatives with investments in green innovation capability and digital infrastructure if SMEs are to achieve meaningful circular and sustainability gain.

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Knowledge Management Capabilities and Digital Resource Optimization: Enhancing Innovation in the Digital Transformation Era

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Keywords: knowledge management, digital transformation, digital resource optimization, dynamic capabilities.

JEL: D83; M15; L25; O32; O33

1 Introduction

Digital transformation has significantly altered how organizations operate, compete, and innovate, creating new opportunities while increasing the complexity of managing digital resources [3]. The adoption of advanced technologies such as artificial intelligence (AI), big data analytics, cloud computing, and the Internet of Things (IoT) has enabled organizations to redesign processes and develop new business models [4]. Despite substantial investments in digital technologies, many organizations struggle to translate these investments into improved efficiency and innovation outcomes [2]. A critical dimension of this transformation is the strategic role of digital resources. Digital resources extend beyond data and information to include the infrastructures, practices, and platforms that enable the deployment and integration of digital technologies [5]. Digital resources enable interoperability and the development of integrated products and services, as demonstrated by firms like Amazon, Google, and Microsoft, while the surge in data availability has increased both opportunities and complexity in managing digital assets [1]. Knowledge management (KM) enables organizations to effectively utilize digital resources through capabilities of acquisition, sharing, and application that enhance decision-making and performance. Grounded in the knowledge-based view and dynamic capabilities theory, these capabilities support adaptation and drive digital resource optimization (DRO) by improving the efficient and strategic use of digital assets.

Despite growing recognition of the importance of KM and digital transformation, limited research has examined how knowledge management capabilities translate into outcomes such as digital resource optimization and innovation performance within a unified framework. This study examines how knowledge management capabilities (KMC), encompassing knowledge acquisition, sharing, and application, enhance digital transformation capability (DTC) to drive DRO and innovation performance, draw on the knowledge-based view and dynamic capabilities theory to explain how organizations can maximize digital investments and sustain innovation.

2 Materials and Methods

The study adopts a quantitative research design using survey data collected from managers and professionals involved in digital transformation initiatives across multiple industries. A

structured questionnaire based on a five-point Likert scale was used to measure KMC, DTC, DRO, and innovation performance. Data was analyzed using partial least squares structural equation modeling (PLS-SEM) to assess the relationships among constructs and test the proposed hypotheses, including mediation effects.

3 Results

The findings indicate that knowledge management capabilities have a significant positive effect on digital transformation capability and digital resource optimization. Digital transformation capability is also found to positively influence digital resource optimization and innovation performance. Furthermore, the results confirm the mediating role of DTC in the relationship between KMC and DRO. Digital resource optimization is shown to significantly enhance innovation performance, highlighting its importance as a key outcome of effective digital transformation.

4 Conclusion

This study contributes to literature by integrating knowledge management and digital transformation into a unified framework centered on resource optimization and innovation. The findings emphasize that organizations must move beyond technology adoption and focus on developing knowledge-driven capabilities to maximize digital investments. From a managerial perspective, fostering strong knowledge management practices and aligning them with digital transformation strategies can significantly improve efficiency, innovation, and long-term competitiveness.

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Integrated Production Control Systems: A Contingency-Based Empirical Analysis of MRP, Lean and TOC in Production Planning and Control

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Keywords: MRP, Lean production, Theory of Constraints, contingency theory, production control, operations management

JEL Classification: M10, M11

1 Introduction

Manufacturing firms increasingly operate in environments characterized by demand volatility, rising product complexity, and intensified coordination requirements across supply chains. These conditions challenge traditional production planning and control approaches that rely on a single dominant logic. As a result, recent research has shifted from the search for universally optimal methods toward context-sensitive and hybrid solutions. Three dominant paradigms define the field: Material Requirements Planning (MRP), Lean production, and the Theory of Constraints (TOC). MRP provides a structured, forecast-driven planning logic, Lean focuses on execution stability through waste elimination and continuous improvement, while TOC emphasizes system-level optimization by managing bottlenecks (Goldratt, 1990; Womack and Jones, 2003). Although these approaches are often treated as competing alternatives, emerging evidence suggests that their effectiveness depends on contextual alignment, in line with contingency theory (Donaldson, 2001). This study contributes to the core discourse of production planning and control by examining how planning-oriented (MRP), execution-oriented (Lean), and constraint-oriented (TOC) control logics can be integrated within a unified analytical framework.

2 Material and Methods

The study applies a mixed-methods research design to enhance explanatory power and robustness. The theoretical foundation is established through a structured review of operations management literature, focusing on the characteristics, assumptions, and limitations of MRP, Lean, and TOC systems. Empirical data were collected through a questionnaire survey of manufacturing firms ($n = 48$), capturing system application intensity, organizational characteristics, and performance indicators. Quantitative analysis included descriptive statistics, correlation analysis, and one-way ANOVA with post-hoc tests to identify statistically significant differences between system configurations. To complement the quantitative findings, structured expert interviews were conducted and analyzed using thematic coding, providing deeper insights into managerial decision-making and system integration practices. The research model incorporates three dimensions: 1. application intensity of MRP, Lean, and TOC, 2. moderating variables (demand stability and organizational culture), 3. operational performance outcomes.

3 Results

The findings demonstrate that the effectiveness of production control systems is strongly context-dependent and varies across environmental and organizational conditions. MRP shows significant positive performance effects in stable demand environments, particularly in terms of planning accuracy and inventory control. However, its effectiveness declines in volatile environments due to sensitivity to forecasting errors and frequent replanning. Lean systems improve operational performance primarily in organizations characterized by strong Kaizen-oriented cultures and high levels of employee involvement. Without these conditions, Lean implementation remains limited in scope and impact. TOC delivers rapid improvements in throughput by focusing managerial attention on system constraints. However, these gains tend to remain localized and may diminish over time if not supported by complementary planning and execution mechanisms. Overall, the results indicate that MRP, Lean, and TOC address distinct but interrelated control layers: MRP provides planning logic, Lean ensures execution stability, while TOC represents a constraint-focused improvement logic. The integrated application of these systems consistently outperforms isolated implementations across all examined performance dimensions .

4 Conclusions

This study confirms that MRP, Lean, and TOC should not be interpreted as competing paradigms but as complementary production control logics whose effectiveness depends on contextual alignment. From a theoretical perspective, the findings reinforce contingency theory by demonstrating that no single system is universally optimal. Instead, performance improvements arise from the coherent integration of planning, execution, and improvement logics within a unified control framework. From a practical standpoint, the results suggest that firms face not a method selection problem but an integration challenge. Effective production control requires the alignment of MRP-based planning structures, Lean-based execution routines, and TOC-based prioritization mechanisms. The study contributes to the literature by empirically validating the complementarity of production control systems and by conceptualizing their integration as a multi-layer control architecture. This perspective advances production planning and control research by linking traditionally separate management logics into a coherent and context-sensitive framework. Future research should explore simulation-based approaches and digital technologies, including advanced analytics and artificial intelligence, to further enhance the dynamic integration of production control systems.

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Analysis of Learning Effects on Makespan in SALBP-2

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Keywords: Assembly line balancing, SALBP-2, Learning effect, Makespan.

JEL Classification: C61, D24, L23

1 Introduction

Assembly Line Balancing Problems (ALBP) are widely used to design efficient production systems. In particular, the Simple Assembly Line Balancing Problem type 2 (SALBP-2) aims to minimize the cycle time for a fixed number of stations [2]. However, classical formulations assume constant processing times and neglect the learning effect, which is inherent in real production environments [3].

In practice, operators improve their performance over time, leading to reduced task durations as production progresses [1]. Ignoring this effect may result in inaccurate system evaluation and misleading managerial decisions [3]. This study investigates how the use of a static SALBP-2 solution is affected when learning is present in the system.

2 Material and Methods

A bicycle assembly line balancing problem consisting of 31 tasks distributed across multiple stations is considered. A standard SALBP-2 solution is first obtained under the assumption of constant task times.

This solution is then evaluated under different learning scenarios, where processing times decrease according to Wright's learning curve (LC) as production progresses [4]. The analysis considers multiple production quantities and operators' learning rates. For each scenario, the makespan is computed and compared to the baseline case without learning. In addition, the evolution of the bottleneck station throughout production is examined to assess potential structural changes in the system.

3 Results

The results show that ignoring learning effects leads to significant deviations in makespan estimation, with the magnitude of the error increasing as learning speed and production volume grow.

Beyond quantitative differences, the findings reveal an important structural insight: although the system quickly stabilizes during production, the location of the bottleneck station differs depending on whether learning is considered. In particular, the bottleneck identified under static assumptions does not necessarily correspond to the actual constraint when learning effects are present.

This indicates that the use of traditional SALBP-2 solutions may lead to incorrect identification of critical stations, even when the system appears stable over time.

4 Conclusions

This study highlights the limitations of classical assembly line balancing approaches when learning effects are present. The results demonstrate that neglecting learning can lead not only to inaccurate performance estimation but also to misidentification of system constraints. From a managerial perspective, this may result in inefficient decision-making, particularly when prioritizing improvement actions or resource allocation. Therefore, incorporating learning effects into the analysis of assembly lines is essential for a more realistic evaluation of system performance.

As an extension, future research could focus on developing optimization models that directly minimize makespan while explicitly accounting for learning effects, enabling more robust and adaptive assembly line designs.

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The Organisational and Leadership Factors of Talent Retention

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Keywords: talent retention, talent management, leadership, employee commitment, organisational factors

JEL Classification: M12, M14, J24

1 Introduction

In the contemporary labour market environment, retaining talented employees has become a strategic priority for organisations. Increasing labour shortages, intensifying competition for qualified employees, and changing employee expectations have all strengthened the importance of effective talent retention practices. Retention is no longer determined only by financial incentives, but also by organisational culture, career development opportunities, leadership quality, recognition, and the overall employee experience. In this context, organisations must identify those factors that most strongly contribute to employee commitment and long-term retention.

The aim of this study is to examine the organisational and leadership factors that influence talent retention among employees of Hungarian enterprises. The paper focuses on how employees perceive leadership support, development opportunities, organisational recognition, digital HR solutions, and workplace atmosphere, and how these factors contribute to their willingness to remain with their employer.

2 Material and Methods

The research is based on a quantitative questionnaire survey conducted among employees working in Hungarian enterprises. The questionnaire examined the most important dimensions of talent management and talent retention, with special attention to organisational and leadership-related factors. In addition to demographic background variables, the survey included questions related to workplace commitment, managerial support, career opportunities, recognition, digitalisation of HR processes, generational cooperation, and employees' intention to stay.

The database was processed using descriptive statistical methods and comparative analysis. The study primarily applies exploratory analysis in order to identify the most important dimensions of talent retention and to reveal the relationships between employee perceptions and retention-related attitudes. The interpretation of the findings is grounded in the assumption that talent retention is a multidimensional phenomenon shaped by both organisational context and leadership behaviour.

3 Results

The results indicate that talent retention is strongly influenced by a complex set of organisational and leadership factors. Employees tend to show stronger commitment and a greater willingness to stay when they perceive supportive leadership, regular feedback, recognition of performance, and transparent career opportunities within the organisation. The findings also suggest that the quality of the immediate supervisor plays a central role in shaping employee attitudes, especially through encouragement, involvement, and attention to individual development needs.

Organisational factors also appear to have a considerable effect on retention. A positive workplace atmosphere, fair treatment, opportunities for professional development, and the strategic importance of talent management all contribute to stronger employee attachment. In addition, digital HR practices may support retention indirectly by improving transparency, accessibility of information, and the efficiency of employee-related processes. The results confirm that talent retention should be interpreted not as an isolated HR task, but as an integrated organisational and managerial responsibility.

4 Conclusions

The study concludes that talent retention among employees of Hungarian enterprises is shaped by both organisational characteristics and leadership quality. Supportive managerial behaviour, recognition, career development, and a positive organisational climate emerge as the most important retention-related factors. These findings underline that successful talent retention requires a conscious and coordinated management approach in which leadership practices and organisational systems reinforce each other.

The paper contributes to the literature by highlighting that employee retention is influenced not only by material conditions, but also by relational, developmental, and organisational dimensions. The results may provide useful implications for enterprises seeking to strengthen employee commitment and reduce the risk of talent loss in an increasingly competitive labour market.

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Digitalisation and Technological Transformation in Tourism

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Keywords: digitalisation, new technologies in tourism, tourism efficiency.

JEL Classification: M31, Z33

1 Introduction

Digitalization and technological transformation in the tourism industry have evolved from "value-added" features into the very backbone of the sector [1], [2], [6]. As of 2026, the shift is defined by the transition from passive digital tools to Agentic AI and Smart Ecosystems that anticipate traveler needs before they are even expressed [3], [5].

2 Material and Methods

In the first stage, we gathered the most important trends in tourism industry, in the digital technologies and the use of AI. The innovations can be grouped according to the stages of travel: pre-trip, in-destination, and post-trip innovations [4]. These innovations make significant changes to the industry mechanisms, to destinations and to the experience of tourists as well.

We present the main statistics of the industry, such as the OTA markets, the estimated expenditure on Google advertising or the share of consumers who used an AI-based tool for travel planning worldwide.

The main statistical data of European and other countries, the digital intensity, the social media use, the availability of a website and the e-commerce sales in the accommodation sector are also relevant in this respect.

In the second stage, our research attempts to find a relation between the efficiency of tourism in Europe and the online presence of accommodation units throughout the European countries.

We measured the online presence with four synthetic indicators, constructed from available EURSTAT data:

- Websites and functionalities,
- Digital Intensity,
- E-commerce sales of enterprises,
- Use of any social media.

We also collected data for net occupancy rate of the accommodation units on national levels, since we considered these are the best available efficiency indicators of hotels and similar accommodation units.

- Net occupancy rate of bed-places and bedrooms in hotels and similar accommodation

The aggregated data for 29 European countries, and for three years each (2021, 2023, 2025) are serving as inputs for variables.

The statistical model is constructed with regression and correlation, between the four synthetic indicators of online presence, as independent variables and net occupancy, as dependent

variable. Our assumptions are that higher digital presence can result higher occupancy in different countries, as different destination entities.

3 Results

Digital Intensity remains the primary driver: Even after accounting for social media, the complexity of digital tool usage (Digital Intensity) shows the strongest positive relationship with occupancy. A more sophisticated digital operation is highly correlated with higher bed-place usage.

Social Media Impact: The "Social Media" variable has a positive coefficient (+0.22), meaning that as social media usage increases, occupancy tends to rise. However, in this specific multi-variable model, it is not "statistically significant" ($P > 0.05$). This is likely because Social Media usage is very highly correlated with Digital Intensity ($r = 0.79$); thus, the "Digital Intensity" variable is already capturing most of the positive impact that social media provides.

Website Paradox: The negative relationship for "Website" persists. This reinforces the theory that in the modern EU market, simply having a basic website is a "standard" rather than a "competitive advantage." The advantage now lies in how you use that website (Intensity) and how you engage (Social Media).

4 Conclusions

Digital Intensity in Tourism is more and more important, simply being present and advertising on different channels is not enough. The industry is changing faster than ever, but there are significant differences between European countries in this matter.

In 2026, we have moved beyond basic chatbots. The industry now utilizes "Agentic AI"—autonomous systems capable of complex reasoning and taking proactive actions. The competitive advantage in 2026 no longer comes from just "having an app." It comes from Data Centrality—the ability to orchestrate a multi-channel experience where the digital and physical worlds are perfectly synchronized.

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Management tools for managing generational differences in manufacturing SMEs

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Keywords: generational structure, SMEs, manufacturing sector, labour market, demography

JEL Classification: J21, L60, M12

1 Introduction

The generational composition of the workforce has become a strategic issue for manufacturing SMEs, where labour shortages, demographic ageing, and technological change appear simultaneously. In Hungary, the issue is especially relevant because manufacturing remains a key SME activity while the labour pool is increasingly constrained by age-related demographic trends. This paper examines how the age structure of employees in Hungarian manufacturing SMEs is changing and why these shifts matter for labour supply, knowledge retention, and organisational adaptability. The study focuses on three questions: how employees are distributed across age groups, whether older cohorts are gaining weight relative to younger ones, and how the Hungarian pattern can be interpreted in a broader European context.

2 Material and Methods

The analysis uses secondary macro-level data from the Hungarian Central Statistical Office (HCSO) and Eurostat. It applies descriptive statistics, comparative analysis, and trend analysis to identify changes in the age composition of employment in manufacturing SMEs. The approach is primarily exploratory: it maps the relative weight of younger, middle-aged, and older employees and interprets these shifts as indicators of broader demographic and labour-market processes. Selected European comparisons help position Hungary within a wider international framework and provide a basis for later firm-level research on intergenerational cooperation.

3 Results

The findings indicate a gradual ageing of the workforce in Hungarian manufacturing SMEs. Older age groups account for a growing share of employees, while the proportion of younger workers remains limited and does not compensate for the increase in older cohorts. This points to weaker replacement processes and increasingly constrained labour renewal in the sector. At the same time, the stronger presence of older employees highlights an important organisational resource: accumulated tacit knowledge, practical experience, and process-specific competence. Without conscious managerial solutions for mentoring, succession, and knowledge sharing, however, this resource may turn into a vulnerability as retirements accelerate. The European comparison suggests that Hungary is not alone in facing these tendencies, but the consequences

may be stronger in the SME environment, where formal HR systems and internal labour reserves are often limited.

4 Conclusions

The paper concludes that the generational structure of Hungarian manufacturing SMEs is undergoing a measurable transformation characterised by the growing presence of older workers and the relatively weak inflow of younger employees. This trend has clear implications for workforce planning, age-conscious HR practices, and structured intergenerational knowledge transfer. The study contributes a macro-level foundation for future organisational research. It supports the view that age diversity is not only a demographic fact, but also a management issue affecting resilience and competitiveness in the manufacturing SME sector.

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Digital Payment Adoption and Firm Performance: Evidence from Small and Medium Enterprises in Sub- Saharan Africa

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Keywords: Digital Payment Adoption, Institutional quality, Financial inclusion, SME performance.

JEL Classification: O16, O33, L25; G21, O55, M15

1 Introduction

Indeed, the emergence of digital financial solutions has had a great influence on the business processes of SMEs in less developed countries, especially in Sub-Saharan Africa. In places where people do not have easy access to commercial banking services, alternative solutions like mobile money, e-wallets, and other forms of online payments are used by businesses to conduct their activities. These solutions have great potential to increase the efficiency of operations, expand the financial inclusiveness of businesses, and make them more competitive (Abor, Amidu, & Issahaku, 2018). At the same time, there is no guarantee that the introduction of digital payment solutions will be entirely beneficial for businesses since some enterprises can benefit, while others will face difficulties related to poor infrastructure, low digital literacy, and regulations.

The purpose of this study is to explore the effects of digital payment technology on the performance of small and medium enterprises (SMEs) in Sub-Saharan Africa through its impacts on transaction efficiency, financial inclusion, and institutional quality. According to Tiony and Yin (2023), the application of digital payment systems enhances SME performance by minimizing transaction costs, improving operational efficiency, and making access to formal financial services easier. Further, this study explores the role of institutional quality in enhancing or undermining the effects of digital payment technology in various national settings. This study is based on the Technology Acceptance Model by Davis (1989), the diffusion of innovations theory by Rogers (2003), and institutional theory by North (1990).

2 Material and Methods

The data collection methodology involves obtaining information from firms in Sub-Saharan African countries through a panel data approach over several years. To guarantee the validity of the findings, the research will employ techniques such as fixed-effects modeling and instrumental variable modeling to overcome the challenge of endogeneity and potential omitted variables. Performance indicators used in the research include profitability, sales growth, efficiency, and expansion of the market share.

3 Results

The results show that there is a statistically positive relationship between the adoption of digital payments and SME performance. Compared to SMEs that adopt a predominantly cash-based payment system, SMEs that embrace the use of digital payment systems enjoy faster processing, reduced operating expenses, greater accessibility of customers, and business efficiency. The analysis further shows that financial inclusion is an important mediator because the adoption of digital payments facilitates SMEs' access to formal financial services such as credit, savings, and digital transaction records. This finding is in line with past research, which shows that digital finance enhances the performance of firms in developing countries (Suri & Jack, 2016).

4 Conclusions

The study shows that institutional quality plays a key role in determining the extent to which the association between digital payments and firm performance is moderated. The use of digital payments in countries with well-developed regulatory, governance, and technological frameworks yields higher gains than in those where institutional factors are lacking (Jallow & Tajmouati, 2025).

In general, this paper makes a valuable contribution to the expanding field of digital finance and small and medium-sized enterprise (SME) development by offering insights from Sub-Saharan Africa. The study emphasizes the need to enhance digital infrastructure, improve institutions, and promote financial inclusion to ensure that the full potential of digital payment usage is realized.

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Structural Transformation of Transcarpathian Regional Economy under Wartime Conditions: Financial Security Challenges and Competitiveness Perspectives

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Keywords: wartime structural transformation, regional financial security, business relocation, fiscal resilience, regional competitiveness, Transcarpathia, EU cross-border integration.

JEL Classification: R11, R58, G32, O18.

1 Introduction

The full-scale armed invasion of Ukraine (24 February 2022) contracted national GDP by 28.8% in 2022, while simultaneously generating massive international assistance flows. By 2025, GDP growth had slowed to +1.8% (CES/Ukrstat), reflecting sustained energy attacks and labour shortages. At the regional level, these forces produced an asymmetric outcome in Transcarpathia, Ukraine's westernmost region bordering Hungary, Slovakia, Romania and Poland. Pre-war, it ranked among Ukraine's least developed regions: GRP per capita in 2019 at UAH 48,861 – only 51.7% of the national average – with regional budget subsidy dependence of 60% [1]. This paper assesses the nature, drivers, financial security implications, and competitiveness perspectives of Transcarpathia's wartime structural transformation (2019-2025), applying an adapted Financial Security Index (FSI) framework – originally developed by the author at the enterprise level [2] – to regional-level wartime analysis.

2 Materials and Methods

The study employs a three-dimensional analytical framework across the period 2019-2025. First, structural shift analysis examines sectoral GRP composition, business registration dynamics, and export structure transformation. Second, the financial security assessment applies an adapted FSI framework using seven indicators across four dimensions (fiscal stability, trade and openness, business environment, and external financing), generating a composite FSI trajectory. Third, competitiveness benchmarking compares Transcarpathia against western Ukrainian peers and assesses EU cross-border integration depth. Primary data sources include: the Zakarpattia Regional Development Strategy to 2027 (USAID/GOVERNA, 2024) [1]; Zakarpattia RMA foreign trade statistics (2019-2025) [3]; IOM Displacement Tracking Matrix Rounds 15 and 19 [4]; UNIDO Enterprise Survey on firm relocation (2024) [5]; Centre for Economic Strategy War Economy Tracker [6]; and EBRD Ukraine country reports (2022–2025) [7].

3 Results

Three interlocking findings are identified. First, business relocation drove unprecedented structural diversification: 282 enterprises relocated to Transcarpathia by 2024 (around 40-50% of all nationally relocated firms), investing collectively about €1 billion. Machinery and

electrical equipment rose to 48% of regional exports (from 30% pre-war); EU export share reached almost 72% - the highest among western Ukrainian regions. Despite Ukraine's national export contraction of 6.9% in Q1 2025, this structural reorientation is holding [3]. Second, the fiscal transformation is historically significant: subsidy dependence fell from 60% (2021) to 25% (2024), own-source revenue rose to 75%, driven by relocated enterprise tax contributions [1]. The FSI trajectory: HIGH (2021) → ACCEPTABLE (2022) → HIGH (2024) → HIGH consolidating (2025) – confirms sustained improvement. Third, the EBRD has deployed about €8.4 billion across Ukraine since 2022 [7]; the Interreg NEXT HU-SK-RO-UA Programme (€83 million; Hungary as Managing Authority) anchors the transformation in durable EU cross-border integration. However, UNIDO (2024) finds 50% of relocated firms intend to return home post-war, identifying enterprise retention as the primary structural risk [5].

4 Conclusions

Transcarpathia's wartime transformation demonstrates that a peripheral EU-adjacent region can achieve historic structural change under geopolitical challenges. The FSI framework confirms consolidating gains: 25% subsidy dependence, 72% EU export share, €1 billion productive investment. The 2025 slowdown (+1.8% national GDP) contextualizes the fragility, which means that transformation is reversible without deliberate policy anchoring. Four levers are identified, namely: post-war enterprise retention incentives; deepened EU cross-border integration through Interreg NEXT; transition to strategic cohesion investment via the Ukraine Facility (up to €50 billion, 2024–2027); and EU accession conditionality as a reform anchor. Transcarpathia's case offers a replicable model for EU enlargement and cohesion policy.

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Psychological and Economic Consequences of Workplace Mobbing: An Integrated Approach in the Context of Organizational Performance

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Keywords: workplace mobbing, psychosocial risk, chronic stress, mental health,

JEL codes: I10; J28; M12

1 Introduction

In modern organizations, psychosocial risks play an increasingly significant role in shaping employee well-being, organizational efficiency, and overall economic performance. Workplace mobbing—as a persistent and systematic form of psychological harassment—should not be interpreted merely as an interpersonal conflict, but rather as a complex organizational and socio-economic phenomenon.

The importance of this phenomenon lies in the direct relationship between psychological stressors and the deterioration of human capital, which significantly affects organizational performance and competitiveness.

The aim of this study is to provide an integrated analysis of the psychological, health-related, and economic consequences of workplace mobbing, with particular emphasis on the relationship between stress mechanisms and organizational performance.

2 Material and Methods

The research is based on a systematic literature review using a multidisciplinary approach integrating organizational psychology, occupational health, and economics.

Relevant international literature was selected through a structured screening process, focusing on peer-reviewed scientific journal articles. The main selection criteria included scientific relevance, methodological reliability, and international citation impact.

The theoretical framework is grounded in classical definitions of workplace mobbing [3] and modern organizational psychology models, particularly the Job Demands–Resources (JD-R) model [1], which explains the development of chronic stress and burnout through the imbalance between job demands and available resources.

A qualitative synthesis method was applied, enabling the integrated interpretation of findings across different disciplines. Special attention was given to empirical studies examining the effects of workplace mobbing on mental and physical health, as well as organizational outcomes, particularly absenteeism, presenteeism, and employee turnover.

The objective of the review was to establish an integrated conceptual framework linking psychological processes with economic consequences.

3 Results

The findings indicate that workplace mobbing functions as a chronic psychosocial stressor with significant effects on both individual health and organizational performance.

At the physiological level, prolonged exposure to harassment activates the hypothalamic–pituitary–adrenal (HPA) axis, leading to sustained elevation of cortisol levels and increased allostatic load, thereby raising the risk of chronic diseases, particularly cardiovascular conditions [2], [6].

From a psychological perspective, mobbing is strongly associated with mental disorders, including depression, anxiety, and symptoms of post-traumatic stress disorder [7], [4]. It also plays a key role in the development of burnout, characterized by emotional exhaustion and reduced personal efficacy.

At the behavioral and organizational level, the depletion of mental and cognitive resources results in decreased job performance, impaired decision-making, and reduced organizational commitment. The lack of psychological safety further intensifies these negative effects.

At the organizational level, consequences manifest in reduced productivity, increased absenteeism and presenteeism, higher turnover rates, and declining employee satisfaction. These factors generate substantial indirect and hidden costs for organizations [5].

4 Conclusions

The results confirm that workplace mobbing is a complex, multidisciplinary phenomenon that can be interpreted across psychological, health, and economic dimensions. Chronic stress and deterioration of mental health directly reduce the quality of human capital, which is a key determinant of organizational performance.

From an economic psychology perspective, employee well-being and organizational efficiency are closely interconnected. Psychological safety, supportive leadership, and a healthy organizational culture are not only ethical imperatives but also strategic drivers of competitiveness.

Therefore, the prevention and management of workplace mobbing are essential for sustainable organizational functioning. Future research should focus on the integrated analysis of psychological mechanisms and economic cost models.

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Reducing Economic Gender Gaps through Tax Policy Instruments in the EU

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Keywords: Gender equality, Gender pay gap, Tax policy

JEL Classification: H24, J16, H22

1 Introduction

Gender-based economic inequalities represent one of the most complex structural challenges of modern market economies, manifesting as systemic differences in income levels, employment patterns, and long-term financial prospects. Statistical data from the European Union highlight that women generally have lower wage levels and significantly higher rates of part-time employment, often due to career interruptions for caregiving. While tax policy is often expected to be neutral, it frequently carries implicit gender biases that interact with existing socio-economic patterns. The objective of this research is to systematically demonstrate how tax policy instruments (particularly personal income tax and the system of indirect taxes) can contribute to improving women's economic status and strengthening their financial autonomy.

2 Material and Methods

The theoretical foundations of the research are established through a systematic analysis of relevant literature. The empirical study is grounded in multivariate statistical modeling, specifically utilizing cluster analysis (K-means and hierarchical clustering using Ward's method) to categorize EU-27 member states based on tax policy and gender equality indicators. Data were primarily collected from Eurostat (EU-SILC and LFS databases) and the OECD Tax Database for the year 2024. Analyzed variables include tax policy indicators (e.g., tax wedge, VAT on feminine hygiene products), earnings data (gender pay gap), and labor market indicators (unemployment rates, proportions of low-wage earners).

3 Results

The cluster analysis classified the EU member states into four distinct groups. Cluster 1 (Scandinavian Welfare Model) is characterized by high nominal wage levels, the lowest proportions of female low-wage earners, and conscious gender-responsive tax policies, such as exceptionally low VAT on feminine hygiene products. Conversely, Cluster 3, which includes post-socialist states like Hungary, exhibits lower wage levels, high tax wedges, and the highest "tampon tax" (15.85%). The results confirm that flat-rate tax systems and high consumption taxes impose a greater fiscal burden on women in lower income brackets. Targeted Scandinavian-style incentives were found to more effectively support day-to-day economic gender equality.

4 Conclusions

The research demonstrates that tax system design is not gender-neutral; seemingly technical decisions fundamentally influence socio-economic gender dynamics. The Scandinavian model proves that progressive income taxation and targeted VAT reductions are effective tools for supporting women's economic autonomy. Key policy recommendations include transitioning from joint to individual taxation, reducing the marginal tax burden on "second earners," and mitigating the regressive effects of VAT on essential goods and hygiene products. Tax policy is a vital, yet currently underutilized, instrument for promoting long-term economic stability and sustainable social cohesion.

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Digitalizing IT Operations

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Keywords: IT operations, digitalization, SMEs, cloud, Microsoft 365, security awareness

JEL Classification: M15, O32

1 Introduction

Both small and medium-sized enterprises (SMEs) and large multinational companies have become strongly dependent on IT infrastructures and digital services to support their core activities. At the same time, they face increasing pressure to improve efficiency, ensure business continuity and manage cybersecurity risks with limited resources.

Digitalizing IT operations – for example through cloud services, collaboration platforms and structured service management – has become a key element of competitiveness. However, many organizations still rely on fragmented tools, ad-hoc workflows and low security awareness. This extended abstract presents practical lessons from IT operations digitalization projects in two multinational environments and shows how these experiences can be translated into recommendations for SMEs.

2 Material and Methods

The paper applies a practice-oriented, case-based approach built on the author's experience in IT operations and digitalization projects at two multinational companies.

