

Structured Abstracts of 'Emerging Technologies for Sustainable Transformation in Business and Society' session

Innovation and Sustainability: An Empirical Study on Hungarian Football Clubs

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Background and introduction: The intersection of innovation and sustainability has gained increasing attention in the context of sports management. However, limited empirical research addresses how these concepts manifest in Hungarian football clubs. This study aims to explore the relationship between innovation, sustainability, and economic performance, building on the assumption that clubs embracing these principles can gain a competitive edge. The research is grounded in prior theoretical work and seeks to fill a gap by examining how club management and athletes perceive and implement sustainability and innovation.

Objective: The main objective of the research is to assess how Hungarian football clubs integrate innovation and sustainability into their operations and strategic thinking. It aims to determine whether such integration contributes to improved organizational performance, enhances the motivation of athletes and coaches, and leads to long-term economic benefits for clubs and their communities.

Methodology: The research employed a mixed-methods approach. Qualitative data were collected through in-depth interviews with senior management of five Hungarian football clubs to explore their commitment to sustainable and innovative practices. Quantitative data were gathered via a structured questionnaire distributed to coaches, professional players, and amateur athletes, measuring attitudes and experiences related to innovation and sustainability within their respective clubs.

Results: Findings indicate that clubs where management prioritizes sustainability and innovation report higher levels of internal motivation among players and coaches, alongside more efficient organizational practices. Statistical analysis of the survey data suggests a strong correlation between management commitment to these values and improved team performance, increased stakeholder engagement, and perceived economic resilience.

Conclusions: The study concludes that innovation and sustainability are not only compatible with competitive sports but can also be key drivers of success. Clubs that align strategic management with these values are more likely to experience improved motivation, better economic performance, and stronger community ties. The findings support the idea that sustainability and innovation offer long-term benefits beyond environmental or technological gains.

Limitations and future research directions: The study is limited by its sample size, focusing on five clubs and a specific national context. Further research could expand the sample to include more diverse clubs and regions for broader generalizability. Longitudinal studies are also recommended to assess how innovation and sustainability initiatives impact performance over time. Future work may also explore the role of external stakeholders and funding structures in supporting these strategies.

Keywords: sustainability, innovation, management, sport, organizational performance



Climate Anxiety Among Hungarian University Students: The Role of Perceived Personal Vulnerability

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Background and introduction: Among the psychological impacts of climate change, climate anxiety is receiving increasing attention. This phenomenon is characterized by chronic fear, worry, and anxiety related to climate change, which can affect an individual's mental health and well-being. Previous research has indicated that various factors can influence the development and intensity of climate anxiety, however, the role of perceived personal vulnerability has been examined in few studies.

Objective: The main objective of our research is to examine the relationship between perceived personal vulnerability to climate change and the level of climate anxiety (frequency and intensity). We hypothesize that there is a strong, positive relationship between perceived personal vulnerability to climate change and the level of climate anxiety. The results can contribute to a better understanding of climate anxiety mechanisms and the development of more effective interventions.

Methodology: The research involved 696 Hungarian University Students who completed a comprehensive online questionnaire. Perceived personal vulnerability ("To what extent do you feel personally vulnerable to climate change?"), the frequency and intensity of climate anxiety were measured on 5-point Likert scales. Descriptive statistics, Pearson and Spearman correlation analyses, linear regression analysis, and analysis by categories were used for data analysis.

Results: The results showed a significant, positive relationship between perceived personal vulnerability and the frequency and intensity of climate anxiety. Based on linear regression analysis, perceived personal vulnerability is a significant predictor of both the frequency and intensity of climate anxiety. The analysis by categories showed a gradual increase in both aspects of climate anxiety.

Conclusions: Our results clearly support that there is a strong, positive relationship between perceived personal vulnerability to climate change and the level of climate anxiety. From a practical perspective, it is important to consider the role of perceived personal vulnerability in interventions aimed at managing climate anxiety, and to develop strategies that reduce excessive vulnerability perception while maintaining motivation for environmentally conscious behaviour.

Limitations and future research directions: The main limitations of our research are the cross-sectional design, which does not allow for clear determination of causal relationships, and the single-item measurement of perceived personal vulnerability and climate anxiety. The sample is not representative of the Hungarian population, which may limit the generalizability of the results.

