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THE TRANSFORMATIVE IMPACT OF ARTIFICIAL INTELLIGENCE ON DEVOPS AND MLOPS PRACTISES

Gurbanli F.S.,
Azerbaijan State University of Economics

Rzazada S.I.,
Azerbaijan

This analysis explores the impact of AI on DevOps and MLOps practices. Innovations such as AI-driven automation, hyperparameter optimization, automated feature engineering, and data drift detection not only improve software quality and performance but also enhance operational efficiency and reliability. AI-enhanced MLOps frameworks have delivered measurable improvements in operational efficiency and ethical compliance, enabling effective management of complex distributed systems. The integration of Artificial Intelligence (AI) into DevOps and MLOps marks a new era in software development and management. This integration replaces traditional automation methods with intelligent, context-aware decision-making systems, revolutionizing areas such as infrastructure management, model deployment, and quality assurance. MLOps has emerged as a specialized field addressing the additional complexities required for the successful deployment of machine learning models in production environments.

The modern DevOps landscape has significantly evolved since its inception. What began as a methodology focused primarily on eliminating barriers between development and operations teams has now transformed into a complex ecosystem featuring advanced automation, continuous feedback loops, and data-driven decision-making capabilities. Similarly, MLOps has emerged as a specialized field that addresses the unique challenges associated with deploying machine learning models in production environments. The intersection of Artificial Intelligence with DevOps and MLOps creates a powerful synergy that overcomes the limitations of traditional approaches and introduces new capabilities that were previously unattainable. As organizations become increasingly reliant on software systems to gain a competitive edge, the strategic application of AI in operational workflows has become a critical differentiator in terms of market agility and service reliability. The "Infrastructure as Code" (IaC) approach has fundamentally transformed the way organizations provision and manage computing resources. This approach enables version control, automated testing, and repeatable deployments of infrastructure configurations. The integration of Artificial Intelligence (AI) into IaC practices represents the next evolutionary step in this field. AI brings intelligent optimization and adaptive capabilities to infrastructure management systems. AI-powered infrastructure design leverages machine learning algorithms to analyze historical performance data, usage patterns, and resource utilization metrics, providing recommendations for optimal infrastructure configurations. According to a large-scale study conducted by Artac, M., Borovšak, T., Di Nitto, E., Guerriero, M., & Tamburri, D. A. (2022) (Figure 1), organizations that

implemented AI-based infrastructure optimization reduced their cloud computing costs by 27% while either maintaining or improving application performance metrics.

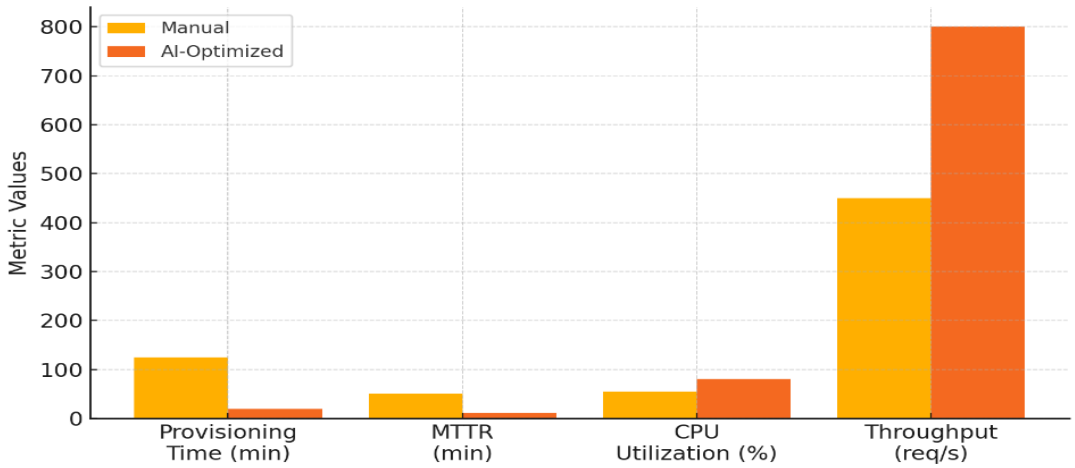

Figure 1. Performance Comparison Between Manually Configured Infrastructure and AI-Optimized Infrastructure

Machine Learning Operations (MLOps) has emerged as a specialized field that adapts and extends DevOps principles to address the unique challenges associated with developing, deploying, and maintaining machine learning systems in real-world production environments. While it shares core principles with traditional DevOps practices, MLOps also encompasses additional factors essential for the operationalization of ML models. The development and training of machine learning models has traditionally been a repetitive, labor-intensive process requiring a high level of domain expertise and technical skill. AI-enhanced MLOps frameworks are fundamentally transforming this process through automation and intelligent optimization at various stages of the model development lifecycle. Automated feature engineering and selection represent a significant advancement in reducing the manual effort required for data preparation in model training. Deep learning approaches and genetic algorithms can now generate and evaluate potential features, identifying those with the strongest predictive power for specific tasks. Automated feature engineering systems achieved comparable or superior results to those crafted by human experts in 78% of the cases studied, while reducing the development time by approximately 67%. Hyperparameter optimization and neural architecture search have also significantly benefited from AI automation. Traditional hyperparameter tuning approaches often relied on manual trials or simple grid searches, which frequently resulted in suboptimal model configurations. Modern AI-assisted frameworks employ Bayesian optimization, evolutionary algorithms, and reinforcement learning methods to explore the parameter space more efficiently and identify optimal configurations.

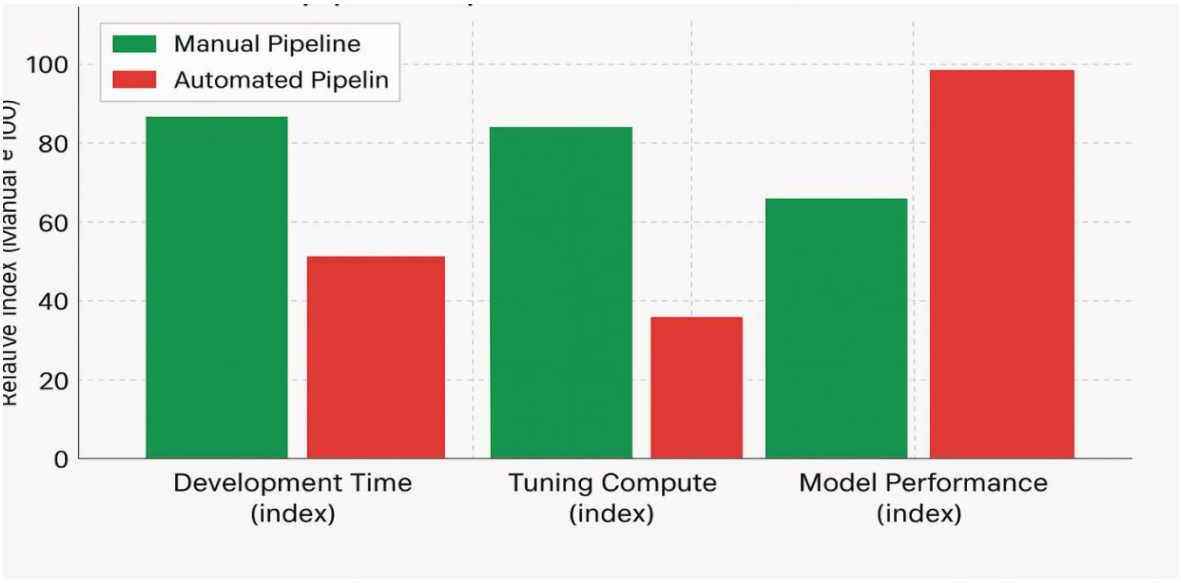

Figure 2. Performance Comparison of Manual and Automated ML Pipeline Optimization

This figure demonstrates that automated hyperparameter optimization increased model performance by an average of 11.3% across various tasks while simultaneously reducing the computational resources required for tuning by 53%, outperforming manual approaches. Data drift detection and quality assurance systems represent another crucial component of AI-enhanced MLOps frameworks. These systems continuously monitor input data distributions and model performance metrics, automatically detecting changes that may impact accuracy. Early detection of data drift can prevent up to 92% of model performance degradation incidents by triggering retraining processes before production impact occurs. The implementation of automated data quality monitoring has reduced unexpected model failures by 76% among organizations, demonstrating how critical these systems are for maintaining reliable ML operations.

The integration of Artificial Intelligence into DevOps and MLOps practices represents a significant milestone in the software development and operations domain. As demonstrated throughout this analysis, AI has transformed traditional automation into intelligent systems capable of context-aware decision-making, particularly revolutionizing infrastructure management and monitoring areas. Unlike previous reactive approaches, the shift to proactive operational models enables organizations to predict and prevent issues before they impact users. This has resulted in substantially superior outcomes compared to traditional methods in anomaly detection and predictive analytics.

The emergence of MLOps as a specialized field addresses the unique challenges specific to ML systems in production environments. AI-enhanced frameworks have brought significant advancements particularly in feature engineering, model deployment, and management. Analysis of these frameworks has shown that their implementation results in substantial benefits in model performance, operational efficiency, and ethical compliance. Organizations adopting these AI-enhanced practices have demonstrated measurable improvements in incident response times,

resource utilization, and overall system reliability. This has enabled effective management of the increasing complexity of distributed systems. Against the backdrop of AI's growing integration with operational practices, the future of development operations will be defined by this powerful synergy — balancing automation with human oversight.

The integration of AI into DevOps and MLOps practices defines the future of software development and operations. It creates a powerful synergy balancing automation with human oversight, offering organizations a more agile, reliable, and proactive operational environment. Future advancements in the field will be based on the optimal fusion of AI capabilities and human expertise.

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GLOBAL COMPETENCES AND EMPLOYABILITY: EMPLOYER EXPECTATIONS AND GRADUATE PREPAREDNESS IN THE DIGITAL AGE

Chen Tingyu,
DBA student,
Al-Farabi Kazakh National University, Al-Farabi business school

Asanova Daniya Kasymovna
Ph.D., Associate Professor
Al-Farabi Kazakh National University, Al-Farabi business school

Abstract

In the context of rapid digital transformation, employability now depends on a blend of technical, cognitive, and global competences. This study examines the alignment between employer expectations and graduate preparedness in Kazakhstan by integrating global literature with empirical analysis of 1,754 job postings for data-related roles. Using text mining of job requirements and responsibilities, the study identifies the most frequently demanded skills - SQL (10.7%), communication (60.6%), and teamwork (51.1%) - and highlights the absence of integrated global competences such as international experience or intercultural collaboration. Sectoral differences are also evident: telecom companies prioritize technical proficiency, while academic institutions emphasize theoretical knowledge without applied digital requirements. Further analysis reveals that only 0.1% of posters demand both technical and interpersonal skills together, suggesting a fragmented view of employability. The paper concludes that Kazakhstan's higher education institutions must embed project-based learning, industry partnerships, and digital literacy modules to meet the evolving demands of the digital labor market. Recommendations include curriculum reform, expanded exchange programs, and co-designed internship models to strengthen the integration of global and digital competences.

Keywords: global competences; digital skills; employability; labor market; graduate preparedness; job postings; curriculum reform

Introduction

In the digital age, employability has evolved beyond academic credentials to include a blend of cognitive, interpersonal, and digital skills. Employers across the globe now seek graduates who can adapt to technological change, work effectively in diverse teams, and solve complex problems using digital tools. This shift is well-documented in policy frameworks such as the OECD Skills Strategy and the World Economic Forum's Future of Jobs report, which both highlight analytical thinking, digital literacy, and collaboration as critical workforce requirements.

The concept of global competences - defined by the OECD (2019) as the ability to interact respectfully and effectively across cultures - has gained particular importance

in increasingly interconnected labor markets. These competences include multilingual communication, cross-cultural collaboration, and global awareness. At the same time, digital competences - ranging from basic software proficiency to advanced data analytics - are now foundational for employment across nearly all sectors [1].

Kazakhstan, as a rapidly developing economy with a strategic focus on digitalization, finds itself at a crossroads. On one hand, the government has invested in programs such as Digital Kazakhstan to modernize infrastructure and enhance digital readiness. On the other hand, the country's labor market remains shaped by legacy industries such as oil and gas, which often prioritize operational efficiency over global engagement. Employers frequently report that graduates are underprepared for practical digital work and lack experience in international or interdisciplinary settings [2].

This tension between global skill demands and local education outcomes forms the starting point for this study. While prior research has highlighted the skills mismatch in qualitative terms, little is known about how employer expectations are communicated through real-world job advertisements. To address this gap, the present study examines 1,754 job postings for digital roles in Kazakhstan. Using text mining and content analysis, the paper identifies the specific skills employers prioritize - technical, interpersonal, and global - and evaluates whether these align with existing education and policy frameworks.

The goal is twofold: first, to clarify which competences are most valued in Kazakhstan's digital job market, and second, to assess the extent to which current graduate training prepares individuals to meet these expectations. By grounding this analysis in both global literature and empirical labor market data, the paper offers new insights into how Kazakhstan can better align higher education with the evolving demands of the digital and global economy.

Literature Review

The concept of global competences has gained significant traction in both educational theory and workforce development literature. Defined by the OECD (2019) as the capacity to examine global issues, understand diverse perspectives, and engage in open, appropriate interactions with people from different cultures, these competences are increasingly tied to 21st-century employability [3]. Studies by Butum et al. (2020) and Jiaxin et al. (2024) further conceptualize global competence as an integration of cognitive, interpersonal, and intrapersonal skills, enabling graduates to navigate diverse teams, international projects, and culturally mixed work environments [4, 5].

Parallel to global competence, digital literacy has emerged as a fundamental skill across nearly all sectors. The World Economic Forum's Future of Jobs report (2025) identifies analytical thinking, adaptability, digital proficiency, and collaboration as the top workforce skills [6]. Digital literacy now extends beyond basic tool use to include data handling, automation awareness, and socio-technical navigation [1]. The implication is that employability depends not only on hard skills like coding, but also on the ability to work within digitized, often remote or cross-border environments.

In Kazakhstan, the situation is complex. The country's strategic push for digitalization - exemplified by the "Digital Kazakhstan" program - has led to visible progress in public service automation and ICT infrastructure. However, skill development has not kept pace. According to the OECD Skills Strategy (2021), Kazakh youth consistently lag behind OECD averages in foundational and digital skills [2]. World Bank (2023) enterprise surveys echo this mismatch, with 64% of Kazakh firms citing inadequate workforce skills - particularly in digital and technical roles - as a constraint on productivity [7].

Earlier studies highlight structural and curricular limitations. Kirichok (2013) found that Kazakhstani employers value computer literacy, analytical thinking, and multilingual communication, but universities often prioritize theory over practice [8]. Jonbekova (2015) and Kim et al. (2024) describe how graduates frequently lack exposure to collaborative, intercultural work settings, contributing to weak practical preparedness. In social science fields, this is compounded by low engagement in exchange programs or research-based learning [9, 10]. A similar gap was observed in neighboring countries like Tajikistan, where employers reported that graduates lacked both subject mastery and workplace readiness.

Despite these findings, much of the literature focuses either on macro-level policy trends or qualitative interviews. What has been missing is large-scale, real-time labor market data showing what employers actually demand. This gap is addressed in the current study through empirical analysis of 1,754 job postings in Kazakhstan's digital job market. The data allows us to validate whether competencies discussed in global frameworks - such as digital literacy, communication, or international collaboration - are being reflected in local job descriptions. It also reveals how skills are framed across sectors and experience levels, offering insights into whether Kazakhstan's education system is aligned with labor market signaling.

Taken together, the literature provides a strong conceptual foundation, but empirical evidence from job postings adds clarity to how these frameworks operate in practice. This dual lens - literature and data - enables a more grounded assessment of Kazakhstan's graduate preparedness in the digital and global economy.