The analysis focuses on four key components:

- migration from on-premise systems to cloud-based services (mainly Microsoft 365),
- introduction of centralized ticketing systems for incidents and requests,
- deployment of monitoring tools to improve visibility and service continuity,
- integration of digital security and security awareness into everyday IT operations.

Project documentation, process descriptions and implementation experiences are analysed to identify recurring patterns, typical challenges and enabling factors. Based on these findings, the paper formulates scalable, resource-conscious recommendations for SMEs.

3 Results

The cases show that digitalizing IT operations can significantly improve transparency and coordination between IT and business. Centralized ticketing and standardized request handling reduce ad-hoc communication and make incident and request management more traceable and prioritizable. Monitoring supports earlier detection of problems and more proactive maintenance.

Cloud-based collaboration platforms such as Microsoft 365 enable more flexible work and better information sharing, but also create new dependencies and governance needs. The results highlight that efficiency gains depend strongly on human and organizational factors: clear roles, continuous communication and regular training increase acceptance of new tools and processes. Integrating security awareness into daily workflows – through policies, short trainings or regular reminders – helps reduce risky behaviour and supports a more secure use of cloud and

collaboration services. Many of these practices can be scaled down and applied in SMEs with limited resources.

4 Conclusions

The cases show that digitalizing IT operations with cloud services, collaboration platforms, ticketing and monitoring can markedly improve efficiency and service quality. These benefits, however, require conscious attention to cybersecurity and security awareness, otherwise new vulnerabilities may appear.

For SMEs, the key lesson is that efficiency and digital security must be planned together. Even simple standardized workflows, basic monitoring and regular awareness activities can significantly strengthen both operational stability and competitiveness.

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EXAMINING THE CARRYING CAPACITY OF AN MSME WITHIN AN INCREASINGLY DYNAMIC ECONOMIC, ENVIRONMENTAL, AND SOCIAL LANDSCAPE.

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Keywords: Digital transformation, sustainability-driven strategies, Artificial Intelligence, carrying capacity, dynamic economic, Competitiveness.

JEL Classification: L26, M21& O32

1 Introduction

This article conceptualizes the interconnection between sustainability-driven strategies, digital transformation and artificial intelligence of small and medium-sized enterprises (SMEs), through a systematic review of international journal research papers. The approach is by examining how MSME's can achieve and sustain competitiveness within an increasingly dynamic economic, environmental, and social (EES) landscape. The research paper further employs a systematic literature review (SLR) methodology aligned with PRISMA guidelines, which critically evaluates contemporary scholarly publications to demonstrate that sustainability-driven strategies, digital transformation and artificial intelligence continue to play a pivotal role in reinforcing MSME competitiveness and adaptability, particularly within economic environments characterized by globalization pressures and recurrent economic disruptions. More specifically, opportunities for digital transformation are emphasized to enhance operational efficiency, enable the development of sustainability-driven business models, strengthens supply chain risk management, while promoting deeper customer engagement through improved responsiveness and interaction. Despite these opportunities, the review also reveals dynamic challenges, including constrained financial and technological resources, internal cultural resistance to change, and substantial deficiencies in digital competencies. Overall, this article will offer a conceptual enrichment of existing literature while providing practical insights for entrepreneurs, financing institutions, policymakers, and other stakeholders in designing strategic initiatives aimed at reinforcing the long-term competitiveness and resilience of the MSME sector.

2 Material and Methods

This study aims to analyze the carrying capacity of (MSMEs) in use of sustainability-driven strategies to achieve global economic sustainability, to identify the determinants shaping the role of digital transformation and artificial intelligence in reinforcing MSME competitiveness and adaptability, and to examine how innovation- and digitalization-driven strategies enhance MSME competitiveness within an increasingly dynamic economic, environmental, and social landscape. Accordingly, this research addresses the following key questions: (1) how MSMEs function as strategic actors in promoting a sustainable and resilient global economy; (2) which

internal and external factors influence the effectiveness of MSMEs; (3) how the adoption of innovation and digitalization strengthens MSME competitiveness; (4) what the principal constraints faced by MSMEs are; and (5) which policy instruments are most effective in reinforcing the strategic role of MSMEs. These questions are investigated through a qualitative research design, drawing on systematically collected primary and secondary data. The research paper will employ a systematic literature review (SLR) methodology aligned with PRISMA guidelines, which critically evaluates contemporary scholarly publications to demonstrate that sustainability-driven strategies, digital transformation and artificial intelligence continue to play a pivotal role in reinforcing SME competitiveness and adaptability, particularly within economic environments characterized by globalization pressures and recurrent economic disruptions.

3 Results

The review will reveal a substantial increase in relevant scholarly publications over the past five years, reflecting the growing urgency associated with globalization, the Fourth Industrial Revolution, and post-COVID-19 economic dynamics (Adam & Alarifi, 2021). The collected literature will move beyond a narrow focus on traditional business performance toward a contemporary emphasis on digital-enabled adaptation strategies, sustainable innovation, and the strengthening of resilience in response to global disruptions (Ferreira et al., 2021).

4 Conclusions

Overall, this article will offer a conceptual enrichment of existing literature while providing practical insights for entrepreneurs, financing institutions, policymakers, and other stakeholders in designing strategic initiatives aimed at reinforcing the long-term competitiveness and resilience of the MSME sector.

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SOFT SKILLS AS A STRATEGIC ASSET IN ENHANCING ORGANIZATIONAL SUSTAINABILITY

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Keywords: Soft skills, Sustainability, Employee development, Strategic asset

JEL Classification: L20; M12; M51; O15

1 Introduction

The dynamic and complex world of work characterised by conflicts, internationalisation and multiculturalism of the workplaces, globalisation, technological advancement and human rights, has underscored the susceptibility of organisations, as well as become the driver of skill sets and competencies required for individual and organisational competitiveness and survival. Although specialist knowledge is important, interpersonal skills is the glue that binds all the players and can make the difference between success and failure, (1). Studies reveal that soft skills enhance the effectiveness and performance of hard skills and overall productivity. This symbiotic interplay between hard and soft skills has led to organisations setting precedence to competencies that combine the core knowledge with soft skills and practical real-world experience in order to navigate the interconnected sustainability challenges (2) (3). This study is intended to explore the role of soft skills in organisational sustainability and employee's integration and development. The study draws on the dynamic capabilities, resource-based view and knowledge-based view. An organisation's human capital determines its capacity for learning, sensing, integration and coordination capabilities critical for its competitiveness and sustainability.

2 Material and Methods

The study focuses on assessing the significance of soft skills through a theoretical inquiry. It involved review of selected recent literature on soft skills competencies to develop foundation and content analysis to derive insights on the influence.

3 Results

To survive, employees and organisations should balance hard and soft skills. Learning of soft skills should be extended to daily activities for sustainability. Organisations that are anchored on soft skills have better potential for innovation, adoptability and sustainability.

4 Conclusion

The study offers valuable insights into the application of soft skill competencies for organisations seeking to enhance sustainability practices, contributes towards a deeper comprehension of the significance of soft skills for both the employees and organisations and illuminates the practical implications for organisations in relation to recruitments, leadership practices, capacity development and employee well-being. Organisations should, therefore, align human resource strategies with soft skills to be able to strategically adopt training programmes for sustainable practices and employee development.

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The Role of Financial Resilience in Economic Decision Quality

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Keywords: financial resilience, financial stress, decision quality, household finance.

JEL Classification: D14, D81, G51

1 Introduction

Financial resilience has become an important concept for explaining how individuals respond to financial shocks, uncertainty and adverse economic conditions (Tahir & Richards, 2025). Previous researches have mainly examined financial resilience in relation to coping capacity, financial literacy, household stability and broader financial outcomes (Tahir & Richards, 2025; Lusardi et al., 2021; Liu et al., 2024). However, its role in shaping economic decision quality under financial pressure remains insufficiently specified. This study examines financial resilience as both a direct predictor of decision quality and a moderating factor that may reduce the adverse effect of financial stress. The topic is relevant because decision quality influences saving behaviour, borrowing choices, risk exposure and long-term household financial stability (Yue et al., 2020).

2 Material and Methods

The study applies a cross-sectional, scenario-based survey design. Data will be collected through an online questionnaire among adult respondents. The empirical framework includes three constructs: financial resilience, financial stress, and economic decision quality. Financial resilience is defined as the ability to adapt to financial difficulties, absorb shocks and restore stability (Tahir & Richards, 2025). Financial stress refers to the perceived pressure arising from an individual's financial situation. Economic decision quality is operationalised through five dimensions: information use, consistency of choice, consideration of alternatives, risk-return evaluation and avoidance of impulsive responses.

The questionnaire combines demographic variables, Likert-scale items, and scenario-based decision tasks involving unexpected expenses, temporary income loss, borrowing decisions and savings dilemmas (Lusardi et al., 2021; Liu et al., 2024; Yue et al., 2020). A decision quality index will be constructed from the scenario responses. Scale reliability will be evaluated using internal consistency measures, such as Cronbach's alpha and construct structure will be assessed through factor analysis. The hypotheses will be tested with regression models including financial resilience, financial stress, their interaction term and demographic controls.

3 Results

This section presents the expected empirical relationships to be tested. Financial resilience is expected to be positively associated with economic decision quality (Lusardi et al., 2021; Liu et al., 2024). Respondents with higher resilience are expected to evaluate alternatives more systematically, use relevant information more consistently and avoid impulsive financial choices under pressure. Financial stress is expected to reduce decision quality by narrowing evaluation, strengthening short-term focus, and limiting attention to long-term consequences (Yue et al., 2020). The interaction model is expected to show that financial resilience weakens this negative relationship, indicating a protective mechanism in decision-making under uncertainty.

4 Conclusions

The study contributes to the literature by repositioning financial resilience as a determinant of economic decision quality rather than treating it only as a coping, literacy-related or well-being construct (Tahir & Richards, 2025; Lusardi et al., 2021). Its main contribution is a scenario-based empirical framework connecting resilience, financial stress, and decision quality within one testable model. The full paper will elaborate the theoretical background, measurement model, moderation analysis, and implications for financial education and household financial stability (Liu et al., 2024; Yue et al., 2020).

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Building Competitive World-Class Universities: The Strategic Role of Stakeholder Communication

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Keywords: Higher education; world-class universities; stakeholder communication; university brand management.

JEL Classification: I23, I29; M14, M19; M31, M39.

1 Introduction

Higher education has undergone profound transformation since the late twentieth century, particularly with the emergence of global university rankings in the early 2000s [1]. Universities increasingly operate within a competitive, market-oriented environment where reputation, visibility, and stakeholder perception are central [2; 3]. While some institutions question rankings, many, especially in emerging economies, pursue “world-class” status [4], often without a clear understanding of its underlying determinants.

This paper examines what constitutes a world-class university, why some institutions succeed while others struggle, and which factors support such development. It argues that effective stakeholder communication represents a foundational yet often underemphasized element in this process [5; 6]. In particular, clear and responsive communication strengthens institutional credibility, stakeholder trust, and long-term competitiveness [7].

2 Materials and Methods

The study adopts a qualitative, exploratory design. Data were collected through content analysis of official websites and social media platforms of local state and international universities, as well as foreign universities abroad. Selected institutions were also contacted via email and telephone to assess responsiveness and service quality. In addition, focus group discussions were conducted with current and prospective students, as well as parents, to explore perceptions of university communication, website usability, and the adequacy of information for decision-making. This triangulated approach enabled comparison of institutional practices and user experiences across different contexts.

3 Results

The findings indicate recurring deficiencies in stakeholder communication across universities, regardless of ranking status. Institutional websites are often outdated, difficult to navigate, and contain broken links, while social media platforms show limited consistency and engagement. Service accessibility is frequently limited through institutional communication channels. Contact information is sometimes inconsistent or outdated, and responses to inquiries are often delayed or absent. When communication occurs, staff may lack adequate training in professional communication practices, affecting interaction quality.

Language accessibility also presents challenges. In some universities in Tashkent, limited use of spoken Uzbek in official telephone communication may hinder effective interaction, which may be attributed to either insufficient proficiency in the state language or inconsistent prioritization of its use in official contexts. Communication roles are frequently assigned to staff without formal training in marketing or public relations. In addition, feedback mechanisms are weak, and user concerns are not always addressed through official channels.

These findings reveal a gap between the service-oriented role of universities and their actual communication practices.

4 Conclusion

The study concludes that stakeholder communication is a critical yet often underemphasized component in developing world-class universities [5; 7]. While institutional competitiveness depends on multiple factors, the findings highlight communication as a key element in shaping accessibility, trust, and institutional credibility.

For universities in developing contexts, particularly newly established institutions seeking international recognition, communication should be treated as a strategic function rather than a support activity. Strengthening professional communication capacity, improving digital platforms, and fostering a service-oriented institutional culture are essential steps.

Universities with more transparent and responsive communication practices are better positioned to enhance reputation, build stakeholder trust, and achieve long-term competitiveness. In this sense, communication functions as an enabling factor in the broader pursuit of world-class status.

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Who Controls Performance?

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Keywords: Controlling, sport institute controlling, Qualitative research,

JEL Classification: Z23

1 Introduction

Hybrid sports organisations – partly public, partly privately financed – face a fundamental tension between community mission and performance expectations. Public owners want social inclusion, youth development and regional identity, while private stakeholders demand financial sustainability and sporting success. Traditional controlling tools struggle to reconcile these objectives, leading to fragmented planning and reporting systems. This research addresses that gap by examining how mixed-ownership sports clubs design their controlling and KPI frameworks, and by proposing a hybrid model that links strategic planning, budgeting, and operational performance indicators. The aim is to contribute a theoretically grounded yet practice-oriented solution that enables managers to harmonise stakeholder interests while maintaining accountability and long-term sustainability.

2 Material and Methods

The study applies a qualitative multi-case approach. Eight Hungarian sports clubs with mixed public-private ownership were selected to capture variation in size, ownership shares and sporting disciplines. Data were collected through semi-structured interviews with club executives, financial controllers and board representatives, as well as through analysis of internal documents (strategic plans, budgets, performance reports) and public filings. A cross-case analytical framework was used: first, within-case analyses identified how each organisation translated its strategic goals into controlling structures and KPIs; second, an across-case comparison revealed common patterns and divergences. The analytical process combined coding of interview transcripts with iterative refinement of a proposed hybrid controlling model, informed by existing literature on balanced scorecards and stakeholder theory.

3 Results

The findings show that none of the studied clubs had a fully integrated controlling system. Financial KPIs dominated, while non-financial measures related to community engagement, youth development and sporting performance were ad hoc. Strategic plans rarely cascaded into operational targets, and budgeting often reacted to short-term cash constraints rather than long-term goals. However, all clubs recognised the need to harmonise public and private interests. From the cross-case analysis a hybrid controlling model emerged that links ownership structures to performance indicators: public objectives are captured through social and sporting

KPIs (e.g., number of youth participants, community programmes delivered), private goals through financial and market-oriented KPIs (e.g., revenue growth, attendance). The model proposes that strategic goals flow through budgeting to balanced scorecards, supported by transparent reporting routines.

4 Conclusions

Mixed-ownership sports organisations can reconcile conflicting stakeholder goals by adopting a hybrid controlling model that integrates financial and non-financial KPIs. The proposed framework aligns strategic planning, budgeting and operational performance measurement, ensuring that public missions and private performance expectations inform each other. By developing clear strategic objectives, mapping them to balanced scorecards and embedding them into budgeting, clubs can increase transparency, accountability and long-term viability. The research suggests that regulatory bodies and funding agencies should encourage adoption of such models and provide guidance on social and sporting KPIs. Future work could test the model in other cultural contexts and explore how digital tools can support real-time KPI reporting.

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To feed or to be fed: Animal Welfare issues in connection with food chain supply difficulties

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Keywords: food chain supply, animal protection, sustainable agriculture, hunting management

JEL Classification: K29, O13, Q18

1 Introduction

Hunting in general is often considered a luxury activity that harms animals and exploits nature. On the contrary, for those who work in the agriculture without hunting a sustainable and balanced status would not exist between humans and animals. As a strong part of hunting there is, of course, a connection with the food industry. The relevance of the topic is also supported by the annual volume data of hunted wild game meat (which also is a significant label form in food chain regulation). Approximately 13.000 tonnes of game meat were sold or used domestically in the 2024/25 hunting year. Both for agricultural questions and initiatives and for industrial goals, this segment is worth being analysed.

The main scope of this paper is to reflect on the relationship between animal welfare and food chain through the recognition that these two areas are not just connected, but they also support [1]. In the absence of either one, neither animal welfare nor the food chain can develop in a sustainable and forward-looking way.

2 Material and Methods

During the research, we mainly relied on literature issues. As the topic is gaining increasing attention in the academic field, it is seen that the volume of literary data has noticeably grown over the past few years. By contrast, the relationship between animal welfare and hunting was researched decades ago and the core message on the subject has not changed significantly since then. On the other hand, food chain and animal protection (such as labelling) has led to a big expansion of literary papers.

Legal framework was also examined, since there are controversial questions that – according to some opinions – should be repealed and lead to legal reform, so the legal perspective is essential to be considered. Animal welfare itself is debated but food supply indicates health-related questions as well. Hunting management authorities also issue data collections annually so it can also be examined.

3 Results

(1) The results of the topic are strongly focused on the effect of how animal welfare has an impact on the food chain and vice versa. If an animal is kept safely and nurtured properly and maintained in a stress-free environment, the quality of food provided by the animal is much better than that of animals which were raised in a poor and inhumane conditions.

(2) Results show that animal welfare and food chain is not merely a hand-in-hand situation, but it has a strong data-related aspect [2]. Therefore, this relationship should be analysed through data and needs to establish that animal welfare not only has an impact on food chain, but also must be measured, comprehended, visualized and most importantly responded to by the hunting management [3].

(3) The results also show that animal welfare is strongly dependent on the stability of food chain systems. Supply difficulties affecting feed availability, transport, slaughter, veterinary supervision or processing may create direct and indirect welfare risks [4]. In hunting and game management, these risks appear in a specific form, since game animals are not continuously managed like farm animals, yet their welfare is influenced by human decisions on population control, supplementary feeding, habitat management, hunting practices and game meat utilisation.

4 Conclusions

In conclusion it can be observed that animal welfare issues meet important food quality viewpoints. Animals should be treated well to provide high quality meat, which must be an indisputable objective of the food industry, thus labelling solutions can be considered.

It is also concluded by the paper that the humane approach to selling hunted game meat of animals that were reasonably protected by the legal framework should be measured and examined, as new solutions and developments can be considered only by continuous data collection and data analysis [5].

As a conclusion, results also suggest that food chain may create indirect animal welfare risks. Problems may arise in connection with feeding, transport, veterinary control or market access. That is why animal welfare should remain an ethical question but also needs to an integrated part of food chain resilience and sustainable hunting management.

A forward-looking regulatory and management framework should recognise that the responsible use of wild game meat can contribute to both sustainable food systems and animal welfare objectives.

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Determinants of Growth and Sustainability of Micro and Small Enterprises (MSEs): Systematic Literature Review Evidence from Ethiopia

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Keywords: Determinants, Growth, Sustainability, Micro and Small Enterprises.

JEL Classification: O10

1 Introduction

Micro and Small Enterprises are widely recognized as key drivers of economic growth, employment creation, and poverty reduction, particularly in developing countries such as Ethiopia [4] ; [1]. Despite their importance, MSEs face persistent challenges that hinder their growth and sustainability. These challenges include Managerial competencies, access to finance, access to market, availability of infrastructure, access to technology and government support [6];[9]. Understanding the determinants influencing their growth is essential for effective policy design. Therefore, this review aimed to identify the key determinant factors influencing MSEs growth and sustainability in Ethiopia by synthesizing existing articles published (2020 to 2025).

2 Material and Methods

The study was adopted PRISMA 2020 systematic review approach framework collecting empirical studies on MSEs in Ethiopia (2020–2025) from the major databases using keywords including inclusion and exclusion criteria. The selected studies were screened, compared and synthesized to identify major determinants influencing growth and sustainability of MSEs

3 Results

Previous studies revealed that ,limited managerial experience, weak leadership, and, weak teamwork culture, poor communication skill, and limited financial management are significantly hinder enterprise growth and sustainability ([3]; [5]; [7]. Limited access to finance, high interest rate, high collateral requirement, and inadequacy of credit providing institutions [1]; [3] Infrastructural determinants such absence of electric power or frequent power interruption, poor transportation and road, lack of place for working and selling are hindering factors determine the growth and sustainability of Ethiopian MSEs[5] ; [8]. Lack of market linkage, poor marketing information, high price of raw materials, low product quality, inflation are the major and significant factors determine the growth and sustainability of MSEs in Ethiopia[5]. Furthermore, technological limitations including limited of finance to acquire technology are hindering innovation and efficiency [8]. Government regulatory factors such as Bureaucracy procedures, weak government policy support, lack of encouraging tax stimuli, corruption and political instability create unfavorable business environment for MSEs Growth [2].

4 Conclusions

The review concludes that, in Ethiopia MSEs Growth and sustainability shaped by combination of internal and external determinant factors. Key internal determinants include managerial competence and experience, entrepreneurial skills, marketing capabilities, leadership and communication skill, weak teamwork culture, poor, and limited financial management skills whereas environmental challenges comprise limited access to finance, inadequate infrastructural limited access to market, technological limitation and legal regulatory bottlenecks continue hindering MSEs hinder enterprise growth and sustainability. To enhance the growth of MSEs, the study recommends strengthen managerial and entrepreneurial capacities, improving access to finance and markets, investing in infrastructure and technology, and ensuring supportive and institutional coordination policies.

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Comparative Analysis of the Agricultural Structure, Land Tenure and Support Systems of France and Hungary

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Keywords: agriculture, comparative analysis, France, Hungary, land tenure,

1 Introduction

This paper compares the agricultural systems of France and Hungary with a focus on crop production, livestock farming, land tenure and support schemes. The topic is relevant because both countries operate within the Common Agricultural Policy, yet their agrarian structures, institutional solutions and competitive positions differ substantially. The aim of the study is to identify the main structural similarities and differences and to assess how land regulation and support instruments influence agricultural performance and sustainability (Popp et al., 2018).

2 Material and Methods

The study applies a comparative qualitative approach based on secondary sources. Scientific papers, official statistical databases and policy documents were reviewed and synthesised. The analysis is organised around four dimensions: crop production, livestock farming, land structure and agricultural support mechanisms. The comparison relies mainly on Eurostat, KSH, French agricultural sources and selected academic publications in order to describe the most important sectoral features and institutional arrangements in both countries.

3 Results

The results show that in both countries arable crop production has a dominant role, especially cereals and industrial crops. France, however, has a more diversified agricultural structure, supported by favourable agroecological conditions and stronger market integration (Schauberger et al., 2022). In addition to large-scale field crop production, viticulture and fruit growing are much more significant in France than in Hungary. The French livestock sector is also more organised and internationally competitive, particularly in cattle and dairy production, while Hungary has smaller livestock populations and a more uneven technological level across farms (Farkas et al., 2023).

A major difference appears in land tenure regulation. In France, land transactions are influenced by the SAFER system, which helps to moderate land concentration and supports the preservation of an operational farm structure. In Hungary, the land structure reflects the legacy of post-socialist transformation: small family farms coexist with large-scale enterprises, and this duality affects competitiveness, capital access and production efficiency. Both countries participate actively in the CAP, but the practical operation of agri-environmental measures differs. France has a broader and more embedded use of agri-environmental and climate-related schemes, while in Hungary participation is more constrained by farm size, administrative burdens and uneven access to resources (Farkas et al., 2023)..

4 Conclusions

The comparison confirms that France and Hungary pursue similar strategic goals in agriculture, namely competitiveness, sustainability and secure food production, but they do so through different structural and institutional paths. France benefits from a more coordinated land market and stronger sectoral integration, whereas Hungary faces persistent challenges in land structure and in the accessibility of support schemes for smaller producers. The findings suggest that more balanced land regulation and better targeted support instruments could strengthen the long-term resilience of Hungarian agriculture (Schauberger et al., 2022).

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Consumer Profiling and Psychographic Segmentation at the Taste of Transylvania Festival

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Keywords: festival sponsorship strategy, psychographic consumer segmentation, premium brand loyalty, high-income audience profiling

JEL Classification: M31, Z32, M37

1 Introduction

High-income consumers oriented toward premium products and experiences represent an exceptionally valuable yet notoriously difficult-to-reach segment [6, 7]. Conventional mass-communication channels tend to be ineffective with this group, even when the message reaches them, they rarely feel authentically addressed [1, 3, 8, 4]. This audience actively seeks exclusivity, scarcity, and distinctiveness; they hold expectations that substantially exceed those of the average consumer [2], and their purchase decisions are grounded in deliberate information-seeking rather than passive exposure to marketing messages [5].

2 Material and Methods

This study profiles the audience of the Taste of Transylvania (ToT) gastronomy festival held in Transylvania, Romania, drawing on survey data collected on-site in 2024 and 2025 (n = 377; estimated total attendance ≈ 10,000). The segmentation was conducted in two stages. First, exploratory factor analysis was applied to identify the principal attitudinal patterns related to lifestyle and quality orientation. The characteristics of each resulting segment were then determined through the four factors identified: *quality of life*, *premium*, *passive*, and *emerging investor*.

3 Results

Applying a factor–cluster analytical framework, we identify four psychographically distinct visitor segments and characterise them along dimensions of socio-demographic profile, brand preference, purchasing behaviour, financial orientation, and festival motivation. The ToT audience significantly exceeds national averages in educational attainment (72.4% vs. 19% higher education), household income (€2,200 vs. €1,625 average monthly), premium automotive brand penetration, and stock-market participation (26% vs. 1.1% nationally). This quality of life segment (22%) is defined by an emphasis on balance, health, and meaningful living. The uniform age distribution suggests that the values associated with a calm, wellbeing-oriented lifestyle are shared across generations. The premium segment (19%) is distinguished by a broadly balanced distribution of age, gender, and education, with a slight concentration among residents of county seats and among entrepreneurs. The passive segment (31%) is

characterised by a conservative disposition and strong risk aversion, though members are willing to take on credit when it serves business purposes or social-status signalling. The emerging investor segment (28%) is predominantly composed of adults aged 26–35, lending it a dynamic profile oriented toward growth and opportunity. Men are slightly over-represented, and the majority of members reside in Bucharest or other major urban centres.

4 Conclusions

Sponsorship provides direct access to this otherwise hard-to-reach audience through tailor-made experiences, VIP programmes, and exclusive content, generating superior long-term ROI via durable brand loyalty and premium positioning. The *emerging investor* and *premium* segments are ideally suited for luxury and aspirational brands; the former additionally presents significant opportunities in financial services and innovative product categories. With 26% reporting active investment portfolios and household purchasing power approximately double the national average, this audience represents a stable and strategically sound investment. The *quality of life* segment is particularly important as a growth driver for the festival itself: together with the emerging investors, this group assigns special significance to culinary discovery and new taste experiences, even if it does not predominantly belong to the highest income tier. The *passive* segment, while risk-averse in financial matters, regards credit as justifiable when strategically relevant opportunities arise, making it a well-defined target for financial product communications.

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Large Language Models in the management of contemporary business organizations

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Keywords: Large Language Models, Natural Language Processing, Artificial Intelligence, Business Analytics.

JEL Classification: O32, M15

1 Introduction

Contemporary business organizations deploy multiple innovative technological solutions to support their operations, including the decision-making process. One of such solutions is large language models (LLMs), which “are a category of deep learning models trained on immense amounts of data, making them capable of understanding and generating natural language and other types of content to perform a wide range of tasks. LLMs are built on a type of neural network architecture called a transformer, which excels at handling sequences of words and capturing patterns in text” (Stryker 2026). The growth and deployment of Large Language Models since 2022 are evident; their quality is continually improving, and new areas of application are being developed. In combination with business analytics environment applying Business Intelligence systems, deep learning networks (Jelonek et al. 2025), Generative Adversarial Networks (Dunay et al. 2023), big data, Natural Language Processing solutions (Ziora 2022) they have the ability to enhance the decision-making process at all levels of contemporary business organization management, automating routine tasks and supporting multiple areas of business activity, such as customer service management, increasing efficiency and efficacy, speed and quality of the decision-making process. LLMs are applied in AI assistants (chatbots), text generation and summarization, code generation, sentiment analysis, language translation, and the reasoning area. Nowadays, the most popular models include: Anthropic's Claude, OpenAI's ChatGPT, Microsoft's Copilot, Meta's Llama models, Google's Gemini, xAI's Grok, DeepSeek, and Alibaba's Qwen.

2 Material and Methods

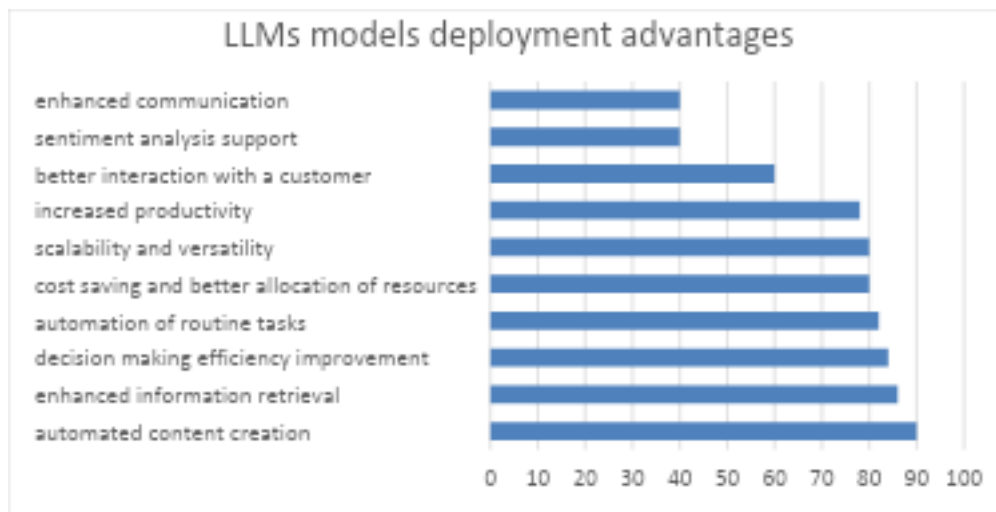
The aim of the paper is to find answers to the following research questions:

1. What is the current state of LLMs deployment and development in contemporary business organization management?
2. What are the advantages resulting from the implementation of LLMs in business organizations?
3. What are the threats resulting from the LLMs application in a business organization's functionality?
4. What are the future trends of LLMs application in business management?

The research part was based on a qualitative approach with the research sample embracing 50 respondents, international students of Czestochowa University of Technology who use LLMs on a daily basis.

3 Results

The research results indicated that large language models bring multiple benefits in business operations where most of the respondents indicated automated content creation (90%), then enhanced information retrieval (86%), the improvement of decision making process (84%), automation of routine tasks (82%), cost saving and better allocation of resources (80%), scalability and versatility of a solution (80%), increased productivity (78%), better interaction with a customer (60%), sentiment analysis support (40%) and enhanced communication (40%)



Source: Authors' study

The disadvantages were related to implementation costs, dependence on technology, accuracy and reliability (possible model hallucinations), bias, and ethical concerns.

4 Conclusions

Large Language Models support managers in their business activities, especially by providing decision-making support, automating daily tasks, facilitating content creation, enabling better information retrieval, and enhancing communication with customers. LLMs are a versatile and scalable solution that increases productivity and contributes to cost savings.