Keywords: Climate anxiety; Perceived vulnerability; Psychological impact of climate change; climate change perception

Enerhash for Real-Time Energy Optimization in Renewable Power Grids

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Background and introduction: Integrating renewable energy into the grid presents challenges due to fluctuations in supply. This study explores how Enerhash applies digital technologies and AI-based systems to enable real-time energy optimization, aiming to improve grid stability and the efficient use of surplus renewable energy.

Objective: This research aims to analyze how Enerhash enables real-time energy optimization through AI-based control systems and modular data centers. The study focuses on how these technologies support the flexible integration of intermittent renewable sources, improve energy efficiency, and stabilize power grids in dynamic and decentralized energy markets.

Methodology: The research is based on a qualitative case study of Enerhash, combining semi-structured expert interviews with company executives and the analysis of internal documentation and operational data provided by the company. Special focus was placed on the technical parameters, system response times, and renewable integration models of Enerhash's modular energy infrastructure.

Results: The study found that Enerhash's AI-coordinated systems enable sub-second response times, making them effective tools for stabilizing renewable grids. The modular units efficiently utilize surplus energy and flared gas, reducing environmental impact while improving energy efficiency. Projects in Sweden and the US confirm the scalability and adaptability of the solution under varying grid conditions.

Conclusions: Enerhash demonstrates how AI-based infrastructure can provide real-time flexibility and efficiency in renewable energy systems. The integration of modular data centers with grid management not only supports environmental goals but also offers an economically viable model. This case highlights the role of emerging technologies in transforming traditional energy operations toward a more sustainable future.

Limitations and future research directions: This study is limited to a single case and early-stage project results. Long-term performance data is not yet available. Future research should include comparative analysis of similar AI-based energy systems, assess economic impacts in different regulatory environments, and explore scalability in emerging markets with high renewable energy potential.

Keywords: AI, grid flexibility, real-time optimization, renewable energy, Enerhash, digital energy solutions

The Role of Artificial Intelligence in Business Education

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Background and introduction: The 21st century has profoundly impacted business education. Evolving business environments, shifting production paradigms, and especially rapid technological change challenge traditional teaching. The introduction of computers required adaptation, but the 2022 release of ChatGPT, a widely accessible large language model, has transformed the educational landscape in unprecedented ways, raising urgent questions for educators.

Objective: This paper examines the distinctions between human and AI learning, drawing on neurological research, and considers how this groundbreaking technology can be leveraged to enhance learning, enrich business education, and potentially reshape human learning.

Methodology: This paper combines secondary research with reflective analysis of primary teaching experiences involving AI from the past two academic years. The teaching contexts include bachelor's and master's level courses in business education. Classroom integration of AI tools and student engagement were observed and reflected upon to evaluate the pedagogical impact of emerging technologies.

Results: Findings suggest that AI can be a powerful tool to support learning when used thoughtfully, offering new ways to engage students and deepen understanding. However, inappropriate or uncritical use may lead to reduced critical thinking and superficial knowledge. The dual nature of AI in education highlights the need for pedagogically sound, research-based integration strategies.

Conclusions: Higher education teachers must develop research-based understanding of human cognition and the pedagogical role of technology. AI's rise has sparked intense debate on its impact on learning quality, knowledge retention, and student attitudes. This paper contributes to the theoretical and practical discourse on integrating AI in education responsibly and effectively.

Limitations and future research directions: The findings are based on early-stage observations within a limited time frame since the release of generative AI tools. Long-term impacts remain uncertain, and definitive conclusions would be premature. Future research should explore longitudinal effects on student cognition, critical thinking, and the evolving role of educators in AI-enhanced learning environments.

Keywords: business education, artificial intelligence, human learning, educational technology, neuroscience



The impact of Digital Transformation on firm efficiency and labor productivity in Europe

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Background and introduction: Digital technologies refer to the use of digital tools, systems and devices to process and transmit data (Pullen, 2009) [1]. Digital transformation speaks to the overall use of digital technologies on the organizations processes and operations (Verhoef, P. C., Kannan, P. K., & Inman, J. J., 2021) [2]. At the heart of business in the current period is the advancement in technologies and digital transformation which are the present and future drivers for growth and efficiency in the business.

Objective: The research aims at understanding the impact digital transformation has on labour productivity within an organization by exploring how the adoption of different digital technologies affect employee productivity.