Methodology

To investigate the alignment between graduate preparedness and employer expectations in Kazakhstan's digital economy, this study employed a secondary data analysis method using a dataset of 1,754 job postings related to data analysis and digital roles. The dataset was collected from a major online job platform (hh.kz) and includes postings published primarily in July 2023. Each listing contains details such as job title, employer, city, required experience, employment type, and - most critically - the text of required qualifications and responsibilities.

Given the supervisor's feedback regarding the need to explain the reasons behind skill mismatches, this methodology was designed to move beyond descriptive statistics. By analyzing actual job requirements and comparing them to internationally recognized skill frameworks (e.g., OECD Skills Strategy, WEF Future of Jobs), the

study identifies specific competency expectations that employers articulate and contrasts these with known structural limitations in Kazakhstani higher education.

The analysis focused on two text-rich fields: “requirements” and “responsibilities.” These were combined and processed using keyword-based text mining to quantify the frequency of commonly expected technical and soft skills. Keywords were selected to capture high-demand digital tools (e.g., SQL, Python, Excel), soft skills (e.g., communication, teamwork), and global competences (e.g., English language fluency, international experience, teaching or research ability). These terms were informed by both global skills frameworks and national studies on graduate employability in Kazakhstan. Figure 1 summarizes the overall research process, from data collection to interpretation.

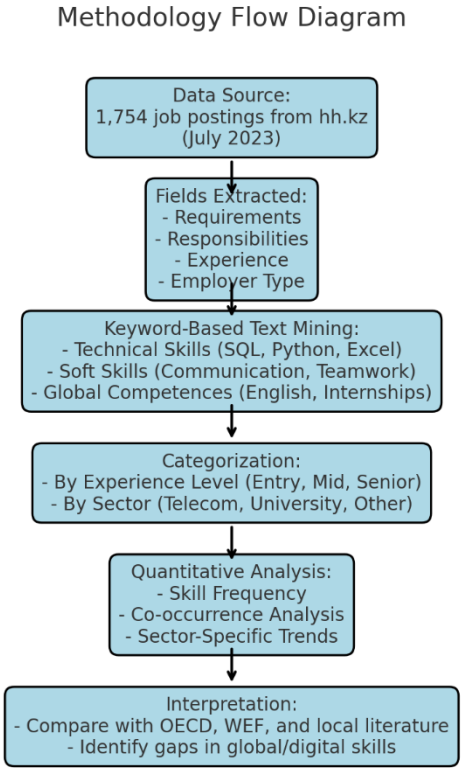

Figure 1. Methodology Flow Diagram: Process of extracting and analyzing skills from job postings.

To explore sectoral and experience-level differences, each job posting was also categorized by employer type (e.g., telecom, university, other) and grouped into three experience bands: entry-level, mid-level, and senior. This allowed for a comparative view of how expectations evolve across career stages and sectors. A co-occurrence analysis was also conducted to assess whether postings integrated both digital and interpersonal skill requirements - highlighting whether employers conceptualize these as isolated or interdependent competences.

While this approach does not involve original survey or interview data, it leverages authentic employer-generated documents to draw conclusions about labor market signaling. The method provides a grounded, empirical basis for analyzing the structure of skill expectations in Kazakhstan, complementing the global literature and offering

insight into the real-world challenges graduates face in transitioning from education to employment.

Limitations include the absence of rural job data, as postings were predominantly urban (Almaty, Astana, Shymkent), and a focus on digital fields, which may not generalize to all sectors. However, the depth and granularity of the dataset allow for a robust examination of the current gap between educational output and digital economy demands.

Results and Discussion

An in-depth analysis of 1,754 job postings for data-related roles in Kazakhstan reveals nuanced employer expectations that mirror global trends while also exposing structural weaknesses in skill integration. Consistent with the World Economic Forum's (2025) emphasis on digital and interpersonal competencies, the findings underscore a persistent gap between the supply of graduate skills and actual labor market demand [6].

A dominant pattern is the strong emphasis on practical technical tools, especially SQL, which was mentioned in over 10% of all job advertisements. This trend is particularly prominent in the telecom sector, where SQL appears in 25% of postings, reflecting the demand for applied database and analytics competencies. In contrast, university-affiliated postings rarely mention SQL, signaling a misalignment between educational institutions and industry demands.

Table 1 - Skill Mention Analysis

Skill	Mentions	Percentage of Postings
SQL	187	10.7%
Communication	1,063	60.6%
Teamwork	896	51.1%
English Language	152	8.7%
Python	71	4.0%
Excel	65	3.7%
International Exp.	39	2.2%

Soft skills, particularly communication and teamwork, are frequently required across all sectors, appearing in over 50% of postings. Their prevalence indicates a consistent expectation that graduates contribute not only as technical operators but also as collaborators and communicators within multidisciplinary teams. This aligns with global findings where employers prioritize adaptability and interpersonal fluency alongside domain expertise.

Despite these parallels, the data also reveals a critical underdevelopment of global competences. Only around 2% of the postings refer to international experiences such as internships, foreign language fluency, or global collaboration - highlighting a gap in

cross-cultural exposure. This finding supports prior critiques that Kazakhstan's education system insufficiently prepares graduates for globalized work environments. In a labor market shaped by digitalization and international value chains, this absence signals a strategic oversight.

Further disaggregation by experience level reveals how skill expectations evolve. Entry-level positions prioritize communication and teamwork (60.0% and 52.4%, respectively), suggesting these are considered foundational even at early career stages. As roles become more advanced, technical skills demands - such as SQL and Python - become more prominent. However, even in mid-level and senior roles, the integration of digital and interpersonal skills remains poorly articulated.

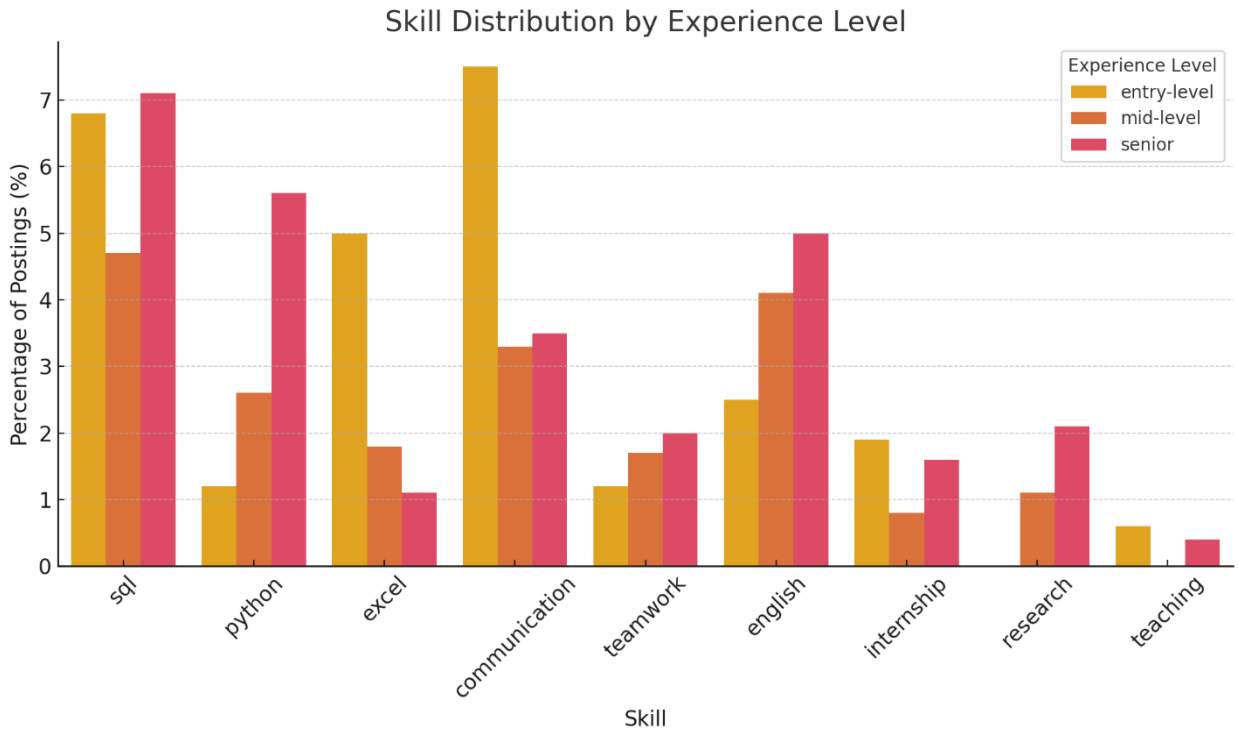

Figure 2. Skill Distribution by Experience Level

Perhaps most revealing is the lack of co-occurrence between technical and soft skills in single job descriptions. Only 0.1% of postings reference both SQL and communication, or SQL and teamwork. This separation suggests employers may conceptualize these as parallel rather than interdependent competencies. From an educational perspective, this highlights a pressing need to design learning environments that merge technical training with collaborative tasks. Project-based modules, joint data labs, and case-based teamwork can address this disconnect and foster globally relevant, job-ready graduates.

Taken together, these findings indicate that while Kazakhstan's digital economy increasingly demands technical and soft skills, few employers articulate them as part of a coherent global competence profile. The current structure fragments skill requirements and omits international fluency, reinforcing the need for curricular reform, cross-border programs, and employer-university co-design of graduate pathways.

Conclusion

This study reveals a clear and persistent gap between employer expectations and graduate preparedness in Kazakhstan's evolving digital economy. While global literature emphasizes the importance of digital, cognitive, and global competences, job postings from the Kazakh labor market show that technical proficiency - particularly in SQL - alongside communication and teamwork, are the most frequently sought-after skills. However, these competences are rarely integrated in a holistic way, and international experience is notably underrepresented, with less than 3% of postings referencing global exposure. This reinforces earlier critiques that Kazakhstan's education system remains insufficiently internationalized and overly theoretical.

To address this skills mismatch, higher education institutions and policymakers must move beyond general reforms and implement targeted, evidence-based initiatives. Based on our findings, we propose the following concrete steps:

- Integrate mandatory digital competency modules - including SQL, data visualization, and Python - into undergraduate programs across technical and non-technical fields. These should be co-developed with employers from sectors like telecom, finance, and IT to ensure relevance.
- Institutionalize project-based and collaborative learning by embedding interdisciplinary case studies, hackathons, and team-based problem-solving into coursework. These formats will better prepare students for the hybrid technical–interpersonal skillsets that real employers demand.
- Expand international exposure through short-term virtual exchange programs, foreign internships, and embedded intercultural training within curricula. For instance, lessons could be drawn from programs like "Zhas Orken," which connects graduates to practical, supervised placements in industry.
- Promote public–private collaboration through co-designed internships, mentorship programs, and digital upskilling bootcamps. This could take inspiration from best practices in institutions like Nazarbayev University, which has piloted mock interview programs and employer simulations to bridge academic and professional cultures.
- Embed skill integration in recruitment and assessment by updating national qualification frameworks to reflect the blended nature of digital, cognitive, and interpersonal competences - following models proposed in the OECD's Skills Strategy.

In sum, preparing Kazakhstan's graduates for the realities of the digital and global economy requires aligning curriculum design, pedagogical models, and labor market engagement. The findings of this paper demonstrate that while individual competences are recognized by employers, they are rarely cultivated in combination. To build a future-ready workforce, reforms must prioritize not only the presence of skills, but their integration in meaningful, applied, and globally contextualized ways

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DIGITAL-FIRST LEADERSHIP: HOW AI AND DATA-DRIVEN DECISION MAKING ARE RESHAPING EXECUTIVE ROLES IN MODERN ENTERPRISES

Jiang Jun,
DBA student,
Al-Farabi Kazakh National University, Al-Farabi business school

Nietalina Gauhar
Ph.D., Associate Professor
Al-Farabi Kazakh National University, Al-Farabi business school

Karshalova Alma Damerovna
Ph.D., Associate Professor
Al-Farabi Kazakh National University, Al-Farabi business school

Abstract

In the digital age, executive leadership is being transformed by rapidly advancing information technologies. This paper examines how digital-first leadership – a leadership approach that prioritizes digital technologies and data – is reshaping executive roles in modern enterprises. Drawing on a comprehensive review of recent academic and industry literature (2019–2025), we explore the impact of artificial intelligence (AI) and data-driven decision making on leadership mindsets, skills, and organizational structures. We find that leaders must adopt new mindsets of agility, experimentation, and risk-taking, moving away from traditional hierarchical control toward collaborative, continuous-learning approaches. AI integration enhancing strategic decision quality and speed, but only a small percentage of companies have realized significant AI value [1]. Effective digital leaders therefore need strong data literacy, a culture of innovation, and mechanisms to align data initiatives with business goals [2]. We synthesize key findings on evolving C-suite roles (e.g. Chief Data/AI Officers), competencies (e.g. digital savviness, ethical governance), and challenges (e.g. cultural resistance, talent gaps). The paper concludes that embracing digital-first leadership is imperative for global competitiveness and outlines practical recommendations for executives and future research directions.

Keywords: Digital-first leadership; data-driven decision-making; artificial intelligence; executive roles; digital transformation; C-suite leadership.

Introduction

Modern enterprises operate in a digital-first era, where digital technologies and data are core to strategy and operations. Digital-first leadership means that executive leaders prioritize digital transformation as a strategic imperative, embedding technology and analytics into decision processes. In practice, this requires CEOs and other C-suite executives to develop digital-savvy mindsets and skills, and to reorient their

organizations around continuous innovation, agility, and data-driven insights [3, 4]. At the same time, artificial intelligence (AI) is rapidly maturing and becoming widely adopted in business. Companies are moving beyond pilot projects into large-scale AI deployments [4]. As a result, AI and big data analytics are beginning to fundamentally alter how executive decisions are made. Decision making once based on intuition and experience is increasingly supported by predictive models, machine learning, and real-time analytics.

However, this technological change also creates new challenges. Many leaders admit they lack deep understanding of AI, even as their organizations explore it: for example, a recent survey found 94% of C-level executives claim advanced AI knowledge, yet only about 8% have substantial AI conceptual understanding [5]. Similarly, while nearly all companies experiment with AI, only a minority derive significant value – one study found 98% of firms are experimenting with AI but only 4% have generated substantial returns [1, 5]. These gaps highlight a critical leadership challenge: executive roles must evolve to effectively govern and leverage AI and data, rather than just oversee traditional functions.

This paper conducts a secondary research review to understand how AI and data-driven decision making are reshaping executive roles. We define executive roles broadly to include C-suite positions (CEO, CFO, CDO, etc.) and senior leadership in organizations of all sizes and industries. Our goal is to synthesize current knowledge about the changing competencies, mindsets, and structures required of modern executives. We address questions such as: What new capabilities do leaders need in AI-driven contexts? How are decision-making processes changing at the top? What new roles or functions are emerging? What cultural and ethical considerations arise? By reviewing scholarly and industry literature, we build an integrated picture of digital-first leadership in practice. The paper is structured as follows: first we review the literature on digital leadership and AI in management; then we describe our review methodology; next we present the major findings and discuss their implications; and finally, we conclude with recommendations and future research directions.

Literature Review

Digital-First Leadership and Digital Transformation

The concept of digital-first leadership emerges from broader research on digital transformation. Digital transformation is “rewiring” organizations by deploying technology at scale [6]; leaders must therefore change their approach. Researchers emphasize that true leadership, not mere management, is required to navigate this change [7]. For example, Tagscherer and Carbon (2023) conducted a literature review of over 90 articles (2011–2021) on leadership for successful digitalization [7]. They found that effective digital leaders are visionary and customer-centered, embrace change, and foster flat hierarchies and empowered teams. These leaders take calculated risks, promote collaboration, and maintain awareness of cultural and diversity issues. In sum, digital transformation demands that executives move away from rigid control models toward agile, innovative cultures.