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Bridging the Leadership Deficit in AI-Driven Digital Transformation: The Role of Workforce Capabilities and Entrepreneurial Competence

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Keywords: Digital transformation, artificial intelligence (AI), human capital, entrepreneurial competence, digital leadership, workforce reskilling.

JEL Classification: J24 – O15 – O33

1 Introduction

Artificial intelligence (AI) is turning digital transformation into a leadership challenge rather than a purely technical one. Although organizations invest heavily in AI, many still struggle to translate digital ambition into effective implementation and value creation. Prior research shows that transformation outcomes depend on leadership capability, organizational readiness, and workforce skills [1]. At the same time, shortages in AI literacy and digital competence continue to constrain adoption and increase the need for workforce reskilling [3]. In parallel, expanding governance expectations make the leadership deficit even more visible in AI-enabled transformation [6]. This paper therefore examines how workforce capabilities and entrepreneurial competence can help explain and reduce the leadership deficit in AI-driven transformation.

2 Material and Methods

The paper applies a conceptual and integrative review of recent peer-reviewed literature on digital transformation, AI readiness, human capital, and AI governance. Its analytical logic is consistent with the broader doctoral research project, which frames the AI leadership gap as a mismatch between technological ambition and leaders' capabilities to deliver responsible and scalable AI implementation [5, 6]. The synthesis is structured around three dimensions: workforce capabilities, entrepreneurial competence, and leadership coordination. These dimensions are integrated into a framework explaining how people, entrepreneurial behavior, and governance must align for AI transformation to succeed.

3 Results

The review indicates that workforce capabilities and entrepreneurial competence are mutually reinforcing pillars of AI-enabled transformation. Human capital supports adoption, learning, and operational improvement, while entrepreneurial competence strengthens experimentation, opportunity recognition, and adaptive action under technological uncertainty [2]. The evidence also suggests that AI literacy and workforce reskilling are necessary conditions for more effective implementation [3]. Leadership functions as the coordinating mechanism that aligns these resources through strategy, incentives, and organizational design [4]. Where leaders

invest in skills development and create learning-oriented structures, firms are more likely to convert AI investment into agility and innovation performance [1]. The resulting framework proposes that transformation success depends on the combined alignment of leadership, capability development, and entrepreneurial action.

4 Conclusions

The paper concludes that the AI leadership deficit should be understood as a competence-alignment problem. AI-driven digital transformation becomes more effective when leaders connect workforce development, entrepreneurial initiative, and supportive governance. In this sense, digital leadership is the practical link between human capital formation and responsible AI-enabled value creation. This people-centered perspective offers a concise conceptual basis for future empirical research on inclusive transformation performance and organizational readiness in the age of AI [5].

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Knowledge Structures and Research Trends in AI-Enabled Digital Transformation Leadership: A Scientometric Analysis

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Keywords: Scientometrics, knowledge graph, artificial intelligence (AI), digital transformation, leadership, co-word analysis, semantic relationships, AI governance.

JEL Classification: O32 – O33 – M15

1 Introduction

Artificial intelligence (AI) is reshaping digital transformation and turning it into a leadership challenge rather than a purely technical one. As the literature expands, research on AI-enabled transformation leadership has become increasingly fragmented across themes such as organizational readiness, trust, governance, culture, and value creation [1]. At the same time, the growing importance of AI governance has intensified the need to understand how leadership-related concepts are structured and how research trends are evolving [2]. This paper therefore examines the knowledge structures and research trends of AI-enabled digital transformation leadership through a scientometric perspective.

2 Material and Methods

The paper applies a scientometric design based on bibliographic records from the relevant literature on AI, digital transformation, and leadership. The analysis combines co-word analysis with knowledge graph-based relationship extraction. Co-word analysis is used to identify recurrent topics and their intellectual proximity within the field [3]. Knowledge graph methods are then used to represent semantic relationships among the main concepts in a more structured way. This combined approach is consistent with calls for more dynamic and concept-oriented bibliometric methods in evolving research domains [5]. It also builds on earlier applications of bibliometric and network-based analysis in management research [6].

3 Results

The analysis identifies several major thematic clusters in the literature, including leadership, AI governance, trust, organizational readiness, culture, MLOps, and value creation. Co-word analysis reveals the dominant topics and shows how closely these concepts co-occur across the research field [3]. The knowledge graph adds further value by capturing semantic relationships among concepts and clarifying how technical, managerial, and governance-related issues are interconnected. In particular, the results suggest that some concepts occupy bridging positions between thematic clusters, which is important for understanding intellectual integration and emerging research directions [4]. Together, the findings show that the field has evolved from

broad digital transformation discourse toward a more differentiated discussion of responsible AI leadership and organizational capability.

4 Conclusions

The paper contributes both methodologically and substantively. Methodologically, it demonstrates that integrating scientometrics, co-word analysis, and knowledge graph representation can provide a richer account of conceptual development than a single mapping technique alone [5]. Substantively, it clarifies the conceptual architecture of AI-enabled digital transformation leadership by showing how leadership, AI governance, and related organizational themes are linked within the literature. The study offers a concise basis for future research on responsible AI leadership and provides practical insight into the organizational conditions required to scale AI effectively [2].

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A thematic matrix of the digital transformation leadership gap across the cooperation life cycle and managerial economics domains

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Keywords: Digital transformation, artificial intelligence (AI), leadership gap, cooperation life cycle, managerial economics, AI governance, organizational capability, value realization, MLOps, productivity.

JEL Classification: O33 – O32 – D23

1 Introduction

Digital transformation driven by artificial intelligence (AI) has intensified the role of leadership in shaping organizational outcomes, yet a persistent leadership gap continues to hinder the translation of technological ambition into measurable value. Current research shows that this gap is not limited to strategy alone, but extends to readiness, governance, organizational capability, technical operations, and value realization in AI-enabled settings [1]. At the same time, the growing importance of AI governance and responsible implementation has made leadership quality even more central to transformation success [2]. This paper develops a thematic matrix of the digital transformation leadership gap across the cooperation life cycle and key domains of managerial economics.

2 Material and Methods

The paper applies a thematic literature review of recent peer-reviewed research on digital transformation, AI leadership, readiness, governance, MLOps, and transformation performance. Its analytical logic is consistent with the broader doctoral research project, which identifies six recurring dimensions of the AI leadership gap: strategy and readiness, governance and trust, talent and capability, culture and organizational design, technical operations and data, and value realization.

The review is organized into a thematic matrix with two analytical axes. The first axis maps leadership challenges across the cooperation life cycle, covering formation, development, maturity, and renewal. The second axis links these challenges to managerial economics domains, including investment decision-making, risk and uncertainty management, organizational coordination, human capital allocation, cost structures, and performance measurement. This design makes it possible to examine how leadership problems evolve over time and how they interact with economic decision logics in digital transformation.

3 Results

The review indicates that the leadership gap changes across the cooperation life cycle rather than remaining static. In the formation stage, the most visible problems concern strategy,

readiness, and AI governance, especially where organizations lack clear direction, risk awareness, or implementation structures [2, 3]. During development and maturity, the gap becomes more operational and organizational, with challenges related to culture, coordination, organizational capability, and technical infrastructure. In particular, MLOps and lifecycle management emerge as critical but underestimated conditions of scalable transformation [4]. In later stages, leadership problems increasingly affect value realization and productivity, as firms struggle to convert AI investment into measurable performance gains [5, 6].

The thematic matrix also shows that these leadership gaps have direct relevance for managerial economics. Strategic misalignment affects investment quality, governance failures increase uncertainty and control costs, weak organizational capability constrains coordination, and poor performance measurement limits value realization. The findings therefore suggest that the digital transformation leadership gap is not a single deficiency, but a systemic misalignment between cooperation processes and economic decision-making logics. This matrix provides a structured way to diagnose how leadership failures emerge, accumulate, and reshape outcomes across different stages of AI-enabled transformation.

4 Conclusions

The paper concludes that the digital transformation leadership gap should be understood as a dynamic and multi-dimensional problem spanning the cooperation life cycle and core domains of managerial economics. AI-enabled transformation is more effective when leadership aligns strategic intent, AI governance, organizational capability, technical operations, and evaluation mechanisms over time. This perspective makes it possible to move beyond static descriptions of leadership deficits and toward a more process-oriented diagnosis of transformation challenges.

The proposed thematic matrix offers a concise conceptual basis for future empirical research and practical assessment. It helps clarify how leadership failures influence value realization, productivity, and organizational adaptation at different stages of cooperation. By integrating digital transformation research with managerial economics, the paper provides a structured framework for designing more targeted interventions in AI-enabled organizational change.

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The Importance of Cloud Business Intelligence Systems in the Process of Digital Transformation of Enterprises

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Keywords: Business Intelligence, Cloud BI, digital transformation,

JEL Classification: L86, O33, M15

Introduction

Today's enterprises operate in a rapidly changing environment, with increasing competition and ongoing market globalization. One of the key factors that determines their growth and ability to stay competitive is the effective use of data and modern information technologies. In this context, digital transformation plays a crucial role, as it involves integrating digital technologies into business activities, leading to changes in business models, processes, and decision-making (Vial:2019). An important tool supporting digital transformation is Business Intelligence systems, which allow companies to collect, process, and analyze data to gain useful insights (Mositsa et al., 2023). In recent years, there has been a growing shift toward cloud-based solutions, known as Cloud Business Intelligence. These solutions offer greater flexibility, scalability, and easier access to analytical tools, while also reducing infrastructure costs and implementation time. The use of Cloud Business Intelligence supports the idea of a data-driven organization, where decisions are based on data analysis rather than only on intuition (Hamidinava et al: 2024, Dziembek, Ziora: 2023). Integrating BI systems with other company systems, such as ERP and CRM, helps create a consistent information environment that supports both daily operations and long-term strategy (Khouibiri, Farhaoui, 2023)

Although numerous studies have investigated the benefits and barriers associated with Cloud BI adoption, relatively little attention has been paid to its role in supporting digital transformation. Existing research predominantly focuses on technological, organizational, and economic determinants of Cloud BI implementation, while the relationship between Cloud BI utilization and digital transformation remains insufficiently explored. Therefore, this study seeks to address this research gap by examining whether Cloud BI contributes to digital transformation and identifying the organizational mechanisms through which this influence occurs.

Material and Methods

The primary objective of this study is to assess the importance of Cloud Business Intelligence systems as a factor supporting the digital transformation of enterprises and to identify the key determinants associated with this process. The empirical study was conducted using the Computer-Assisted Web Interviewing (CAWI) method among 400 medium-sized and large enterprises operating in Poland that actively use Cloud BI solutions. The questionnaire included items related to Cloud BI benefits, barriers, decision-making support, organizational effects, and digital transformation outcomes.

The dependent variable in the study was the assessment of the impact of Cloud BI on accelerating the digital transformation of enterprises. To analyze the collected data, descriptive statistics, Spearman's rank correlation coefficients, multiple regression analysis, and cluster analysis were employed. Spearman's correlation was selected because the survey variables were measured using ordinal Likert-type scales, making non-parametric methods more appropriate than traditional parametric correlation measures.

Results

The descriptive analysis revealed that the perceived impact of Cloud BI on accelerating digital transformation was moderate, with a mean value of 2.77 and a standard deviation of 0.85 on a five-point scale. This finding suggests that respondents do not perceive Cloud BI as a direct or automatic driver of digital transformation. However, the correlation analysis demonstrated statistically significant positive relationships between digital transformation and several organizational outcomes. The strongest correlations were observed for business goal achievement ($\rho = 0.321$; $p < 0.001$), organizational flexibility ($\rho = 0.310$; $p < 0.001$), and the improvement of management functions ($\rho = 0.280$; $p < 0.001$). These findings indicate that enterprises experiencing greater managerial and organizational benefits from Cloud BI are also more likely to perceive stronger digital transformation effects.

Additional analyses identified strong relationships between digital transformation and factors associated with decision-making effectiveness, knowledge sharing, and reduced investment risk. In contrast, a significant negative relationship was observed for the perceived risk of developing additional local functionalities outside the Cloud BI environment ($\rho = -0.509$; $p < 0.001$). This result suggests that fragmented analytical environments and the necessity of creating local extensions may reduce the transformational potential of Cloud BI implementations.

The regression model provided further evidence regarding the determinants of digital transformation. The model explained 75.3% of the variance in digital transformation assessments ($R^2 = 0.753$), indicating a high level of explanatory power. The most influential predictors included decision-making effectiveness, achievement of business goals, organizational flexibility, and management effectiveness. These results demonstrate that digital transformation is more strongly associated with organizational and managerial capabilities than with purely technological factors.

Cluster analysis additionally revealed the existence of distinct groups of enterprises characterized by different levels of Cloud BI utilization and transformation outcomes. The results indicate that organizations vary substantially in their ability to leverage Cloud BI for strategic and transformational purposes. While some enterprises use Cloud BI primarily as a reporting tool, others employ it as a core component of data-driven management and organizational transformation.

The findings provide important insights into the relationship between Cloud BI and digital transformation. Contrary to common assumptions, the results suggest that Cloud BI does not directly transform enterprises. Instead, its influence is realized through a sequence of intermediate organizational mechanisms. Cloud BI improves data accessibility, analytical capabilities, and decision-making processes, which subsequently enhance management effectiveness and organizational flexibility. These improvements ultimately contribute to digital transformation outcomes.

The results support the concept of the data-driven organization, according to which competitive advantage is increasingly derived from the ability to transform data into actionable knowledge. Enterprises that successfully integrate Cloud BI into managerial processes appear to achieve higher levels of organizational agility and digital maturity.

Furthermore, the findings indicate that technological investments alone are insufficient for achieving digital transformation. The organizational context, managerial competencies, and

effective use of analytical insights play a critical role in determining whether Cloud BI generates transformational value.

Conclusions

The study demonstrates that Cloud Business Intelligence is an important factor supporting the digital transformation of enterprises. However, its impact is primarily indirect and mediated through improvements in decision-making effectiveness, management processes, and organizational flexibility.

The results contribute to the existing literature by providing empirical evidence that Cloud BI creates transformational value not through technology itself but through organizational and managerial mechanisms associated with data-driven management. From a practical perspective, the findings suggest that managers should treat Cloud BI as a strategic capability supporting organizational learning, knowledge management, and decision-making rather than merely as an analytical technology.

Future research should employ structural equation modeling (SEM), longitudinal studies, and cross-country comparisons to further explore the causal relationships between Cloud BI utilization and digital transformation outcomes.

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Leveraging Mountain Tourism for Sustainable Livelihoods: Insights from Mt. Kenya National Park

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Keywords: Mountain tourism, facilities, activities, sustainability of livelihoods.

JEL Classification: L83, Q56, R11

1 Introduction

Mountain tourism has become a major force for social and economic growth, especially in rural and environmentally sensitive areas. In developing countries, it is highly significant in improving the lives of the community by creating jobs, making money, and building infrastructure (WTTC, 2022). However, the degree to which tourism fosters sustainable livelihoods is contingent upon the interaction between tourism activities and supporting infrastructure (Thiene et al. 2026). This study therefore examines how mountain tourism can be leveraged to enhance the sustainability of local community livelihoods around Mount Kenya National Park. It considers the mountain tourism activities and facilities as key drivers to sustainability of local community livelihoods.

2 Material and Methods

The study adopted a cross-sectional quantitative survey design based on primary data collected from domestic tourists visiting Mount Kenya National Park from July 2025 to March 2026. Self administered semi-structured questionnaires were used to capture data on mountain tourism activities, tourism facilities, and sustainability of local community livelihoods. Data were analysed using SPSS Version 25. Cronbach's alpha test was used to test the reliability of the questionnaire items ($\alpha \geq 0.70$) was considered acceptable KMO and Bartlett's test of sphericity were conducted to determine the suitability of the data for factor analysis (KMO ≥ 0.60 Bartlett's test < 0.05) was accepted. Exploratory factor analysis (EFA) was used to ascertain the underlying factor structure and factor loadings of $p \geq 0.50$ were retained. Composite indices were computed to measure each construct (activities, facilities and sustainability of local community livelihoods) and Pearson correlation analysis was used to determine the strength and direction of the relationship ($p < 0.05$). Finally, multiple regression analysis was carried out to determine the effect of mountain tourism activities and facilities on the sustainability of local community livelihood. Significant levels was reported at ($p < 0.05$).

3 Results

The reliability test results indicated a strong internal consistency among all constructs (Activities $\alpha = 0.814$, Facilities $\alpha = 0.858$, and sustainability of local community livelihood $\alpha = 0.893$) with excellent sampling adequacy (KMO = 0.919) and statistically significant Bartlett's Test of Sphericity ($p < 0.001$). Exploratory factor analysis revealed a clear three-factor structure (activities, facilities, and livelihood sustainability) with 61.3% of the total variance explained. Livelihood sustainability (38.9%) was the most important factor, followed by tourism facilities (14.2%), and tourism activities (8.2%). The loading of factor items was consistently high ($p \geq 0.50$), implying that the constructs were clearly defined. Pearson correlation results indicated a positive and significant relationship among all the test variables ($p < 0.001$). Tourism activities and facilities revealed a strong positive relationship ($r = 0.645$), activities and livelihood sustainability indicated a moderate relationship ($r = 0.394$) and tourism facilities were moderately associated with livelihood sustainability ($R = 0.468$). These results imply that enhancement of mountain tourism facilities and increased activities are associated with enhanced sustainability of local community livelihoods. The regression model was statistically significant ($F = 78.301$, $p < 0.001$), accounting for 23% of the variation in livelihood sustainability ($R^2 = 0.230$). Tourism activities and facilities both had a significant and positive effect on the sustainability of local peoples livelihoods. The tourism facilities ($\beta = 0.357$, $p < 0.001$) exhibited a more significant impact than tourism activities ($\beta = 0.164$, $p < 0.01$). This finding indicate that mountain tourism facilities plays a more critical role in harnessing tourism potential for sustainable livelihoods of local people than the activities, hence a need to invest more in mountain tourism infrastructure.

4 Conclusions

The study concludes that mountain tourism is an integral part in sustainability of local community livelihoods, and that mountain tourism infrastructure is more important than activities. This suggests that there is a need for more investment into mountain tourism infrastructure, planning tourism in a more integrated way, and enhancing the community's capacity to support inclusive development.

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Artificial Intelligence in the Financial Industry: A Systematic Literature Review

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Keywords: artificial intelligence, finance, automation, banking.

JEL Classification: C02, C45, C60

1 Introduction

The Fourth Industrial Revolution is well underway, bringing the widespread adoption of artificial intelligence (AI). Its impact on the global economy is similar to the electricity or internet. In our study, the focus is on the role of AI in the financial sector. This sector is particularly sensitive to such innovations, as data processing and forecasting lie at the core of its operations. The purpose of this paper is to provide a comprehensive overview of the development of AI, its main directions and the possibilities of its applications in finance.

2 Material and Methods

This study applies a systematic literature review combined with bibliometric analysis to identify, evaluate, and structure the most relevant academic contributions and industry insights. The dataset was compiled from leading international scientific databases, including Scopus, Web of Science, and Google Scholar, supplemented by selected industry reports to ensure practical relevance.

The research follows a secondary research design, enabling a comprehensive examination of existing artificial intelligence approaches and their applications within the financial sector. In addition to the qualitative synthesis of the literature, a bibliometric analysis was performed using VOSviewer to map the intellectual structure of the field. This approach allowed for the visualization of key research trends, co-authorship networks, keyword co-occurrences, and thematic clusters.

3 Results

The bibliometric analysis conducted using VOSviewer reveals several well-defined structural patterns within the literature on artificial intelligence in the financial sector. Based on co-authorship and co-citation networks, the field appears to be moderately fragmented, with a few dominant research clusters primarily originating from the United States, China, and Western Europe. These regions show the highest publication output and strongest collaborative linkages, indicating their leading role in shaping the academic discourse.

Overall, the results suggest that research on AI in the financial sector is both rapidly expanding and increasingly interdisciplinary. While strong thematic concentrations exist around forecasting, risk management, and fraud detection, emerging areas such as explainable AI and ethical considerations are gaining significant attention, pointing toward future research directions.

4 Conclusions

The study examined the role of artificial intelligence in the financial sector through a systematic literature review complemented by bibliometric analysis. The results highlight that AI-related research in finance is rapidly expanding and characterized by well-defined thematic areas, particularly in forecasting, risk management, and fraud detection. At the same time, the growing emphasis on advanced techniques such as deep learning and explainable AI reflects the increasing complexity and maturity of the field.

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Critical success factors for integrating Generative AI and Knowledge Agents into knowledge management systems to achieve sustainable competitiveness

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Keywords: Generative AI, Knowledge Agents, Knowledge Management, Critical success factors, competitiveness, sustainability

JEL Classification: O32, D83, M15

1 Introduction

Traditional knowledge management systems long served as reliable organizational repositories, but their rigid and structured logic is no longer able to keep pace with the speed and pressure for adaptation that shape today's business environment. Organizations must deal with information overload, fast-changing knowledge, fragmented internal knowledge sources, and the growing risk of knowledge loss when experts leave or retire. Recent literature suggests that generative artificial intelligence and large language models are not only introducing new tools into knowledge management, but are also changing the logic of how knowledge is created, accessed, and shared. Pressure to maintain market competitiveness has pushed organizations to introduce these technologies too quickly. This creates a serious tension between speed and sustainable knowledge management. When integration is rushed, knowledge quality may weaken, hallucination risks increase, privacy and accountability problems become harder to control, and shadow AI can spread more easily. A further stage of this shift can already be seen in the rise of more autonomous, goal-directed knowledge agents that no longer only support knowledge processes, but increasingly shape them.

2 Material and Methods

This study is based on an integrative literature review following Torraco's methodological guidance, as this approach is suitable for bringing together different theoretical and empirical strands within a common analytical framework. The review was built on peer-reviewed publications from 2020 to 2026 indexed in Scopus and Web of Science that addressed the intersection of generative AI, knowledge agents, and organizational knowledge management. The TOE framework served as the interpretive lens of the analysis and supported the identification and structuring of critical success factors across technological, organizational, and environmental dimensions.

3 Results

Our analysis identifies seven critical success factors that allow organizations to adopt AI without losing the quality of their knowledge. In the technological area, the most important factors are data integrity and the reliability of AI models to avoid errors. In the organizational area, success depends on strong leadership support and a corporate culture that encourages continuous learning. It is also essential to create a strong partnership between humans and machines, ensuring that employees have the necessary digital skills to work with autonomous agents. Finally, the environmental area requires strict ethical governance and following legal rules to protect information privacy. The results show that rushing to use AI often leads to risks like poor data quality or security problems. To remain sustainable, firms must balance speed with careful planning. By focusing on these factors, organizations can successfully move from old repositories to active knowledge agents while keeping their information base credible and safe.

4 Conclusions

This research shows that moving to autonomous knowledge agents is a major change for any organization. It is not just a technical update but a process that affects people and the whole corporate culture. The study concludes that successful integration requires a careful balance between using new tools quickly and keeping the company knowledge reliable. Organizations should focus on a strong partnership where human expertise and artificial intelligence work together rather than trying to replace people with machines. By following the success factors identified in this paper, managers can ensure that their digital transformation is both safe and sustainable. These findings provide a practical guide for any organization that wants to remain competitive and credible in the rapidly changing AI era.

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Examining SME employees' technological openness in the age of digital transformation

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Keywords: Technological openness, digital transformation, digital skills, employees.
JEL Classification: J24, O33

1 Introduction

Digitalization, automation, and artificial intelligence are increasingly transforming the world of work, the structure of employment, and the competence expectations placed on employees [1]. Technological progress not only leads to the emergence of new job roles, but also reshapes or replaces many traditional tasks [3]. At the same time, digital skills, adaptability, and lifelong learning are gaining greater importance [2]. However, the effects of this technological transition do not affect all groups of employees to the same extent; therefore, it is particularly important to explore how open employees are to new technologies, how they assess their own digital competencies, and to what extent they consider the further development of technological skills necessary [4].

2 Material and Methods

The aim of the research was to explore small and medium enterprise employees' technological openness. The study was conducted using a quantitative approach in the form of a questionnaire survey. The thematic blocks of the questionnaire covered respondents' labour market situation, demographic characteristics, work preferences, experiences with the use of digital tools, as well as motivational and satisfaction-related factors. The questionnaire was distributed exclusively online in both Hungarian and Slovak. Data collection took place between December 2025 and February 2026, with a total of 201 respondents participating. Snowball sampling was applied. The questionnaire-based research was complemented by a targeted literature review conducted in the Web of Science database. The abstracts of relevant publications related to Hungary, Slovakia, and both countries were organized into three separate corpora, and their text analysis was carried out using the Voyant Tools online platform. The analysis focused on the most frequently occurring terms and their relative frequencies.

3 Results

The results indicate that respondents generally have a positive attitude towards workplace technologies. More than half of the participants agreed that their workplace is equipped with modern digital tools, is open to the introduction of new digital solutions, and that the technologies used support their work performance. At the same time, perceptions of technical support were more mixed, suggesting that this remains an area for further improvement. The most common workplace-provided digital tool was a company laptop or computer (59%), while 33% of respondents also had access to software systems. The findings also show that technological openness does not automatically decrease with age, as most respondents reported

either increased or unchanged openness towards new technologies. In addition, most participants considered themselves competent in using digital tools, 63% had already participated in digital training, and 89% expressed openness to acquiring further technological skills.

The text analysis of abstracts identified through the Web of Science database revealed that the most frequent terms were related to digitalization, automation, employment, skills, education, and training. A comparison of relative frequencies showed that Slovak-focused publications placed stronger emphasis on digital skills and technological adaptation, while Hungarian-focused abstracts highlighted work, employment, education, and development more strongly. In the publications addressing both countries, automation appeared as the most dominant concept.

4 Conclusions

Based on the research, the majority of respondents show a positive attitude towards new technologies, consider themselves competent in the use of digital tools, and are open to acquiring further technological skills. At the same time, the results also indicate that the quality of technological support is not equally adequate in all cases. The text analysis of the literature confirmed that digitalization, automation, employment, and skills development are closely interconnected areas. Overall, this suggests that technological openness is a key factor in labour market adaptation.

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Sustainability-related information cues in food marketing: a bibliometric review of labelling, origin, and consumer response

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Keywords: food marketing, sustainability communication, food labelling, geographical indication, consumer response.

JEL Classification: M31, Q56, D83

1 Introduction

The literature on sustainability communication in food markets is already sizeable, but it remains split across food labelling, origin-related cues, eco-labels, packaging communication, and consumer response [1-4]. As a result, it is difficult to see how these strands fit together and which topics sit at the centre of the field. This paper maps sustainability-related information cues in food marketing, with particular attention to labelling, origin cues, and consumer response.

2 Material and Methods

The pilot review uses Scopus as the source database. The search was limited to English-language journal articles and reviews published between 2010 and 2026. Search terms combined food and beverage contexts with sustainability-related information cues, including eco-labels, sustainability labels, origin information, geographical indications, packaging communication, and price transparency, together with consumer and marketing terms. After title and abstract screening, 821 records were retained. The review follows PRISMA 2020 in record identification and screening [5], while the synthesis is structured through a CIMO logic [6]. For the pilot stage, VOSviewer was used for author keyword co-occurrence analysis and overlay visualization by average publication year.

3 Results

The keyword map shows a dense central structure built around food labelling, eco-labelling, willingness to pay, consumer preferences, and consumer behaviour. A second major strand is organized around geographical indication and country of origin, showing the continued weight of origin-related information in food marketing. Trust and certification appear mainly as linking mechanisms rather than separate dominant themes. Packaging-related and price-related cues are present, but they do not occupy the centre of the current map. The overlay view points to an earlier concentration around geographical indication, country of origin, food quality, and related

product domains, while more recent attention is visible around food packaging, food waste, purchase intention, eco-score, and willingness to buy.

4 Conclusions

The pilot results suggest that the field is not organized around a single claim type. It is structured by a broader set of information cues connecting labels, origin signals, and consumer response. The review contributes a common analytical frame for these strands and helps locate both previous themes and thinner areas of research. This gives the later full paper a stable basis for thematic interpretation, research gaps, and implications for sustainability communication in food marketing.

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Digital sustainability as the sustaining force of Generation Z in the white-collar sector with the presence of AI

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Keywords: generation, motivation, sustainability, AI, competitiveness

JEL Classification: J24, L22, M54, O33

1 Introduction

In the 21st-century white-collar sector – regardless of whether it is a public institution, a multinational corporation, or a small to medium-sized enterprise – the focus of management has shifted from exclusive profit maximization towards the strategic importance of talent retention [1],[2]. Generation Z and the upcoming Generation Alpha entering the labour market possess digital expectations that fundamentally reshape traditional employer value propositions [3]. The core problem of the research is the lack of organizational adaptation: if a company is unable to keep pace with digital trends, both its strategic sustainability and its attractiveness to young talent are jeopardized.

A critical question arises how competitiveness can be preserved in an environment – particularly in the public sector – where technological limitations make it difficult or even impossible to fully meet expectations for integrating Artificial Intelligence (AI). If the work environment is digitally underdeveloped, the career path becomes unsustainable for the employee, which inevitably leads to increased turnover.

This study examines which alternative retention strategies and leadership approaches can compensate for technological limitations, thereby supporting a sustainable human-centered strategy in the absence of AI's physical presence.

2 Material and Methods

The methodological structure of the study is based on secondary literature review, followed by primary qualitative and quantitative data (n>100) collection. In the quantitative research phase, the attitudes of Generation Z (born between 1996–2010) white-collar employees were examined through a self-designed, non-representative online survey. The survey covers participants working in the public sector, the private sector, as well as in the small and medium-sized enterprises.

The main points of the questionnaire cover the following areas:

- The respondents' subjective assessment of the digital development level of their current workplace.
- Analysis of the company's innovation willingness and environment.

- Examination of the presence of Artificial Intelligence (AI) tools in the workplace (actual use, prohibition, or absence).
- Exploration of the extent of perceived technological backwardness.
- Verification of whether a significant relationship exists between an innovative work environment and employee retention (loyalty) among the examined generation.

3 Results

The results of the research are expected to confirm that in the white-collar sector, the quality of the technological environment and the organization's willingness to innovate fundamentally influence Generation Z's loyalty.

The following specific results are anticipated:

- It is assumed that employee retention depends not only on current AI use but on the organization's vision.
- In companies where technological backwardness is perceived but management is open to innovation, turnover intention remains lower.
- The digital divide is highest in the public sector.
- In the absence of the above, the effectiveness of motivation and incentive systems for the younger generations decreases.

4 Conclusions

The study highlights that in 21st-century management, the dilemma of sustainability versus competitiveness can be resolved at the level of human capital. Generation Z retention in the white-collar sector is not merely an HR issue but a result of strategic 'digital sustainability.' Key conclusions include:

- Loyalty remains sustainable if the organization demonstrates a credible vision for digital transformation.
- Leadership attitude as a strategic bridge: Leadership plays a decisive role in bridging the technological and generational gap. Supportive leadership open to innovation can counterbalance slower technological adaptation.
- Competitiveness and turnover: Digital backwardness represents a direct competitive disadvantage in the labor market. Reducing turnover can only be achieved through continuous digital modernization of the work environment.