Methodology: This study will adopt a quantitative cross-sectional design to examine the impact digital transformation has on labour productivity. The study will examine literature review and also secondary data from national and international databases such as the OECD, World Bank, Eurostat, and national statistics offices to compare digital adoption indicators with labour productivity metrics across industries and countries in Europe. The data will be analysed using descriptive statistics and regression.

Results: Digital transformation (DT) has profoundly influenced firms' operations, boosting both efficiency and labor productivity. By incorporating technologies such as cloud computing, artificial intelligence, and data analytics, businesses can optimize processes, cut costs, and improve decision-making allowing employees to concentrate on complex tasks. This leads to greater operational efficiency through automation, better labour resource management, and quicker adaptation to market shifts. This paper

Conclusions: Recent literature confirms that digital transformation significantly impacts labor productivity by automating repetitive tasks, enabling better decision-making through AI, and fostering collaboration through digital platforms (Bresnahan, 2002) [20]. The adoption of digital tools leads to greater efficiency, allowing firms to allocate human capital more effectively, reduce administrative burdens, and streamline workflows (Brynjolfsson, 2014) [5]. However, the benefits of digital transformation on

Limitations and future research directions: The study is limited to secondary data and therefore lacks the firm-level insights which are needed to fully capture the effects of digital transformation on labor. Some possible sectoral and regional differences may also be under represented in the aggregated databases. Future research in this area should include primary data and qualitative insights and emerging technologies

Keywords: Digital transformation (DT), Digital Technologies, Innovation



Understanding Motivational Barriers in Digital Adoption: Evidence from Healthcare Systems in Indonesia

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Background and introduction: The digital divide in healthcare persists despite advancements in digital technologies, with inconsistent adoption levels across different settings. Traditional models like TAM, UTAUT, and TTF explain adoption based on usability and organizational factors but often overlook motivational barriers. These barriers, including psychological resistance and habitual preferences, can hinder meaningful digital engagement even when structural and cognitive readiness are high.

Objective: This study aims to investigate the role of motivational barriers in digital adoption within healthcare institutions in Indonesia. It seeks to understand how these barriers interact with traditional adoption variables and influence system engagement in different institutional contexts.

Methodology: The study employs a partially mixed-methods approach, combining TAM-based surveys and interviews in a rural clinic and TTF–UTAUT-based surveys in an urban hospital. Two contrasting case studies are analysed: a rural clinic using the E-Clinic system and an urban hospital implementing a Hospital Management Information System (SIMRS).

Results: Findings indicate that even when users report high system usability and institutional support, adoption remains partial or passive due to psychological resistance, habitual preferences, or hierarchical compliance. Motivational barriers significantly affect digital adoption in both settings, underscoring the limitations of traditional adoption models.

Conclusions: The study highlights the importance of addressing motivational factors in digital transformation strategies. It contributes to the literature by contextualizing motivational disengagement in real-world healthcare settings and offers practical recommendations for improving adoption outcomes.

Limitations and future research directions: This study is limited by its focus on two specific healthcare institutions in Indonesia. Future research should expand to other regions and healthcare settings to explore the generalizability of motivational barriers across diverse contexts. Additionally, longitudinal studies could investigate how motivational barriers evolve over time and how they might be effectively mitigated through targeted interventions.

Keywords: Digital Adoption, Healthcare, Motivational Barriers, Technology Acceptance Model (TAM), Task-Technology Fit (TTF)

Revolutionizing IT service process monitoring with AI

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Background and introduction: This study investigates a novel artificial intelligence (AI) tool that plays a pivotal role in process monitoring, metric creation, and statistical generation with minimal human intervention.

Objective: By leveraging AI capabilities, the research aims to demonstrate potential efficiency improvements, thereby enabling teams to focus on customer excellence.

Methodology: The study employs literature review and a primary, qualitative analysis through a case study based on six in-depth interviews within a Hungarian subsidiary of a multinational IT company.

Results: The proposed AI tool offers a consultative approach to understanding IT data, utilizing AI and ML to identify issues and opportunities, and automating issue resolution with minimal human intervention. It also provides a unified user interface focusing on critical incidents, aiding departments in addressing availability and cost issues.