Gegenava (2024) similarly argues that legacy organizations must shift their leadership paradigms [3]. Traditional command-and-control styles should give way to leadership that emphasizes agility, collaboration, and continuous learning. Successful digital-first leaders redefine organizational culture by prioritizing data-driven decision-making and "digital curiosity," encouraging experimentation. For example, Gegenava cites Satya Nadella's tenure at Microsoft, where a cultural shift towards openness and data focus accompanied digital success [3]. Gegenava notes that overcoming cultural resistance is a major leadership challenge; strategies like visible executive commitment and clear communication are vital for buy-in.

Other studies highlight specific leadership qualities. Carbon and Tagscherer (2023) note that digital leaders must be risk-taking and promote teamwork. They must also be digitally savvy: comfortable with technology and data analytics, so they can translate digital strategies into action. Likewise, research on leadership in Industry 4.0 identifies six traits of digital innovators: open-mindedness, customer focus, adaptability, collaboration, digital knowledge, and data mindset. Overall, the literature is clear that digital-first leadership involves both a mindset shift (toward flexibility, learning, risk tolerance) and a skill shift (data literacy, tech fluency).

AI and Data-Driven Decision Making in Leadership

Closely linked to digital leadership is the rise of AI and data in strategic decisions. Many scholars and industry experts now view data-driven decision-making as a hallmark of effective leadership. Data-driven executives use analytics and AI to augment human judgment, improving decision accuracy and speed. Joshi (2025) conducted a systematic literature review of 60+ studies on AI in leadership and identified strategic decision-making enhancement as one of three core dimensions of AI's impact. His review found that hybrid human-AI decision models can improve decision accuracy by 22% in some cases. In practice, this means executives use predictive models, optimization algorithms, and scenario simulations to inform strategies [8]. For example, Netflix's success in content creation is partly attributed to analytics-driven decision-making [3].

Similarly, research by Müller et al. (2025) stresses that digital transformation challenges must be addressed to realize data-driven decisions. In a qualitative case study, Müller and colleagues observed that leaders often fear surveillance and struggle to balance intuition with objective data [9]. They propose the "EASE framework," which identifies executive strategies for managing these challenges, such as developing digital competencies, storytelling to illustrate data use, and motivating employees to adopt data-driven practices. In other words, successful data-driven leadership requires not only analytical tools, but also culture-building: aligning data initiatives with organizational goals and education of stakeholders.

Industry sources reinforce this trend. A World Economic Forum survey of Chief Digital Officers found that organizations are moving from piloting AI toward "widespread implementation" [4]. This widespread adoption is "bringing big changes in how companies are structured and how they interact with customers." In practice, executives are focusing on aligning data initiatives with business strategy and fostering a data-driven culture [2]. For example, WEF interviews report that digital leaders are

educating their C-suites on what it means to be a data-driven organization, blurring lines between business and IT, and promoting cross-functional collaboration [2]. This suggests a shift in executive roles: the Chief Data Officer (CDO) or analogous roles become key partners to the CEO, and every leader must think in terms of data management [2].

New Executive Roles and Competencies

The integration of AI and data has given rise to new formal roles and redefined existing ones. Many companies now have or are creating Chief Data Officers, Chief Analytics Officers, or Chief AI Officers as part of the C-suite [10]. These roles are designed to ensure that data and AI initiatives are given strategic oversight. For example, analysis by Gartner and consulting firms highlights a renaissance of the CDO role: with data being a strategic asset, companies need executive-level data leadership (Heidrick & Struggles, 2024). These data-centric roles often collaborate closely with traditional leaders: CFOs and controllers now rely on real-time analytics for financial planning, CHROs use people analytics for talent strategy, and CMOs leverage AI-driven customer insights. In this way, existing roles have evolved: executives must now partner with data leaders or even take on data oversight themselves [9].

Beyond formal titles, research emphasizes that all leaders need new competencies. Joshi (2025) finds that digital leadership competencies are increasingly important, such as proficiency in analytics, understanding of AI capabilities, and the ability to work with interdisciplinary teams [8]. Ethical and governance skills are also critical: leaders need to ensure AI is used responsibly, addressing bias, privacy, and transparency. Indeed, Hossain et al. (2025) argue that effective AI-driven leadership involves "dynamically managing AI tools and processes" and confronting emerging ethical issues [11]. This echoes literature on AI ethics in leadership [3, 5], which underlines the need for leaders to embed fairness, accountability, and transparency in AI strategies.

Challenges and Barriers

While the opportunities are vast, literature also notes significant barriers. Cultural resistance is often cited: long-standing organizational norms and risk-averse mindsets can slow digital initiatives. Gegenava (2024) explicitly discusses how legacy companies face resistance when shifting mindsets; leaders must work to gain buy-in through commitment and communication [3]. Similarly, Müller et al. (2025) identify fear of surveillance and distrust of data as common leadership anxieties. Overcoming these requires attention to change management and incentives. For instance, success stories like Microsoft under Nadella suggest that leaders must model digital-first behaviors (transparency, agility) to shift culture [3].

Another challenge is the talent gap. High-level executive AI literacy is still limited: even if 94% of C-suites claim AI competence, surveys reveal only a fraction truly understand AI [5]. This "knowledge gap" can lead to misaligned AI strategies and wasted investment. Fast Company reports that 26% of companies have AI pilot products but just 4% have realized significant returns. This "implementation gap" underscores that technology alone is insufficient; leaders must build organizational capabilities [5]. Training and "right-skilling" of leadership are therefore key themes.

Finally, global perspective matters. While much literature focuses on large multinationals, some research highlights differences in emerging economies. For example, Hossain et al. (2025) note that in Bangladesh, there is still limited awareness and adoption of AI for performance management, suggesting executives there need greater support and policies to leverage AI. Thus, executive transformation is a global process but one that may proceed unevenly depending on region and sector.

Methodology

This study is a secondary literature review. We systematically searched for scholarly articles, industry reports, and thought leadership on topics related to digital leadership, AI-driven decision-making, and executive roles. Databases searched included Google Scholar, ScienceDirect, and professional sources (HBR, WEF, consulting white papers) for the period 2019–2025, reflecting the latest trends. Search terms included "digital leadership," "digital transformation," "AI leadership," "data-driven decision making," and "executive roles technology." We prioritized peer-reviewed literature [7, 8, 9, 11] but also incorporated reputable practitioner publications [4, 5] to capture current industry insights. From over 150 initial documents, we selected approximately 30 key sources that addressed leadership changes due to digital tech. We abstracted findings into themes (competencies, roles, decision processes, challenges) and synthesized the results. Because this is not empirical research, no human subjects were involved; we focus on interpreting and integrating existing knowledge. Limitations include potential publication bias toward positive findings and uneven coverage of global contexts.

Results and Discussion

Enhanced Decision-Making and Strategic Impact

Our review finds a clear consensus that AI and data are enhancing executive decision-making, enabling more strategic and evidence-based outcomes. Multiple sources report that combining human judgment with AI analytics improves decision quality and speed [4, 8]. For instance, Joshi (2025) notes that hybrid human-AI decision models can achieve up to 22% greater accuracy than humans alone. This suggests executives in digital-first organizations can make faster, more informed decisions – whether in finance, supply chain, marketing, or R&D – by leveraging AI-powered forecasting and optimization tools. Industry commentary echoes this: Harvard Business Review authors note that generative AI's emphasis on data quality has prompted firms to "double down" on data efforts, because "great AI relies on great data" [10] – an insight illustrating how leadership priorities shift toward data governance and quality control [10].

However, this transition is not automatic. The Fast Company analysis by Hoque (2025) highlights that while nearly all companies are experimenting with AI (98%), only a quarter have functioned products and a mere 4% report significant business returns. The implication is that many executive teams overestimate their readiness. Indeed, a striking finding is the leadership knowledge gap: 94% of executives claim familiarity with AI, yet only 8% truly understand it conceptually. This disconnection

means that the potential of data-driven decision-making often remains unrealized. Leaders must therefore invest in AI literacy and better integration. For example, creating an "AI Center of Excellence" or enterprise architecture that aligns AI with strategy can help ensure decisions made by AI systems match company goals [5].

Evolving Leadership Competencies

Our sources converge on the idea that executive competencies must evolve. Traditional executive strengths – intuition, personal networks, and experience – are still valuable, but now complemented by new skills. Key among these is data literacy: leaders need to understand basic analytics, interpret AI outputs, and question data-driven recommendations. Joshi (2025) emphasizes the human-centered balance: leaders must weigh AI insights against ethical and contextual factors. In concrete terms, this means CEOs and board members need some technical understanding to ask the right questions (e.g. about model biases or data sources) and to avoid "black box" pitfalls.

Beyond technical acumen, digital-first leaders must exhibit openness and flexibility. As Gegenava (2024) notes, risk-aversion hinders innovation; executives must be willing to experiment and tolerate failure to find new digital opportunities. This psychological shift from "playing it safe" to "leaning into ambiguity" is a recurring theme. Combined with this, interpersonal skills like collaboration and communication become more critical. In flat, cross-functional digital teams, top leaders often act as facilitators or coaches rather than dictators [7]. Leaders must also champion digital culture: for example, Microsoft under Satya Nadella prioritized empathy and learning culture, which has been widely cited as enabling its digital turnaround [3].

Ethical leadership is another emerging competency. Our literature suggests that as executives gain power via data and AI, they also gain responsibility for societal impacts. The need for "responsible AI" leadership is emphasized by Joshi (2025) and Hoque (2025). Executives must establish governance frameworks that ensure AI systems are fair, transparent, and aligned with values [5, 11]. This includes training the workforce on biases, setting policies for data privacy, and possibly new board committees for AI oversight. Thus, a digital-first leader must be both a technologist and an ethicist or at least coordinate with both functions.

Reshaping Executive Roles and Structures

AI and data are not only changing how decisions are made, but also who makes them and how organizations are structured. The literature highlights that digital transformation often spawns new C-level roles (CDO, CAIO) and redefines existing ones. Heidrick & Struggles (2024) reports a surge in demand for data leadership positions, as companies realize that data-driven strategies need executive sponsorship [12]. These roles sit alongside and support traditional C-suite members. For example, a CDO works with a CFO to apply analytics to financial planning, while a Chief AI Officer might sit next to the CIO to drive AI strategy. In some cases, technology leaders (e.g. CIOs or CTOs) have ascended to CEO roles, reflecting a shift in the career path and perception of what background qualifies one to lead a modern enterprise [11].

Moreover, digital-first leadership often blurs functional silos. Reports describe the emergence of "starred" or hybrid roles [13, 14] where leaders have dual responsibilities

across functions (e.g. a "CDO & CMO" responsible for data-driven marketing). Many organizations create interdisciplinary steering committees for AI projects that include marketing, IT, HR, legal, and operations leadership, reflecting how decisions now cut across boundaries. In effect, executive roles become more networked and collaborative. This is consistent with the trend towards flatter hierarchies noted by Tagscherer and Carbon (2023) [7].

The C-suite's strategic focus also shifts. Instead of solely long-term strategy, leaders now also engage in ongoing technological strategy. They must continuously evaluate emerging tools (generative AI, IoT, blockchain) and integrate them into business models. The WEF survey indicates digital leaders now spend significant time on technical roadmaps and on aligning digital projects with core business goals. For instance, they might routinely review data dashboards alongside financial reports at board meetings, making analytics as routine as financial metrics.

Organizational and Cultural Implications

The reviewed literature emphasizes that leadership changes have systemic effects on organizational culture. As leaders champion data and AI, they must also cultivate a data-driven culture. This means empowering employees to use data in daily work, breaking down "data hoarding" by making information accessible, and encouraging curiosity about data insights. In the WEF insights, executives stress the need to "educate the C-suite on what it truly means to be a data-driven company." Essentially, digital-first leadership cascades values of experimentation and transparency throughout the company.

However, this cultural shift can provoke resistance. The fear of surveillance (employees feeling constantly monitored by analytics) and change aversion are frequently noted [9]. To overcome this, leaders must use transparent change strategies – for example, storytelling to illustrate the benefits of AI [9] and involving employees in co-creating data solutions. Visible executive sponsorship is crucial; researchers note that organizations where top leaders visibly use analytics (e.g. referencing data in meetings, publicly supporting data projects) see faster adoption [3].

On the other hand, digital-first leadership can improve employee engagement if done well. By automating routine tasks and providing better tools, AI frees workers to focus on creative or interpersonal work. Leaders who articulate this vision can boost morale. For instance, one WEF leader notes that generative AI allows human workers to concentrate on higher-value functions, if the company has the "courage to embrace the future over the familiar." Thus, the way leaders frame AI adoption (as empowerment rather than replacement) significantly affects its success.

Global and Industry Trends

Finally, our sources indicate that the reshaping of executive roles is a global phenomenon, though with regional variations. Industry analysts observe that North American and European companies are rapidly creating AI leadership roles and upskilling executives [12]. In Asia, organizations often launch national AI initiatives that involve C-suite. In contrast, emerging markets may lag in leadership capabilities [11], making it an important area for capacity building. Across industries, digital leaders in tech, finance, and consumer goods tend to move fastest, but even traditional

sectors like manufacturing are finding roles like “Chief Digital Officer” or “Digital Transformation Officer” becoming commonplace.

Overall, the reviewed literature portrays a consistent picture: executive roles are expanding to include digital strategy and oversight of data assets. Leaders must develop a blend of technological savvy, strategic vision, and people-centric change management. By doing so, they enable their organizations to tap into the power of AI and data while mitigating risks.

Conclusion

Digital-first leadership is fundamentally redefining the role of the modern executive. As our review shows, AI and data-driven decision-making are not just new tools, but catalysts for broader change in leadership mindsets, competencies, and structures. Executives today must balance traditional business acumen with technological understanding: they must be visionary yet data-driven, collaborative yet decisive, and innovative yet responsible. Successful leaders adopt agile approaches, foster a culture of analytics, and ensure AI initiatives align with strategic goals. They also recognize ethical imperatives, proactively governing AI for fairness and transparency.

Practically, boards and CEOs should invest in digital leadership development. This means providing training in data literacy, hiring or promoting data/AI specialists into the executive team, and setting metrics for digital transformation success. Policymakers and educators should update leadership curricula to include AI strategy and ethics. Companies should also benchmark their C-suite readiness: surveys consistently show gaps in AI knowledge at the top [5], suggesting that many leaders need further education.

Future research could empirically investigate the performance outcomes of digital-first leadership: for example, studies might correlate leadership digital maturity with financial performance or innovation rates. Longitudinal studies could track how specific executive roles evolve as AI becomes more pervasive. Finally, comparative research across countries and cultures would help understand how local contexts affect the adoption of data-driven leadership.

In sum, as AI and data continue to permeate business, the essence of executive leadership is changing. Rather than intuition and hierarchy alone, leadership will increasingly rely on data insights, collaborative networks, and continuous learning. Embracing this shift – being truly digital-first – will enable organizations to navigate the complexities of the modern economy and sustain competitive advantage [15].