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The Role of International Students in Sustainable Tourism and Enhancing Destination Competitiveness

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Keywords: internationalization of higher education, cultural diversity, sustainability, competitiveness, tourism trends

JEL Classification: Z32, I23, M31

1 Introduction

The internationalization of higher education has significantly increased the number of international students worldwide, generating economic, social, and tourism-related impacts (Richards, 2011; King & Raghuram, 2013). Student mobility is increasingly interpreted as a form of educational tourism, characterized by extended stays, intensive destination experiences, and complex consumption patterns (Amaro et al., 2019). International students actively explore host destinations and frequently share their experiences through social media, contributing to destination image formation and international visibility (Marin-Pantelescu et al., 2022; Gallarza et al., 2024). Their longer stays foster cultural engagement, authentic interactions, and responsible travel behavior, which are closely linked to contemporary sustainability-oriented tourism trends (Quintela et al., 2022; Pinto et al., 2021). Furthermore, international students can strengthen destination competitiveness through continuous demand generation and positive word-of-mouth communication (Amaro et al., 2019; Gallarza et al., 2024).

2 Material and Methods

The study is based on an online questionnaire survey conducted among international students studying in Hungary. The questionnaire examined students' well-being, tourism activities, travel habits, cultural perceptions, and intercultural relationships.

The research hypotheses focused on the relationships between tourism interest, cultural experiences, satisfaction, and background variables such as country-of-origin distance and length of stay. Data were analyzed using descriptive statistics, cross-tabulation analysis, chi-square tests, and analysis of variance.

3 Results

The findings indicate that international students generally evaluate their Hungarian experience positively and demonstrate strong interest in the country's tourism attractions. Most respondents actively participate in tourism-related activities and visit various destinations during their stay.

The results also show that students successfully preserve their own cultural identity while remaining open to Hungarian culture, which is widely perceived as distinctive and valuable. Intercultural relationships between local and international students are present, although their intensity varies.

Statistical analyses revealed significant associations between the distance of the country of origin and perceptions of Hungarian culture, as well as selected satisfaction indicators. In contrast, no significant relationship was identified between the length of stay and tourism interest or overall satisfaction.

4 Conclusions

International students represent an important yet still underutilized segment of the tourism sector. Their longer stays promote deeper destination attachment, cultural understanding, and responsible travel behavior, supporting both sustainability objectives and destination competitiveness.

The study also highlights the ambassadorial role of international students in shaping destination image and influencing future travel decisions. In the Hungarian context, stronger interaction between domestic and international students could further improve social integration and enhance the tourism-related benefits generated by international student mobility.

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Economic Blocs and Environmental Innovation: An Analysis of the Efficiency of Investment in Research and Development

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Keywords: Research and Development (R&D), Environmental Innovation, Economic Blocs, Investment

JEL Classification: F15, O31, O44, Q56

1 Introduction

Companies have been investing a significant portion of their expenditure in Research and Development (R&D) – referred to as ‘green investment’ – seeking environmental innovation within the R&D sector and pursuing innovative technologies that mitigate environmental degradation (Xie, et al. 2026). Investing in R&D has a positive influence on innovative performance, which leads to a commitment to green investment, as environmental innovation encompasses management practices and technological advances that enhance corporate performance and resource efficiency, and sustains a competitive advantage (Juvercina Sobrinho et al., 2025).

There are recent studies on environmental innovation and R&D, such as those by Ozacan et al. (2024); Iamamoto et al. (2024); Juvercina Sobrinho et al. (2025); Xie et al. (2025); Duarte-Kzam et al. (2025); Coria and Jairaté (2025); and Ahmad et al. (2026).

In light of the above, the research question is as follows: **how does institutional integration within economic blocs influence the efficiency of R&D investments in generating environmental innovation within firms?**

With the overall aim of analysing the influence of institutional integration within economic blocs on the efficiency of R&D investments in promoting corporate environmental innovation. Economic blocs were created not only to expand trade between the countries comprising each bloc, improve the economy and secure peace between nations, but today the central issue also concerns sustainable innovation.

2 Materials and Methods

A quantitative, descriptive and documentary study was conducted. The population comprises Brazilian companies and companies from emerging countries that are members of the European Union (EU), namely Greece, Hungary and the Czech Republic. The classification as emerging was made in accordance with the MSCI, part of the European Union. The data were extracted from the LSEG database. It was a non-probability sample. An initial sample of 555 companies

was surveyed over the period from 2010 to 2025. As for the econometric estimation method, the panel data regression model was used.

The explanatory variables considered are research and development intensity (RDINTENSE), the decision to invest in research and development (RD), institutional integration into an economic bloc (INTEG), and the interaction terms between these variables (RDINTENSE \times INTEG and RD \times INTEG). Research and development intensity is measured as the ratio of total R&D expenditure—including expenditure recognised as an expense and that capitalised as intangible assets—to total assets. The RD variable is a *dummy variable* that takes the value 1 when the firm reports R&D investment in the period and 0 otherwise.

The following control variables were included: firm size (SIZE), measured by the natural logarithm of total assets, given that larger firms tend to have greater capacity to invest in environmental innovation; economic performance (ROA), measured by the ratio of net profit to total assets; leverage (LEV), measured by the ratio of liabilities to total assets; and cash (CASH), corresponding to the value of cash and cash equivalents as shown on the balance sheet. Additionally, CAPEX is included as a proxy for investment in long-term assets, captured by the net cash flow associated with the purchase and sale of fixed and intangible assets, which indicates the capital expenditure reported by companies; and the sectors in which they operate (SECTOR). In this context, higher levels of cash and cash equivalents suggest greater availability of internal resources for financing innovative projects. On the other hand, more highly leveraged companies tend to face greater financial constraints, which may limit their investments in environmental innovation.

3 Results

Following data processing, with the exclusion of companies that did not provide complete information, the final sample of this study comprises 133 companies, comprising 107 Brazilian, 2 Czech, 19 Greek and 5 Hungarian firms.

After data processing, excluding companies that did not provide complete information, the final sample of this study consists of 133 companies, comprising 107 Brazilian, 2 Czech, 19 Greek and 5 Hungarian firms.

The model was estimated using panel data (1,097 observations and 133 companies). The interaction term RDINTINTEG was significant, presenting a negative coefficient at the 10% significance level ($p=0.085$); that is, it suggests that the combination of R&D intensity and institutional integration into an economic bloc may have a negative effect on innovation. The result may indicate likely inefficiencies or difficulties in coordinating R&D efforts with the integration process.

The control variables were significant, notably SIZE (firm size), which showed a positive coefficient ($p = 0.055$) at the 10% significance level, demonstrating that larger firms tend to exhibit a higher level of innovation. The sector variable was also significant at the 10% level ($p=0.078$), suggesting that sectoral characteristics influence innovation.

When analysing the estimation results whilst considering sector-specific fixed effects, sector dummy variables were included to control for specific structural characteristics of the sectors. Sector 1 (Discretionary Consumption) was used as the reference. The results suggest that innovation is influenced by sectoral structural characteristics, with some sectors performing significantly worse than the Discretionary Consumption sector.

In the estimation, which took into account fixed effects for the year, year *dummy* variables were included to control for macroeconomic shocks over time. In this case, the year 2010 was used as the reference year. The results indicate an upward trend in innovation over time, particularly from 2013 onwards. From 2014 to 2025, the level of significance was 1%, intensifying further between 2019 and 2025 with $p<0.01$.

The fixed effects for the year reveal that innovation did not remain static, but evolved significantly over the course of the period.

4 Conclusions

This study analysed the influence of institutional integration within economic blocs on the efficiency of R&D investments in promoting corporate environmental innovation. Through a quantitative study using panel data, the result was contrary to what the literature (Ozcan et al., 2024) had previously discussed on the subject, as the combination of institutional integration into an economic bloc and R&D intensity may have a negative effect on innovation.

However, firm size was significant, demonstrating that larger firms tend to exhibit a higher level of environmental innovation.

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Environmental, Social and Governance in the Brazilian insurance market: an analysis in light of SUSEP Circular 666/2022

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Keywords: Environmental, Social and Governance Sustainability (ESG), Insurance Companies, Risk Management

JEL Classification: G22, M14, Q56

1 Introduction

In the insurance market, the risks and opportunities associated with sustainable practices take on even greater significance due to the high level of uncertainty regarding the future extent and timeframe in which climate change may impact their results. The disclosure of sustainability information by insurers has become a strategic pillar for legitimacy in the contemporary financial market. According to Brogi et al. (2022), factors such as the size of the institution and its profitability are key determinants of the level of awareness and transparency regarding environmental, social and governance practices.

Based on Jensen's agency theory (1976), this study discusses how the disclosure of sustainability information can reduce information asymmetry, strengthen transparency and enhance institutional legitimacy. On the other hand, stakeholder theory emphasises the interdependencies between the company and various groups, including investors, regulators and society at large (Freeman, 2020). Transparent ESG disclosures are essential to meeting expectations of accountability and securing the support necessary for the firm's long-term survival. By providing relevant and accurate information on environmental and social impacts, managers reduce information gaps and strengthen mutual trust. Therefore, high-quality ESG reports serve as strategic tools to promote institutional legitimacy and engagement with stakeholders (Himanshu & Baker, 2025).

Taking into account the SUSEP regulation (Circular No. 666/2022), the research aims to identify how Brazilian insurers are integrating ESG risks and practices into their corporate governance structure to comply with the regulatory body's requirements.

It is worth emphasizing that the usefulness of the report depends directly on insurers' ability to provide metrics that are comparable and integrated into their long-term strategy, thereby preventing transparency from being reduced to a mere documentary formality lacking analytical substance (Marti et al, 2025).

2 Materials and Methods

This descriptive, qualitative study uses as its sample the insurers listed on the Brazilian stock exchange (Brasil, Bolsa, Balcão), totalling three companies: BB Seguridade and Caixa Seguridade, both publicly and privately owned, and the privately owned Porto Seguro. The research technique employed was content analysis of the published sustainability reports, using the disclosure requirements for sustainability reports set out in SUSEP Circular 666/2022 as a benchmark. For the content analysis, Bardin's (1995) parameters were employed. The period analysed covers the years 2022 to 2024 and is justified by the publication of the circular.

The information analysed was categorised in accordance with the circular and comprises the disclosure requirements set out in the sustainability report, namely: the results of sustainability policies achieved in the previous financial year and those expected for the current one; the most relevant aspects relating to the management of sustainability risks to which the company is exposed, including: a) the monitoring carried out by the highest management body; b) the manner in which the results of the monitoring are taken into account in the review of strategic objectives and the business plan and the sustainability policy; c) the main employees, bodies and units involved in risk management, as well as their respective duties and responsibilities; d) the main risks identified and their potential short-, medium- and long-term impacts on the supervised entity's business model, strategy and operations; e) the processes used to identify, assess, classify, measure, manage, monitor and report risks; and f) the manner in which risks are integrated into the EGR and the management of underwriting, credit, market, operational and liquidity risks.

3 Results

The data was categorised as described in the previous section and analysed on a time-series basis by company.

Brasileg consolidated its sustainable maturity with the launch of its Sustainability Policy and the maintenance of full carbon neutrality in its operations between 2022 and 2024. For the current financial year and the 2025–2027 period, progress is expected in the pillars 'Simplify, Protect and Delight', integrating ESG solutions into the portfolio to address new macroeconomic challenges. Risk management focuses on climate and socio-environmental aspects, using remote sensing and stochastic modelling to improve underwriting and anticipate scenarios. The Board of Directors oversees performance and approves the annual review of strategic objectives and the business plan in line with changes in the external environment. Through the three lines of defence model, the company uses annual inventories and materiality studies to identify, measure and address threats. Finally, these risks are integrated across EGR and the underwriting, credit, market, operational and liquidity areas through the Risk Appetite Statement and the continuous monitoring of limits.

Between 2022 and 2024, CAIXA Seguridade consolidated its sustainable maturity, progressing from the revision of its Social, Environmental and Climate Responsibility Policy (PRSAC) in 2022 to the retention of the Gold Seal under the GHG Protocol (a Brazilian version of the GHG Protocol methodology) in 2023 and 2024. The Board of Directors monitors the implementation of the Institutional Strategic Plan (PEI) on a quarterly basis, allowing the results to guide the annual review of strategic objectives and the business plan to ensure the resilience of the operating model. Risk management is based on the three lines of defence model and the ORSA (Own Risk and Solvency Assessment) methodology, integrating socio-environmental threats into EGR and the areas of underwriting, credit, market and liquidity. Short-term risks, such as an increase in claims due to pandemics, and medium-term risks, related to the transition to a low-carbon economy, have been identified; these may impact gross domestic product and pension redemption rates. The systematic monitoring of operational and capital limits ensures that these risks are addressed across the board, promoting positive-impact business and regulatory compliance.

Porto Seguradora has consolidated its 2025–2030 Strategic Sustainability Plan with clear decarbonisation and social impact targets for the current and future cycles. Management uses climate risk matrices formally incorporated into the Risk Appetite framework to ensure the resilience of the business model. The Board of Directors carries out strategic oversight via the Sustainability Committee, integrating monitoring results into the five-year strategic plan. This governance framework enables agile revisions to objectives to incorporate ESG criteria from the product and service design phase. Extreme weather events and cyber risks generate short-term operational impacts, whilst the economic transition affects the long term. Processes for identifying, measuring and addressing threats operate under a three-lines-of-defence model and independent audits. Socio-environmental risks are integrated across the entire EGR, directly influencing underwriting, credit limits and solvency indicators. The company uses integrated risk and sustainability dashboards to monitor market and liquidity metrics, mitigating systemic impacts. Governance maturity is validated by milestones such as the Gold Seal in the GHG Protocol and inclusion in the Brazilian Stock Exchange's Corporate Sustainability Index.

4 Conclusions

Transparency in the ESG disclosures of the companies surveyed proved to be consistent with legal requirements. These results demonstrate a critical mechanism for mitigating the risks and gaps identified by both theories used to underpin this study. Whilst agency theory warns of manipulation under conditions of opacity, stakeholder theory demands absolute clarity for informed decision-making. Therefore, the adoption of standardised frameworks is essential to ensure that sustainability data is reliable, comparable and useful to the market. Ultimately, the integrity of this information enables investors and regulators to correctly assess organisations' socio-environmental and governance risks.

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Research Trends in Agricultural Knowledge and Innovation Systems: A Bibliometric Review

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Keywords: Agriculture, Bibliometric Review, Knowledge and Innovation Systems, Cluster

JEL Classification: O13, Q38, Q55

1 Introduction

The fundamental prerequisites of sustainable agricultural production are innovation, knowledge transfer and knowledge sharing, as well as the application of new technologies in a way that provides solutions to the challenges of the 21st century [1]. The Agricultural Knowledge and Innovation System (AKIS) offers an alternative solution to this; it is a system that supports the modernisation of agriculture through the dissemination of innovation and digitalisation, and via knowledge transfer [2]. A key element of AKIS is the flow of information and networking among stakeholders, which promotes agricultural innovation at national and international levels, thereby enhancing production efficiency and competitiveness [3]. The aim of this study is to use bibliometric modelling to illustrate the changes in the research landscape of the Agricultural Knowledge and Innovation System (AKIS) over the past five decade, and to outline the main scientific trends of this period. This bibliometric analysis provides detailed insight into the main research trends, the factors influencing them, and international research and collaboration networks contributing to a better understanding of the research environment.

2 Materials and methods

Innovations and technological developments over the past four decades have significantly broadened the scope of literature reviews. New digital research tools have considerably facilitated systematic literature processing, in both quantitative and qualitative analyses. We applied a bibliometric-methodological approach based on a previous research model when analysing scientific works published in the field of AKIS. Accordingly, using relevant keywords for the subject area, we developed a four-step search strategy to ensure that the review of the related literature was as comprehensive and reliable as possible [4]. In line with the model, we used the Web of Science (WoS) database. By classifying the reference functions of WoS, we identified the appropriate search terms, which aided in the analysis and recording of words derived from scientific titles, abstracts and keywords. A keyword search in the WoS Core Collection database covering the period from 1975 to 2024 yielded 236 qualified scientific and academic hits within the examined time frame. We used the VOSviewer software to visualise these, given that this model is suitable for representing bibliographic data in this way [5].

3 Results

The VOSviewer software is capable of filtering keywords by frequency and grouping them by topic, provided that a minimum expected number of occurrences is specified. According to our observations, in the literature, a threshold of at least four occurrences is typically used for keywords [6]; however, in this study, five occurrences were specified to achieve a more sophisticated result. The programme enables the examination of various types of relationship networks based on bibliographic data, such as: keywords co-occurrence, co-authorship, citation, bibliographic linkage, and co-citation. In this study, an analysis based on the keywords co-occurrence was applied. Of the 381 keywords examined, 31 met the threshold value set by the researchers, so the subsequent analysis was based on these keywords.

As a result of the analysis, the 31 keywords were organised into four clusters. The first cluster comprised ten keywords, such as ‘communication’; the second cluster also contained ten keywords, such as ‘co-innovation’; the third cluster consisted of seven keywords, such as ‘knowledge’; the fourth cluster comprised four keywords, such as: the concept of rural-development.

4 Conclusions

According to the Web of Science database, 236 articles were published in the field of agriculture between 1991 and 2024. Of these, the 5 most frequently cited are: multidisciplinary agriculture, environmental studies, agricultural economic policy, environmental sciences, and green sustainable science and technology, which topics well represent the fields related to AKIS, reflecting the needs of 21st-century society and the associated research demands in these subject areas.

The findings of this study confirm that AKIS research has undergone a significant transformation over the past two decades [7], attributable to technological advancements, policy changes and evolving knowledge transfer models. These trends indicate that the increasing prominence of sustainability, digitalisation and collaborative research networks reflects a broad shift in perspective within global agricultural innovation strategies.

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Prospect Theory and Insurance Demand at Corporate and Household Levels

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Keywords: prospect theory; insurance demand; loss aversion; corporate risk management; household finance; behavioral economics; sustainability

JEL Classification: G22, G41, G52

1 Introduction

Insurance decisions play a key role in household and corporate risk management, as they directly influence financial stability, economic resilience, and long-term adaptability [4]. In today's economic environment, households and companies alike face increasing uncertainty, growing operational and property-related risks, as well as intensifying climate-related and financial risks. According to classical expected utility theory, economic agents rationally assess risks and insurance premiums; however, empirical evidence suggests that insurance decisions often deviate from this model logic [2].

According to prospect theory, decision-making is significantly influenced by loss aversion, reference dependence, framing effects, and the distorted evaluation of probabilities [3]. In the context of insurance demand, it is particularly important that the insurance premium appears as an immediate and certain cost, while the benefit derived from insurance is perceived as a future and uncertain gain [5]. The aim of this research is to examine how prospect theory contributes to explaining insurance demand at both household and corporate levels.

2 Materials and Methods

The research is based on a structured literature review and an exploratory questionnaire survey. The literature review systematizes the classical and behavioral economic approaches to insurance demand [1], [4]. The empirical analysis examines the insurance decisions and attitudes of 200 respondents. The sample includes both household respondents and corporate decision-makers.

The five-point Likert-scale items of the questionnaire examine loss aversion, subjective risk perception, emotional decision-making, framing effects, the role of previous negative experiences, and the sense of security associated with insurance [5]. The questionnaire also includes decision dilemmas based on the main elements of prospect theory, especially loss aversion, the evaluation of low-probability but high-impact events, and framing effects [3]. The corporate section analyzes the presence of formal risk management strategies, insurance review practices, and strategic risk management orientation. Descriptive statistics, reliability analysis, correlation analysis, and group comparison methods are applied in the data analysis. As the research is non-representative, the results are suitable for drawing exploratory conclusions.

3 Results

Based on the available data, it can be established that loss aversion and security-seeking behavior are strongly present in respondents' insurance decisions. A total of 85.5% of the respondents chose to pay a fixed insurance premium rather than face an uncertain alternative involving a potentially larger loss. This indicates that the avoidance of financial losses plays a decisive role in insurance decision-making [3].

In the case of low-probability but high-impact events, 80.5% of the respondents considered the insurance of this type of risk to be more urgent, which indicates the importance of distorted probability evaluation [1], [5]. The framing effect can also be identified: 85.5% of respondents found the offer more attractive when it emphasized the potential financial loss resulting from the absence of insurance. Among corporate decision-makers, a more structured risk management practice can be observed; however, their decisions cannot be regarded as completely free from behavioral biases [2], [4].

4 Conclusions

Overall, it can be concluded that prospect theory provides a relevant interpretive framework for examining insurance demand at both household and corporate levels. Based on the results, insurance decisions cannot be explained solely by the rational assessment of expected utility, as they are significantly influenced by loss aversion, subjective risk perception, distorted probability evaluation, and framing effects [3], [5]. The study highlights that the psychological characteristics of decision-makers should be taken into account in the development and communication of insurance products. In the corporate sector, formal risk management systems and a strategic approach to insurance may contribute to maintaining competitiveness, while at the household level, financial awareness and transparent information provision may improve the quality of insurance decisions.

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The Sustainability Conflict of AI Advancement Artificial Intelligence, Productivity and Environmental Limits in the Data-Centre Era

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Keywords: artificial intelligence; sustainability conflict; data centres; energy demand.

JEL Classification: O33; Q55; Q56.

1 Introduction

Artificial intelligence (AI) is rapidly becoming a general-purpose technology for productivity growth, process optimisation and decision support. Firms use AI to automate routine work, forecast demand, improve logistics and support knowledge-intensive services. At the same time, large-scale AI depends on expanding computational infrastructure: data centres, specialised chips, cooling systems and electricity supply. This creates a sustainability conflict: AI may improve efficiency across sectors, while its own training and inference workloads increase demand for energy, water and materials. The International Energy Agency projects that global data-centre electricity consumption could reach about 945 TWh by 2030 in its base case, nearly double 2024 levels [1]. The OECD similarly frames digital technologies as part of the green transition, but emphasises that their environmental footprint must be considered [2]. The conflict is therefore not a simple opposition between innovation and sustainability. It is a question of whether the scale, siting and governance of AI infrastructure can remain compatible with climate targets and resource constraints. This extended abstract asks: how does the literature explain the tension between AI-enabled competitiveness and environmental sustainability?

2 Material and Methods

A literature review method was applied. Sources were selected from policy reports and peer-reviewed research addressing AI compute, data-centre electricity demand, carbon accounting, water use and sustainable digitalisation. Priority was given to recent institutional evidence from the IEA and OECD, complemented by academic studies on the environmental cost of machine learning. The review synthesised findings around four analytical categories: (1) drivers of AI infrastructure growth, (2) direct and indirect environmental impacts, (3) efficiency and rebound effects, and (4) governance responses. The inclusion criterion was relevance to the environmental consequences of AI infrastructure or the potential of AI to support sustainable transformation. The purpose was not to calculate a new footprint, but to integrate available evidence into a conference-oriented conceptual argument that can inform management, policy and technology strategy discussions.

3 Results

The reviewed literature indicates four main results. First, AI adoption is becoming a structural driver of data-centre expansion. The IEA reports that data-centre electricity consumption is growing much faster than overall electricity demand, with AI identified as a major contributor [1]. Second, the environmental footprint is multidimensional. Training and inference require electricity, but impacts also depend on grid carbon intensity, water used for cooling and electricity generation, hardware manufacturing, rare minerals and e-waste. Earlier work by Strubell et al. showed that training large models can involve substantial financial and carbon costs [3], while Patterson et al. demonstrated that model design, accelerator choice, data-centre efficiency and workload location can change emissions by orders of magnitude [4]. Third, efficiency gains do not automatically reduce total impact. More efficient chips and models may reduce energy per computation, but lower costs and easier access can increase the number of AI applications, users and automated tasks. This rebound logic is important for management decisions because per-unit efficiency can coexist with rising aggregate demand. Fourth, AI also has enabling potential. OECD analysis notes that digital technologies can accelerate green transformation across sectors, for example through smart grids, efficient logistics, precision agriculture and infrastructure optimisation [2]. Therefore, the sustainability impact of AI is not fixed; it depends on how, where and why AI systems are deployed.

Table 1. Literature synthesis of the AI sustainability conflict

Dimension	Main finding	Implication
Energy	Data-centre electricity demand is projected to rise sharply [1].	AI growth must be aligned with grid capacity and clean power.
Carbon	Emissions vary by workload, hardware and regional electricity mix [4].	Reporting should include location- and time-sensitive carbon metrics.
Water/materials	Cooling, power generation, chips and e-waste extend impacts beyond electricity [5].	Siting and life-cycle assessment are needed.
Benefits	AI can improve efficiency in several sectors [2].	Use cases should be judged by net sustainability value.

4 Conclusions

The literature suggests that AI advancement should be evaluated as both an economic opportunity and an environmental governance challenge. The key conflict is not whether AI is useful, but whether the scale and speed of AI deployment are compatible with climate, energy and resource constraints. A responsible pathway requires transparent reporting of energy, carbon and water impacts; clean-energy procurement matched to time and location; efficient model and hardware choices; and prioritisation of high-value AI applications. For companies, this means treating computational resources as strategic and environmental assets, not as invisible background infrastructure. For policy makers, it means connecting AI strategy with electricity planning, water governance and circular-economy rules for hardware. The central conclusion is that AI is neither inherently sustainable nor unsustainable. Its net impact depends on infrastructure decisions, policy design and the social value of the applications for which computational resources are used.

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How Science Learns: Debate, Critical Thinking, and Peer Review in the Evolution of Knowledge

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Keywords: science learning, debate, critical thinking, peer review, knowledge governance.

JEL Classification: I23, O30, D83.

Abstract

This extended abstract proposes a conceptual model of how science learns. Scientific knowledge is treated not as a fixed collection of findings, but as a social learning system that improves through organized criticism, disciplined judgment, and institutional filtering. The model connects three pillars: debate, critical thinking, and peer review. Debate exposes claims to resistance and counterargument; critical thinking evaluates assumptions, evidence, inference, and uncertainty; and peer review organizes expert scrutiny before selected claims enter the formal scholarly record. The argument builds on the view that science depends on organized skepticism [1], severe testing and revisability [2], paradigm-sensitive communities [3], and critical interaction among knowers [4]. In the age of artificial intelligence and information abundance, generating plausible explanations is increasingly easy, while evaluating them responsibly is increasingly difficult. The framework therefore emphasizes the practices that convert disagreement into reliable, corrigible knowledge.

1 Introduction

Science is often described through experiments, discoveries, and theories. Yet behind these outputs lies a learning process: claims are proposed, challenged, revised, rejected, or provisionally accepted. The central argument of this paper is that science learns through a cycle of debate, critical thinking, and peer review. Debate brings ideas into public disagreement; critical thinking disciplines that disagreement through standards of reasoning [5]; and peer review gives criticism institutional form by assigning specialists to assess methods, interpretation, and contribution [7].

This topic is urgent because the contemporary knowledge environment has changed. Artificial intelligence can generate summaries, hypotheses, and polished arguments quickly, but fluency is not the same as justification. When information production accelerates, the key scientific task becomes evaluation: identifying which claims survive criticism, which assumptions are hidden, and which conclusions are warranted. A theory of “how science learns” must therefore focus on the mechanisms that make error visible and correctable [6,9].

2 Material and Methods

The study uses a conceptual synthesis method. Three author manuscripts on debate, critical thinking, and peer review were read as source material and compared with established literature on scientific norms, philosophy of science, critical thinking, and publication review. The analysis identifies the epistemic function of each practice and arranges them into a process model. The method is interpretive rather than statistical: its aim is not to measure scientific learning, but to clarify how ideas move from proposal to criticism, revision, and provisional acceptance.

The synthesis followed four steps. First, each pillar was examined for its main contribution to knowledge formation. Second, overlaps were identified, especially where debate requires critical-thinking standards and where peer review formalizes expert debate. Third, the practices were arranged as a feedback loop rather than a linear sequence, because published claims can re-enter debate through replication, critique, and correction. Fourth, implications were drawn for scientific communication under conditions of rapid information production and increasing pressure on evaluation systems.

3 Results

The first result is that debate functions as the entry point of ideas into the shared intellectual space. Debate exposes assumptions, tests definitions, creates alternative explanations, and prevents private conviction from being mistaken for knowledge. Productive debate is not conflict for victory; it is structured disagreement aimed at improving understanding. Its main contribution is pressure: it forces claims to become clearer, more testable, and more accountable to criticism [1,2].

The second result is that critical thinking converts disagreement into analytical clarity. Debate without reasoning standards can become noise or motivated conflict. Critical thinking acts as argument quality control: it asks whether premises are acceptable, evidence is relevant and sufficient, causal claims are justified, and uncertainty is honestly represented [5,6]. It also requires intellectual humility, because scientific learning depends on revising beliefs when stronger reasons or evidence appear.

The third result is that peer review organizes skepticism at the institutional level. Peer review does not guarantee truth, but it raises the threshold for publication by requiring claims to survive expert criticism. Reviewers examine methods, interpretation, contribution, and limitations; editors coordinate the process and decide what enters the journal record. Peer review also gives legitimacy to claims, because it signals that they have passed through a recognized evaluative procedure [7,8]. However, it remains fallible and must be complemented by replication, transparency, post-publication critique, and correction [6,9].

The Learning Process of Science

The three pillars form a feedback loop. A claim is proposed and enters debate. Debate reveals weaknesses or unresolved questions. Critical thinking reformulates the claim, clarifies assumptions, and identifies what evidence would support or weaken it. Peer review evaluates whether the refined claim meets disciplinary standards. If accepted, the claim enters the literature, but it does not become final. It becomes available for further debate, replication, and revision. In this way, science learns not by eliminating disagreement, but by organizing disagreement so that it becomes cumulative [3,4].

The model also explains why science is both powerful and fragile. It is powerful because its norms and institutions make error correction possible. It is fragile because each pillar can fail: debate can become rhetoric, critical thinking can be replaced by motivated reasoning, and peer review can become bias, gatekeeping, or bureaucratic certification. The health of science

depends on whether these practices remain connected to their purpose: improving the reliability of knowledge.

4 Conclusions

Science learns through a cycle of challenge, evaluation, and institutional filtering. Debate introduces ideas into criticism; critical thinking disciplines that criticism; and peer review organizes it within the scientific record. This makes science self-correcting not because scientists are free from error, but because scientific communities have developed practices for finding and correcting error over time. In the age of artificial intelligence, this model becomes more important: when producing claims becomes easy, evaluating claims becomes the central intellectual task. Strengthening debate, critical thinking, and peer review is therefore essential for the future reliability of science.

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The Concept, Components and Economic Importance of Financial Self-Care

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Keywords: financial self-care, financial literacy; resilience

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1 Introduction

In recent years, the sustainability challenges of welfare systems, population ageing, labour market uncertainty, and the increasing complexity of financial decision-making have significantly increased the importance of financial self-reliance. As traditional state-based welfare models have gradually retreated, individuals' conscious financial decisions have become increasingly decisive. The examination of this topic is justified by the fact that the concept of financial self-care is not uniformly accepted in the English-language literature, and its interpretation often appears fragmented across different subfields. Its content is typically described through related concepts such as financial literacy, financial capability, financial behavior, and financial well-being. Therefore, this study aims to establish a unified interpretative framework. We use the term financial self-care as a working concept, referring not merely to financial independence, but to conscious and proactive financial self-management. The aim of the study is to clarify the concept of financial self-reliance, identify its main components, and examine its economic significance.