Conclusions: The research aims to elucidate the efficiency of AI tools in enhancing data analysis accuracy, improving key business metric identification and prioritization, bridging IT operation skill gaps, minimizing human intervention, and optimizing system performance through a unified user interface.

Limitations and future research directions: By addressing key challenges and leveraging AI capabilities, organizations can achieve significant efficiency improvements, reduce costs, and enhance overall system performance. The results of data collection will be shared in the upcoming publication.

Keywords: AI, efficiency, measurement



Mapping the FinTech Revolution: A Global Atlas of Transformation for 2010 and 2025

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Background and introduction: The global FinTech sector has transformed financial services over the past fifteen years, evolving from early digital disruptors to a mature, integrated ecosystem. This period witnessed the proliferation of digital payments, lending, wealth management, and InsurTech. This evolution reflects not just the digitalization of finance but a structural reconfiguration of how capital is accessed, managed, and distributed worldwide.

Objective: This study aims to map and analyze the global FinTech ecosystem for 2010 and 2025, with particular focus on Digital Lending as the largest and most representative segment. The study seeks to identify patterns of growth, diversification, and regional variation, and to situate these within wider debates on financial inclusion, digital transformation, and global economic change.

Methodology: A mixed-methods design was employed, combining quantitative mapping with qualitative interpretation. The primary data source is the Cambridge Centre for Alternative Finance (CCAF) FinTech Ecosystem Atlas, which provides harmonized information on FinTech entities by year, region, and segment. Descriptive statistics, relative growth rates, and compound annual growth rates were calculated to capture temporal dynamics, while visualizations such as bar charts, bubble diagrams, and global maps.

Results: Findings show a dramatic expansion of FinTech from fewer than 400 active entities in 2010 to over 4,000 in 2025. Digital Lending grew from 116 to 1,310 entities (+1,029%), establishing itself as the backbone of the industry, alongside Digital Payments (988) and Enterprise Tech Provisioning (869). Sub-segments of lending diversified significantly, moving from a dominance of balance-sheet models in 2010 to a multi-pillar structure in 2025, where marketplace lending, securities-based models.

Conclusions: From 2010 to 2025, FinTech shifted from fragmented experimentation to systemic integration, reshaping the architecture of global finance through scale, diversification, and inclusion. Digital Lending exemplifies this transition, evolving from a niche sector to the most dominant and structurally diverse segment. The study shows that FinTech is no longer peripheral but central to global financial systems, expanding access to credit, enabling new market models, and embedding finance.

Limitations and future research directions: The study is limited by reliance on secondary data, which may underrepresent informal or unregistered entities, especially in emerging markets. It also focuses primarily on quantitative trends, without capturing qualitative dimensions such as user trust or cultural adoption. Future research should incorporate more granular, real-time data in fast-evolving areas like crypto-assets, AI-driven finance, and regulatory technology.

Keywords: FinTech, ecosystem, digital finance, financial innovation, technology, global trends



Unlocking Lean potential in SMEs: A study on commitment, tools and outcomes through Systematic review and Data analysis

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Background and introduction: Lean management has been a widely accepted approach to process optimisation yet its implementation within Small and Medium Enterprises – SMEs remains unexplored. Resource limitations and inconsistent engagement can create gaps between lean knowledge and actual practice.

Objective: This research investigates how leadership commitment and awareness of Lean tools influence successful implementation outcomes, with a focus on operational efficiency and supply chain resilience.

Methodology: A mixed method design was used, including a systematic literature review using PRISMA and PEO frameworks, followed by a structured survey. Responses from 780 SME professionals were analysed using various statistical methods.

Results: Top and Middle management commitment significantly predicted perceived Lean success. A measurable knowledge to practice gap was identified between methods known and those applied, highlighting the need for strategic alignment and cultural engagement.

Conclusions: The study brings novelty by linking leadership behavior to Lean outcomes and quantifying the extent to which theoretical knowledge is or isn't translated into action in real SME environments. It can be seen that leadership commitment and holistic implementation of Lean can produce significant positive results.

Limitations and future research directions: The study is limited by focus on the SMEs of a single country and database. Expansion to other databases and more robust data from SMEs of different regions can provide a comprehensive view. Future work will expand to other countries and integrate ESG indicators, financial outcomes, and cross sectoral comparisons.

Keywords: Lean Management, Lean, Leadership, Supply chain, SMEs