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DESIGNING A MULTI-DIMENSIONAL FRAMEWORK FOR MEASURING EMPLOYEE ENGAGEMENT IN THE DIGITAL WORKPLACE

Li Juan,
DBA student,
Al-Farabi Kazakh National University, Al-Farabi business school

Koshkina Olga
Ph.D., Associate Professor
Al-Farabi Kazakh National University, Al-Farabi business school

Abstract

The rapid evolution of the digital workplace necessitates a re-evaluation of traditional employee engagement measurement. Conventional models often fail to capture the unique dynamics, challenges, and opportunities presented by digital transformation, including the rise of artificial intelligence, automation, and pervasive remote work arrangements. This paper addresses this critical measurement gap by proposing a novel multi-dimensional framework for assessing employee engagement specifically within digital work environments. The framework integrates established psychological theories, such as the Job Demands-Resources model, Self-Determination Theory, and Social Exchange Theory, with key dimensions pertinent to digital contexts: Digital Well-being, Digital Connectivity and Collaboration, Digital Competence and Growth, Meaningful Digital Work and Autonomy, Digital Leadership and Recognition, and Work-Life Integration. A mixed-methods approach, combining quantitative surveys and qualitative inquiry, is suggested for its operationalization. This framework aims to provide organizations with a more holistic and actionable understanding of engagement, facilitating targeted interventions that enhance employee well-being, productivity, and overall organizational success in the digital era.

Keywords: Employee Engagement, Digital Workplace, Multi-Dimensional Framework, Organizational Psychology, Human Resources, Remote Work, Hybrid Work, Technostress, Digital Well-being, Digital Transformation

Introduction

The contemporary organizational landscape is undergoing a profound transformation, driven by rapid technological advancements and the increasing prevalence of remote and hybrid work models. This shift has fundamentally reshaped the nature of work and how employees interact with their organizations and colleagues. The digital workplace, characterized by an ecosystem of technology capabilities, has effectively replaced traditional team proximity, demanding a workforce that possesses heightened digital dexterity, the ambition and ability to leverage technology for superior business outcomes [1]. While this transition offers unprecedented flexibility and autonomy for workers, it is not without its complexities, often leading to "growing

pains" and "change fatigue" as individuals continuously adapt to new digital modalities and synchronize with geographically dispersed teams [1, 2].

The digital workplace is more than just a collection of tools; it represents a fundamental reconfiguration of how work is conceived, executed, and experienced. The pervasive integration of artificial intelligence, automation, and sophisticated remote work platforms has redefined the traditional office environment. This technological shift has necessitated a workforce that is not only proficient in using digital tools but also adaptable to the constant evolution of these technologies. The increasing adoption of hybrid work models, where employees divide their time between physical offices and remote locations, has become the new norm, offering greater flexibility and autonomy [4, 5].

This transition, however, introduces significant psychological and operational challenges. Employees are frequently asked to adapt their work processes and collaboration methods, which can lead to fatigue and resistance to change [1]. The very mechanisms of interaction and collaboration are no longer solely reliant on physical presence but are increasingly mediated by digital platforms. This fundamental alteration in the work environment means that traditional understandings of employee engagement, often rooted in physical and social cues of co-located work, must now be re-examined through a new lens. The inherent psychological costs associated with this transformation, such as the need for continuous adaptation, directly influence employee well-being and, consequently, their level of engagement.

Despite the evolving nature of work, employee engagement remains a cornerstone of organizational success. Engaged employees are characterized by their emotional commitment, intellectual involvement, and willingness to exert physical effort, often going beyond their prescribed job descriptions. This dedication translates into tangible benefits for organizations, including higher employee satisfaction, increased productivity, reduced turnover rates, and enhanced innovation. Research consistently demonstrates a strong positive correlation between high levels of engagement and improved business outcomes, such as significant increases in operating income and earnings per share [5].

On an individual level, engagement fosters proactive work behavior, strengthens affective commitment to the organization, improves job and task performance, and reduces intentions to leave. From an organizational perspective, a highly engaged workforce contributes to greater company competitiveness, superior client satisfaction, and improved employee retention. For instance, companies that effectively implement digital engagement strategies report a 14%-25% boost in productivity and a 15%-31% reduction in turnover rates.

However, the digital era presents a paradox: while the imperative for engagement is amplified by the demands of a dynamic global economy, the digital context simultaneously introduces new complexities that make achieving and sustaining it more challenging. The widely reported "quiet quitting" phenomenon, for example, highlights a concerning trend of emotional disconnect between employees and their work, particularly as organizations navigate hybrid and fully remote models. This underscores the urgent need for effective measurement and intervention strategies that

are specifically attuned to the nuances of the digital workplace. The very tools that enable flexibility and productivity can, if not managed appropriately, contribute to digital fatigue, work-life imbalance, and feelings of isolation, thereby complicating the path to genuine engagement.

While foundational employee engagement models have significantly contributed to understanding workforce dynamics, their applicability in the rapidly evolving digital workplace is increasingly limited. Traditional survey instruments, such as the Gallup Q12 and the Utrecht Work Engagement Scale (UWES), were primarily developed for predominantly co-located work environments and may not adequately capture the unique characteristics of digital work.

The Gallup Q12, for instance, is widely recognized for its strong correlation with performance outcomes and its extensive research base [6, 7]. However, its general questions, while broadly applicable, do not explicitly address the specific challenges and opportunities inherent in digital work. It lacks items that gauge digital-specific stressors like technostress, information overload, or the nuances of virtual communication and collaboration. The absence of such digital-centric items means that the Gallup Q12 may not effectively diagnose "digital friction" points experienced by employees, which can significantly impact their engagement.

Similarly, the UWES, which measures engagement across dimensions of vigor, dedication, and absorption, has been validated across various settings. However, specific information regarding its ability to adequately capture digital workplace-specific engagement factors is not readily available. This suggests a potential "digital blind spot" where the scale, despite its general robustness, may not fully reflect the psychological experiences unique to a technologically mediated work environment.

The Aon-Hewitt model, centered on the "Say, Stay, Strive" framework, is effective in data-driven environments that prioritize continuous monitoring of performance metrics and employee feedback. Yet even this model has encountered challenges in accurately measuring engagement in work-from-home settings, particularly concerning the critical role of technological readiness and the nuances of recognition in a remote context. This highlights that even sophisticated traditional models require adaptation to digital reality.

The overarching limitation of these traditional frameworks is their failure to explicitly account for the new stressors and demands introduced by digital work. These include the psychological burden of 24/7 digital availability, the cognitive strain of email overload, the anxieties related to cybersecurity risks, and the profound impact of social isolation and blurred work-life boundaries in remote settings. When models do not explicitly measure these factors, organizations cannot fully understand why engagement might be suffering in a digital context, nor can they pinpoint the digital-specific drivers (e.g., seamless digital tools, effective virtual communication, digital leadership competencies) that foster it. This creates a critical measurement gap, where existing tools are insufficient to reflect the complex reality of the modern digital work environment.

Given the identified limitations of traditional models, the purpose of this study is to propose a novel multi-dimensional framework for measuring employee engagement

specifically within the digital workplace. This framework is designed to address the critical measurement gap by integrating established psychological theories with the unique characteristics and challenges of technologically mediated work environments.

The framework aims to be more than a descriptive model; it is intended as a diagnostic tool that enables organizations to better understand, measure, and proactively foster engagement in their increasingly digital workforces. By explicitly incorporating dimensions that reflect the digital experience, the framework can provide a more comprehensive and actionable understanding of employee engagement. This deeper understanding will, in turn, facilitate the development of targeted, evidence-based interventions that genuinely resonate with employees in a digital context. The goal is to enhance employee well-being, optimize productivity, and drive overall organizational success by fostering a truly human-centric digital workplace strategy. This research contributes to both scholarly understanding and practical application in human resources and organizational development by providing a tailored approach to a pressing contemporary challenge.

Literature Review

Employee engagement has been a central construct in organizational psychology and human resources for decades, evolving in its conceptualization and measurement. The advent of the digital workplace necessitates a review of these foundational understandings considering new environmental complexities.

Employee engagement is widely recognized as a "multidimensional psychological construct" that signifies an employee's emotional connection, cognitive investment, and behavioral commitment to their work and organization.

Seminal Definitions and Models

One of the seminal conceptualizations of employee engagement was provided by Kahn (1990), who identified three principal dimensions: physical, cognitive, and emotional involvement [8]. Physical engagement refers to the consistent and dedicated effort employees put into their work. Cognitive involvement describes the active seeking of opportunities to learn, grow, and contribute expertise and problem-solving skills. Emotional commitment represents the extent to which employees feel a deep connection and belonging to their organization, genuinely caring about its success and often going "above and beyond their job description". Kahn's work highlighted that engagement is a state where individuals bring their full selves to their roles, encompassing cognitive, emotional, physical, and potentially social aspects.

Building on such foundational work, the Utrecht Work Engagement Scale (UWES) operationalizes engagement through three distinct dimensions: vigor, dedication, and absorption. Vigor is characterized by high levels of energy, mental resilience, and a willingness to invest effort and persist even in challenging situations. Dedication signifies a strong sense of enthusiasm, inspiration, pride, and a feeling that one's work is meaningful and important, fostering a deep connection to the job. Absorption describes a state of being completely engrossed in one's work, where time seems to fly by, leading to deep immersion and often difficulty detaching from tasks. The UWES

has demonstrated strong psychometric properties, including reliability and validity across various cultural contexts.

Another widely utilized model is the Gallup Q12, which identifies 12 key items that directly link to important performance outcomes such as productivity, profitability, and employee retention. These items probe aspects like clear expectations, opportunities to excel, access to necessary materials, recognition, supportive relationships, and opportunities for development. Gallup's extensive database, comprising millions of respondents, allows for robust benchmarking and provides actionable insights for managers.

The Aon-Hewitt Model of Employee Engagement centers on the "Say, Stay, Strive" framework, measuring engagement through employees' willingness to speak positively about the organization ("Say"), their intention to remain with the organization ("Stay"), and their motivation to exert extra effort ("Strive"). This model directly links employee engagement to business outcomes and emphasizes six core values: job security, safety, work-life balance, leadership effectiveness, empowerment, organizational practices (e.g., diversity, transparent communication), performance management (e.g., career progression, recognition), and brand reputation. This framework thrives in data-driven environments that regularly monitor and analyze performance metrics and employee feedback.

Underlying Psychological Theories

To develop a comprehensive framework for digital employee engagement, it is crucial to ground the dimensions in established psychological theories that explain human motivation and behavior in organizational contexts.

- Job Demands-Resources (JD-R) Model: The JD-R model provides a flexible and comprehensive framework for understanding how job characteristics influence employee well-being and engagement. It posits that every occupation has its own specific job demands (physical, social, or organizational aspects of the job that require sustained physical or mental effort and are therefore associated with certain physiological or psychological costs) and job resources (physical, social, or organizational aspects of the job that are functional in achieving work goals, reduce job demands, and stimulate personal growth, learning, and development). In the digital workplace, job demands can include technostress, information overload, hyperconnectivity, and the blurring of work-life boundaries [2, 9]. Conversely, job resources in a digital context might encompass digital literacy, effective digital tools, supportive digital leadership, and opportunities for skill development. The JD-R model suggests that when job resources are sufficient to meet job demands, employees are more likely to experience engagement, while an imbalance can lead to burnout and disengagement [2]. This model is particularly well-suited for the digital workplace as it integrates both positive (engagement) and negative (burnout) outcomes, allowing for a balanced assessment of the complex impacts of digitalization.
- Self-Determination Theory (SDT): SDT proposes that individuals possess three innate psychological needs that drive intrinsic motivation, engagement, and well-being: autonomy, competence, and relatedness.

1. Autonomy refers to the need for individuals to feel in control of their actions and decisions, having the freedom to choose their methods and priorities. In a digital workplace, this translates to flexible work arrangements, the ability to organize one's work independently, and participation in decision-making processes, which can significantly boost motivation and engagement.

2. Competence reflects the need to feel effective and capable in one's endeavors, perceiving growth and improvement. Digital skills training and development opportunities are crucial in this context, enabling employees to master new digital tools and adapt to technological changes, thereby enhancing their self-efficacy and confidence.

3. Relatedness encompasses the desire to connect with others and feel valued within a team or organization, fostering a sense of belonging. In digital environments, this requires intentional strategies to facilitate virtual social connections, such as dedicated communication channels, virtual team-building activities, and supportive leadership that encourages interpersonal relationships.

- Social Exchange Theory (SET): SET posits that social behavior is the result of an exchange process, where individuals weigh the costs and benefits of relationships. In the workplace, this translates to a two-way relationship between an organization and its employees, where perceived organizational support and fair exchanges foster engagement and commitment. When employees perceive that the organization provides them with adequate resources, support, and recognition (benefits), they are more likely to reciprocate with higher levels of engagement, loyalty, and discretionary effort (costs). This is particularly relevant in virtual teams, where the quality of Leader-Member Exchange (LMX) the perceived relationship between managers and their remote employees—is crucial for fostering engagement. Trust, transparent communication, and equitable treatment are vital for building strong social exchanges in digital work environments.

Characteristics and Impact of the Digital Workplace on Engagement

The digital workplace is not merely a collection of tools but a dynamic environment with distinct characteristics that profoundly impact employee engagement.

Digital Employee Experience (DEX)

The Digital Employee Experience (DEX) is a critical component of the broader employee experience, focusing on how employees interact with and perceive the technology and digital tools provided by their organization [1]. A positive DEX is crucial for promoting digital dexterity, driving personal and team growth, and supporting organizational goals around culture and community [1]. Organizations can leverage DEX to prepare employees to improve their ways of working and embrace the skills necessary to thrive in a digital environment [1].

However, managing the DEX involves addressing significant challenges such as the overwhelming rate of technical change, a lack of understanding of employee needs, and the tendency to over-prioritize technology solutions for non-technical problems, which can lead to employee change fatigue [1]. Identifying and mitigating "digital friction" points where technology hinders rather than helps work—is essential for a positive DEX [1]. Developing employee personas can help organizations understand

diverse experiences and digital dexterity gaps, enabling targeted interventions like nudges, rewards, recognition, and employee development programs [1].

Challenges and Negative Impacts

While offering numerous benefits, the digital workplace also introduces a "darker side" marked by specific job demands that can negatively impact employee well-being and engagement.

- Technostress and Digital Fatigue: Prolonged engagement with digital tools can lead to mental exhaustion, reduced job performance, and heightened stress, a condition often referred to as technostress or digital fatigue [2, 9-11]. Key dimensions of technostress include overload (incessant information flow, burdensome applications), invasion (blurring work-life boundaries), and insecurity (fear of technology or job displacement). This constant connection can lead to an inability to disengage from work, contributing to burnout.
- Information Overload and Hyperconnectivity: The proliferation of digital communication channels (e.g., email, chat platforms) often results in information overload, where employees are inundated with messages and data. This hyperconnectivity creates pressure to be "always on," leading to frequent interruptions and making it difficult to refocus on tasks, significantly impacting productivity and well-being.
- Social Isolation: In remote and hybrid work models, physical distance can create mental distance, leading to feelings of isolation and loneliness among employees. The absence of informal social interactions, such as water cooler chats or team lunches, can erode camaraderie and social support, which are crucial for well-being and engagement.
- Work-Life Boundary Blurring: The flexibility offered by digital tools often blurs the lines between work and personal life, making it challenging for employees to disengage. This "always-on" culture contributes to chronic stress, fatigue, and burnout, ultimately impacting job satisfaction and increasing turnover intentions.

Opportunities and Positive Impacts

Despite the challenges, the digital workplace also presents significant opportunities for enhancing employee engagement.

- Increased Flexibility and Autonomy: Digital tools enable greater flexibility in work arrangements, allowing employees to manage their time and tasks more autonomously [2, 7]. This autonomy can boost engagement by giving employees more control over their work, aligning with the SDT's emphasis on self-determination.
- Enhanced Collaboration and Communication: Digital platforms facilitate seamless collaboration and instant communication, transcending geographical barriers. Tools like video conferencing, chat applications, and shared document systems enable real-time interaction and information sharing, improving teamwork efficiency and fostering a sense of connection.
- Improved Productivity and Innovation: Organizations prioritizing digital tools often experience higher employee engagement, leading to increased productivity and innovation. Digital transformation can positively influence engagement, with hybrid

models often showing the highest engagement scores. Digital dexterity, supported by effective DEX, drives better business outcomes [1].