2 Material and Methods

The study applies a narrative literature review combined with targeted source analysis. Rather than aiming for a comprehensive review, it systematises the key findings of research that are most relevant to financial self-reliance. The analysis builds on classical studies of financial literacy, researches on the effects of financial education, and recent literature on resilience. These studies show that financial knowledge improves saving and retirement planning decisions [1], while its absence may lead to welfare losses at both individual and societal levels [2]. Financial education has a positive impact on financial behaviour [3], and higher financial literacy increases household resilience [4]. Automatic saving mechanisms can effectively support long-term financial goals [5], although outcomes are influenced not only by income but also by financial satisfaction [6]. Financial self-reliance also contributes to subjective financial well-being by increasing the sense of security and financial control [7].

The analysis follows three logical steps: defining the concept of financial self-care, identifying its main pillars, and examining its economic effects. The three-step structure ensures that the theoretical framework leads to a practical and measurable financial category.

3 Results

The main contribution of the study is the development of a comprehensive definition that goes beyond simple saving behaviour. Financial self-care is defined as the individual's practical capability to ensure long-term financial stability and well-being for themselves and their household through a series of conscious financial decisions. It represents a system of actions aimed at maintaining both present financial balance and future financial security. Based on the analysis, five interrelated pillars can be identified:

- Everyday financial management, referring to the planned management of income and expenditures
- Precautionary savings, providing security in unexpected situations
- Long-term saving and wealth accumulation, ensuring future financial stability
- Risk management and insurance, reducing financial vulnerability
- Financial awareness, supporting effective decision-making, self-control, and planning

At the economic level, conscious and widespread financial self-care can increase household savings, reduce excessive indebtedness, and result in more stable consumption patterns during periods of crisis. It may contribute to a more balanced functioning of the financial intermediation system and reduce the burden on public welfare systems. In the long term, conscious saving behaviour may also support economic growth through capital accumulation. As a synthesis of the analysis, a unified conceptual definition of financial self-care has been established, its main pillars have been identified, and it has been demonstrated that conscious financial self-care supports long-term financial stability at the individual level, while at the macroeconomic level it contributes to higher savings and lower vulnerability.

4 Conclusions

Financial self-care is no longer an optional behaviour in modern economies but a fundamental condition for economic stability. It extends beyond saving and includes conscious financial decision-making, precautionary behaviour, long-term planning, and financial responsibility.

In societies with higher levels of financial knowledge and saving capacity, it enhances household resilience, reduces financial vulnerability, and contributes to more balanced consumption and saving patterns. At the macroeconomic level, this supports financial system stability and reduces future pressure on public welfare systems.

Financial self-care cannot be reduced to a single dimension; it is simultaneously a matter of knowledge, behaviour, and institutional context. Therefore, financial education based solely on information provision is insufficient. Effective progress requires supportive regulation, automated saving mechanisms, and accessible digital financial tools. From a strategic perspective, strengthening financial self-reliance can be interpreted as a long-term economic policy investment.

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Sustainable Marketing Strategies in the Circular Economy: Evidence from a Trade Fair Survey at Ecomondo 2025

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Keywords: sustainable marketing, circular economy, pricing strategy, market acceptance

JEL Classification: M31, Q56, L21

1 Introduction

This study explores how companies adapt management and marketing strategies in response to increasing sustainability demands within the circular economy. Empirical data were collected through a survey conducted with 192 exhibitors at Ecomondo 2025 in Rimini, an international exhibition featuring 1,850 participants. The analysis focuses on firms' approaches to sustainable development, market acceptance, and growth effects. Results show that although awareness of sustainability and climate protection is rising, firms' face persistent challenges in implementing price premiums due to higher costs of sustainable production [1]. This creates a strategic tension between sustainability-oriented value propositions and actual customer willingness to pay. Consequently, companies are shifting their marketing strategies toward enhanced value communication, transparency, and customer education to strengthen market acceptance. The findings underline the critical role of marketing management in translating sustainability efforts into competitive advantage and long-term growth.

2 Material and Methods

In this study, theoretical approaches and findings from a narrative literature review are analyzed in conjunction with practical experience. The literature review is based on empirical studies, specialist books, and official publications by authorities concerning sustainable development, the circular economy, and the feasibility and acceptance of these concepts. Significant contributions are provided by Greener Task in the redesign of processes [2], by sustainable product design as well as recycling and upcycling to increase resource efficiency [3], and by the use of digitalization to support the Cradle-to-Cradle circular economy in closing material loops [4]. Sustainable products are attractive to customers and allow companies with a sustainable positioning to achieve higher prices; however, this phenomenon is usually accompanied by a higher level of corporate social responsibility [3]. Furthermore, sustainable design is projected to be assessed as a more competitive product alternative in the future, which indirectly suggests greater customer acceptance of premium pricing [4]. The Green Transformation alters employment patterns, productivity, and market structures, thereby driving higher investments and fostering sustainable economic sectors [2]. In sustainability marketing, communication according to the 4C model plays a central role, as sustainable growth can only be effectively achieved through credible, transparent and dialogue-oriented communication that goes beyond the mere transmission of product and price information [5].

The practical relevance of this study is established through the use of an intercept survey, a method commonly applied at trade fairs and similar events. A total of 192 respondents (convenience sampling, based on participant availability and willingness) were included in the study. All participants were drawn from the manufacturing sector and represented exhibitors in the domains of the Blue Economy, Circular Economy, and Regenerative Bioeconomy. The questionnaire, comprising seven items, was deliberately kept concise to maximize response rates. While the findings are not representative of the industry as a whole - due to the absence of data collection beyond the trade fair setting - they provide valuable insights into prevailing trends within the sampled population.

3 Results

The focus of this study is on the current state of sustainable development, as well as its feasibility and acceptance within the respective markets. The surveyed companies frequently reported high investment costs associated with implementing measures related to the circular economy, digitalization, and improvements in energy efficiency. The literature review indicates that, for this reason, sustainable transformation is often perceived as a barrier [6]. At the same time, it is described as a foundation for increased efficiency, reduced operating costs, and the creation of new market opportunities [3].

The survey results indicate an overall pattern of moderately positive evaluations regarding sustainability and market acceptance. Sustainable development achieved the highest rating, suggesting that the progress made by companies is largely perceived as positive. Demand and acceptance also fall within the upper mid-range, indicating that sustainable products generally attract considerable interest. In contrast, willingness to pay is significantly lower, implying that although sustainable products are widely accepted, higher prices are only tolerated to a limited extent. Growth associated with more sustainable products is moderate and does not yet consistently indicate strong growth effects. The findings further reveal that the prevailing marketing approach places strong emphasis on cost and value for money. A key factor underlying resistance to higher prices appears to be a lack of transparency and insufficient communication of the benefits and added value of sustainable products. Overall, the results point to substantial progress in sustainability and market acceptance, yet a markedly lower willingness to pay. While sustainability is viewed positively, this perception does not automatically translate into price acceptance. The strongest correlations are observed between sustainable development, demand, acceptance, and growth. Conversely, resistance emerges primarily where price perception and willingness to pay are negatively associated with the marketing concept, particularly in terms of cost and perceived value for money.

4 Conclusions

The survey results indicate that investments in sustainability and the circular economy provide companies with a measurable competitive advantage, particularly through strong correlations between sustainable development and business growth. Firms with more advanced sustainability practices report higher levels of demand, market acceptance, and increased sales. Despite these benefits, significant challenges persist. In particular, customers' willingness to pay for sustainable products and services remains limited, leading to strategic tensions between sustainability-driven value propositions and prevailing market price expectations. In this context, targeted measures - such as enhanced communication and transparency, as conceptualized in the 4C marketing model - are of critical importance.

Furthermore, the circular economy contributes to long-term improvements in ecological sustainability. Investments in digitalization, environmentally oriented processes, and the development of green jobs, alongside continuous employee training and skills development, are

essential to support this transition. Ultimately, only through such integrated efforts can sustainability evolve from a strategic objective into a driver of economic success.

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Climate adaptive, sustainable and competitive forest management under changing conditions

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Keywords: climate adaptation, natural capital, active forest management

JEL Classification: Q23, Q54, Q57

1 Introduction

The current rate of climate (habitat) change is a hundred times faster than what our tree species have encountered so far - the natural adaptive capacity of forest ecosystems cannot and will not be able to keep up.

The most important effects of climate change currently experienced are:

- Deterioration of the water balance of forest soils
- Decreasing product (one annual increment is missing in the last 5 years)
- Increasing forest damage
- Increasing mortality
- Decreasing carbon storage and adaptive capacity
- Decreasing quality of processable wood and competitiveness

2 Material and Methods

The recognition is not new – but the processes have accelerated incredibly. Adapting to climate change and managing forests requires coordinated action, the entire sector needs to come together – an open, flexible professional platform: public, private, practical – field, scientific – research, educational, professional organizations, authorities, thinking together and finding solutions. We must be able to successfully manage this situation: we need modern professional responses at the sectoral level, and we must stand unitedly for it at the sectoral level. It is not a coincidence that the term forest management is used instead of forestry, thus a strategic change in approach to forest management. We are consciously talking about: green assets, forest management, green infrastructure, forests as a solution to climate change, ecosystem services. The Forestry Climate Adaptation Forum and its 8 working groups were established with the participation of nearly a hundred experts - from the entire spectrum of the sector: forestry sector administration, education/research, professional and advocacy organizations as well as practical forest managers, nature conservation and water management experts - to examine and develop short- and long-term management options for the impacts of climate change on forests and forest management.

1. Resolving the situation of forests in particularly vulnerable locations
2. Resolving the situation of forests that are vulnerable in the longer term
3. Analysis, monitoring and registration tasks and opportunities related to climate adaptation
4. Forestry water management, water replenishment
5. Local and general reduction of wildlife impact

6. The importance and development opportunities of forest reproductive material production in order to achieve forestry climate adaptation goals
7. Economic sustainability of forestry climate adaptation, support and development policy opportunities
8. Regulatory tasks

3 Results

The aim should be to create forests that are more resilient – by selecting tree species adapted to the climate of the future, by diversifying forest management methods, using a wide range of tree species, and by preserving biodiversity and soil functions. A further condition for success is the restoration of the balance between wildlife and forest.

Summary guiding principles for decision support:

- Recognition and delimitation of changed climate zones traditional (1) (2)
- Prediction of new habitat type variants for intervention site and planning period (3)
- Selection of tree species for a given site and period (4)
- Selection of propagation material for a given site and period
- New technological processes
- Joint result of forest and ecologist experts

4 Conclusions

The resilience of forest stands can only be ensured through interventions adapted to the impacts: forests must be made more adaptable or even rebuilt.

Forests offer a solution to climate change, through their role as carbon sinks, in order to achieve carbon neutrality goals (5).

In parallel, wood must play a greater role in the transition to a carbon neutral economy: production of wood construction materials, production of wood/paper/cardboard packaging materials (instead of plastic), green chemistry (an alternative to petrochemicals), and production of renewable energy (6).

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Sustainability or Competitiveness? Green Investment Capacity and Competitive Polarisation in the Hungarian Bakery Industry

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Keywords: firm-level competitiveness, green transition, financial constraints, bakery industry, polarisation.

JEL Classification: L66, Q56, M21

1 Introduction

The 14th International Conference on Management poses a pointed question: Sustainability and/or Competitiveness? For large enterprises, the dilemma is primarily strategic. For the micro and small firms that constitute the backbone of the Hungarian bakery industry, the dilemma is more fundamental: green investment presupposes financial capacity that a substantial share of the sector does not possess. This paper argues that, in a resource-constrained agri-food sector, sustainability and competitiveness are not a simultaneous choice but a sequence — firms must first secure financial stability before the green transition becomes feasible. Where this sequencing is ignored in policy design, environmental regulation risks accelerating competitive polarisation: the financially strong adapt, the financially weak are crowded out.

The Hungarian bakery sector (TEÁOR 10.71) is an acute test case. Material-cost expenditures — the closest available proxy for energy and input intensity in public financial statements — consume a median of 56.9% of net revenue across a delimited partial population of $N = 496$ Hungarian bakery firms (TEÁOR 10.71; publicly available financial statements, 2014–2024). Industrial ovens, proofing chambers, and cold-chain logistics make energy efficiency a direct profitability lever. Yet the sector is structurally fragmented, with chronic financing constraints among micro and small operators. The imminent cascade of CSRD supply-chain requirements [3] through retail partners — mandatory reporters since 2024 — is beginning to transmit sustainability pressure downward to bakeries with no reporting infrastructure and limited investment capacity.

2 Material and Methods

The analysis draws on a ten-year objective financial panel (publicly available financial statements, 2014–2024) of a delimited partial population of $N = 496$ Hungarian bakery firms. Competitiveness is operationalised via the VK_INDEX composite indicator, which integrates two equally weighted financial dimensions: revenue dynamics (Block-CAGR, 2015–2024) and shareholder value creation (Delta Tobin Q, Chung–Pruitt [2]), following Chikán's (2006) dual value creation framework [1]. Firms are ranked by VK_INDEX into four equal quartiles ($Q1 =$ lowest, $Q4 =$ highest), each containing $n = 124$ firms.

Green investment capacity is assessed through a threshold financing test applied to 2024 balance sheet data. Three investment thresholds (HUF 10, 20, and 50 million) were selected to represent a range of realistic green transition cost levels in the sector, from minor upgrades to comprehensive energy transitions.

3 Results

The results demonstrate a statistically robust and structurally coherent pattern: competitive weakness and financial constraint co-occur and mutually reinforce each other in the Hungarian bakery sector. Firms in the lowest competitiveness quartile are more than twice as likely to be unable to self-finance a HUF 20 million green investment as firms in the highest quartile (35.5% vs 16.1%), and this gap widens further at the HUF 50 million level (56.5% vs 25.8%). The deflated 10-year cash balance confirms that this is not a cyclical artefact: the weakest quartile has structurally maintained lower liquid reserves over the entire 2015–2024 period.

4 Conclusions

These findings have a direct policy implication. If green transition costs are left to market forces alone, the firms least able to comply — predominantly micro and small bakeries in Q1 and Q2 — face accelerated competitive disadvantage relative to larger, better-capitalised peers. The sustainability imperative, transmitted via CSRD supply-chain pressure [3] and EU Taxonomy criteria, risks functioning as a structural exit mechanism for the financially constrained segment of the sector. Targeted subsidy instruments are a necessary condition for an equitable green transition in this sector.

A limitation of this study is that equity-based self-financing capacity is a conservative proxy: firms may access debt financing. However, the structural financing asymmetry documented here implies that the weakest quartile also faces higher borrowing constraints [4], so the equity threshold test is likely to understate rather than overstate the financing gap. Incorporate the conclusions from your paper.

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The importance of employer branding in employee retention in Hungary A quantitative study based on questionnaire data

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Keywords: employer branding, employee retention, employee engagement, human resource management

JEL Classification: M31, J24, J63

1 Introduction

While branding contributes to creating initial interest and a positive impression, long-term employee engagement and retention depend on the quality of internal organizational culture, development opportunities, and leadership support (Rajitha, 2025).

The results of the research suggest that employer branding has a strong influence on employee retention, as employees who perceive a strong and positive company brand are more likely to stay with the organization for a longer period. This finding is in line with previous studies, which indicate that employer branding has a positive effect on employee retention (Hussain and Alvi, 2024).

2 Material and Methods

The quantitative study was conducted through a questionnaire-based data collection, primarily distributed via Hungarian employee Facebook groups. A total of 378 respondents completed the questionnaire, and the sample was not limited to the researcher's direct personal network. The survey data were analyzed using SPSS software.

The main objective of the research is to explore how employees' perceptions of employer branding are structured and how these relate to their intention to stay. The findings contribute to a better understanding of the role of internal employer branding elements, such as leadership support, development opportunities, workplace well-being, and a supportive organizational culture, in shaping employee engagement and long-term retention.

3 Results

The presentation of the survey sample supports the interpretation of the results and clarifies which group of employees is represented in the data. The sample is heterogeneous: it shows a slight female majority (60.3%), with most respondents having higher education qualifications and representing multiple economic sectors. The distribution of tenure and age is balanced, allowing the inclusion of different career stages and generations. Most respondents work in

employee positions, but individuals with managerial experience are also included. The majority live in urban areas and often work in the same location where they reside; these factors are treated as background variables in the study.

The quantitative results suggest that employer branding plays a role in shaping employees' intention to stay, although its dimensions have different levels of influence. Internal factors, especially leadership support, workplace well-being, and a supportive environment, show a strong positive relationship, while work–life balance appears to have a more moderate effect. External factors also show a positive relationship, but to a lesser extent; company reputation and ethical operation demonstrate a moderate connection, while CSR plays a more complementary role.

Factor analysis identified several distinct dimensions (internal experience, development and feedback, and digital employer branding). Overall, internal factors appear to be more important in terms of employee retention.

4 Conclusions

The aim of the research was to explore how different elements of employer branding are related to employees' intention to stay, and whether employees perceive these elements as a unified concept or as several distinct dimensions. The study was conducted along three hypotheses using a quantitative (questionnaire-based) approach, which allowed for a complex and multi-perspective interpretation of employer branding.

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Latent Sustainability Discourse in Hungarian Hospitality: A BERTopic Analysis of ESG and Corporate Governance Perceptions Among Industry Professionals

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Keywords: BERTopic, ESG, Corporate Governance, Hospitality Industry, Topic Modelling

JEL Classification: L83, M14, C38

1 Introduction

Sustainability governance frameworks across the EU are intensifying, propelled by instruments including the Corporate Sustainability Reporting Directive [9] and the accompanying European Sustainability Reporting Standards [10], making it an urgent research priority to understand how industry practitioners internalise, interpret, and articulate ESG and corporate governance concepts. While the volume of ESG scholarship in hospitality and tourism has grown substantially in recent years, it has remained dominated by quantitative financial performance studies, with qualitative and discourse-level perspectives markedly underrepresented [3, 4]. Existing qualitative approaches in hospitality research have predominantly relied on thematic or content analysis guided by researchers, which, while rigorous, introduces interpretive bias and may suppress latent or peripheral discourse patterns that fall outside predefined coding schemes [11]. Despite mounting evidence that ESG implementation is shaped as much by the professional culture of a given sector as by regulatory pressure [5, 7], the internal language through which hospitality professionals construct and negotiate sustainability meaning has received little systematic attention. This paper addresses this gap by applying BERTopic [1], an unsupervised topic modelling framework built on transformer architectures, to a corpus of qualitative interviews with Hungarian hospitality professionals. The aim is to reveal the authentic semantic structure of ESG discourse as it emerges from practitioner language, without the imposition of predetermined coding frameworks.

2 Material and Methods

The study analyses a corpus of ten semi-structured interview transcripts conducted in Hungarian with professionals active across the hospitality sector. Following corpus preparation that encompassed segmentation at the sentence level and removal of Hungarian stopwords, text units were encoded using the paraphrase-multilingual-mpnet-base-v2 sentence transformer model [2], selected for its high quality semantic representations of morphologically rich languages. The HDBSCAN clustering algorithm embedded within BERTopic was subsequently applied to identify coherent latent topic clusters, with topic representations refined through the class-based term frequency weighting procedure (c-TF-IDF) introduced by Grootendorst [1]. Emergent topics were then manually labelled and interpreted by the author

against the broader ESG and corporate governance literature, ensuring analytical transparency alongside the computational process.

3 Results

BERTopic analysis identified nine distinct topic clusters within the interview corpus, revealing a structured and internally coherent ESG discourse landscape among Hungarian hospitality professionals. Three topics accounted for the dominant share of semantic mass: data systems and audit discipline, strategic importance linked to guest preferences and market positioning, and operational efficiency as a practical ESG driver. Together these indicate that practitioners engage with sustainability primarily through an operational and market-oriented lens, rather than through ethical or regulatory reasoning. This finding aligns with broader evidence that hospitality firms adopt ESG frameworks most readily when they perceive direct links to financial resilience, brand positioning, and competitive advantage [6]. Topics of intermediate representational weight encompassed barriers and resource logic specific to SMEs, familiarity with certification frameworks and reporting standards, the social and community dimension of ESG, and value chain pressure transmitted through cascading compliance dynamics. These are consistent with the established literature identifying resource constraints as central obstacles to sustainability adoption among smaller enterprises [8]. Crucially, two topics emerged with markedly low representational weight: regulatory context as a sustainability catalyst, and greenwashing and credibility concerns. This distributional asymmetry, observed between the operational centrality of data, strategy and efficiency discourse on one hand, and the near-total absence of regulatory or sceptical framing on the other, constitutes a core finding of the study. It suggests a significant gap between the policy and academic ESG narrative and the lived discourse of Hungarian hospitality professionals [4, 5].

4 Conclusions

The semantic architecture produced by BERTopic reveals that ESG and corporate governance are processed by Hungarian hospitality professionals through predominantly operational and commercially oriented frames, with regulatory compulsion and greenwashing scepticism remaining at the margins of practitioner discourse. The divergence between ESG communication driven by policy and its internalisation at the practitioner level has direct implications for regulatory design, sustainability education tailored to the sector, and the communication strategies of public bodies and larger hospitality corporations engaging their supply chains [7, 9]. The study further demonstrates that BERTopic [1] is a viable and analytically productive method for qualitative research conducted on small corpora outside English, offering a complement to conventional thematic approaches that is grounded in data rather than in prior assumptions [11]. Future research should expand the corpus longitudinally to track whether the nearly absent regulatory and credibility topics gain semantic weight as CSRD implementation progresses across the sector [3, 9].

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The Integrated, Competency-Based Competitiveness of Hungarian Small Businesses, 2012–2024

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Keywords: competitiveness, small business, resource-based view, dynamic capabilities, configuration, Hungary

JEL Classification: L26, M21, O12

1 Introduction

Understanding small business competitiveness remains a persistent challenge in both theory and empirical research. While the resource-based view (RBV) has long dominated the field, its static perspective provides only a partial explanation of firm performance, particularly in the case of small and medium-sized enterprises (SMEs), where resource constraints and environmental volatility are more pronounced. Building on recent advances in dynamic capabilities and configurational approaches, this paper reinterprets SME competitiveness as a multidimensional and evolving construct and applies it to a Hungarian sample.

2 Material and Methods

The empirical analysis builds on a longitudinal dataset developed at the University of Pécs, covering Hungarian SMEs across four survey waves between 2013 and 2025, with a total sample of 3,877 firms of 5-249 employees. Competitiveness is measured using the Small Business Competitiveness Index (SBCI), a composite indicator capturing firm-level competencies across eight pillars, including digitalisation, human resources, innovation, internationalisation, strategy, marketing, networking, and operations. The conceptual framework integrates four major theoretical lines. First, the resource-based view (RBV) explains competitiveness through the possession of valuable, rare, and inimitable resources ([1]). Second, the dynamic capabilities (DC) perspective extends this view by emphasising firms' ability to reconfigure and renew resources in changing environments ([2], [3]). Third, entrepreneurial abilities (EA) highlight the role of individual-level competencies—such as opportunity recognition, decision-making, and resource orchestration—in shaping firm performance ([4]). Finally, the configurational approach argues that competitiveness and growth emerge from specific combinations of these elements rather than from any single factor, reflecting causal complexity and equifinality ([5]; [6]). Importantly, these theoretical strands are not treated as competing explanations but as complementary and interdependent mechanisms. Resources define the initial conditions of competitiveness, dynamic capabilities enable adaptation over time, and entrepreneurial abilities act as microfoundations that orchestrate both resources and capabilities. Competitiveness is therefore conceptualised as the outcome of their configuration, consistent with recent advances in SME research emphasizing the joint and context-dependent effects of firm-level competencies ([7]).

3 Results

The results reveal a non-linear evolution of SME competitiveness over time. Following a period of improvement between 2013 and 2019, competitiveness stagnated and declined in the most recent period (2023–2025), reflecting broader economic slowdown effects. Importantly, these trends are driven by internal firm-level and macroeconomic conditions changes. However, we examine only firm level competency-based competitiveness factors. At the pillar level, heterogeneous patterns emerge. Innovation shows a gradual improvement, while digitalisation and networking display significant volatility, with a marked decline in the latest period. Management strategy and internationalisation improved until 2020 but weakened thereafter, indicating potential adjustment difficulties in a changing economic environment. Firm size plays a decisive role: larger SMEs consistently exhibit higher competitiveness scores across all periods. However, the dynamics are similar across size categories, suggesting that structural constraints affect firms regardless of scale. Smaller firms (5–9 employees) remain significantly disadvantaged, while medium-sized firms (50–249 employees) maintain a stable competitiveness premium.

4 Conclusions

The findings challenge the adequacy of purely resource-based explanations of SME competitiveness. Instead, they support a dynamic and configurational perspective, where competitiveness arises from the interaction and continuous adaptation of firm-level competencies. The observed decline in recent years highlights the vulnerability of Hungarian SMEs to systemic shocks and structural rigidities. From a policy perspective, the results underline the need for differentiated, size-specific interventions that target not only resource provision but also capability development and strategic adaptability. Uniform policy approaches are unlikely to address the heterogeneous constraints identified across firm size categories.

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Redefining ERP: The Evolution from Monolithic Databases to Autonomous Intelligence Operating Ecosystems

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Keywords: ERP, ERP evolution, AI, Cloud ERP

JEL Classification: M15, O33

1 Introduction

Introduction: Modern market volatility necessitates a fundamental transition of Enterprise Resource Planning (ERP) systems from rigid, monolithic on-premise structures toward intelligent, cloud-native ecosystems [1].

Traditional legacy systems increasingly act as barriers to business agility due to high modification costs and slow decision cycles.

This study analyzes the structural shift toward Composable ERP architecture, which integrates artificial intelligence (AI) and predictive analytics to transform the ERP from a passive transactional platform into a proactive hub for "intelligence operations" [2][3].

2 Material and Methods

This study uses a multi-method qualitative research methodology combining architectural and empirical assessment. The paper presents a methodology for studying evolutionary ERP change concepts by comparing traditional ERP solutions with new cloud-native and modular ERP solutions [4][5].

Extensive industry and market research reports were reviewed to determine relevant emerging technologies and emerging markets. Moreover, best practices for security and compliance frameworks "built secure by design" are compared and evaluated in relation to current threats against information security.

Based on an evaluation of cross-sector case studies this approach also looks into the impact of autonomous AI agents, low-code platforms and Two-Tier ERP on organizational flexibility and system core stability.

3 Results

Traditionally, Enterprise Resource Planning systems have been delivered as a monolithic solution packaged into a single 'block' and implemented in its entirety. That model is now being replaced by a new approach to delivering ERP functionality in a composable, modular and extensible form-packaged as Composable ERP [6][7].

The evolution of ERP converts transactional data repositories into an intelligence operations system native to the organization, leveraging built-in artificial intelligence capabilities to predict outcomes and make recommendations to drive greater business intelligence [8].

Autonomous AI (Agentic AI) enables autonomous AI agents that automatically manage processes such as financial reconciliations, mailroom processing and communication with suppliers fully automatically, which in turn greatly reduces the need for manual handling of business processes [9].

Implementation of intelligent ERP systems substantially shortens incident detection times and reduces operating costs, as empirical data shows. Modular architecture delivers rapid time-to-value and incorporates latest innovations such as blockchain and IoT without introducing new risk.

4 Conclusions

ERP systems have evolved from passive data repositories into autonomous ecosystems of operational intelligence.

Flexible architecture coupled with native artificial intelligence are at the root of gaining competitive advantage in the long run and sustaining that in a challenging regulatory environment fueled by digital transformation. Future research should focus on empirically validating the long-term organizational and financial impacts of Agentic AI integration within composable ERP frameworks across diverse industry sectors.

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Perceived Benefits and Risks of Artificial Intelligence Among Business Students at Budapest Metropolitan University

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Keywords: Artificial Intelligence, Technology Acceptance, Student Perceptions, Higher Education.

JEL Classification: I23, O33

1 Introduction

The rapid development of Artificial Intelligence is transforming higher education, particularly in business programs where digital competencies are essential. Students increasingly use AI tools for learning, problem-solving, and productivity enhancement. While prior research highlights the importance of perceived usefulness in technology adoption, less attention has been paid to the multidimensional nature of perceptions of AI, including trust and perceived risks.

This study examines how business students perceive AI across three key dimensions: usefulness and future importance, attitude and trust, and perceived risks. Using survey data from students at Budapest Metropolitan University, the research aims to identify the underlying structure of these perceptions and explore differences across demographic groups. The findings contribute to a more nuanced understanding of AI acceptance in higher education.

2 Material and Methods

This study applies a quantitative, cross-sectional survey design to examine students' perceptions of Artificial Intelligence. Data were collected in February 2026 from business students at Budapest Metropolitan University using an online questionnaire. Items measuring attitudes, perceived usefulness, and risks of AI were assessed on a 5-point Likert scale.

Exploratory factor analysis (EFA) with varimax rotation was used to identify underlying dimensions of AI perception. Internal consistency was evaluated using Cronbach's alpha. Descriptive statistics (means, standard deviations) were calculated for all variables. Group differences were examined using independent samples t-tests (gender, education form, working status) and one-way ANOVA (age groups).

All analyses were conducted using R, ensuring a comprehensive assessment of both the structure and variation of AI-related perceptions.

3 Results

Exploratory factor analysis identified three dimensions of Artificial Intelligence perception – Attitude and Trust, Usefulness and Future Importance, and Perceived Risks – explaining 45.9%

of total variance. Reliability was good for Attitude and Trust ($\alpha = 0.81$) and very good for Usefulness ($\alpha = 0.83$), while Risks showed lower consistency ($\alpha = 0.54$).

Descriptive results indicate high perceived usefulness ($M = 4.17$, $SD = 0.70$), moderate attitudes and trust ($M = 3.27$, $SD = 0.71$), and lower perceived risks ($M = 2.95$, $SD = 0.84$).

T-tests revealed significant gender differences in Attitude and Trust ($p < 0.001$) and Usefulness ($p = 0.033$), with males reporting higher values. No significant differences were found for risks, education form, or working status. ANOVA results showed no significant differences across age groups, although minor trends suggest slightly more positive perceptions among older students.

4 Conclusions

This study examined students' perceptions of Artificial Intelligence and identified a three-dimensional structure comprising usefulness, attitude and trust, and perceived risks. The findings confirm that perceived usefulness is the dominant dimension, which is consistent with the Technology Acceptance Model [1], emphasizing the central role of performance-related benefits in technology adoption. At the same time, the separation between usefulness and trust supports more recent perspectives suggesting that trust in AI operates as a distinct construct influenced by reliability and transparency [2].

The relatively weak and heterogeneous nature of perceived risks aligns with arguments that AI-related concerns – such as ethical issues and job displacement – are often less structured in early adoption phases [3]. Furthermore, the observed gender differences, with male students reporting higher levels of trust and perceived usefulness, are consistent with prior findings in technology acceptance research [4]. In contrast, the absence of significant differences across age, education form, and working status suggests that AI perceptions are relatively homogeneous within student populations, particularly in digitally intensive environments [5].

Overall, the results indicate that students approach AI in a pragmatic and opportunity-oriented manner, recognizing its benefits while maintaining cautious trust. These findings highlight the importance of strengthening AI literacy and critical evaluation skills in higher education. Future research should adopt longitudinal designs and advanced analytical methods to better understand the evolving relationships between usefulness, trust, risks, and actual usage behavior.

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A Gap Analysis of Job Preferences and Actual Job Conditions: Evidence from Budapest Metropolitan University Graduates

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Keywords: Job mismatch, Graduate employment, Job satisfaction, Gap analysis.

JEL Classification: I23, J24, J28

1 Introduction

The transition from higher education to the labour market is a critical phase in graduates' careers, particularly in business studies where expectations regarding career opportunities, salary, and working conditions are often high. Universities aim not only to provide knowledge but also to prepare students for successful integration into the labour market. However, a potential mismatch may exist between graduates' job preferences – such as job security, career advancement, salary, or flexible working conditions – and the realities they encounter in their actual employment. This gap can significantly influence job satisfaction, motivation, and long-term career development.

This study examines the discrepancy between job preferences and actual job conditions among graduates of Budapest Metropolitan University, based on data from the Graduate Career Tracking System – Institutional online survey research (2025). By analysing both expected and experienced workplace characteristics, the research identifies key areas of mismatch and explores their implications. The findings contribute to a better understanding of the alignment between business education and labour market outcomes, offering practical insights for curriculum development and career support services.

2 Material and Methods

The analysis is based on data from the *Graduate Career Tracking System – Institutional online survey research (2025)*, conducted among graduates of Budapest Metropolitan University. The study applies quantitative methods, including descriptive statistics and multivariate techniques. Gap analysis is used to compare job preferences (importance ratings) and actual job conditions (satisfaction indicators). Factor analysis is employed to identify key dimensions, and regression models are applied to identify the determinants of the observed discrepancies.

3 Results

The results reveal a measurable gap between graduates' job preferences and their actual job conditions. The largest discrepancies were observed in areas related to salary, career advancement opportunities, and work-life balance, where expectations significantly exceeded experienced conditions. In contrast, smaller gaps were found in workplace atmosphere and teamwork, indicating better alignment in these dimensions. Factor analysis identified two main

dimensions: extrinsic factors (e.g. salary, benefits, job security) and intrinsic factors (e.g. interesting work, autonomy, social usefulness). Regression results suggest that income level, job relevance to field of study, and employment sector significantly influence the size of the gap. Graduates working in positions closely related to their studies and those with higher earnings reported smaller discrepancies. Overall, the findings highlight that while business graduates are relatively satisfied with interpersonal aspects of work, economic and career-related expectations remain only partially fulfilled.

4 Conclusions

The results confirm that a significant gap exists between graduates' job preferences and actual job conditions, particularly in extrinsic factors such as salary and career advancement. This finding is consistent with earlier research on education – labour market mismatches, which highlights their negative effects on wages and job satisfaction [1], as well as with more recent evidence showing that both vertical and horizontal mismatches remain widespread among graduates [2].

The relatively smaller gaps observed in interpersonal aspects of work support Herzberg's motivation–hygiene theory [3], which distinguishes between intrinsic and extrinsic job factors. Furthermore, the importance of job–education match is reinforced, as graduates working in positions related to their studies reported lower discrepancies, in line with previous findings [4] and recent studies emphasizing the long-term consequences of skill mismatch on employee outcomes [5].

Overall, the study confirms that while higher education provides a solid foundation, alignment with labour market expectations remains partial. These findings support both classical and recent literature, suggesting that improving career guidance, strengthening practical components, and enhancing university–industry cooperation can reduce mismatches and improve graduate outcomes.

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Navigating ESG Transitions in Hospitality: A Multi-Level Analysis of the Hungarian Hotel Industry

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Keywords: ESG, hotel SMEs, sustainability transitions, multi-level perspective, competitiveness, CSRD Omnibus, Hungary

JEL Classification: L83, Q56, M14

1 Introduction

Environmental, social, and governance (ESG) principles are increasingly shaping competitive dynamics in European hospitality, yet the mechanisms through which ESG pressures reach small and medium-sized hotel enterprises remain undertheorised. Most existing research focuses on large, publicly listed hotel chains and treats ESG either as a compliance obligation or as a direct driver of financial performance [1, 2]. This framing neglects the distinctive position of hotel SMEs, structurally constrained actors that constitute over 80% of the global hospitality market yet lack the resources, reporting infrastructure, and institutional visibility of their larger counterparts [3]. Meanwhile, the EU regulatory landscape has shifted dramatically: the Omnibus I Directive (EU 2026/470) raised CSRD scope thresholds to 1,000 employees and €450 million turnover, removed listed SMEs from mandatory reporting, and introduced provisions protecting smaller firms from excessive value-chain data requests [4]. This regulatory retreat does not eliminate ESG pressures on hotel SMEs; rather, it redirects them through indirect institutional channels, such as investor due diligence, supply-chain signalling by international hotel groups, green lending criteria, and evolving guest preferences. This paper reconceptualises ESG as an emerging mechanism of competitive reconfiguration within the hotel sector, drawing on the multi-level perspective (MLP) of sustainability transitions [5] and focusing on Hungary as a mid-size EU member state with a distinctive domestic ESG regime established by Act CVIII of 2023 [6].

2 Material and Methods

The study adopts a conceptual narrative analysis structured around the MLP framework [5, 7]. The MLP distinguishes three analytical levels: landscape pressures, socio-technical regime structures, and niche innovations. It has recently been applied to tourism transitions research with increasing frequency [8, 9]. Building on this framework, the paper identifies four

interacting drivers of ESG-related competitive reconfiguration: (i) regulatory realignment, encompassing both EU-level CSRD/ESRS dynamics and Hungary's domestic ESG Act; (ii) financial market integration, including green lending and ESG-linked investment criteria [2]; (iii) evolving demand patterns, reflected in growing traveller preferences for certified sustainable accommodation; and (iv) enabling technological infrastructure, including energy management systems, ESG reporting platforms, and digitalised property management. Evidence is synthesised from recent academic literature, EU regulatory texts, and institutional sources to develop a set of forward-looking propositions on the conditions under which ESG adoption translates into competitive advantage for hotel SMEs. The analysis explicitly engages with the post-Omnibus regulatory reality, distinguishing between direct regulatory mandates and the indirect institutional channels that now constitute the primary transmission mechanism for ESG expectations reaching SME-scale hospitality firms [10].

3 Results

The analysis yields three principal findings. First, hotel SMEs are characterised as structurally constrained but behaviourally adaptive actors whose ESG responses range along a spectrum from resistance and symbolic compliance through selective adoption to strategic differentiation. This heterogeneity is mediated by organisational capabilities, particularly absorptive capacity and dynamic capabilities, rather than by firm size or regulatory exposure alone [3, 11]. Second, the paper identifies a central tension between ESG as a cost of market participation and as a source of competitive differentiation. The post-Omnibus regulatory environment has paradoxically sharpened this tension: with direct regulatory pressure reduced for most hotel SMEs, the differentiation channel becomes relatively more salient, but capability gaps prevent many firms from exploiting it [10, 12]. Third, the paper advances propositions framing ESG adoption as a contingent process shaped predominantly by indirect institutional pressures, a pattern the Omnibus regulatory retreat has made empirically visible ahead of the 2030 horizon originally anticipated. The Hungarian context, with its layered regulatory structure and a hotel market where chain-operated properties significantly outperform independents on green practices [13], offers a particularly revealing case for examining these dynamics. Evidence from Central and Eastern European hotel managers further confirms that limited public support and resource constraints shape adoption patterns in ways distinct from Western European markets [14].

4 Conclusions

This paper contributes to the hospitality ESG literature by situating competitive reconfiguration within a sustainability transitions framework, extending the analysis beyond the large-chain focus that characterises existing reviews [1]. The MLP lens reveals that the ESG transition in European hotel SMEs is not uniformly innovation-led but mediated by capability gaps, heterogeneous organisational behaviour, and a shifting regulatory landscape whose non-linear trajectory (from CSRD expansion to Omnibus contraction) itself illustrates the contested character of sustainability transitions. For practitioners and policymakers, the findings suggest that capacity-building mechanisms, simplified reporting frameworks such as the VSME standard, and cascaded training programmes are likely more effective than regulatory mandates in driving substantive ESG adoption among hotel SMEs. The study outlines directions for future empirical research, including comparative analysis across CEE hotel markets and longitudinal tracking of how the post-Omnibus institutional environment reshapes SME competitive positioning.

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Joint keyword analysis of Short Supply Chains (SSC) and bibliometric network analysis of sustainable agrotourism

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Keywords: Sustainability, Agrotourism, Short Supply Chain

JEL Classification: Q26

1 Introduction

The focus of the research is to explore the scientific intersections between experience-based agrotourism elements and direct food marketing systems. Through the comparison of bibliometric and keyword association maps, several structural relationships can be identified. The revealed relationship is not only a commercial advantage but also a cornerstone of the multifunctionality of rural areas.

2 Material and Methods

The basis of the studies was provided by the keyword diagrams of two bibliometric reviews, which examined experiential agrotourism elements and the short supply chain separately. The basis of the searches was determined by the keyword database search of Clarivate Web of Science (WoS). The authors narrowed the focus on the topics by using combinations of keywords. The bibliometric evaluation of the complete results was conducted using the VOSviewer program, with the assistance of Python scripts (Juhász, 2025). From the created visual analytical diagrams, the authors compared the keyword-based full network diagrams and sought to identify the connections.

3 Results

The density of the diagrams suggests the SSC is no longer just a sales channel, but a fundamental building block of the agrotourism product experience. The network diagrams clearly indicate the connection focal points. The connection between the topics is sustainability, sustainable development, and sustainable rural development, which are central elements in both networks, essentially forming the common denominator. Local food, local produce, or locally grown food are also common elements in both diagrams, forming part of our gastronomic heritage. The goal of rural development is common to both topics, as the ultimate objective is the development of rural areas (Renting et al, 2003). COVID-19 prominently appears on the periphery of the charts, indicating that the pandemic is impacting tourism and food supply chains. The examined model includes system-level overlaps, which analyse networks and processes based on the triad of systems thinking (Systems), modelling (Model), and management (Management). The design,

organisation, and management of the two systems are visible in this part of the model. Related overlaps pertain to consumer behaviours, whose elements examine perception, behaviour, and conduct. I would like to highlight the term “face of the producer”, which Marsden and his colleagues describe as particularly significant when the consumer meets the producer in person (Marsden, Bank, & Bristow, 2000). Quality is also a key connection in the examined analyses.

4 Conclusions

The comparative analysis of network visualisations highlights the symbiotic relationship between agrotourism and short supply chains (SSC). While the short supply chains (SSC) guarantee the structural foundation of physical product bases and consumer trust, experience-based tourism acts as the catalyst that generates economic added value. The synergy between these two areas is not merely a theoretical construct, but a fundamental condition for the long-term competitiveness and resilience of rural regions.

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Sustainable Animal Protection in the Age of AI: A Strategic Framework for Competitiveness, Responsibility and Digital Transformation

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Keywords: sustainable animal protection, artificial intelligence, competitiveness, digital transformation.

JEL Classification: O33, Q01, M14

1 Introduction

The research examines sustainable animal protection as an emerging strategic field at the intersection of sustainability, competitiveness, digital transformation, and artificial intelligence (AI). Animal protection is usually discussed in ethical, legal, or sector-specific terms, while its relevance to organisational strategy remains less explored. In this paper, sustainable animal protection is used as a broader category than animal welfare, because it also includes the legal, institutional, educational, preventive, and governance mechanisms through which animal-related harm is prevented, detected, and addressed in the long term. [1,2]

This broader interpretation is especially relevant in the context of current sustainability debates, where organisations are increasingly evaluated not only by their economic performance, but also by their capacity to manage complex social and ethical responsibilities in transparent and future-oriented ways. Within this perspective, animal protection may be understood as a field in which prevention, education, institutional coordination, and evidence-based decision-making converge. The growing availability of AI-enabled governance tools therefore raises an important research question: under what conditions can digital innovation contribute to more effective and more legitimate animal protection systems without weakening ethical judgement or human accountability?

2 Material and Methods

The study is conceptual and is based on an interdisciplinary synthesis of sustainability studies, animal protection governance, animal welfare scholarship, strategic management, and responsible AI literature. The analysis combines recent academic work with international policy frameworks on trustworthy AI, especially the OECD Due Diligence Guidance for Responsible AI and UNESCO's Recommendation on the Ethics of Artificial Intelligence. [3–5] The aim is to develop a governance-oriented framework showing how AI-enabled systems may support animal protection across public institutions, NGOs, educational settings, and animal-related organisations.

3 Results

The analysis identifies four interrelated governance functions through which AI may generate strategic value in sustainable animal protection: early risk detection, more effective allocation of scarce resources, enhanced transparency and traceability, and stronger evidence-based decision support. These functions may help organisations move from fragmented and reactive responses towards more preventive, coordinated, and analytically grounded practices. At the same time, the paper argues that AI can create strategic value only if animal protection is understood as a field where ethical responsibility, governance quality, stakeholder trust, and organisational legitimacy are closely connected.

4 Conclusions

The main conclusion is that AI can become a valuable component of sustainable animal protection only when embedded in governance arrangements that ensure meaningful human oversight, professional accountability, contextual sensitivity, data validity, and ethical reflexivity. The paper contributes to current conference debates by linking sustainability, competitiveness, and digital transformation to a field that has remained marginal in mainstream management discourse. It also opens a new research agenda by positioning sustainable animal protection as a strategically relevant domain of responsible and AI-supported governance.

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The Talent Map of the Hungarian Startup Ecosystem: A Multi-Methodological Analysis of In-Demand Skills and Labor Market Gaps

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Keywords: Hungarian Startup Ecosystem; Bibliometric Mapping; Digital Skill Gap; Content Analysis; Human Capital; CEE Region.

JEL Classification: J24, M13, O33

1 Background

While the Hungarian startup ecosystem is maturing and expanding within the CEE, achieving the overall 51st position in terms of most active startup ecosystems globally by quarter '25 onwards[1], [2], the mismatch between academically produced human capital and what fast-growing ventures need is now a key bottleneck. The region is known for its technical "brainpower," yet this pivot to an AI-first operation and green economy has shifted startup job number one into something else entirely[3], [4], [5], [6].

2 Objectives

This research examines the development of demanded competences in startups in Hungary over a past five years. Specifically, it seeks to identify:

- Skills that are most common in regional innovation literature, organized into thematic clusters.
- The misalignment of "soft skills" priorities vs. "technical" ones in labour market data.

3 Methodology

This study applies a two-stream secondary data method:

- Value of analysis: A bibliometric map (through VOSviewer) was built upon a sample of 500+ peer-reviewed articles (2021–2026) sourced from Scopus and Web of Science. It identifies the co-occurrence of keywords such as Entrepreneurial Education, Digital Competencies, and CEE Innovation Hubs to uncover dormant theoretical heuristics.
- Content Analysis of Digital Job Boards: As to putting the theoretical results into practice, the other arm of this study is a thematic content analysis based on an additionally-created dataset comprising job posting collected from certain Hungarian startup-specific platforms. NLP methods to identify and classify technical requirements (e.g.,LLM integration, Embedded Systems) and transversal skills.

4 Significance

The paper will show a strategic pathway between theoretical research and actual market analysis for Hungarian governmental bodies and educational institutions. The framework establishes a method to match vocational education with the technological needs of the "Smart '26" period which will help Hungarian systems maintain their competitive advantage in the digital-first worldwide market.

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EXAMINING FINANCIAL STRESS CAUSED BY CLIMATE CHANGE AMONG AGRICULTURAL ENTERPRISES, WITH A FOCUS ON LAVENDER GROWERS

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Keywords: lavender, climate change, financial stress

JEL Classification Q13, Q54, R51

1 Introduction

Climate change represents one of the most significant challenges of the 21st century, with considerable economic implications even in the short term. Agricultural and food industry enterprises are particularly exposed to physical climate risks such as droughts, floods, and hailstorms, which can lead to substantial production losses and income instability. In addition to direct losses, climate change also contributes to increasing production costs, including water usage, fertilizers, pesticides, and seeds.

The growing importance of financial preparedness in managing climate-related risks highlights the role of financial literacy. Financial literacy enables enterprises to make informed financial decisions and to develop strategies that enhance resilience and long-term sustainability. The aim of this research is to explore how agri-food enterprises, with a specific focus on lavender growers, are financially prepared to cope with climate-related stress.

2 Material and Methods

The research is based on both secondary and primary data sources. A comprehensive literature review was conducted using international and domestic scientific databases to establish the theoretical background and support the development of the research framework.

Primary data collection was carried out using a questionnaire survey targeting agricultural and food industry enterprises in Hungary. The study applies the OECD (2020) methodology to assess financial literacy, which evaluates three main dimensions: financial knowledge, financial behavior, and financial attitudes.

Special attention was given to enterprises operating in the lavender sector in the Balaton region. These include businesses engaged in various activities such as primary production, processing, event organization, and direct sales.

3 Results

The findings indicate that the financial preparedness of Hungarian agri-food enterprises for climate-related stress varies significantly. Many enterprises face considerable financial challenges due to climate impacts, particularly those lacking structured financial strategies and risk management practices.

The analysis reveals that limited financial awareness and insufficient planning increase vulnerability to climate-induced risks. Enterprises with higher levels of financial literacy demonstrate better adaptability and are more capable of implementing effective financial solutions.

The case of lavender growers in the Balaton region provides additional insights. Lavender production has become increasingly significant in recent years, not only as an agricultural activity but also as part of tourism and value-added product development. Despite its growing importance, the sector shows varying levels of financial preparedness, especially in managing climate-related risks.

4 Conclusions

The study highlights the critical role of financial literacy in enhancing the resilience of agri-food enterprises to climate change. Improving financial knowledge, behavior, and strategic planning can significantly reduce the negative economic impacts of climate stress.

The findings suggest that targeted financial education and the development of adaptive financial strategies are essential for strengthening the competitiveness and sustainability of agricultural enterprises. The lavender sector, as an emerging and regionally important industry, requires particular attention in this regard.

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The Role of Financial Resilience in Economic Decision Quality

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Keywords: financial resilience, financial stress, decision quality, household finance.

JEL Classification: D14, D81, G51

1 Introduction

Financial resilience has become an important concept for explaining how individuals respond to financial shocks, uncertainty and adverse economic conditions. Previous researches have mainly examined financial resilience in relation to coping capacity, financial literacy, household stability and broader financial outcomes. However, its role in shaping economic decision quality under financial pressure remains insufficiently specified. This study examines financial resilience as both a direct predictor of decision quality and a moderating factor that may reduce the adverse effect of financial stress. The topic is relevant because decision quality influences saving behaviour, borrowing choices, risk exposure and long-term household financial stability.

2 Material and Methods

The study applies a cross-sectional, scenario-based survey design. Data will be collected through an online questionnaire among adult respondents. The empirical framework includes three constructs: financial resilience, financial stress, and economic decision quality. Financial resilience is defined as the ability to adapt to financial difficulties, absorb shocks and restore stability. Financial stress refers to the perceived pressure arising from an individual's financial situation. Economic decision quality is operationalised through five dimensions: information use, consistency of choice, consideration of alternatives, risk-return evaluation and avoidance of impulsive responses.

The questionnaire combines demographic variables, Likert-scale items, and scenario-based decision tasks involving unexpected expenses, temporary income loss, borrowing decisions and savings dilemmas. A decision quality index will be constructed from the scenario responses. Scale reliability will be evaluated using internal consistency measures, such as Cronbach's alpha and construct structure will be assessed through factor analysis. The hypotheses will be tested with regression models including financial resilience, financial stress, their interaction term and demographic controls.

3 Results

This section presents the expected empirical relationships to be tested. Financial resilience is expected to be positively associated with economic decision quality. Respondents with higher resilience are expected to evaluate alternatives more systematically, use relevant information

more consistently and avoid impulsive financial choices under pressure. Financial stress is expected to reduce decision quality by narrowing evaluation, strengthening short-term focus, and limiting attention to long-term consequences. The interaction model is expected to show that financial resilience weakens this negative relationship, indicating a protective mechanism in decision-making under uncertainty.

4 Conclusions

The study contributes to the literature by repositioning financial resilience as a determinant of economic decision quality rather than treating it only as a coping, literacy-related or well-being construct. Its main contribution is a scenario-based empirical framework connecting resilience, financial stress, and decision quality within one testable model. The full paper will elaborate the theoretical background, measurement model, moderation analysis, and implications for financial education and household financial stability.

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User Evaluation of AI-based Healthcare Software: Implications for Efficiency and Competitiveness

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Keywords: Health Innovation, AI software, efficiency, competitiveness

JEL Classification: I11, I15, O31

1 Introduction

The growing use of artificial intelligence (AI)-based software in healthcare systems offers new opportunities for improving efficiency and organizational performance [1], [2]. In the Hungarian hospital context, characterized by a publicly financed and highly regulated system, competitiveness does not primarily refer to market-based competition but rather to the ability of institutions to operate efficiently, optimize resource utilization, and adapt to technological challenges [3]. [4]. While existing studies focus mainly on clinical performance, limited attention has been paid to how user-level factors influence the economic effectiveness of AI systems. This study aims to analyze the economic efficiency of AI-based healthcare software from a user evaluation perspective, taking into account the specific institutional and regulatory characteristics of Hungarian hospitals.

2 Material and Methods

The study applies a mixed-method approach combining quantitative and qualitative analysis. The quantitative component examines cost-efficiency indicators such as cost per patient, average length of stay, and staff productivity, using regression-based models to assess the impact of AI adoption [5].

The qualitative component is based on a structured questionnaire administered to healthcare professionals, focusing on key dimensions such as usability, trust, workflow integration, and perceived economic impact. Responses are measured using Likert scales and analyzed through exploratory factor analysis and regression techniques. The evaluation framework is informed by established standards, including CHEERS-AI, DECIDE-AI, TRIPOD+AI, and the FUTURE-AI [6], [7].

3 Results

The expected results indicate that AI-based software contributes to improved operational efficiency by reducing administrative workload, accelerating diagnostic processes, and supporting clinical decision-making. In the Hungarian context, these improvements are particularly relevant due to resource constraints and capacity limitations. Quantitative findings are expected to show a reduction in average treatment costs and improvements in productivity indicators.

Qualitative results are anticipated to highlight that user-related factors—especially usability, trust, and integration into existing workflows—play a critical role in determining the effectiveness of AI systems [8]. The analysis suggests that economic benefits are not solely dependent on technological performance but are strongly influenced by organizational and human factors [9].

4 Conclusions

The study demonstrates that the evaluation of AI-based healthcare software in Hungary requires a context-sensitive approach that integrates economic, operational, and user-level perspectives. Competitiveness in this environment is best understood as the ability of healthcare institutions to achieve higher efficiency and better resource allocation within a regulated system. The findings indicate that AI can contribute to this objective, provided that systems are effectively integrated into clinical workflows and accepted by users.

The study highlights the importance of evaluating AI not only from a technological perspective but also in terms of its economic and organizational impact. By linking user evaluation with economic outcomes, the study offers a comprehensive framework for assessing the cost-efficiency and strategic value of AI technologies in healthcare. The results provide practical implications for healthcare managers and policymakers aiming to improve institutional performance through digital innovation.

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Tourism Competitiveness and Regional Resilience in Times of Crisis: A Comparative Study of Hungary and Transcarpathia

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Keywords: tourism competitiveness, regional resilience, rural tourism, sustainable development, crisis management.

JEL Classification: L83, R11, Q56

1 Introduction

Tourism has become one of the most dynamic sectors of the global economy. However, it is also highly vulnerable to external crises and geopolitical instability. The COVID-19 pandemic, followed by the energy crisis, inflationary pressures, and the Russian–Ukrainian War, significantly transformed the operational environment of tourism destinations across Central and Eastern Europe. These challenges have particularly affected regions strongly dependent on international mobility and tourism-related services. The present study examines tourism competitiveness and regional resilience in Hungary and Ukraine's Transcarpathia during the period of overlapping crises between 2020 and 2025 [4, 7]. Particular attention is devoted to the adaptability of rural tourism destinations and the role of sustainable tourism development in mitigating economic and social vulnerabilities [5]. The paper aims to identify the main factors contributing to regional resilience and to compare the responses of urban and rural tourism systems under crisis conditions.

2 Material and Methods

The research is based on a comparative analytical approach combining statistical analysis, literature review, and secondary data evaluation. The study utilizes publicly available datasets from national statistical offices, tourism agencies, international organizations, and regional development reports related to Hungary and Ukraine. The methodological framework includes the examination of tourism indicators such as tourist arrivals, overnight stays, accommodation capacities, domestic tourism demand, and regional tourism revenues. In addition, qualitative analysis was applied to evaluate the role of digitalization, ESG-oriented tourism strategies, and sustainable rural development initiatives in strengthening tourism resilience [1, 5, 6]. The comparative perspective enables the identification of similarities and differences between the Hungarian tourism sector and the tourism dynamics of Transcarpathia under extraordinary economic and geopolitical circumstances [4].

3 Results

The findings demonstrate that the tourism sector experienced significant structural transformation during the analyzed crisis period. Major urban tourism destinations, especially Budapest, recorded substantial declines in international tourist arrivals due to travel restrictions and reduced global mobility [6]. In contrast, rural and nature-oriented destinations showed greater flexibility and adaptability [5]. Domestic tourism became a key stabilizing factor in Hungary, contributing to the recovery of local tourism economies and increasing demand for wellness, eco-tourism, and short-distance travel [4, 6]. Similar tendencies were observed in Transcarpathia, where internal tourism and regional mobility partially compensated for the decline in international visitors [1, 5]. The research also reveals that regions with diversified tourism services, stronger digital infrastructure, and sustainability-oriented management practices demonstrated higher levels of resilience [1, 7]. Nevertheless, small-scale rural enterprises continue to face substantial challenges related to financing, infrastructure deficiencies, labor shortages, and regulatory uncertainty. The results further indicate that long-term tourism competitiveness increasingly depends on innovation capacity, environmental sustainability, and the integration of digital technologies into tourism services and destination management [4, 7].

4 Conclusions

The study confirms that tourism resilience is closely connected to regional adaptability, sustainable development strategies, and the diversification of tourism products. Rural tourism destinations in both Hungary and Transcarpathia proved to be more resistant to crisis-related disruptions than highly internationalized urban tourism centers [5, 6]. The research highlights the growing importance of domestic tourism, digital transformation, and ESG-based tourism management in enhancing regional competitiveness under conditions of uncertainty [4, 7]. Future tourism development strategies should therefore prioritize sustainability, smart tourism solutions, and support mechanisms for small and medium-sized tourism enterprises [3]. The comparative analysis demonstrates that balanced regional development and resilient tourism governance are essential for mitigating the long-term impacts of global crises and strengthening the attractiveness of Central European tourism destinations [1, 4, 7].

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Responsible public catering solutions in schools – Case studies from different countries applying the systems thinking model

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Keywords: school canteen, sustainable consumption, transformation statement, BATWOVE.

JEL Classification: Q01, Q13

1 Introduction

Food systems have become a central focus of global sustainability debates [1], which face multiple challenges today and have significant impacts on environmental protection, public health, and social inclusion [2]. Within this context, public catering—especially school catering—has served as a key intervention point, given its capacity to influence dietary habits early in life and to generate stable demand for sustainably produced food [3, 4]. In 2020, a daily total of 304 million portions were served in school canteens to the 19% of the school-aged population worldwide. Extending school meal programs to all school-aged children by 2030 would increase the number of recipients by 430% to 1.6 billion [4], making them critical leverage points for transforming food systems toward more resilient and equitable models [5, 6].

In recent years, many countries have introduced policies to increase the use of local, organic, and sustainably produced ingredients in school meals. These measures attempt to improve food quality, achieve equitable access to nutritious meals, and reduce the ecological burden of public catering [3, 5]. However, the effectiveness of these projects varies widely. Some countries demonstrate strong political ambition but face implementation difficulties, while others rely on community-based approaches that lack lasting stability or capacity [4, 7].

Achieving more responsible public school catering requires major transformations across the entire food system; all stakeholders, including governments, businesses, scientists, civil society organizations, and consumers, need to collaborate and take action to achieve this [2]. The study attempts to answer the research question: What transformations are needed in current school catering systems to meet sustainability goals?

2 Material and Methods

This paper provides a comparative study of school catering systems, including 10 case studies across three continents (Asia, Europe, and Africa), using the BATWOVE model to examine actor interactions, governance structures, and system performance. The model delivers a framework for aligning multiple interests and cutting through complexity. It considers Beneficiaries of the proposed transformation, Actors who should make the transformation, Transformations defining what input is changed to what output, Worldview perspectives

(including values) from which the transformation looks meaningful and desirable, Owners who have the power to stop the transformation from happening, Victims who are negatively affected by the transformation and Environmental constraints that have to be taken as a given [2].

3 Results

The results show that, notwithstanding significant contextual differences, the cases present strikingly parallel challenges in aligning sustainability aims with real world implementation capacities [2, 4, 7]. According to the rich pictures, the current situation is unsustainable, and almost everywhere, the challenges and participants are the same. In several African and Asian cases, school meals remained primarily calorie focused, with sustainability considerations secondary to food security. All case studies introduced sustainability oriented transformations—such as increasing organic procurement, including local supply chains, or reducing food waste. The analysis identified groups negatively affected by current transformation efforts, including small-scale farmers, retailers, and fast-food restaurants. Environmental constraints - such as climate variability, water scarcity, and seasonal production limits - were present in all case studies.

4 Conclusions

The analysis shows that sustainable school catering requires radical transformation steps to secure the necessary sustainable components for school canteens. The BATWOVE model highlighted that shared values alone are insufficient; alignment must be supported by coherent governance structures and adequate resources. Without coordinated action across all layers of the food system, the goal of providing high quality, equitable, and environmentally responsible school meals will remain out of reach.

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Bridging the Monetary Gap: The "Shadow Border" Effect in Hungarian-Eurozone Trade (2015–2025)

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Keywords: Currency friction, Gravity model, Transaction costs, Hungarian export, Eurozone integration.

JEL Classification: F14, F33, O52.

1 Introduction

Hungary represents a unique case in the European Single Market: a deeply integrated economy operating outside the Eurozone. This duality creates a "Shadow Border" a system of invisible trade barriers including exchange rate volatility, hedging costs, and administrative transaction burdens. While traditional tariffs are absent, the persistence of a national currency introduces friction into cross-border supply chains. Building on Optimum Currency Area (OCA) theory (Mundell, 1961), this paper investigates the impact of non-euro status on trade volumes and integration depth between 2015 and 2025 (Rose, 2000), suggesting that microeconomic efficiency losses may outweigh the perceived benefits of monetary autonomy (Glick & Rose, 2016).

2 Material and Methods

The research employs a robust gravity model of trade (Baldwin, 2006; Baldwin et al., 2008) to quantify currency-related impediments. To address common estimation biases, the framework incorporates country-pair fixed effects and accounts for sectoral asymmetries (Wooldridge, 2010). This methodological approach isolates monetary effects from other time-varying characteristics. The study utilizes secondary data from international trade and macroeconomic databases covering 2015–2025, focusing on bilateral flows between Hungary and the EU-27. Analysis covers both intensive (volume) and extensive (variety) margins, with emphasis on value-added trade flows.

3 Results

Preliminary findings suggest that non-euro status functions as a significant non-tariff barrier. The Shadow Border effect manifests in four dimensions:

- **Trade Friction:** Hungarian trade flows lag significantly behind levels predicted by gravity variables, a gap not observed in euro-adopting regional peers (Bakucs et al., 2019; Maliszewska, 2006).
- **The SME Gap:** Domestic SMEs face higher relative transaction costs than multinationals, hindering their integration into European value chains.
- **Volatility Penalty:** Currency instability acts as an "uncertainty tax," negatively correlating with trade growth and complicating long-term contracts.

- Structural Distortion: Monetary fragmentation may shift trade composition toward lower-processed products with lower transaction requirements.