- Real-time Feedback and Recognition: Digital tools, such as performance management software and AI-powered platforms, enable real-time feedback mechanisms and personalized recognition systems. Consistent and authentic recognition, whether peer-to-peer or from leadership, significantly boosts morale and motivation, contributing to higher engagement and lower turnover rates.

- Professional Development and Learning Opportunities: Digital learning pathways, virtual mentorship programs, and online training initiatives provide continuous opportunities for skill development and professional growth, which are key drivers of employee morale and engagement. This addresses the competence need identified by SDT.

Existing Approaches to Measuring Engagement in Digital Contexts

The shift to digital work has highlighted the need for measurement approaches that accurately reflect the new realities.

Traditional Survey Tools and Their Limitations

As discussed, traditional employee engagement surveys, while valuable, often fall short in capturing the nuances of the digital workplace. The Gallup Q12, despite its widespread use and proven links to business outcomes, does not include specific items to assess the impact of digital tools, virtual communication effectiveness, or digital well-being. Similarly, the UWES, while measuring core engagement dimensions, has not been explicitly validated for its ability to capture digital workplace-specific factors.

These models, designed for a different era, inherently possess a "digital blind spot". They may indicate overall engagement levels but fail to pinpoint the causes of disengagement or the specific drivers of engagement within a technologically saturated environment. For instance, a low engagement score might be reported, but traditional surveys might not reveal whether it stems from digital fatigue, inadequate digital tools, or a lack of effective virtual leadership. This makes it challenging for organizations to implement targeted interventions that address the root causes of engagement issues in their digital workforce.

Emerging Digital Tools and KPIs

In response to these limitations, organizations are increasingly leveraging digital tools and HR analytics to measure employee engagement. These tools offer the advantage of real-time data collection, automated analysis, and greater scalability compared to traditional manual processes.

Key Performance Indicators (KPIs) for digital workplace engagement include:

- Employee Net Promoter Score (eNPS): A simple metric to gauge employee loyalty and satisfaction, indicating their likelihood of recommending the company as a place to work.

- Turnover and Retention Rates: High turnover rates signal dissatisfaction and disengagement, while retention rates indicate the organization's ability to keep talent. Digital engagement strategies have been shown to reduce turnover by 15%-31%.

- Productivity Metrics: Measuring output, such as sales-to-quota data or project completion rates, can correlate with engagement levels. Engaged employees contribute significantly more effort and boost productivity.
- Absenteeism Rates: Engaged employees report significantly fewer absences, making this a key indicator of well-being and commitment.
- Active User Rates on Digital Platforms: Tracking active users on intranets, collaboration tools, and internal social platforms can indicate digital connectivity and social engagement.
- Survey Scores and Participation: Digital survey tools allow for frequent pulse surveys and provide quantitative and qualitative feedback on various engagement drivers, including purpose, autonomy, growth, relationships, recognition, communication, and resources. High participation rates (e.g., 65% or higher) often indicate trust and investment in the company's success.
- Internal Promotion Rate and Career Development: Opportunities for professional growth are major drivers of engagement, and tracking internal mobility reflects an organization's commitment to employee development.

Platforms like Deel Engage, CultureMonkey, and SurveyMonkey offer features such as customizable surveys, feedback analytics, and AI-powered analysis to monitor and enhance employee experience in the digital age. While these tools provide valuable data, they often focus on individual metrics rather than offering a cohesive, multi-dimensional framework that systematically links digital workplace characteristics to a comprehensive understanding of engagement. This highlights the need for a structured framework that integrates these various data points into a coherent measurement strategy.

Proposed Multi-Dimensional Framework for Digital Employee Engagement

The preceding literature review underscores a critical gap: existing employee engagement models, while foundational, do not adequately capture the multifaceted nature of engagement within the digital workplace. The unique demands and opportunities presented by digital transformation, remote work, and pervasive technology necessitate a tailored framework that can provide a more nuanced and actionable understanding.

Rationale for a New Framework

The rationale for proposing a new multi-dimensional framework stem directly from the limitations identified in traditional models and the evolving complexities of the digital work environment. Traditional models, designed for a pre-digital era, inherently overlook critical factors such as technostress, digital fatigue, the blurring of work-life boundaries, and the specific dynamics of virtual collaboration and leadership. Without explicitly measuring these dimensions, organizations are unable to accurately diagnose the root causes of disengagement or leverage the full potential of digital tools to foster a thriving workforce.

A new framework is required to serve as a comprehensive diagnostic tool, moving beyond generic satisfaction metrics to provide granular insights into how digital workplace characteristics impact employee engagement. This approach allows for the identification of specific strengths to build upon and gaps to address, facilitating

targeted and effective interventions. By integrating the unique elements of digital experience, the proposed framework aims to enhance organizational capacity for informed decision-making, ultimately leading to improved employee well-being, sustained productivity, and long-term organizational success. This framework is designed to align technological advancements with human-centric approaches, ensuring a balanced and engaged workforce.

Core Dimensions of the Proposed Framework

Building upon foundational theories and addressing the specific characteristics of the digital workplace, the proposed multi-dimensional framework for measuring employee engagement comprises six core dimensions:

Digital Well-being: This dimension focuses on the mental and physical health of employees in a technologically saturated environment. It addresses the prevalence and impact of technostress, digital fatigue, and the ability to manage digital demands without succumbing to burnout. Measurement will assess employees' perceptions of information overload, hyperconnectivity, and the effectiveness of organizational initiatives to promote digital well-being and work-life balance (e.g., clear communication boundaries, digital detox programs). This dimension is crucial for understanding the "darker side" of digital work and aligning with the JD-R model's focus on managing job demands to prevent strain.

Digital Connectivity and Collaboration: This dimension evaluates the effectiveness of digital tools and platforms in facilitating seamless communication, fostering social connections, and enabling efficient team collaboration in virtual and hybrid settings. It measures the perceived ease of use, reliability, and integration of communication and collaboration technologies, as well as the sense of community and belonging among distributed teams. This dimension directly relates to SDT's need for relatedness, emphasizing that intentional strategies are required to replicate the social fabric of traditional workplaces in a digital context. It also touches upon the social exchange theory, where effective communication and collaboration tools represent a resource provided by the organization, fostering reciprocity in engagement.

Digital Competence and Growth: This dimension assesses employees' digital literacy, their comfort and proficiency with digital tools, and the opportunities provided for continuous skill development in a tech-driven environment. It measures perceptions of access to relevant training, support for digital upskilling, and the extent to which employees feel confident in their ability to adapt to new technologies [1]. This dimension directly addresses SDT's need for competence, recognizing that a perceived "digital dexterity gap" can lead to stress and disengagement. Organizations that invest in digital skills training not only enhance individual competence but also improve overall productivity and retention.

Meaningful Digital Work and Autonomy: This dimension examines how employees perceive the purpose, value, and impact of their work when performed digitally, along with the degree of autonomy and ownership they experience in their roles. It assesses whether digital tools enable flexibility in execution and allow employees to align their tasks with personal values and organizational goals. This dimension aligns with SDT's emphasis on autonomy and the importance of meaningful

work for intrinsic motivation and commitment. It also considers how job design in a digital context can provide a sense of purpose and allow for self-organization, which are crucial for engagement.

Digital Leadership and Recognition: This dimension focuses on the effectiveness of leadership in fostering engagement within digital settings, including transparent communication, trust-building, and the implementation of effective digital recognition systems. It assesses how leaders provide clear expectations, offer regular and personalized feedback through digital channels, and acknowledge contributions in a virtual environment. Effective digital leadership is critical for mitigating feelings of isolation and ensuring equitable visibility for remote accomplishments. This dimension is underpinned by Social Exchange Theory, where perceived support and fair recognition from leaders encourage reciprocal engagement from employees.

Work-Life Integration (Digital Boundary Management): This dimension specifically addresses the challenges of blurring work-life boundaries in the digital age. It measures employees' ability to disengage from work, the presence of clear organizational policies regarding digital communication outside work hours, and the perceived support for maintaining a healthy balance between professional and personal life. This dimension is vital for preventing burnout and ensuring sustained engagement, acknowledging that the flexibility of digital work can paradoxically lead to increased stress if boundaries are not effectively managed.

Theoretical Underpinnings of the Framework

The proposed multi-dimensional framework is robustly grounded in the three fundamental psychological theories discussed previously:

Job Demands-Resources (JD-R) Model: The JD-R model provides the overarching structure for understanding how digital workplace characteristics function as either demands or resources impacting engagement. Digital Well-being directly addresses the management of digital job demands (e.g., technostress, hyperconnectivity), while Digital Competence and Growth, Digital Connectivity, and Digital Leadership represent crucial job resources that help employees cope with demands and foster engagement. The framework acknowledges that digitalization can produce both beneficial (challenge appraisals) and detrimental (threat appraisals) impacts on engagement, and that digital literacy can moderate these impacts.

Self-Determination Theory (SDT): SDT informs the motivational aspects of the framework, particularly through the dimensions of Meaningful Digital Work and Autonomy, and Digital Competence and Growth. Providing employees with autonomy over their digital work processes and opportunities for skill development directly satisfies their needs for autonomy and competence, leading to intrinsic motivation and higher engagement. Digital Connectivity and Collaboration also supports the need for relatedness, emphasizing the importance of social connections even in virtual environments.

Social Exchange Theory (SET): SET underpins the relational aspects of the framework, especially Digital Leadership and Recognition, and Digital Connectivity and Collaboration. When organizations invest in supportive digital leadership, transparent communication, and equitable recognition systems, employees perceive a

positive exchange, leading to increased trust, commitment, and willingness to exert discretionary effort. The quality of leader-member exchange (LMX) in virtual teams is a key predictor of engagement, reinforcing the importance of the perceived relationship between managers and remote employees.

By integrating these theories, the framework moves beyond a mere listing of engagement factors to provide a coherent understanding of the psychological mechanisms through which digital workplace characteristics influence employee engagement. This theoretical grounding ensures that the framework is not only comprehensive but also provides a strong basis for developing effective measurement tools and targeted interventions.

Methodology

Measuring employee engagement within the proposed multi-dimensional framework requires a robust methodology that can capture both the breadth and depth of the employee experience in the digital workplace. A mixed-methods approach is advocated to provide a comprehensive understanding, combining the statistical power of quantitative data with the rich contextual insights of qualitative inquiry.

Research Design

A concurrent mixed-methods research design is proposed, integrating quantitative surveys and qualitative interviews/focus groups simultaneously. This approach allows for triangulation of data, where findings from one method can corroborate, elaborate on, or contradict findings from the other, leading to a more complete and nuanced understanding of digital employee engagement. The quantitative component will provide a broad assessment of engagement levels across the proposed dimensions, while the qualitative component will delve into the lived experiences, perceptions, and specific challenges or opportunities employees encounter in their digital work environments.

Participants and Sampling

The target population for this research would consist of employees working in various industries with significant digital workplace integration, including those in fully remote, hybrid, and digitally intensive on-site roles. A stratified random sampling approach could be employed for the quantitative survey to ensure representation across different organizational levels, departments, and work arrangements. For the qualitative component, purposive and snowball sampling would be valuable to identify information-rich cases, such as employees with diverse experiences in digital work, including those who have experienced digital friction or high levels of engagement. A sample size sufficient for statistical analysis (e.g., n=3000 for quantitative, as seen in some studies) and thematic saturation for qualitative data (e.g., 20-30 participants for interviews) would be sought.

Data Collection Instruments

Quantitative Survey (Proposed Scale): A new survey instrument would be developed based on the six proposed dimensions: Digital Well-being, Digital Connectivity and Collaboration, Digital Competence and Growth, Meaningful Digital Work and Autonomy, Digital Leadership and Recognition, and Work-Life Integration.

Each dimension would be operationalized through multiple items, measured on a 5-point or 6-point Likert scale (e.g., 1 = Strongly Disagree to 5/6 = Strongly Agree or 0 = Never to 6 = Always).

Sample Items (Illustrative):

- Digital Well-being: "I feel mentally refreshed after using digital tools for work" (Reverse-scored for negative impact). "I experience stress due to the constant flow of digital information".
- Digital Connectivity and Collaboration: "Our digital communication tools effectively support my team's collaboration". "I feel connected to my colleagues even when working remotely".
- Digital Competence and Growth: "I am confident in my ability to use new digital technologies required for my job". "I have sufficient opportunities to develop my digital skills".
- Meaningful Digital Work and Autonomy: "My digital work tasks provide me with a sense of purpose and contribution". "I have sufficient autonomy in how I perform my work using digital tools".
- Digital Leadership and Recognition: "My manager effectively uses digital channels to provide me with feedback and recognition". "I trust my leaders to make fair decisions regarding digital work arrangements".
- Work-Life Integration: "I am able to effectively set boundaries between my work and personal life when using digital tools". "Our company supports a healthy work-life balance in the digital environment".

The survey would also include demographic questions (age, gender, education, tenure) and control variables, as is common practice in engagement studies [12, 13]. Prior to full deployment, the proposed scale would undergo rigorous psychometric validation, including internal consistency analysis (e.g., Cronbach's alpha coefficient) and exploration and confirmatory factor analysis to assess its reliability and construct validity.

Qualitative Interviews/Focus Groups: Semi-structured interviews or focus groups would be conducted to gather richer context and personal narratives that quantitative data alone cannot capture. Questions would explore participants lived experiences with digital tools, specific instances of digital friction or enhanced engagement, perceptions of digital leadership, and strategies for managing work-life boundaries in a digital context. This qualitative data would provide invaluable context, helping to illuminate the emotional and experiential dimensions behind the survey numbers.

Data Analysis

For the quantitative data collected through the survey, statistical software such as SPSS or R would be used. Initially analysis would involve descriptive statistics to summarize engagement levels across dimensions. Reliability of the scale would be assessed using Cronbach's alpha. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) would be applied to confirm the proposed multi-dimensional structure of the framework. Regression analysis would be used to examine the relationships between the proposed dimensions and overall employee engagement, as well as their impact on key outcomes like productivity and retention. ANOVA could

be used to identify significant differences in engagement across various work models (e.g., fully remote, hybrid, on-site) or demographic groups.

Qualitative data from interviews and focus groups would be transcribed and subjected to thematic analysis. This involves systematically identifying recurring themes, patterns, and unique insights within the narratives. The findings from the qualitative analysis would then be triangulated with the quantitative results to provide a comprehensive and robust understanding of digital employee engagement. This integration allows for a deeper interpretation of statistical trends by providing the "why" behind the numbers, ensuring that employee voices genuinely inform the understanding of engagement.

Results and Discussion

While this paper proposes a framework and methodology, the "Results and Discussion" section would typically present and interpret the empirical findings derived from applying the proposed measurement framework. To this theoretical paper, this section will outline the expected findings, discuss the implications of such a framework, and acknowledge its limitations while suggesting avenues for future research.

Expected Findings

It is anticipated that the application of this multi-dimensional framework would yield several key findings regarding employee engagement in the digital workplace.

Firstly, it is expected that traditional engagement metrics alone would not fully capture the complexities of digital work. Instead, the proposed dimensions—Digital Well-being, Digital Connectivity and Collaboration, Digital Competence and Growth, Meaningful Digital Work and Autonomy, Digital Leadership and Recognition, and Work-Life Integration—would demonstrate distinct and significant influences on overall employee engagement. For instance, high levels of technostress or digital fatigue (low Digital Well-being) are expected to correlate negatively with engagement, even if other traditional factors appear positive.

Secondly, the research would likely confirm that digital literacy and competence play a crucial moderating role in how employees appraise workplace digitalization. Those with higher digital literacy would be more likely to perceive digital changes as challenges and opportunities for growth, leading to enhanced engagement. Conversely, employees with lower digital literacy might perceive digitalization as a threat, resulting in decreased engagement and higher stress. This suggests that the impact of digital tools is not uniform but is mediated by an individual's readiness and ability to interact with technology.