4 Conclusions

The study concludes that non-euro status is a structural impediment to export potential, primarily penalizing domestic-owned firms. The findings highlight the necessity for sophisticated currency risk management at the firm level. For policymakers, the results quantify the "opportunity cost" of fragmentation (Darvas, 2021), framing Eurozone accession as a strategic necessity for supply chain efficiency and technological catch-up in the long run.

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Antifragility in Twin Transition Business Models

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Keywords: antifragile, twin transition, business model, strategy

JEL Classification: D81, O33, L21, M21

1 Introduction

Today's global business environment is characterized by an unprecedented intertwining of accelerating natural resource depletion, climate change, and technological disruptions. In such environment, it is no longer sufficient for companies to be merely resilient (resistant); they require business models that not only survive shocks but also benefit from uncertainty [1].

This capability is referred to as antifragility. In contemporary management research, Business Model Innovation (BMI) has emerged as a key instrument of strategic agility, enabling firms to adapt and thrive in unpredictable environments [2]. One of the most influential contemporary strategic frameworks in this field is the Twin Transition (TT), which conceptualizes sustainability and digital transitions as mutually reinforcing, inseparable processes [3].

TT is not merely the parallel implementation of two separate strategic objectives, but rather an integrated approach where digital technologies (AI, IoT, blockchain) serve as the engines of sustainable value creation [4]. Antifragility in TT business models becomes evident when companies are able to transform external regulatory pressures and market volatility into competitive advantages through the synergy of technological innovation and environmental commitment [5].

2 Material and Methods

A Systematic Literature Review (SLR) was conducted following the PRISMA Protocol [6]. The objective of the review was to explore how, and through which structural mechanisms, business models implementing the twin transition can generate antifragile organizational operations, particularly in SMEs. The PRISMA process is divided into four main phases: Identification, Screening, Eligibility and Inclusion.

The search for relevant scientific publications is conducted in two leading international databases: Scopus and Web of Science (WoS). The search query is structured using Boolean operators to cover all three dimensions of the topic (twin transition, antifragility, business models). Additional search criteria were:

- Timeframe: The last 5 years, with particular regard to the post-Covid-19 pandemic period, which acted as a catalyst for digital and green transformation.
- Document type: Exclusively peer-reviewed journal articles and book chapters.
- Language: Publications in English and Hungarian.

In the first phase, bibliographic data of identified records are exported (e.g., RIS or CSV format), and duplicates are removed using software (e.g., EndNote, Covidence). This is followed by title and abstract-based screening, performed by two independent researchers to avoid bias. At this stage, studies not directly related to organizational-level operations are excluded (e.g., purely macroeconomic or purely technical-engineering focuses that do not

examine the business model). A full-text review of the screened articles is conducted based on predetermined inclusion and exclusion criteria:

Category	Inclusion Criteria	Exclusion Criteria
Thematic focus	The synergistic relationship between digital transformation and green/sustainable transition is present.	Only examines one transformation branch (e.g., isolated digitalization without sustainability aspects).
Risk	Examines risk reduction, resilience, uncertainty, or antifragility.	Does not address external shocks, crises, or the management of uncertainty.
Methods	Clearly described empirical (qualitative/quantitative) or structured theoretical framework.	Non-scientific journalism, opinion pieces, or non-peer-reviewed conference abstracts.

3 Results

The systematic literature review conducted according to the PRISMA protocol confirms that antifragility in twin transition business models is not a static condition, but rather a continuously evolving, dynamic organizational capability. The synergy between technological (digital) and ecological (green) transformation creates a self-improving loop that treats external disturbances and crises not as threats, but as opportunities for innovation and structural renewal.

4 Conclusions

Future research is recommended to extend to the validation of quantitative models, that examine, for example, the direct impact of ESG-based financing mechanisms and digital twin-based risk management systems on corporate bankruptcy risks and long-term value creation in turbulent economic cycles.

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The Role of Financial Resilience in Economic Decision Quality

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Keywords: financial resilience, financial stress, decision quality, household finance.

JEL Classification: D14, D81, G51

1 Introduction

Financial resilience has become an important concept for explaining how individuals respond to financial shocks, uncertainty and adverse economic conditions. Previous researches have mainly examined financial resilience in relation to coping capacity, financial literacy, household stability and broader financial outcomes. However, its role in shaping economic decision quality under financial pressure remains insufficiently specified. This study examines financial resilience as both a direct predictor of decision quality and a moderating factor that may reduce the adverse effect of financial stress. The topic is relevant because decision quality influences saving behaviour, borrowing choices, risk exposure and long-term household financial stability.

2 Material and Methods

The study applies a cross-sectional, scenario-based survey design. Data will be collected through an online questionnaire among adult respondents. The empirical framework includes three constructs: financial resilience, financial stress, and economic decision quality. Financial resilience is defined as the ability to adapt to financial difficulties, absorb shocks and restore stability. Financial stress refers to the perceived pressure arising from an individual's financial situation. Economic decision quality is operationalised through five dimensions: information use, consistency of choice, consideration of alternatives, risk-return evaluation and avoidance of impulsive responses.

The questionnaire combines demographic variables, Likert-scale items, and scenario-based decision tasks involving unexpected expenses, temporary income loss, borrowing decisions and savings dilemmas. A decision quality index will be constructed from the scenario responses. Scale reliability will be evaluated using internal consistency measures, such as Cronbach's alpha and construct structure will be assessed through factor analysis. The hypotheses will be tested with regression models including financial resilience, financial stress, their interaction term and demographic controls.

3 Results

This section presents the expected empirical relationships to be tested. Financial resilience is expected to be positively associated with economic decision quality. Respondents with higher resilience are expected to evaluate alternatives more systematically, use relevant information more consistently and avoid impulsive financial choices under pressure. Financial stress is expected to reduce decision quality by narrowing evaluation, strengthening short-term focus, and limiting attention to long-term consequences. The interaction model is expected to show that financial resilience weakens this negative relationship, indicating a protective mechanism in decision-making under uncertainty.

4 Conclusions

The study contributes to the literature by repositioning financial resilience as a determinant of economic decision quality rather than treating it only as a coping, literacy-related or well-being construct. Its main contribution is a scenario-based empirical framework connecting resilience, financial stress, and decision quality within one testable model. The full paper will elaborate the theoretical background, measurement model, moderation analysis, and implications for financial education and household financial stability.

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The Role of Administrative Reform in Enhancing the Financial Self-Sufficiency of Transcarpathian Micro-Regions

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Keywords: Financial self-sufficiency, budgetary decentralization, fiscal capacity of territorial communities, transfer dependency, wartime economic impacts.

JEL Classification: H83, H71, H72, H77, R58

1 Introduction

Financial self-sufficiency of micro-regions is a key factor in building an effective model of public administration under the modern socio-economic transformation of Ukraine. The quality of public services, infrastructure development, social sustainability, and the reduction of pressure on the state budget largely depend on the ability of local budgets to generate their own revenues.

Since 2014, Ukraine's administrative-territorial reform and fiscal decentralization have transferred both responsibilities and financial resources to local governments. However, the distribution of fiscal powers has remained uneven, leading to significant differences in revenue capacity and dependence on intergovernmental transfers. This issue has become especially important during Russia's full-scale invasion of Ukraine and the period of martial law, which have reshaped the country's socio-economic geography through migration, loss of active taxpayers, infrastructure destruction, changing budget priorities, and increased reliance on external financial assistance.

In this context, a comprehensive analysis of the financial self-sufficiency of micro-regions is essential. Such research makes it possible to assess local fiscal capacity, identify differences in revenue generation, transfer dependence, and expenditure efficiency, and develop strategic recommendations for strengthening budgetary autonomy and ensuring sustainable development during wartime and post-war recovery.

2 Materials and Methods

The methodology of the study is based on a combined quantitative and qualitative analysis of the financial capacity of micro-regions. The research applies a systematic approach, enabling micro-regions to be examined as integrated financial and administrative units within a multi-level governance system. Indicative analysis is used to assess local budget revenues, subsidies, tax potential, and expenditure structures. The quantitative part of the research includes k-means clustering, which groups micro-regions according to indicators of financial self-sufficiency, such as per capita revenues, the share of transfers, and the expenditure coverage ratio. Correlation and regression analysis are applied to identify relationships between key factors — including population, economic structure, tax burden, and employment — and the level of financial self-sufficiency. In addition, data normalization and the construction of an integrated index make it possible to rank micro-regions and compare their fiscal capacity.

The study also uses a cartographic method to visualize the spatial differentiation of financial self-sufficiency by district. Content analysis of legislation and budgetary documents is applied to evaluate the regulatory framework of local financing and the mechanisms of intergovernmental transfer distribution. The information base of the research consists of official data from the Open Budget portal, financial reports of micro-regions, statistics of the State Treasury, and analytical publications of international organizations. The study covers the period 2021–2025, which makes it possible to trace changes in local budget revenues before and after the beginning of Russia's full-scale invasion of Ukraine.

For the purposes of the research, a specific integrated indicator was developed to measure and compare the financial self-sufficiency of micro-regions. Its construction takes into account conceptual approaches used by international organizations, including the World Bank, the United Nations Development Programme (UNDP), and the OECD, particularly in the fields of local fiscal sustainability, municipal revenue potential, community capacity assessment, and financial stress evaluation.

3 Results

Under martial law, local budgets have generally demonstrated positive financial stability. Micro-regions continue to perform the basic functions of budgetary policy, provide public services, and finance defense-related needs, territorial defense measures, and support for internally displaced persons. Assessing the financial condition of micro-regions makes it possible to diagnose local budget policy, identify the need to adjust expenditure priorities, and support managerial decision-making. Local governments can use the results of financial capacity assessment in the budget process and in defining the priorities of local fiscal policy.

At the same time, further development of state regional and budgetary policy is needed, especially regarding support mechanisms for frontline and war-affected micro-regions. The improvement of the fiscal equalization system and the strengthening of local financial capacity remain key issues. As the guarantor of social and economic rights, the state must ensure an adequate standard of living for citizens regardless of their place of residence.

4 Conclusions

The analysis of local budget revenues in 2021–2024 showed that own-source revenues of micro-regions increased by an average of 38.2% in absolute terms. The highest growth was observed in communities with a strong personal income tax base, especially in larger urban centres. However, more than 30% of micro-regions still face revenue instability, partly due to tax changes introduced under martial law.

Cluster analysis made it possible to divide micro-regions into three groups according to their financial capacity. The first cluster includes 12 financially stronger communities, where own-source revenues per capita exceed UAH 6,000 and the share of transfers is below 25%. The second cluster includes 34 medium-capacity communities, with per capita revenues between UAH 4,000 and 6,000. The third cluster consists of 18 transfer-dependent communities, where transfer dependence exceeds 60% and per capita revenues remain below UAH 4,000.

Correlation and regression analysis identified the main factors influencing financial capacity: the tax base, population size, employment level, and the share of small and medium-sized enterprises in the local economy. The strongest correlations were found with the tax base (0.71), population size (0.64), and employment level (0.59). Martial law significantly changed the distribution of resources and intensified migration processes, leading to declining tax revenues in many communities, especially frontline and transit areas.

The Transcarpathian analysis revealed significant differences among micro-regions. The regional centre and larger towns generally show stronger financial indicators, while several border micro-regions, many of them predominantly Hungarian-populated, entered a critical

zone of financial self-sufficiency during the war years. Larger urban communities benefited more from business relocation processes, while this positive economic effect was much weaker in rural micro-regions.

The implementation of these measures would help increase the level of self-financing of micro-regions and reduce their critical dependence on the state budget..

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Reducing Economic Gender Gaps through Tax Policy Instruments in the EU

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Keywords: Gender equality, Gender pay gap, Tax policy

JEL Classification: H24, J16, H22

1 Introduction

Gender-based economic inequalities represent one of the most complex structural challenges of modern market economies, manifesting as systemic differences in income levels, employment patterns, and long-term financial prospects. Statistical data from the European Union highlight that women generally have lower wage levels and significantly higher rates of part-time employment, often due to career interruptions for caregiving (Stotsky, 1996). While tax policy is often expected to be neutral, it frequently carries implicit gender biases that interact with existing socio-economic patterns (Thomas&O'Reilly, 2016). The objective of this research is to systematically demonstrate how tax policy instruments (particularly personal income tax and the system of indirect taxes) can contribute to improving women's economic status and strengthening their financial autonomy.

2 Material and Methods

The theoretical foundations of the research are established through a systematic analysis of relevant literature. The empirical study is grounded in multivariate statistical modeling, specifically utilizing cluster analysis (K-means and hierarchical clustering using Ward's method) to categorize EU-27 member states based on tax policy and gender equality indicators. Data were primarily collected from Eurostat (EU-SILC and LFS databases) and the OECD Tax Database for the year 2024 (OECD Tax Working Paper, 2026). Analyzed variables include tax policy indicators (e.g., tax wedge, VAT on feminine hygiene products), earnings data (gender pay gap), and labor market indicators (unemployment rates, proportions of low-wage earners).

3 Results

The cluster analysis classified the EU member states into four distinct groups. Cluster 1 (Scandinavian Welfare Model) is characterized by high nominal wage levels, the lowest proportions of female low-wage earners, and conscious gender-responsive tax policies, such as exceptionally low VAT on feminine hygiene products. Conversely, Cluster 3, which includes post-socialist states like Hungary, exhibits lower wage levels, high tax wedges, and the highest "tampon tax" (15.85%). The results confirm that flat-rate tax systems and high consumption taxes impose a greater fiscal burden on women in lower income brackets. Targeted

Scandinavian-style incentives were found to more effectively support day-to-day economic gender equality.

4 Conclusions

The research demonstrates that tax system design is not gender-neutral; seemingly technical decisions fundamentally influence socio-economic gender dynamics. The Scandinavian model proves that progressive income taxation and targeted VAT reductions are effective tools for supporting women's economic autonomy. Key policy recommendations include transitioning from joint to individual taxation, reducing the marginal tax burden on "second earners," and mitigating the regressive effects of VAT on essential goods and hygiene products. Tax policy is a vital, yet currently underutilized, instrument for promoting long-term economic stability and sustainable social cohesion.

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Changes in the Ukrainian Tax System and Their Impact on the Business Sector in Transcarpathia

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Keywords: tax system, wartime taxation, business sector, local budgets, Transcarpathia.

JEL Classification: H25, H71, M13

1 Introduction

The aim of this study is to examine changes in the Ukrainian tax system during 2022–2025 and to identify their impact on the business sector in Transcarpathia. Under martial law, taxation has performed a dual function: it has supported the continuity of entrepreneurial activity and, at the same time, remained one of the key sources of public revenue for financing defence and public services. The examined period covers three interconnected processes: the introduction of emergency tax relief in 2022, the rollback of temporary wartime tax preferences from 2023 onwards, and the transition towards wartime fiscal consolidation in 2025. Transcarpathia, officially Zakarpattia Region, represents a relevant regional case due to its border location, relative security, and inflow of relocated enterprises, which created specific conditions for business adaptation and local fiscal resilience.

2 Material and Methods

The study combines legal-institutional and regional economic analysis. It examines amendments to the simplified taxation regime, the single social contribution, the military levy, land tax relief, and fuel-related VAT and excise rules. The empirical basis includes official local budget data for Zakarpattia Region, open budget indicators, and previous research on wartime changes in the regional business environment [1, 2]. The methods include comparative legal analysis, dynamic and structural analysis of tax revenues, and synthesis of regional business trends.

3 Results

The results show that wartime tax regulation in Ukraine developed in three main stages. In 2022, emergency measures were introduced to prevent a collapse of entrepreneurial activity. Sole proprietors were temporarily allowed not to pay the single social contribution for themselves, Groups I and II simplified taxpayers received single-tax relief, and Group III taxpayers could opt for a preferential 2% single-tax rate. Tax relief was also granted to certain territories and sectors affected by hostilities. From 2023 onwards, tax policy gradually shifted towards the restoration of standard rules and the narrowing of temporary preferences, including the termination of the 2% regime. In 2025, wartime fiscal consolidation became more pronounced: mandatory payment of the single social contribution was restored for most sole proprietors, self-employed persons, and members of farm enterprises, while the military levy was extended and differentiated for employees, entrepreneurs, and simplified taxpayers [3, 4].

For the business sector, these changes had a differentiated impact. On the one hand, the restoration of mandatory contributions and the new military levy rules increased fixed fiscal obligations, especially for microenterprises, sole proprietors, and low-turnover businesses. This reduced part of the fiscal flexibility that helped entrepreneurs survive during the first years of the full-scale war. On the other hand, regional evidence indicates that Transcarpathia retained considerable revenue-generating capacity. Personal income tax continued to play the dominant role in local budget revenues, while the single tax, property tax, excise tax, and corporate profit tax reflected the ongoing fiscal contribution of entrepreneurial activity.

Therefore, the regional effect should not be interpreted solely as an increase in the tax burden. Earlier research shows that enterprise relocation contributed to the restructuring of Transcarpathia's business environment, employment opportunities, and corporate tax potential [1]. However, small-scale entrepreneurship remains the most vulnerable segment, as its resilience depends on liquidity, predictable regulation, administrative simplicity, and adaptation to new fiscal obligations. The findings indicate that wartime tax policy is both a fiscal instrument and a factor shaping regional business resilience.

4 Conclusions

The Ukrainian tax system in 2022–2025 moved from crisis-oriented tax relief towards a model of wartime fiscal consolidation. In Transcarpathia, this transition produced a dual effect. The new rules strengthened the revenue base of public finances and confirmed the fiscal importance of the entrepreneurial sector, but they also increased pressure on micro and small businesses. For regional development policy, the central challenge is to preserve budgetary stability without weakening business resilience. This requires stable and predictable tax regulation, targeted support for vulnerable entrepreneurs, transparent communication regarding the military levy and single social contribution obligations, and closer cooperation between regional authorities, local self-government, and business. The case of Transcarpathia demonstrates that tax policy under martial law should be assessed simultaneously as a revenue mechanism and as a determinant of regional economic sustainability.

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Analysis of Scaling Sustainable Driven & Digital-Enabled Strategies to Achieve MSME's Competitiveness

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Keywords: Sustainable Strategies, Circular Economy, Digital Transformation, MSME's.

JEL Classification: L26, M21, O32

1 Introduction

Micro, small and medium-sized enterprises (MSMEs) are the backbone of economies worldwide, particularly in developing countries. Their flexibility, agility, innovative capacities and growth potential significantly contribute to economic development and job creation, which are essential to national economic success [1]. The World faces several challenges like climate change, poverty and environmental pollution [2], which impacts their corporate strategies and business models [3]. Research in business, management, and organisation studies increasingly emphasizes the importance of addressing societal and environmental challenges. In parallel, the circular economy represents growing attention as an alternative to traditional linear economic models by promoting a more sustainable and regenerative system. Although the benefits of the circular economy are broadly acknowledged, the transition towards circularity represents a complex and challenging process for organisations in different industries and firm sizes [4]. In response, firms are progressively shifting from traditional linear business practices towards circular business models to generate economic, environmental, and social value while supporting to environmental sustainability and the well-being of future generations [5]. Existing studies also argue that businesses must play a more responsible role in addressing climate-related challenges and supporting the transition towards regenerative systems, such as the circular economy [3]. Our paper therefore explores the opportunities and challenges influencing the implementation of circular economy business models by MSMEs, particularly in the context of sustainability-driven strategies and digital transformation initiatives aimed at enhancing their competitiveness.

2 Material and Methods

This study adopts a systematic literature review approach based on international journal articles retrieved from recognised scientific databases. The review focuses on contemporary scholarly contributions addressing circular economy practices, sustainability-driven business strategies, and digital transformation within the MSME sector. The study aims to provide a conceptual perspective on the relationships between circular economy implementation, digital transformation, organisational resilience, and MSME competitiveness. Particular attention is given to the opportunities and constraints faced by MSMEs in adapting to rapidly changing economic and technological environments.

3 Results

The review will reveal a substantial increase in scholarly publications related to circular economy implementation, sustainability strategies, and digital transformation in MSMEs over the past five years. This growing academic interest reflects the increasing urgency associated with globalisation, the Fourth Industrial Revolution, climate-related challenges, and post-COVID-19 economic restructuring [6]. The analysed literature demonstrates that MSMEs started to recognize circular economy business models as strategic instruments for improving operational efficiency, reducing resource dependency, and enhancing long-term competitiveness. It also highlights that sustainability-oriented strategies contribute not only to environmental performance but also to organisational resilience and adaptive capacity during periods of economic disruption. Consequently, MSMEs that successfully integrate digital transformation with circular economy principles appear to achieve higher levels of flexibility, innovation capability, and market responsiveness [7].

4 Conclusions

Overall, this study offers a conceptual enrichment of existing literature while providing practical insights for entrepreneurs, financing institutions, policymakers, and other stakeholders in designing strategic initiatives to strengthen the MSME sector. The findings suggest that the integration of circular economy principles and digital technologies can support MSME competitiveness, innovation capacity, and organisational resilience. However, the transition towards circular business models remains constrained by financial, technological, and institutional barriers that require coordinated support from policymakers, financial institutions, and innovation ecosystems. Future research may further investigate industry-specific implementation patterns, regional differences, and the role of emerging digital technologies in accelerating circular economy adoption among MSMEs.

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The Impact of Trust on a Country's Wealth

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Keywords: social trust, social capital, GDP *per capita*, economic development, institutional trust.

JEL Classification: O11, Z13.

1 Introduction

Social trust is one of the key components of social capital and plays an important role in the functioning of economies and public institutions [8]. Research indicates that high levels of trust foster cooperation, reduce transaction costs, improve institutional performance, and support economic development [5]. According to the OECD, trust in public institutions remains one of the key determinants of effective public policy and democratic stability [7].

In recent years, the issue of trust has gained particular importance due to increasing social polarization, economic uncertainty, and technological transformation. The World Development Report 2025 emphasizes that institutional quality, transparency, and social standards create conditions supporting long-term economic development [9]. The Edelman Trust Barometer additionally indicates growing differentiation between institutional trust and generalized interpersonal trust [2][3].

The aim of this study was to examine the relationship between social trust and economic development measured by GDP *per capita* (PPP), using EVS/WVS (2017–2022) data and macroeconomic indicators published by the OECD, the World Bank, and Kulbacki and Sobolewski (2025).

2 Material and Methods

The study used data on social trust and GDP *per capita* (PPP) for selected countries. Social trust was measured as the percentage of respondents declaring that „most people can be trusted” based on EVS/WVS surveys conducted between 2017 and 2022 [1]. The analysis included countries for which both trust data and macroeconomic indicators were available.

GDP *per capita* (PPP) data were obtained from the report by Kulbacki and Sobolewski (2025), based on OECD and World Bank statistics [6]. Additional interpretation was supported by OECD reports concerning institutional trust and effectiveness [7].

The study employed Pearson correlation, linear regression, and sensitivity analysis involving the exclusion of outliers (the United States and China). The coefficient „ r ” assessed the relationship between trust and GDP *per capita*, while „ R^2 ” estimated the share of GDP variability explained by trust.

The main limitations included the relatively small sample size, the cross-sectional nature of the analysis, and the inability to determine direct causal relationships between the analyzed variables.

3 Results

The analysis of the full sample revealed a positive relationship between social trust and GDP *per capita* (PPP). The Pearson correlation coefficient reached $r = 0.55$, indicating a moderate relationship, while the coefficient of determination was $R^2 = 0.31$. This means that approximately 31% of the variation in GDP *per capita* could be explained by differences in social trust levels.

The regression equation for the full sample was: $GDP = 631.3 \cdot trust + 31,039$

The results also showed the presence of significant outliers, particularly the United States and China. The United States was characterized by very high GDP combined with moderate levels of trust, whereas China demonstrated relatively high trust despite lower GDP *per capita* values. After excluding these countries, the relationship became stronger, with $r = 0.75$ and $R^2 = 0.56$, indicating a strong and more homogeneous relationship between social trust and economic development.

The regression equation after removing the outliers was: $GDP = 809.7 \cdot trust + 25,016$

The findings suggest that societies characterized by higher levels of trust tend to achieve higher levels of economic development and institutional stability [5][7]. OECD and World Bank analyses additionally indicate that institutional quality, transparency, and effective governance may strengthen both social trust and long-term economic development [7][9].

4 Conclusions

The analysis confirmed a positive relationship between social trust and GDP *per capita* (PPP). In the full sample, the relationship was moderate, while after excluding outliers it became strong. The findings suggest that social trust may support economic development by improving cooperation, reducing transaction costs, and strengthening institutional effectiveness.

The relationship between trust and economic development is also influenced by institutional, political, and cultural factors. The cases of the United States and China show that high GDP or high trust alone do not determine a uniform relationship between the analyzed variables.

OECD and World Bank reports indicate that institutional quality and transparency may strengthen both social trust and long-term economic development. The results therefore support the interpretation that trust constitutes an important element of social capital contributing to the stability of modern economies.

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Core Future Social Competences. Evidence from Cluster Analysis

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JEL Classification: M12

1 Introduction

The text discusses the impact of rapid civilizational changes on human well-being and highlights the importance of psychological resilience and knowledge sharing. Contemporary reality, described through the VUCA and BANI frameworks[1], is characterized by uncertainty, complexity, instability, and unpredictability, requiring adaptability and emotional flexibility. According to Seligman[2], resilience can be developed through optimism, meaningful relationships, and a sense of purpose. The knowledge-sharing behaviors strengthen trust, social support, self-awareness, cognitive flexibility, and a sense of agency, thereby enhancing employees' psychological resilience and well-being. Psychological resilience is defined as the ability to cope with difficulties, adapt to changing conditions, and maintain emotional balance under stress. According to Martin Seligman, resilience is not a fixed personality trait but a competency that can be developed. Inspired by Seligman's book "Tomorrowmind: Thriving at Work with Resilience, Creativity, and Connection—Now and in an Uncertain Future", the study examined respondents' views on key future competencies. In uncertain and rapidly changing environments, adaptability is considered the most important skill, influenced by interpersonal relationships, resilience, meaning at work, prospection, and creativity. Additionally survey included selected aspects of knowledge sharing in the research framework. The study aims to examine the relationship between items studying mentioned competencies using an explanatory statistical method.

2 Material and Methods

The examined study was conducted using a questionnaire consisting of 20 statements assessed on a five-point Likert scale, where 1 meant "not important" and 5 "very important." Four validity procedures were applied [3]: content, face, construct, and nomological validity. The online survey was carried out between December 2025 and May 2026 among full-time and part-time students of Poland, Hungary and Brazil. As a result, 385 correctly completed questionnaires were collected. Research results were analyzed using the STATISTICA software. The study employed hierarchical agglomerative cluster analysis, a non-overlapping method used to identify groups of similar objects. Cluster analysis enables the classification of data into internally coherent and externally diverse groups, supporting the interpretation of

socio-economic phenomena. The method produced dendrograms illustrating relationships between clusters.

3 Results

The reliability of the used tool was investigated using Cronbach's alpha index (0.91), KMO (0.92) and Bartlett's test (Chi square 2845,25, df=190, p<0.000). The data reliability analysis indicates that the variables are significantly correlated and suitable for further analysis. As a result of the applied procedure of analysis of clusters of variables, using the Ward Method as the agglomeration method and the percentage discrepancy as a measure of distance (coupling distance = 0.544231), the following division of variables into clusters was obtained based on the dendrogram. 6 clusters were obtained in the following areas:

1. relationships in the workplace;
2. derive satisfaction and an optimistic attitude towards work;
3. the ability to transfer knowledge and identify people who can use their own experience and knowledge and create original ideas;
4. the ability to build scenarios of the development of events, cope with emotions, look for ways to constantly learn, practical use of knowledge, cooperation with others and build one's own commitment to work;
5. the ability to focus on the task, analyze the situation to predict the future, and draw from one's own and others' experiences;
6. and building one's own conviction of success in a specific project, managing one's own time, pushing away negative emotions and the ability to relax effectively.

Among the surveyed competencies, respondents considered the ability to manage time to be the most important (average 4.62) and the ability to analyze the past and present to predict the future to be the least important in the future (3.96). Interestingly, the Kruskal-Wallis statistical significance test shows significant differences in the statements of people representing different countries. Similar regularities were observed regarding gender. Interestingly, professional experience differentiates respondents' statements only in relation to the ability to build bonds in the workplace, analysis of potential scenarios of events in relation to the tasks performed, and the transfer/translation of knowledge resulting from professional and life experience. Interestingly, age also differentiates respondents' statements in the case of most of the questions in a statistically significant way.

4 Conclusions

The cluster analysis identified relationships between variables that differed from the structure originally proposed by Martin Seligman. New clusters emerged, representing modified content areas. Interestingly, the clusters are differentiated by demographic conditions such as gender and age, culture (nationality), but also by professional experience.

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Alternative Dispute Resolution as a Strategic Tool for Organizational Competitiveness and Sustainable Management

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Keywords: alternative dispute resolution, mediation, labour conflicts, legal culture, organisational competitiveness, sustainable management, Brazil, Poland.

JEL Classification: K41, M14, M12

1 Introduction

Alternative Dispute Resolution (ADR) — particularly mediation — has gained growing recognition as a strategic mechanism for conflict resolution aligned with the principles of sustainability, efficiency, and social responsibility. As an alternative to adversarial litigation, mediation offers parties the opportunity to build consensus, preserve relationships, and reduce the economic and social costs of disputes. Despite its expanding normative recognition in both Brazil and Poland, the effectiveness of mediation continues to depend heavily on cultural and institutional legitimacy. The persistence of litigation-centred legal cultures, limited public awareness, and professional resistance among lawyers remain significant barriers to its consolidation [1, 2]. This paper examines how ADR mechanisms — especially mediation and arbitration — can function as strategic management tools capable of advancing both organisational competitiveness and sustainable governance, drawing on a comparative legal analysis of the Brazilian and Polish experiences.

2 Material and Methods

The study adopts a qualitative, interdisciplinary approach combining doctrinal legal analysis with a management science perspective. Building on prior collaborative research between the authors — including a comparative study of mediation in individual and collective labour disputes in Brazil and Poland [1] and an analysis of the cultural and social perceptions shaping the acceptance of mediation in both countries [2] — this paper extends that body of work to the organisational and strategic dimensions of ADR. The methodology includes a comparative review of ADR legislation and institutional frameworks in Brazil and Poland, with attention to EU harmonisation trends. Key legal instruments analysed include Brazil's Mediation Law (Law No. 13.140/2015), the Code of Civil Procedure (Law No. 13.105/2015), CNJ Resolution No. 125/2010, the 2024 reforms (CNJ Resolution 586/2024 and CSJT Resolution 377/2024), and Poland's Act on Collective Labour Dispute Resolution (1991), the 2005 amendment to the Polish Code of Civil Procedure, and the December 2025 Act on Collective Labour Agreements. The theoretical framework integrates conflict management theory [3], stakeholder theory [4], and sustainable competitive advantage, situating ADR within the ICoM 2026 theme of sustainability and competitiveness.