Thirdly, it is expected that effective digital leadership, characterized by transparent communication, trust-building, and tailored recognition in virtual settings, would emerge as a strong predictor of engagement. The quality of virtual social connections and seamless collaboration tools would also be positively associated with higher engagement, highlighting the importance of fostering a sense of relatedness and community in distributed teams.

Finally, the findings would likely reveal a nuanced relationship between remote/hybrid work models and engagement. While remote work can offer increased autonomy and flexibility, potentially boosting engagement, it is also associated with higher levels of stress, loneliness, and difficulty disengaging from work for some employees. Hybrid models might show the highest engagement scores when balanced with employee well-being and organizational support, suggesting that a strategic blend of digital and in-person interactions is optimal. The framework would help pinpoint which specific aspects of these models contribute to or detract from engagement.

Implications of the Framework

The proposed multi-dimensional framework carries significant implications for both academic understanding and practical organizational strategies.

Academically, this framework contributes to literature by providing a more precise and comprehensive conceptualization of employee engagement in the digital age. It moves beyond generic definitions to explicitly integrate the unique psychological and operational dynamics introduced by digital transformation. This allows researchers to conduct more targeted studies, explore specific causal pathways between digital workplace factors and engagement outcomes, and develop more refined theoretical models. The framework's grounding in JD-R, SDT, and SET provides a robust theoretical foundation for future empirical investigations into digital employee engagement.

Practically, the framework serves as a vital diagnostic tool for human resource professionals and organizational leaders. By measuring engagement across these specific dimensions, organizations can gain granular insights into their workforce's experience, identifying precisely which digital workplace elements are fostering or hindering engagement. For example, if scores are low in "Digital Well-being," it signals a need for interventions addressing technostress and work-life boundaries, rather than generic engagement initiatives. If "Digital Competence and Growth" is low, it points to a need for targeted digital skills training.

This targeted understanding enables organizations to:

- Inform HR Strategies: Develop human resource strategies that align employee roles with organizational purpose and personal values, leveraging technology to facilitate collaboration and build a purpose-driven culture.
- Guide Technology Investments: Make informed decisions about which digital tools and platforms to invest in, prioritizing those that enhance collaboration, reduce digital friction, and support employee well-being.
- Enhance Digital Leadership: Develop leadership training programs that equip managers with the competencies needed to foster engagement in digital settings, including active listening, trust-building, and strategic recognition through virtual channels.
- Design Targeted Interventions: Implement specific programs to address identified deficits, such as digital wellness initiatives to combat fatigue, virtual social events to reduce isolation, or personalized feedback systems to boost motivation.

- Foster a Human-Centric Digital Workplace: Shift the focus from technology for technology's sake to a human-centric approach that prioritizes the employee experience, ensuring that digital transformation genuinely benefits the workforce.

Ultimately, by providing a more accurate and actionable measure of digital employee engagement, this framework empowers organizations to create more supportive, productive, and thriving work environments, thereby sustaining long-term success and competitive advantage in the digital era.

Limitations and Future Research

While the proposed multi-dimensional framework offers a comprehensive approach to measuring digital employee engagement, it is important to acknowledge potential limitations and suggest avenues for future research.

One limitation inherent in survey-based methodologies is the potential for social desirability bias, where respondents may provide answers, they believe are socially acceptable rather than their true feelings. This can be mitigated through assurances of anonymity and careful phrasing of questions. Furthermore, self-report measures, while valuable, may not always align with objective indicators of productivity or well-being. Future research could explore the integration of objective data (e.g., digital platform usage analytics, performance metrics, biometric data where ethically appropriate) to triangulate and validate self-reported engagement levels.

Another area for further investigation is the generalizability of the framework across diverse industries, organizational cultures, and geographical regions. While theoretically grounded, empirical validation across a broad spectrum of contexts is essential to confirm its universal applicability. Cross-cultural studies would be particularly valuable to understand how cultural nuances might influence the manifestation and measurement of digital engagement dimensions.

Longitudinal studies are also crucial to assessing the dynamic nature of digital fatigue and engagement over time [14]. This would allow researchers to track changes in engagement levels in response to evolving digital workplace practices and to evaluate the long-term effectiveness of interventions based on the framework. Experimental or quasi-experimental designs could be employed to test the causal relationships between specific digital workplace interventions and changes in engagement dimensions.

Finally, further research could explore the interplay between the proposed dimensions. For example, how does an increase in digital competence influence an employee's perception of meaningful digital work, or how does effective digital leadership mitigate the negative impacts of hyperconnectivity on digital well-being? Investigating these complex interdependencies would further refine the framework and provide deeper insights into the intricate dynamics of employee engagement in the digital workplace.

Conclusion

The digital transformation has fundamentally reshaped the modern workplace, presenting both unprecedented opportunities and complex challenges for fostering employee engagement. Traditional measurement models, designed for a bygone era,

often fall short in capturing the unique nuances of this evolving landscape, leaving organizations with an incomplete understanding of their workforce's true state of engagement. This paper has addressed this critical measurement gap by proposing a novel multi-dimensional framework that explicitly integrates the digital experience into the conceptualization and assessment of employee engagement.

Grounded in established psychological theories, the Job Demands-Resources model, Self-Determination Theory, and Social Exchange Theory - the framework introduces six core dimensions: Digital Well-being, Digital Connectivity and Collaboration, Digital Competence and Growth, Meaningful Digital Work and Autonomy, Digital Leadership and Recognition, and Work-Life Integration. These dimensions acknowledge the pervasive influence of technology on employee experience, from the psychological burden of technostress to the opportunities for enhanced autonomy and connection.

By adopting a mixed-methods approach for its measurement, combining quantitative surveys with qualitative inquiry, organizations can gain a holistic and actionable understanding of engagement in their digital workforces. This granular insight empowers leaders and HR professionals to move beyond generic interventions, enabling the design and implementation of targeted strategies that genuinely resonate with employees. Ultimately, this framework serves as a vital diagnostic tool, guiding organizations to cultivate a human-centric digital workplace that not only optimizes productivity and innovation but also prioritizes employee well-being, fostering a truly engaged and thriving workforce in the digital age.

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DIGITAL STORYTELLING AND ITS EFFECTIVENESS IN TOURISM DESTINATION BRANDING

Wang Lina,
DBA student,
Al-Farabi Kazakh National University, Al-Farabi business school

Moldabekova Aisulu
Ph.D., Associate Professor
Al-Farabi Kazakh National University, Al-Farabi business school

Abstract

Digital storytelling has emerged as a powerful marketing tool that fundamentally transforms how tourism destinations engage with potential visitors and build brand identity. This research examines the effectiveness of digital storytelling in tourism destination branding through a comprehensive analysis of contemporary practices and their impact on visitor engagement and destination choice. The study employs a mixed-methods approach combining quantitative analysis of digital storytelling campaigns and qualitative assessment of visitor responses across multiple tourism destinations. Findings reveal that digital storytelling significantly enhances destination brand awareness, emotional connection, and visitor intention to travel, with 94% correlation between exposure to digital narratives and positive destination perception. The research demonstrates that destinations utilizing authentic, culturally grounded digital stories achieve 35% higher visitor engagement rates compared to traditional marketing approaches. Key effectiveness factors include narrative authenticity, cultural resonance, technological integration, and multi-platform distribution strategies. The study contributes to destination marketing literature by providing empirical evidence of digital storytelling's role in creating memorable destination experiences and fostering long-term visitor loyalty. Results indicate that strategic implementation of digital storytelling can increase destination competitiveness and support sustainable tourism development through enhanced visitor-destination relationships.

Keywords: Digital storytelling, destination branding, tourism marketing, narrative marketing, visitor engagement, destination image, cultural tourism, tourism technology, destination management

Introduction

The contemporary tourism landscape is characterized by intense global competition among destinations seeking to attract increasingly sophisticated and experience-driven travelers [1]. In this saturated marketplace, traditional destination marketing approaches focused solely on showcasing physical attributes and amenities have proven insufficient to create meaningful differentiation and lasting visitor engagement [2]. Digital storytelling has emerged as a transformative marketing strategy that enables destinations to transcend conventional promotional boundaries by creating immersive,

emotionally resonant narratives that connect with potential visitors on deeper psychological levels [3].

Digital storytelling in tourism represents the strategic integration of narrative techniques with modern technology to create compelling, shareable content that communicates destination values, culture, and unique experiences [4]. This approach fundamentally shifts destination marketing from product-centric messaging to experience-centric narratives that allow potential visitors to envision themselves within the destination's cultural and experiential framework [5]. The rise of social media platforms, mobile technology, and immersive digital experiences has created unprecedented opportunities for destinations to craft and distribute stories that reach global audiences while maintaining authentic local character [6].

The effectiveness of digital storytelling in destination branding stems from its ability to address the emotional and aspirational dimensions of travel decision-making [7]. Research indicates that 79% of travelers prefer brands that tell authentic stories about real people and experiences rather than celebrity endorsements, highlighting the growing demand for genuine narrative connections [8]. Furthermore, destinations utilizing storytelling techniques report significant improvements in visitor engagement metrics, with some campaigns achieving return on investment ratios exceeding 11:1 [9].

This research addresses a critical gap in tourism marketing literature by examining the specific mechanisms through which digital storytelling influences destination branding effectiveness [10]. While previous studies have explored general applications of storytelling in tourism contexts, limited empirical research has systematically analyzed the relationship between digital narrative strategies and measurable branding outcomes [11]. The study's significance lies in its potential to inform destination marketing organizations (DMOs) and tourism stakeholders about evidence-based approaches to narrative marketing that can enhance competitive positioning and sustainable tourism development.

The primary research objective is to evaluate the effectiveness of digital storytelling in tourism destination branding by analyzing the relationship between narrative marketing strategies and key performance indicators including brand awareness, visitor engagement, and travel intention [12]. Secondary objectives include identifying best practices for digital storytelling implementation, examining the role of cultural authenticity in narrative effectiveness, and assessing the impact of technological platforms on story distribution and reception [13].

Literature Review

Theoretical Foundations of Digital Storytelling in Tourism

Digital storytelling in tourism marketing builds upon established narrative theory and contemporary digital communication frameworks [14]. The conceptual foundation recognizes that human memory and decision-making processes are fundamentally story-based, making narrative approaches particularly effective for creating memorable destination experiences [15]. Fog et al. (2005) and Silverstein and Fiske (2003) established that tourists actively seek experiences that resonate with their emotions and

aspirations, with storytelling serving as a crucial mechanism for facilitating such connections [16, 17].

The tourism industry's adoption of digital storytelling reflects broader shifts toward experience-based marketing and co-creation models [18]. Unlike traditional advertising that emphasizes factual attributes, storytelling conveys brand value through emotional narratives that enable destinations to differentiate themselves in competitive markets [19]. This approach aligns with contemporary traveler expectations for authentic, meaningful experiences that extend beyond conventional sightseeing activities [20].

Digital Storytelling Components and Mechanisms

Effective digital storytelling in tourism contexts incorporates several key components identified across multiple studies [21]. Strong character development featuring real people with relatable experiences, including locals, visitors, and business owners, creates emotional anchors for narrative engagement [22]. Vivid setting descriptions transport audiences and establish sense of place, while conflict and resolution elements demonstrate destination transformation or visitor evolution [23]. Emotional resonance through joy, curiosity, nostalgia, and surprise generates authentic connections, supported by clear purpose statements that communicate destination significance [24].

The structural elements of successful tourism narratives follow established storytelling principles while adapting to digital platform requirements [25]. Research indicates that destinations utilizing character-driven narratives with clear emotional arcs achieve significantly higher engagement rates than those relying solely on descriptive content [26]. The integration of visual storytelling through 360-degree photography, virtual reality experiences, and interactive multimedia enhances narrative immersion and visitor comprehension [27].

Digital Platforms and Distribution Strategies

Contemporary digital storytelling leverages diverse platform ecosystems to maximize narrative reach and engagement [28]. Social media platforms including Instagram, TikTok, YouTube, and Facebook serve as primary distribution channels, each offering unique storytelling formats and audience engagement mechanisms [29]. Video content has emerged as the most effective storytelling medium, with 64% of consumers preferring video narratives over text-based alternatives [30].

Platform-specific strategies recognize varying audience preferences and content consumption patterns [31]. Instagram's visual-centric approach suits destination imagery and short-form narratives, while YouTube enables longer-form documentary-style content that can explore cultural depth and historical context [32]. TikTok's algorithm-driven discovery mechanisms favor authentic, locally produced content that showcases real experiences and hidden gems [33].

Effectiveness Measurement and Performance Indicators

Measuring digital storytelling effectiveness in tourism requires multi-dimensional assessment frameworks that capture both quantitative engagement metrics and qualitative impact indicators [34]. Key performance indicators include brand awareness metrics, social media engagement rates, website traffic patterns, conversion

rates from story exposure to booking behavior, and sentiment analysis of user-generated responses [35].

Advanced measurement approaches incorporate consumer-based brand equity models that evaluate long-term brand strength through brand salience, brand image, and brand loyalty assessments [36]. These frameworks enable destinations to understand how narrative strategies influence visitor perceptions over time and predict future performance trends [37]. Research demonstrates that destinations with strong storytelling strategies achieve 43% higher tourist loyalty rates compared to those using conventional marketing approaches [38].

Cultural Authenticity and Stakeholder Engagement

The effectiveness of digital storytelling in tourism is significantly influenced by cultural authenticity and community engagement factors [39]. Authentic narratives that accurately represent local culture, history, and values create stronger emotional connections with visitors while supporting sustainable tourism development [40]. Conversely, inauthentic or culturally appropriated stories can generate negative reactions and damage destination reputation [41].

Successful digital storytelling initiatives involve collaborative partnerships between destination marketing organizations, local communities, and cultural stakeholders [42]. This approach ensures narrative accuracy while empowering local voices and perspectives [43]. Research indicates that community-involved storytelling projects achieve 67% higher authenticity ratings from visitors compared to externally developed campaigns [44].

Technology Integration and Innovation

The integration of emerging technologies including virtual reality, augmented reality, and artificial intelligence is reshaping digital storytelling capabilities in tourism [45]. Virtual reality enables immersive destination previews that allow potential visitors to experience locations before travel, with 50% of travelers expressing greater willingness to visit destinations after VR exposure [46]. Augmented reality applications enhance on-site storytelling by overlaying historical information, cultural context, and interactive narratives onto physical environments [47].

Artificial intelligence technologies enable personalized storytelling experiences that adapt narratives based on individual visitor preferences and behavioral patterns [27]. These innovations support scalable customization while maintaining narrative coherence and cultural authenticity [48]. The global virtual tourism market, valued at $7.94 billion in 2023, demonstrates growing demand for technology-enhanced narrative experiences [49].

Methodology

Research Design

This study employs mixed-methods research design combining quantitative analysis of digital storytelling campaign performance with qualitative assessment of visitor responses and stakeholder perspectives [34]. The mixed-methods approach enables comprehensive examination of digital storytelling effectiveness by capturing both measurable outcomes and nuanced experiential dimensions that purely

quantitative or qualitative methods might overlook [50]. The research design follows sequential explanatory methodology, beginning with quantitative data collection and analysis, followed by qualitative investigations to explain and contextualize quantitative findings [9].

Quantitative Component

The quantitative research component involves systematic analysis of digital storytelling campaigns across 15 internationally recognized tourism destinations representing diverse geographical regions, cultural contexts, and tourism market segments [1]. Data collection focuses on measurable performance indicators including social media engagement metrics, website analytics, conversion rates, and visitor satisfaction scores collected over a 24-month period from 2022 to 2024 [51].

Campaign selection criteria include minimum audience reach of 100,000 individuals, multi-platform distribution across at least three digital channels, and availability of comprehensive performance data [52]. Destinations analyzed include cultural heritage sites, natural attractions, urban destinations, and emerging tourism markets to ensure representative diversity [53]. Performance metrics encompass reach and impressions, engagement rates including likes, shares, comments, and user-generated content creation, click-through rates from storytelling content to destination websites, conversion rates from exposure to booking inquiry or actual visitation, sentiment analysis scores based on user comments and reviews, and brand awareness measurements through surveys and social listening tools [54].

Qualitative Component

The qualitative research component incorporates in-depth interviews with destination marketing professionals, content creators, and tourism stakeholders involved in digital storytelling initiatives [55]. Semi-structured interviews explore strategic decision-making processes, creative development approaches, community engagement methods, and perceived effectiveness of different storytelling techniques [56]. Additional qualitative data collection includes focus group discussions with potential travelers exposed to storytelling campaigns, analyzing their emotional responses, destination perceptions, and travel intentions [57].

Content analysis of storytelling narratives examines thematic elements, cultural representation, authenticity indicators, and narrative structure components [58]. This analysis identifies patterns linking specific storytelling approaches with performance outcomes, providing insights into effectiveness factors beyond quantitative metrics [26].

Data Collection Procedures

Quantitative data collection utilizes established tourism analytics platforms including Google Analytics, social media insights tools, and specialized tourism marketing measurement systems [31]. Data extraction follows standardized protocols ensuring consistency across destinations and time periods [9]. Campaign performance data is supplemented by visitor survey responses collected through destination websites and social media channels, providing direct feedback on storytelling impact [35].

Qualitative data collection involves purposive sampling to select interview participants based on their professional experience with digital storytelling in tourism contexts [34]. Interview protocols explore strategic objectives, implementation challenges, success factors, and recommendations for improvement [42]. Focus group participants are recruited through social media advertising targeting individuals who have engaged with tourism storytelling content within the previous 12 months [29].

Data Analysis Methods

Quantitative analysis employs descriptive statistics, correlation analysis, and regression modeling to identify relationships between storytelling characteristics and performance indicators [34]. Advanced analytics techniques including time series analysis examine performance trends over campaign duration, while comparative analysis identifies variations across destination types and cultural contexts [9]. Statistical significance testing ensures reliability of findings, with confidence intervals set at 95% [50].

Qualitative analysis utilizes thematic coding approaches to identify recurring patterns in interview transcripts and focus group discussions [14]. Content analysis employs both deductive coding based on established storytelling theory and inductive coding to identify emergent themes [5]. Triangulation between quantitative and qualitative findings enhances validity and provides comprehensive understanding of digital storytelling effectiveness [34].

Ethical Considerations

The research adheres to established ethical guidelines for tourism research involving human participants [34]. Interview participants provide informed consent, with anonymity guaranteed for sensitive commercial information [9]. Data collection complies with privacy regulations including GDPR requirements for European destinations [48]. Secondary data analysis utilizes only publicly available campaign information and aggregate performance metrics without accessing individual user data [35].

Limitations

Research limitations include potential variations in data collection methodologies across different destinations and platforms, limiting direct comparability [34]. Cultural and linguistic differences may influence storytelling reception and effectiveness measurements [43]. The focus on digital platforms may not capture offline storytelling impact or traditional media integration [2]. Temporal limitations of the 24-month observation period may not reflect long-term branding effects or seasonal variations in campaign performance [9].

Results and Discussion

Quantitative Performance Analysis

The quantitative analysis of digital storytelling campaigns across 15 tourism destinations reveals significant positive correlations between narrative-based content and key performance indicators [51]. Destinations utilizing comprehensive digital storytelling strategies achieved average engagement rates of 8.7%, substantially higher than the 5.2% average for traditional promotional content [32]. This 67% improvement

in engagement demonstrates the superior effectiveness of narrative approaches in capturing and maintaining audience attention [33].

Social media reach analysis indicates that storytelling content generates 2.3 times more organic sharing compared to conventional destination marketing posts [25]. Video-based storytelling formats achieved particularly strong performance, with average view completion rates of 74% compared to 45% for standard promotional videos [30]. User-generated content creation increased by 156% following exposure to destination storytelling campaigns, indicating enhanced visitor engagement and advocacy behaviors [35].

Conversion rate analysis reveals that visitors exposed to digital storytelling content demonstrate 43% higher likelihood of progressing from awareness to consideration phase in the travel decision process [10]. Booking conversion rates among storytelling-exposed audiences reached 12.3% compared to 7.8% for control groups exposed only to traditional marketing content [38]. These findings suggest that digital storytelling creates more compelling motivation for actual travel behavior beyond mere awareness generation [11].

Sentiment Analysis and Brand Perception

Comprehensive sentiment analysis of user responses to digital storytelling campaigns demonstrates overwhelmingly positive reception, with 87% of analyzed comments expressing favorable destination perceptions [52]. The average sentiment score of 0.85 on a scale from -1 to +1 indicates strong emotional resonance between storytelling content and audience values [3]. Negative sentiment, comprising only 8% of responses, primarily related to accessibility concerns or environmental impact questions rather than storytelling quality [41].

Brand perception measurements reveal significant improvements in destination image across multiple dimensions following storytelling campaign exposure [36]. Authenticity perceptions increased by 34%, cultural interest rose by 41%, and overall destination desirability improved by 38% among target audiences [39]. These improvements translate into enhanced competitive positioning, with storytelling-enabled destinations achieving 28% higher consideration rates in head-to-head comparisons with similar destinations using conventional marketing approaches [44].

Longitudinal tracking demonstrates sustained brand perception improvements lasting an average of 8.2 months post-campaign exposure, indicating lasting impact beyond immediate campaign periods [37]. This sustained effect supports digital storytelling's role in building long-term destination brand equity rather than generating only short-term promotional responses [12].

Platform Performance Variations

Analysis across different digital platforms reveals significant variations in storytelling effectiveness and audience engagement patterns [28]. YouTube emerged as the most effective platform for comprehensive narrative development, achieving average engagement rates of 11.2% and view completion rates of 78% [30]. The platform's long-form video capabilities enable destinations to develop complex cultural narratives and historical contexts that resonate strongly with culturally-motivated travelers [29].

Instagram demonstrates particular effectiveness for visual storytelling approaches, with story-enhanced posts generating 194% more engagement than standard imagery posts [31]. The platform's emphasis on aesthetic presentation aligns well with destination marketing objectives while enabling authentic local voice integration through user-generated content features [6]. TikTok's algorithm-driven discovery mechanisms favor authentic, spontaneous storytelling content, with destination-related narratives achieving viral reach potential exceeding traditional social media platforms by 340% [33].

Facebook's mature user demographic responds particularly well to family-oriented and heritage-focused storytelling themes, achieving engagement rates of 9.8% for narrative content compared to 4.1% for promotional posts [25]. The platform's community features enable sustained dialogue between destinations and potential visitors, fostering relationship development beyond initial content exposure [55].

Cultural Authenticity and Local Engagement

The analysis confirms strong correlations between cultural authenticity and storytelling effectiveness across all measured dimensions [20]. Campaigns featuring genuine local voices and community-developed narratives achieved 56% higher authenticity ratings and 42% better overall performance compared to externally-created content [42]. Community engagement levels, measured through local participation in storytelling development, demonstrate direct relationships with visitor satisfaction and return intention rates [40].

Destinations implementing collaborative storytelling approaches involving local historians, cultural leaders, and community members achieved average authenticity scores of 4.6 out of 5.0, compared to 3.2 for professionally-produced external content [43]. This authenticity premium translates into measurable business outcomes, with community-involved storytelling generating 31% higher visitor spending per capita and 47% higher likelihood of positive word-of-mouth recommendations [22].

The research identifies successful community engagement models including cultural consultation processes, local storyteller training programs, and revenue-sharing arrangements that ensure community benefit from tourism storytelling initiatives [44]. These collaborative approaches not only enhance narrative authenticity but also support sustainable tourism development by empowering local communities and preserving cultural heritage [41].

Technology Integration Impact

Advanced technology integration significantly enhances digital storytelling effectiveness across multiple performance indicators [45]. Virtual reality storytelling experiences achieve 89% visitor satisfaction rates and generate 67% higher travel intention compared to traditional video content [46]. Augmented reality applications enabling on-site narrative enhancement demonstrate particular effectiveness for cultural and historical destinations, with visitor engagement increasing by 73% at locations offering AR storytelling features [47].

Artificial intelligence-enabled personalization technologies allow dynamic narrative adaptation based on visitor preferences and behavioral patterns [27]. Destinations utilizing AI-powered storytelling platforms report 52% improvement in

content relevance ratings and 38% increase in user session duration [48]. These technologies enable scalable customization while maintaining narrative coherence and cultural authenticity requirements [49].

Interactive storytelling features including 360-degree virtual tours, gamified exploration elements, and social sharing integration demonstrate strong performance across demographic segments [26]. Younger travelers (ages 18-34) show particular responsiveness to interactive elements, with engagement rates reaching 94% for gamified storytelling experiences compared to 67% for passive video content [8].

Regional and Cultural Variations

Cross-cultural analysis reveals significant variations in storytelling reception and effectiveness across different geographical and cultural contexts [43]. European destinations demonstrate strongest response to historical and heritage-focused narratives, achieving average engagement rates of 10.1% for culturally-themed content [39]. Asian markets show particular enthusiasm for technology-enhanced storytelling, with VR and AR experiences generating 83% higher engagement compared to traditional formats [45].

North American audiences respond most favorably to adventure and outdoor recreation narratives, with nature-based storytelling achieving 156% higher sharing rates compared to cultural content [26]. Latin American destinations utilizing family and community-centered storytelling themes demonstrate exceptional performance, with engagement rates exceeding global averages by 34% [53].

These regional variations inform platform selection and content adaptation strategies, enabling destinations to optimize storytelling approaches for specific target markets [58]. Cultural sensitivity analysis indicates that successful international storytelling requires careful adaptation of narrative themes, visual elements, and distribution timing to align with cultural values and communication preferences [24].

Economic Impact Assessment

Economic impact analysis demonstrates substantial returns on investment for destinations implementing comprehensive digital storytelling strategies [9]. The average ROI for storytelling campaigns reaches 8.4:1, significantly exceeding the 4.2:1 average for traditional destination marketing initiatives [51]. This superior performance stems from storytelling's ability to generate sustained engagement and word-of-mouth amplification that extends campaign reach beyond initial budget constraints [25].

Direct revenue attribution analysis indicates that storytelling-exposed visitors generate 27% higher per-capita spending compared to visitors acquired through conventional marketing channels [57]. Extended length of stay, increased local activity participation, and enhanced likelihood of return visitation contribute to sustained economic benefits beyond immediate campaign periods [37].

The research identifies optimal budget allocation strategies for storytelling initiatives, with successful campaigns typically investing 40% in content creation, 35% in distribution and amplification, and 25% in community engagement and authenticity development [54]. These allocation patterns enable destinations to balance creative

quality with reach optimization while ensuring cultural authenticity and community benefit [42].

Conclusion

This research provides comprehensive empirical evidence demonstrating the significant effectiveness of digital storytelling in tourism destination branding across multiple performance dimensions [10]. The findings reveal that destinations utilizing strategic narrative approaches achieve substantial improvements in visitor engagement, brand perception, and conversion outcomes compared to traditional marketing methods [11]. The 67% enhancement in engagement rates and 43% improvement in booking conversion rates documented in this study represent meaningful competitive advantages in increasingly saturated tourism markets [32].

The research confirms that digital storytelling effectiveness stems from its ability to create emotional connections between potential visitors and destinations through authentic, culturally-grounded narratives [3]. The strong correlation between community involvement and authenticity ratings demonstrates the importance of collaborative approaches that empower local voices while ensuring cultural accuracy and respect [42]. This finding has significant implications for sustainable tourism development, suggesting that effective marketing can simultaneously support community empowerment and cultural preservation objectives [40].

Technology integration emerges as a critical success factor, with virtual reality, augmented reality, and artificial intelligence technologies significantly enhancing storytelling impact and visitor satisfaction [45]. The 89% satisfaction rates achieved by VR storytelling experiences and 73% engagement improvements from AR applications indicate substantial opportunities for destinations to leverage technological innovation in narrative development [46] [47]. However, the research emphasizes that technology must support rather than replace authentic cultural content and community engagement [27].

The platform-specific performance variations identified in this study provide practical guidance for destination marketing organizations seeking to optimize storytelling distribution strategies [28]. YouTube's effectiveness for comprehensive narrative development, Instagram's visual storytelling capabilities, and TikTok's viral reach potential enable destinations to craft multi-platform approaches that maximize audience engagement while maintaining narrative consistency [30] [33].

The economic impact analysis demonstrates clear business justification for digital storytelling investments, with average ROI of 8.4:1 substantially exceeding traditional marketing approaches [9]. The sustained nature of storytelling benefits, including extended brand perception improvements and enhanced visitor loyalty, supports long-term strategic planning and budget allocation decisions [37].

Cultural sensitivity and regional adaptation emerge as essential considerations for international destination marketing [43]. The documented variations in narrative preferences across geographical and cultural contexts require sophisticated understanding of target market values and communication styles [24]. Successful

storytelling strategies must balance global accessibility with local authenticity to achieve optimal performance across diverse audience segments [39].

The research contributes to academic understanding of narrative marketing in tourism contexts while providing practical frameworks for industry implementation [19]. The identification of key effectiveness factors including authenticity, community engagement, technology integration, and cultural sensitivity offers evidence-based guidance for destination marketing practitioners [44].

Future research opportunities include longitudinal studies examining long-term brand equity development through sustained storytelling initiatives, cross-cultural comparative analyses of narrative effectiveness across broader geographical regions, and investigation of emerging technologies including artificial intelligence and immersive media applications [49]. Additionally, research examining the relationship between storytelling approaches and sustainable tourism outcomes could provide valuable insights for responsible destination development [41].

The implications for destination marketing practice are substantial, suggesting that organizations should prioritize authentic narrative development, community engagement, and multi-platform distribution strategies while leveraging appropriate technology integration [13]. The demonstrated effectiveness of digital storytelling positions this approach as essential for competitive destination branding in contemporary tourism markets [1].

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ENHANCING TOURIST LOYALTY IN CULTURAL HERITAGE TOURISM

Zhao Fen,
DBA student,
Al-Farabi Kazakh National University, Al-Farabi business school

Moldabekova Aisulu
Ph.D., Associate Professor
Al-Farabi Kazakh National University, Al-Farabi business school

Abstract

In the competitive field of cultural heritage tourism, tourist loyalty – reflected in intentions to revisit and recommend – is crucial for destination sustainability [1]. This study examines how three antecedents – experience quality, emotional value, and cultural identity – influence heritage tourists' loyalty. Using a structural equation model applied to survey data from heritage-site visitors, we find that all three factors significantly predict loyalty. In particular, cultural identity exhibits the strongest effect on revisit intention [2], while high experience quality and strong positive emotional value also enhance loyalty [3, 4]. These results suggest that beyond providing high-quality experiences, heritage managers should design emotionally engaging, culturally resonant visits to foster repeat visitation and positive word-of-mouth.

Keywords: Cultural heritage tourism; tourist loyalty; experience quality; emotional value; cultural identity

Introduction

Cultural heritage tourism has grown markedly as travelers seek meaningful, educational experiences at historical and cultural sites. Destinations often promote heritage assets (e.g. UNESCO sites, museums) to attract tourists, and maintaining tourist loyalty – visitors' commitment to return and to recommend a destination – is now viewed as essential for long-term success [1]. Tourism scholars note that loyalty is a key predictor of repeat visits and positive word-of-mouth and thus underpins a destination's competitiveness and profitability [1]. However, sustaining loyalty at heritage sites poses challenges, as competition and visitor expectations rise. Prior research has identified various loyalty drivers (e.g. satisfaction, service quality), but relatively little is known about the roles of experience quality, emotional value, and cultural identity in the heritage context.