3 Results

The comparative analysis yields three principal findings. First, both Brazil and Poland possess advanced normative frameworks for mediation, yet their practical impact remains limited by adversarial legal cultures and insufficient public awareness — a paradox documented in the authors' prior research [1, 2]. In Brazil, while Law 13.140/2015 formally excludes collective labour disputes from mediation (Art. 42), two landmark 2024 reforms have begun to close this gap in practice: CNJ Resolution 586/2024 (September 2024) institutionalised consensual dispute resolution in labour courts and empowered CEJUSC-JT centres to mediate collective and individual disputes pre-processually; and CSJT Resolution 377/2024 (March 2024) formally regulated pre-procedural labour mediation aligned with the UN SDGs. With over 5.4 million cases pending in Brazil's labour courts in 2023 (CNJ, Justice in Numbers), the urgency of ADR expansion is evident. In Poland, the December 2025 Act on Collective Labour Agreements further strengthened ADR by enabling mediation support in collective bargaining negotiations and creating a national register of collective agreements. Poland's 1991 Act continues to provide a structured multi-stage pathway — negotiation, mediation, social arbitration — with mediator prerogatives (release from work, minimum remuneration, warning authority) still absent from Brazilian law [1]. Second, organisations that institutionalise ADR demonstrate lower litigation costs, faster resolution, and stronger stakeholder relations — increasingly valued in ESG assessments. Third, countries with developed ADR infrastructure show greater institutional resilience, confirming ADR as a systemic competitive advantage [2].

4 Conclusions

The consolidation of ADR as a strategic management tool requires more than legislative reform — it demands cultural transformation involving universities, professional associations, public institutions, and civil society [2]. In Brazil, the 2024 reforms (CNJ 586/2024 and CSJT 377/2024) represent significant progress, partially bridging the collective labour mediation gap identified by the authors in earlier research [1]; yet formal legislative reform of Art. 42 of Law 13.140/2015 remains necessary to fully consolidate these advances. In Poland, the December 2025 Act on Collective Labour Agreements and the continued EU institutional support further consolidate an already more mature ADR ecosystem, though gaps in public awareness and professional training persist. In both contexts, embedding ADR into corporate governance frameworks aligns with ESG metrics and stakeholder theory, reinforcing the argument that sustainability and competitiveness are complementary rather than competing goals — the central thesis of the ICoM 2026 conference. This paper contributes to that debate by demonstrating that ADR represents a concrete, evidence-based and increasingly consolidated pathway for organisations seeking to reconcile social responsibility, legal efficiency, and long-term competitive advantage.

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Structural Changes in SMEs across Transcarpathian Micro-regions during Wartime Evidence from Cluster Analysis

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Keywords: SMEs, Transcarpathia, cluster analysis, structural change, war economy.

JEL Classification: C38, R12, M20

1 Introduction

The aim of the presentation is to examine the position of enterprises operating in selected micro-regions of Transcarpathia and to reveal the specific features of their structural transformation during the period of the Russian-Ukrainian war [1], [2]. The analysis focuses on the small and medium-sized enterprise sector, which plays a key role in local employment, income generation, and regional resilience [3], [4]. Although a regional focus allows a partial homogenisation of the otherwise highly heterogeneous SME sector, significant internal differences can still be observed among enterprises in the examined micro-regions [5]. For this reason, the research seeks to identify distinct business segments and development patterns through statistical grouping methods. The period between 2021 and 2025 provides an opportunity to compare the last pre-war year with the years marked first by the immediate shock of war and later by various forms of adjustment and adaptation in the local business environment [6].

2 Material and Methods

The study is based on the quantitative statistical analysis of aggregated financial data related to enterprises operating in selected micro-regions of Transcarpathia. The database makes it possible to assess changes in enterprise structure, performance, and survival tendencies over time. Since the SME sector remains strongly differentiated even within geographically limited areas, cluster analysis is used as the main methodological tool. This approach supports the creation of relatively homogeneous groups of enterprises based on their measurable financial and structural characteristics. The research covers the period 2021–2025, enabling both a longitudinal and comparative evaluation of pre-war conditions, the first war-related disruptions, and the subsequent adaptation processes. The methodological framework is particularly suitable for identifying the different trajectories of indigenous enterprises and newly established or relocated firms within the regional economy.

3 Results

The analysis confirms that Transcarpathia occupies a specific position within Ukraine during the wartime period. Although the negative consequences of the war are clearly present in the region as well, Transcarpathia has remained relatively more stable and secure than many other parts of the country. As a result, the examined years were characterised not only by losses and uncertainty but also by a noticeable inflow of relocated enterprises. The cluster-based evaluation reveals that the regional SME sector cannot be interpreted as a uniform category: rather, it consists of several distinguishable segments with different levels of resilience, adaptability, and growth potential. The results indicate that some indigenous enterprises demonstrate strong crisis resistance and survival capacity, while other clusters show stagnation or vulnerability. At the same time, the appearance and settlement of new firms suggest an ongoing restructuring of local entrepreneurial space, influenced both by wartime pressures and by relocation-based economic opportunities.

4 Conclusions

The findings highlight that the wartime transformation of the SME sector in Transcarpathia is characterised by both disruption and renewal. The regional enterprise structure has been shaped not only by the direct negative effects of the war but also by adaptation mechanisms and relocation-driven business dynamics. Cluster analysis proves to be an effective tool for revealing the internal diversity of the SME sector and for identifying well-defined enterprise groups with different structural characteristics. The research contributes to a more nuanced understanding of regional economic resilience in wartime conditions and offers an empirical basis for further investigations into local development, enterprise survival, and post-war economic recovery in Transcarpathia.

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Competitiveness and Sustainability in Economics Concepts: A Literature Review

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Keywords: competitiveness, economic concepts, sustainability, sustainable competitiveness.

JEL Classification: Q01, F63, L25

1 Introduction

In today's debate on economic processes, the constructs of competitive and sustainable development have role in explaining long-term economic performances. Competitiveness has traditionally been connected with productivity, efficiency, and the capacity of enterprises, regions or countries to operate in global markets. Sustainable, however, highlights the harmonious interaction of the economy, environmental quality and social equity to guaranty the well-being of current generation without compromising future generations. Researchers and policy makers increasingly view competitiveness and sustainability as interrelated concepts. From the human progress perspective, the most important issue is economic growth. Nations prosper when important performances in economic growth are recorded. Moreover, worldwide power differences arise first of all because of uneven worldwide economic growth. Competitiveness has become synonymous with economic strength of nation, industry or individual firm. The differentiated roles of human and physical capital, economic development and demographic dynamics in shaping the transition towards competitive and sustainable economic structures. [1]

Choosing the right competitive strategy is becoming a key factor not only for the survival and success of individual companies, but also for the sustainable development of the national economy as a whole. [2]

Globalization, environmental degradation, climate change, and social inequalities have intensified the need to reassess conventional economic models that prioritize short-term competitiveness at the expense of long-term sustainability. [3] This literature review examines how competitiveness and sustainability are conceptualized in economic theory and explores their evolving relationship within academic and policy-oriented research.

2 Material and Methods

The main aim of this research is to review the definitions, see determinants of competitiveness, sustainability and integration of competitiveness and sustainability related economic concepts. An extensive conceptual study of the literature on the subject is the dominant research method for this study. The material was presented in figures and table with a view to making it more practical and convenient for readers.

3 Results

Sustainable development integrates economic growth with environmental protection and social equity. Its theory has evolved from resource conservation to the broader SDGs, emphasizing strong sustainability and the interdependence of environmental, social and economic pillars. Sustainable competitiveness is defined as the institutions, policies and factors that make an economy productive over the long term while ensuring social and environmental sustainability. It bridges productivity based competitiveness with sustainable development by including social well being, ecological limits and intergenerational equity in competitiveness metrics [4].

A firm's competitiveness which comprises of three interrelated dimensions, namely competitive performance, competitive potential, and competitive process. Competitive potential refers to the resources used to generate (superior) performance, while competitive performance is a performance outcome relative to that of competitors. Competitive process relates to the management (administration) of the company. The main argument offered by the authors is that no single measure of competitiveness can entirely capture all relevant dimensions of competitiveness, therefore the measures of performance, potential and process should be examined together and in relation to a firm's rivals [5].

The concept of sustainable competitiveness is becoming increasingly relevant, as it combines the investigation of the factors that determine the competitive advantages of economic entities, as well as management strategies that ensure economic and environmental efficiency in the face of modern global requirements and challenges. [6]

4 Conclusions

Sustainable competitiveness is as the ability of a company to utilize all of its resources in a synergistic manner in order to enhance productivity, profitability, efficacy, and sustainability over the years. Sustainable competitiveness is a multifaceted phenomenon and is affected by many factors at both micro and macro levels.

Fostering economic development and efficient use of available resources to increase the size of gross domestic product is one of the key challenges for the country. As mentioned above, sustainable competitiveness is one of the key factors affecting the country's economic and sustainable development.

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A Multi-Dimensional IntenScope-Based Analysis of Consumer Attitudes Toward Last-Mile Convenience Services

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Keywords: last-mile logistics; service quality; consumer satisfaction; attitude mapping, convenience services, e-commerce logistics, consumer behavior.

JEL Classification: M11, M31, R41, R49

1 Introduction

Last-mile logistics has become one of the most dynamically evolving and strategically critical segments of contemporary supply chains, particularly in densely populated urban environments shaped by rapidly expanding e-commerce activity. The increasing pressure for faster delivery, greater service flexibility, sustainability, and seamless customer experience has fundamentally transformed the interpretation of logistics service quality. While earlier logistics research predominantly focused on operational efficiency, routing optimization, and cost reduction [1], recent developments increasingly emphasize customer-centered service design and convenience-oriented delivery solutions, in which asymmetric and non-linear relationships between service attributes and customer satisfaction also emerge [2, 3]. Delivery-related service attributes can no longer be interpreted exclusively through rigid and static satisfaction categories [4].

The present study aims to extend the previously developed refined Kano framework through a novel multi-dimensional attitude mapping approach based on the emerging IntenScope analytical perspective. The core assumption of the research is that consumer responses should not be interpreted solely through aggregated averages or discrete category classifications [5, 6, 7]. The proposed framework seeks to reveal hidden consumer preference structures and latent attitude configurations that remain invisible under traditional statistical aggregation.

2 Material and Methods

The present study directly builds upon our previously published refined Kano-model research focusing on sustainable last-mile convenience services and customer satisfaction [4]. The previous study applied a modified Kano framework to classify last-mile service attributes according to their differentiated effects on customer satisfaction. Rather than relying exclusively on discrete Kano categories, the model introduced a two-dimensional fuzzy satisfaction matrix that enabled the interpretation of transitional and overlapping satisfaction structures.

The previous research identified several important patterns regarding last-mile convenience services. The new visualization methodology also provides a novel analytical opportunity, the experimental application of which has been established as one of the objectives of the study.

3 Results

Based on the findings of the previously published refined Kano-model research and the theoretical logic of the IntenScope-based multidimensional attitude mapping framework, several expected tendencies and structural patterns can be anticipated. First, it is expected that several convenience-related service attributes will reveal substantially different internal attitude structures through multidimensional mapping. This would support the assumption that complex preference domains exist, characterized by distinctive structural patterns within the given market environment.

4 Conclusions

The expected conclusions of the research may suggest that traditional aggregative and averaging statistical approaches are insufficient for a deeper evaluation of Likert-scale surveys related to last-mile logistics services [5, 6, 7]. There is a clear need for additional innovative methodologies capable of revealing hidden internal relationships. The proposed IntenScope-based multidimensional attitude mapping framework is expected to reveal further hidden preference structures, respondent polarizations, and transitional expectation zones that remain invisible in conventional mean-based analyses. The research is also expected to confirm that several last-mile convenience service attributes cannot be interpreted solely through rigid and static categories, and that numerous transitional characteristics can also be observed.

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Openness to technology adoption among the Hungarian population

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Keywords: Technology Adoption Propensity Scale (TAP), User profiles, Segmentation, Two-step clustering, Hungary.

JEL Classification: C83, D12, L91

1 Introduction

The adoption of new technologies is influenced not only by the financial implications of their purchase and/or installation, but also by its local availability, the skills and knowledge of consumers [1, 2]. The examination of technological adoption is of paramount importance, because high-tech automobile and battery manufacturing have become the two strongest sectors of Hungarian industry, the success of which is determined by the willingness of the local workforce to technical adoption. The main aim of this study is to explore the components and indicators of technological adoption willingness in Hungarian society using quantitative survey data.

2 Material and Methods

To measure attitudes towards new technologies, we used the Technology Adoption Propensity (TAP) scale [3]. The TAP comprises 14 closed questions that measures the level of four dimensions of propensity to adopt new technologies on four subscales. For each item, respondents can indicate their answer on a Likert scale, ranging from 1 ('not true at all') to 7 ('absolutely true'). SPSS ver. 29.0 was used to perform the analysis. We checked that theoretical factors separated the questions. This was tested using exploratory factor analysis. The resulting factors were used in subsequent studies. The second phase of the questionnaire data analysis involved segmenting respondents into homogeneous groups using a two-step clustering procedure. To test the research hypothesis, a questionnaire survey research was conducted in January and February 2023 with a sample of 2000 respondents in Hungary. The data was collected from the whole country, from the population of 18 years and older, using the so-called CAPI method, using a laptop or tablet.

3 Results

Propensity to Technology Adoption: Respondents generally agree that technology makes life easier (Mean = 3.93, SD = 1.878). They also believe it helps them implement necessary life

changes (Mean = 3.77, SD = 1.881). The optimism scores are relatively high, indicating a positive perception of technology. Respondents show moderate confidence in their technological skills according to the Proficiency subscale. The lowest score (Mean = 3.00, SD = 1.881) suggests that not everyone is seen as a tech expert by others. However, they report being able to understand new technology without external help.

Factors of Technical Adoption Propensity: The data is grouped into four primary factors: Optimism (belief that technology improves life), Proficiency (confidence in using technology), Dependence (feeling reliant on technology) and Vulnerability (concerns about technology's negative impact). Optimism scores are consistently high, with respondents strongly agreeing that technology makes life easier. Proficiency shows the largest variation it represent that people enjoy exploring new technologies, but they do not always feel like experts. Dependence scores are relatively lower, suggesting that while some feel technology dominates their lives, this is not a widespread belief. Vulnerability has the highest mean values overall, reflecting strong concerns about privacy and security.

The six identified clusters exhibit differentiated demographic characteristics, providing a structured segmentation of the Hungarian population regarding technology adoption. The largest cluster (Cluster 5) contains 440 respondents (26.2%), while the smallest cluster (Cluster 4) has 160 respondents (9.5%). Clusters 3 and 5 together account for nearly half of the respondents (47.4%), suggesting that the majority of individuals fall into these two dominant categories. Their characteristics likely define the mainstream attitude toward technology adoption. Clusters 1, 2, and 6 represent smaller but substantial proportions (ranging between 9.4% and 15.3%), implying that these groups contain specific sub-populations with unique adoption patterns. The variation in cluster sizes suggests that technology adoption is not evenly distributed among respondents. Some segments demonstrate a significantly higher affinity for technological engagement, while others are more reserved or selective.

4 Conclusions

Our study provides clear evidence that education level is a key determinant in shaping technology adoption behaviour, reinforcing the importance of educational interventions to promote digital inclusion. The overall findings indicate that residence size plays a crucial role in technology adoption behaviour, with urban populations more inclined to embrace digital transformation than their rural counterparts. Addressing the barriers to rural technology adoption, such as infrastructure improvements, affordability, and education, could lead to a more inclusive digital landscape across different settlement types. The strong divide between younger and older generations aligns with broader research findings that digital natives (born into technology) are naturally more receptive to digital tools, while older generations often face barriers related to digital literacy and usability concerns.

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The Importance of S-LCA in the Comprehensive Life Cycle Assessment of Chemical Product

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Keywords: Life cycle assessment (LCA), S-LCA, polymer waste, flocculant, industrial wastewater

JEL Classification: M11, Q56

1 Introduction

One of the cornerstones of sustainable development is Life Cycle Assessment (LCA) as a comprehensive tool. LCA enables a holistic assessment of a product's environmental impact at every stage of its life cycle, whilst S-LCA is an extension of LCA that incorporates social aspects. S-LCA is defined as an evaluation tool used to assess the potential positive or negative social impacts of a product throughout its entire life cycle [1]. As with Environmental Life Cycle Assessment, the processes of raw material extraction, production, distribution, use, as well as reuse, maintenance, recycling and final disposal are analysed. S-LCA can provide social information to decision-makers and influence decision-making regarding the production of new-generation products and consumption across all aspects of society. An analysis of potential environmental risks has now been carried out using the Environmental Life Cycle Assessment technique, which allows for the assessment of the production of waste-based synthetic polymers and their use, assuming the same boundaries. The main objective of the research was to assess the environmental impact of the process of obtaining polymer flocculants derived from polystyrene waste, with an emphasis on energy consumption and the associated emissions from production. The results of the environmental impact assessment of the new product derived from polymer waste showed that the flocculants obtained can be effectively used in industrial wastewater treatment processes. S-LCA, in the context of the industrial-scale application of new polymer products, will constitute a necessary element of research within a comprehensive approach to co-creating a circular economy. Companies that have a complete picture of environmental impacts, taking S-LCA into account, can consciously and effectively manage the improvement of production processes and contribute to the circular economy whilst minimising the risk of accusations of greenwashing.

2 Material and Methods

The research conducted on the environmental life-cycle assessment of products made from polystyrene waste (flocculants) drew on the results of studies into the synthesis of new compounds and the technological treatment of industrial wastewater from a steelworks. The LCA analysis of newly synthesised flocculants used in mine water treatment was carried out in accordance with the guidelines and recommendations contained in ISO 14040 and ISO 14044. The methodology for conducting the LCA analysis comprised four stages: defining the objective and scope, analysing the set of inputs and outputs, assessing the life cycle impact of the product, and interpreting the research results. In accordance with the principles set out in ISO 14040 [2]. The article presents the results of environmental studies of the production

process of a newly synthesised polyelectrolyte from polystyrene waste. The following software was used for the study: SimaPro Developer v. 9.4.0.2. The analysis was performed using the EF 3.0 method with the SimaPro programme and its implemented databases – primarily Ecoinvent. The EF 3.0 method used in the study is an impact assessment method adopted by the European Commission (EC). It takes into account the normalisation factors and weights published in November 2019 by the EC. One of the elements complementing the research in the field of product life cycle assessment will be S-LCA, with the aim of implementing solutions that minimise the social footprint.

3 Results

An analysis of the test results following the weighing stage, across 16 categories expressed in mPt (millipoints, where Pt stands for ‘point’), shows that the environmental footprint of producing 100 kg of a new polystyrene-based flocculant is 45.31 mPt. The ‘inputs’ to the system whose environmental impact during production exceeds 6% are: electricity (24.5 mPt), sulphuric acid (19.5 mPt), emissions during production (5.4 mPt), sodium carbonate (3.1 mPt) and polystyrene waste, as an environmental benefit (-16.2 mPt). To the greatest extent, flocculant production impacts the following categories: water use (65%), resource use – mineral raw materials and metals (8.9%), acidification (14.2%), climate change (9.5%) and particulate matter (9%). In the case of the resource depletion category – fossil raw materials – there is a noticeable environmental benefit resulting from the management of polystyrene waste (-7.9%). As with the assessment of the environmental impact of the potential production technology, an analysis was carried out of the process of treating steelworks effluent using the newly synthesised product. Based on the inventory tables, the potential environmental impact of treating a specific volume of steelworks effluent was determined. The daily volume of treated wastewater, i.e. 20,000 m³, was selected as the functional unit. The inventory tables for the wastewater treatment process included: metallurgical wastewater, flocculant, mixing water, electricity, and sludge generated after wastewater treatment. The decisive factor potentially burdening the environment during the steelworks wastewater treatment process is high electricity consumption, which results in SO_x and NO_x emissions to air. A negative value for the fossil fuel category indicator indicates a beneficial impact on the environment, particularly when polymer waste is used in the production of flocculants, as this allows for the conservation of natural resources such as natural gas and crude oil, which are used in the production of polystyrene. Based on an analysis of the results of studies on the use of the product in the treatment of steelworks effluent, it was found that these products significantly reduced effluent pollution levels. Based on these studies, a pilot-scale technology is being developed and S-LCA studies in this area are planned.

4 Conclusions

With the current face of business, the market success of a company is increasingly determined by the ability to build a favorable corporate image, as well as to promote the product brand. In this field, the most important factor is the human factor, that is, the ability to manage a company using analytical techniques. Currently, promoting a new product through the application of LCA constitutes one of the most important global trends. An innovative approach to the problem of waste management requires a comprehensive treatment of the issue in terms of economics and ecology, as well as social conditions, which seems to be currently the key to the success of an enterprise. Life Cycle Assessment of a new product (flocculant) using polymer waste, taking into account S-LCA analysis, can provide an impetus for creating new environmentally friendly technologies.

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KPI gaming risk and Goodhart's Law: designing robust predictive KPIs for industrial performance management

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Keywords: KPI Gaming, Goodhart's Law, Predictive KPIs, Incentive Robustness, Industrial Performance Management.

JEL Classification: M11, M52, D82

1 Introduction

In Industry 4.0 manufacturing, Key Performance Indicators (KPIs) are increasingly transformed from retrospective monitoring indicators into real-time and predictive decision-support mechanisms. Integrated dashboards and predictive analytics help managers anticipate downtime, production inefficiency and quality deviations, thereby supporting proactive operational control [1], [2]. However, when such predictive KPIs are incorporated into reward systems, shift evaluations or bonus mechanisms, their informational role may be distorted by behavioural responses. This problem is consistent with Goodhart's Law, which argues that a measure loses validity when it becomes a target [5], [6]. The paper therefore addresses the following research question: how can predictive KPIs in industrial performance management remain reliable and decision-useful when employees have incentives to optimise the metric itself? The study focuses on "incentive robustness", understood as the capacity of a KPI architecture to preserve measurement validity under strategic behaviour.

2 Material and Methods

The research follows a design science approach, where the main output is an artifact designed to solve a relevant organisational and information system problem [7], [8]. First, literature on Industry 4.0 performance management, predictive monitoring, measurement failure and KPI gaming was synthesised [1], [4]. Second, known manipulation mechanisms were classified into a taxonomy of predictive-KPI gaming pathways. Third, these pathways were translated into design rules for more robust KPI systems. Finally, the framework was applied to an illustrative lithium-battery production case in which predicted downtime was used as a performance target. This case was used not as a statistical validation, but as a structured demonstration of how the proposed design rules can identify vulnerabilities and guide redesign decisions.

3 Results

The study identifies four main gaming pathways in predictive KPI systems. The first is data and timing manipulation, where employees alter dates, event categories or reporting moments to improve the measured result [3]. The second is proxy optimisation, where actors improve the model input or visible indicator without improving the underlying process [4]. The third is local optimisation, where one KPI, such as predicted downtime, is improved while quality, asset health or maintenance stability deteriorates. The fourth is redundancy consumption, where teams create short-term performance improvements by postponing necessary preventive actions

and transferring risk to later periods. Based on these pathways, five design rules are proposed: separating learning metrics from reward metrics, adding multi-objective guardrails, implementing immutable auditability through digital traces such as SCADA records, combining short-term predictive targets with longer-term realised outcomes, and testing KPIs for manipulation-resilience rather than accuracy alone. In the battery-production example, the redesign combines a quality-stability guardrail, automated verification of hidden stops, and a reward split between weekly predicted downtime and rolling four-week realised downtime.

4 Conclusions

The paper concludes that predictive analytics does not automatically eliminate classical measurement problems; rather, it can transfer Goodhart-type distortions into more complex data-driven environments. Predictive KPIs should therefore be evaluated not only by statistical accuracy, but also by their resistance to strategic behaviour and their alignment with long-term organisational value. The proposed framework contributes conceptually by extending Goodhart's Law to predictive industrial KPI systems and practically by offering a design checklist for managers, controllers and data analysts. Future research should strengthen the empirical basis through multi-case comparison or quantitative before-and-after analysis of KPI behaviour following redesign.

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Analysis and Enhancement of ITIL Knowledge Management in Corporate Environments

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Keywords: ITIL 4, Knowledge Management, IT Service Management, ITSM, Corporate Operations, Process Improvement.

JEL Classification: M15, D83, O33

1 Introduction

In modern corporate environments, effective Knowledge Management (KM) has become a critical component of IT Service Management (ITSM), particularly within organizations operating across geographically distributed teams and complex digital infrastructures. Within the ITIL 4 framework, KM supports operational efficiency, service quality, organizational learning, and continuous improvement. However, despite the presence of advanced collaboration tools and structured ITSM processes, many organizations still experience fragmented documentation, inconsistent knowledge-sharing practices, and limited accessibility of operational knowledge. These issues negatively affect onboarding efficiency, task execution, and service continuity.

This study investigates Knowledge Management practices within a global finance operations environment of a multinational technology organization. The objective is to evaluate existing KM practices, identify operational gaps, and propose improvements aligned with ITIL 4 principles.

2 Material and Methods

The research adopts a mixed-methods approach combining qualitative and quantitative techniques. Primary data were collected through employee interviews, structured questionnaires, direct observation, and analysis of existing documentation and knowledge-sharing tools.

The study focused on key KM dimensions including knowledge accessibility, documentation quality, onboarding effectiveness, and employee confidence in task execution. In addition, current organizational practices were benchmarked against ITIL 4 Knowledge Management best practices to identify gaps between theoretical frameworks and practical implementation. Data analysis included thematic analysis of qualitative responses and comparative evaluation of current vs. ideal KM processes defined by ITIL 4 guidelines.

3 Results

The analysis identified several significant challenges in the existing Knowledge Management system. Knowledge was distributed across multiple disconnected platforms, resulting in fragmented documentation and inconsistent information quality. Employees frequently relied

on informal communication channels and individual colleagues rather than centralized knowledge repositories.

Survey and interview results indicated varying levels of task confidence among employees, as well as inconsistencies in onboarding and training processes. Although KM tools were available, their usage was not standardized, leading to inefficiencies and reduced knowledge reuse.

Proposed improvements included standardized documentation templates, simplified knowledge structures, short instructional videos for repetitive tasks, and structured feedback mechanisms. These interventions improved accessibility of information, supported independent learning, and enhanced collaboration across teams.

4 Conclusions

The study demonstrates that effective Knowledge Management is not solely dependent on technological solutions but requires organizational alignment, consistent processes, and a knowledge-sharing culture. By aligning KM practices with ITIL 4 principles, organizations can improve operational efficiency, reduce dependency on informal knowledge transfer, and enhance service quality.

The proposed enhancements contribute to more structured and accessible knowledge systems, supporting both day-to-day operations and long-term organizational learning. Future work may explore the integration of AI-supported Knowledge Management tools to further improve efficiency and scalability.

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The impact of lean management on sustainability in automotive supplier

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Keywords: lean management, sustainability, energy consumption, saving

JEL Classification: M11, P18, Q56

1 Introduction

Ensuring sustainable development is a fundamental expectation and a competitive advantage for business organizations. The importance of lean developments supporting sustainability in automotive companies deserves special attention due to the role of the sector in the economy [1]. The research and the basis of the problem are economically motivated, but the solution was offered by lean management and tools. The main aim of the research is to reduce energy consumption. The research questions are the following: How do lean tools affect energy use in an automotive environment? What types of losses (muda) occur in the energy system? What role does digitalization play in increasing energy efficiency?

2 Material and Methods

The examination of lean management and tools implementations and sustainability impacts in a real environment can only be interpreted through intervention, therefore we used the methodology of action research [2].

The research is based on the processing of quantitative and qualitative data, which is the result of primary data collection at automotive supplier company. The quantitative data includes time-series energy data (kWh/pc, €/pc, peak consumption), the qualitative data includes Gemba observation, lean workshop documentation and interviews with maintenance and management. The data sources for the analysis are energy bills (historical data), machine-level measurement data, Lean audits (5S, TPM) and production data (volume, shift) [3]. The primary goal of the time-series analysis is to identify anomalies and compare and analyze them with the state before and after the development.

We used a two-sample t-test to examine whether the reduction in energy consumption resulting from lean actions were statistically significant. We compared the average energy consumption before and after the development [4].

3 Results

The investigation revealed the energy usage irregularities occurring during the company's operations, the reasons for abnormal energy usage from the management, technical/technological, information/digitalization and environmental perspectives.

The energy-oriented planning of shift starts played a prominent role, which prevented the occurrence of power peaks when starting the machines. The technical condition protection also reduced unexpected machine shutdowns and excessive energy consumption of the machines.

The total annual amount of energy savings is €420,000, which means a 15.5% reduction in total electricity used. It should be mentioned as an economic advantage that with lean development the company achieved that energy usage does not exceed the contracted electricity quota, thus avoiding the financial penalty by sanctioning the exceeding of the quota.

Reducing energy consumption also supports sustainability goals and creates a connection between lean management and sustainability [5].

4 Conclusions

Anomalies in energy use can be considered wastes (muda) in the lean sense and can be detected and reduced using structured methods, so the lean management toolbox can be effectively applied to optimize energy use in the automotive environment [6].

The development of measurement systems and data analysis enables the identification of regularly recurring wastes, which is the basis for effective actions. Since the problems are not unique, the data collected with lean tools enable predictive operation. The actions not only resulted in significant cost reductions but also pointed out their role in maintaining energy efficiency.

The research contributes to the empirical confirmation of the relationship between lean and sustainability, i.e. lean methods are not only productivity-increasing tools, but also directly contribute to the achievement of sustainability goals (energy efficiency), which enables the support of energy efficiency (SDG 7) and resource efficiency (SDG 12).

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Risk Properties and Fat-Tailed Nature of Stock Market Returns in the CEE Region

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Keywords: CEE stock markets, fat tails, neglected markets, return distributions.

JEL Classification: G11, G15, C46

1 Introduction

This study examines the risk properties of stock market returns in the Central and Eastern European (CEE) region, with a primary focus on fat-tailed behavior and neglected market effects. The CEE equity markets are typically smaller and less liquid than their Western European counterparts, which may translate into distinct distributional patterns of returns and a higher incidence of extreme price movements. We aim to document these features empirically and to relate them to the specific structural characteristics of the region's markets.

2 Material and Methods

Our empirical analysis is based on daily closing prices of major stock indices and a broad set of individual stocks from several CEE countries over a multi-year period. From these prices, we compute log-returns and investigate their empirical distributions, focusing on skewness, excess kurtosis, and the frequency of extreme observations at both the index and single-stock level. We fit a range of continuous probability distributions to the return series, covering several distinct distributional families that allow for heavy tails and asymmetry, and we evaluate goodness-of-fit using standard statistical tests and information criteria. In addition, we explore how proxies for market liquidity and investor attention relate to distributional properties, thereby linking fat tails and asymmetry to the neglected status of some of these markets.

3 Results

The empirical results show that CEE stock market returns deviate substantially from normality, exhibiting pronounced excess kurtosis and, in many cases, marked skewness. Distributions that explicitly account for heavy tails and potential asymmetry provide a considerably better fit to the data than simple benchmark specifications. We further find that markets with lower trading volumes and weaker international visibility tend to display stronger tail thickness and more frequent large negative returns, supporting the view that neglect and limited liquidity amplify distributional risk. These findings highlight the importance of explicitly accounting for non-normality when modeling risk and pricing assets in the region.

4 Conclusions

Our study confirms that stock market returns in the CEE region are characterized by strong fat-tailed behavior and asymmetry, which are closely linked to structural features such as lower liquidity and the relatively neglected position of these markets in global portfolios. These distributional properties have direct implications for risk measurement, portfolio optimization, and stress testing, as standard models based on normality may severely underestimate downside risk. Incorporating heavy-tailed and neglected market effects into empirical models and risk management frameworks can therefore improve the accuracy of risk assessment for investors and policymakers focusing on emerging European markets.

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