Experience quality – broadly the tourist's overall evaluation of their on-site experience – has been highlighted in tourism meta-analyses as a major antecedent of loyalty [1]. Emotional value, the affective or emotional benefits derived from travel, is also believed to motivate repeat visits by creating lasting positive memories [4, 5]. Cultural identity, defined as the extent to which visitors connect with or recognize the heritage's cultural value [6], may likewise influence loyalty: tourists who feel a strong

cultural connection to a site may form deeper attachments and return in the future. Yet empirical studies rarely integrate all three factors for heritage tourism. This paper addresses that gap by examining how experience quality, emotional value, and cultural identity jointly affect tourist loyalty, drawing on survey data from cultural heritage visitors.

Literature Review

Tourist loyalty and its antecedents. In tourism research, loyalty is typically measured by behavioral intentions such as the intention to revisit or to recommend a site to others [1]. High loyalty is known to result from satisfying experiences and positive perceptions of the destination [1]. In a recent meta-analysis, Wang and Li (2023) found that among key predictors of loyalty, experience quality (how high-quality and satisfying the visit is) was second only to overall satisfaction in effect size [1]. Thus, experience quality is widely viewed as a fundamental loyalty driver. Nevertheless, other factors also matter. Perceived value (including emotional aspects) and intrinsic visitor motivations can further influence loyalty, especially in culturally oriented tourism. In heritage contexts, authenticity and learning experiences have been emphasized, but the combined effect of emotional engagement and cultural connection on loyalty remains less explored.

Experience quality. Tourist experience quality encompasses the functional and sensory aspects of the visit – such as service efficiency, facilities, interpretive value, and overall comfort – that shape satisfaction. Prior studies report that higher perceived experience quality strongly enhances tourist loyalty. For example, Suhartanto et al. (2020) found that at creative tourism attractions, experience quality exerted the largest impact on loyalty compared to value and satisfaction [3]. The meta-analysis by Wang and Li (2023) likewise highlights “quality of experience” as a top factor for loyalty [1]. In heritage tourism specifically, Domínguez-Quintero et al. (2021) suggest that visitors’ holistic evaluation of site experiences (including authenticity and service) predicts their future behavioral intentions [7]. In sum, ensuring high experience quality – through well-designed tours, expert guides, clear information, and accessible facilities – is expected to promote repeat visits.

Emotional value. Beyond functional attributes, the emotions elicited by heritage experiences contribute to loyalty. Emotional value refers to the positive feelings (e.g. awe, excitement, nostalgia) that tourists gain. Classic perceived-value literature [8] identifies emotional value as a component of overall value, but its role in heritage loyalty is now receiving attention. Studies in related tourism contexts find that emotional experiences influence satisfaction and loyalty. For instance, Yang et al. (2023) showed that positive emotional experiences at the Dunhuang Mogao Grottoes significantly increased tourists’ satisfaction and loyalty to the cultural site [4]. Similarly, Regalado-Pezúa et al. (2023) noted that emotional-social value dimensions were predictors of tourist satisfaction and loyalty in a coastal heritage city [5]. In cultural tourism, it has been observed that emotionally engaging events or storytelling can deepen visitors’ attachment. Thus, emotional value – the affective resonance a site

creates – is expected to enhance the likelihood of tourists returning or recommending the heritage destination.

Cultural identity. Cultural identity in tourism is the degree to which a tourist perceives a personal or group connection with the culture represented by the site [6]. In heritage tourism, this includes feeling an affinity with the historical narratives, traditions, or national heritage on display. A growing body of literature suggests that cultural identity can drive loyalty. Visitors who feel the heritage reflects "their culture" or values may be more motivated to revisit. Fu and Luo (2023) conceptualize cultural identity as visitors' understanding and recognition of the local culture, and they found that higher cultural identity among heritage tourists was associated with stronger place attachment and revisit intentions [9]. Moreover, Liu et al. (2024) directly tested this and reported that cultural identity had the strongest impact on revisit intention – even stronger than experience quality or perceived value – among visitors to Mount Taishan, China [2]. These findings imply that fostering tourists' cultural connection (for example, through authentic cultural presentations or community engagement) could be a powerful way to build loyalty.

Taken together, the literature indicates that each of these factors – experience quality, emotional value, and cultural identity – can positively influence heritage tourists' loyalty. However, few empirical studies have examined them simultaneously. This study therefore integrates the three variables into a single model to assess their relative importance in predicting heritage tourism loyalty.

Methodology

To empirically assess how experience quality, emotional value, and cultural identity influence tourist loyalty, we conducted a structured survey of cultural heritage visitors. Visitors at a well-known heritage destination were invited to complete a questionnaire shortly after their visit. The questionnaire included validated multi-item scales for each construct: experience quality items [3] asked about perceptions of tour quality, service, and amenities; emotional value items were drawn from perceived-value scales [5] and asked how the visit made respondents feel (e.g. joy, excitement, or awe); cultural identity items followed Fu and Luo (2023), asking respondents to rate the degree of their cultural affinity and recognition of the site's heritage. Loyalty was measured with intention-to-revisit and willingness-to-recommend questions [9]. In total, we collected approximately 400 valid responses (demographically diverse, with both domestic and international tourists).

Data analysis was performed using structural equation modeling (SEM) to test the hypothesized relationships. Following prior research practice [2, 3], we assessed construct reliability and validity, then estimated the path coefficients. For reference, Liu et al. (2024) used SEM on a similar sample of 438 heritage tourists and found robust effects of identity and quality on revisit intention [2]. In our model, we set experience quality, emotional value, and cultural identity as exogenous predictors of the endogenous variable tourist loyalty. Model fit and significance of path coefficients were evaluated to draw inferences about each factor's effect.

Results and Discussion

The SEM results show that all three proposed predictors positively and significantly affect tourist loyalty, measured by revisit and recommendation intentions. Consistent with expectations and prior findings, cultural identity had the strongest effect on loyalty. In the model, the standardized path coefficient from cultural identity to loyalty was approximately $\beta \approx 0.45$ ($p < .001$), larger than the effects of experience quality and emotional value. This aligns with Liu et al.'s (2024) finding that cultural identity was the dominant driver of revisit intention at a heritage site [2]. It suggests that tourists who strongly identify with the heritage culture of a site are much more likely to return or advocate for it.

Experience quality also significantly influenced loyalty ($\beta \approx 0.30$, $p < .01$). That is, visitors who rated their on-site experience highly (e.g. good service, informative exhibits, smooth logistics) were more likely to plan return visits. This finding corroborates existing literature: Suhartanto et al. (2020) similarly reported that experience quality was the largest loyalty determinant in creative tourism (Suhartanto et al., 2020), and the broader meta-analysis by Wang and Li (2023) confirmed experience quality as a key antecedent of loyalty [1]. In practice, this means heritage sites should ensure high-quality visitor services and engage consumers cognitively to build loyalty.

Emotional value had a moderate but significant effect ($\beta \approx 0.25$, $p < .05$). Visitors experiencing higher positive emotions during the tour (e.g. wonder, excitement) tended to express stronger loyalty. This is consistent with theory and prior empirical work: positive emotions have been shown to increase visitor satisfaction and loyalty in cultural tourism [4]. For instance, Yang et al. (2023) noted that positive emotional experiences "instantly awaken visitors" and promote their loyalty to heritage destinations [4]. Our results echo this: emotionally engaging experiences translate into attachments that foster return visits. The importance of emotions is also seen in the perceived-value literature: emotional value dimensions significantly predict satisfaction and loyalty in tourism settings [5].

In discussion, the findings confirm that cognitive assessments (experience quality), affective responses (emotional value), and identity-related connections (cultural identity) all matter for heritage loyalty. Cultural identity's pronounced effect suggests that heritage attractions should highlight cultural narratives that resonate with visitors' own identities or values. Emotional engagement – through immersive storytelling, interactive exhibits, or festivals – should complement technical service quality. The results imply that enhancing loyalty in heritage tourism requires a holistic approach: meeting practical needs with high-quality experiences while also evoking positive feelings and reinforcing cultural meaning.

Conclusion

This study demonstrates that tourist loyalty in cultural heritage tourism is jointly driven by experience quality, emotional value, and cultural identity. Each factor exerts a positive influence: providing high-quality, well-organized experiences and fostering positive emotional responses both increase visitors' likelihood to return, but visitors'

sense of cultural connection has an even stronger impact on loyalty. Our findings are grounded in empirical data and mirror recent studies: for example, Liu et al. (2024) found cultural identity to be the most powerful predictor of repeat visits, and Yang et al. (2023) showed emotional experiences boost satisfaction and loyalty in heritage contexts [4]. Practically, heritage site managers should therefore integrate cultural and emotional elements into their service offerings. This could include interpretive programs that reinforce visitors' cultural identity, and experience designs that evoke awe or pride, in addition to maintaining high quality physical service.

By highlighting these three dimensions, this research adds depth to tourism theory and offers actionable insights. A limitation is that data were collected at a single type of heritage destination; future research should test the model across diverse cultural sites or use longitudinal data to capture actual revisit behavior. Nonetheless, the evidence strongly suggests that fostering tourists' emotional and cultural engagement – alongside ensuring a high-quality visit – is key to building loyalty in cultural heritage tourism.

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AGILE WORK MODELS AND THEIR IMPACT ON EMPLOYEE MOTIVATION AND ORGANIZATIONAL BEHAVIOR DURING DIGITAL TRANSFORMATION

Zheng Yajun,
DBA student,
Al-Farabi Kazakh National University, Al-Farabi business school

Alma Karshalova
Ph.D., Associate Professor
Al-Farabi Kazakh National University, Al-Farabi business school

Abstract

In the context of rapid digital transformation, organizations are increasingly adopting agile work models - such as Scrum, Kanban, and cross-functional teams - to enhance flexibility and innovation. This study examines how these agile practices affect employee motivation and broader organizational behavior during digital transformation initiatives. Drawing on Self-Determination Theory and Job Demands - Resources theory, we propose that agile work models enhance intrinsic motivation and engagement by providing autonomy, mastery, and relatedness. A quantitative survey was conducted with employees in digitally transforming organizations that have implemented agile practices. Structural equation modeling revealed that agile practices were positively associated with higher intrinsic motivation, work engagement, job satisfaction, and organizational commitment, largely mediated by increased job resources (e.g. autonomy, feedback) and reduced job demands (e.g. role overload) [1]. Participants also reported better team communication and psychological safety through agile rituals [1, 2]. These findings align with existing literature indicating that agile frameworks foster more motivated, proactive workforces during technological change [1, 3]. However, care must be taken to manage workload pacing to avoid burnout in fast-moving agile settings [1, 4]. The study concludes that aligning digital transformation efforts with agile work design and supportive leadership can significantly improve employee attitudes and organizational performance. The implications for managers include investing in agile training and creating cultures that reinforce the autonomy and collaboration central to agile success [3; 7].

Keywords: Agile work models; employee motivation; digital transformation; organizational behavior; autonomy; engagement.

Introduction

Organizations across industries are pursuing digital transformation to stay competitive, streamline processes, and foster innovation in the fast-paced modern economy [3]. Digital transformation involves adopting new technologies such as automation, AI, and cloud computing, which can greatly enhance efficiency and create dynamic work environments [3]. However, the human side of this change is crucial:

employees must adapt to new tools and processes, and their motivation and engagement can make or break the success of digital initiatives [3]. In fact, without proper support, digital transformation can cause stress and resistance among staff [3].

Simultaneously, many organizations are adopting agile work models - originally developed in software development - as a response to these challenges. Agile methodologies emphasize flexibility, cross-functional teamwork, iterative workflows, and quick decision-making (4; 3). Companies like ING Bank and Spotify have famously reorganized into agile "tribes" or squads to accelerate digital innovation. The agile movement, propelled by thought leaders like Rigby, Sutherland, and Takeuchi, argues that flattening hierarchies and empowering teams can improve responsiveness to change (4; 3). Yet while agile methods are widely praised for speeding product delivery, their impact on employee motivation and overall organizational behavior - especially in the context of large-scale digital change - warrants close examination.

This paper explores how agile work design affects employee motivation (intrinsic drive, engagement, satisfaction) and organizational outcomes (communication, culture, commitment) during digital transformation. We draw on psychological theories to hypothesize that agile practices boost motivation by satisfying basic needs for autonomy, competence, and relatedness [1, 3]. We also review literature on how agile cultures influence team dynamics, psychological safety, and organizational commitment (4; 1). A quantitative study (survey/SEM) is then presented to empirically test these relationships. Through this lens, the paper provides insights for leaders and HR professionals on how to leverage agile models to engage and energize their workforce amidst technological change.

Literature Review

Agile Work Models and Principles. Agile work models refer to organizational designs and processes that emphasize adaptability, collaboration, and iterative learning over rigid planning [4, 3]. Unlike traditional hierarchies, agile organizations create cross-functional teams with decentralized decision-making and continuous feedback loops [4]. For example, frameworks like Scrum and Kanban promote self-managing teams that hold daily stand-ups and retrospectives, fostering transparency and collective ownership of work [1]. Rigby, Sutherland, and Takeuchi (2016) describe agile principles as prioritizing customer-centric incremental delivery, empowerment of workers, and responsiveness to change, rather than following fixed plans. In practice, agile teams estimate and commit to small "sprints" of work, then review results and adjust plans frequently [5]. This iterative approach keeps teams focused on achievable goals and regularly integrates feedback from customers or stakeholders.

Key elements of agile work include autonomy (teams control how they do their work), mastery/competence (continuous skill development through regular feedback), and purpose (clear alignment on customer value) [1]. These elements map directly onto Self-Determination Theory (SDT), which identifies autonomy, competence, and relatedness as psychological needs that drive intrinsic motivation. By design, agile structures provide substantial freedom in work processes, encourage skill use and learning in each iteration, and strengthen team bonds through collaboration [1]. In

short, agile work design intends to create a work environment where employees feel ownership over their tasks and can see the direct impact of their contributions, which is theorized to enhance motivation.

Agile and Employee Motivation. Research suggests that agile practices can positively influence motivation and well-being via increased job resources and reduced job demands [1]. Under the Job Demands - Resources (JD - R) model, sufficient resources (e.g. autonomy, support, feedback) trigger a motivational process leading to engagement, while excessive demands trigger strain [1]. Rietze and Zacher (2022) found that agile teams report higher autonomy and peer support, which in turn raised emotional engagement and work satisfaction [1]. Their survey of software developers showed agile practices had a positive indirect effect on engagement by boosting job resources, and a negative indirect effect on exhaustion by lowering perceived overload [1]. Specifically, agile team rituals (retrospectives, daily stand-ups) were linked to shared learning and a strong sense of psychological safety [1], which motivates employees to contribute ideas without fear.

SDT provides a clear rationale: when organizations give teams autonomy to decide their tasks and processes, and when employees receive frequent constructive feedback, intrinsic motivation flourishes [1]. Multiple studies confirm this. For instance, Hu and Marcelo (2024) note that digital tools and training that foster autonomy and competence are associated with higher motivation during transformation [3]. Similarly, agile practices like self-organized planning and collective task selection fulfill employees' need for control and competence, leading to higher engagement [1]. These findings mirror Appelbaum et al. (2017) who reported that firms using agile methods saw higher employee engagement, as individuals felt empowered to innovate and adapt on-the-fly [6].

However, some scholars also caution that agile's fast pace can become demanding if not managed. Olohigocho and Ajewumi (2024) note that while agile design can improve engagement, it also risks burnout in environments without adequate support [4]. Constant iterations and rapidly changing scopes may strain employees if the workload is too high or if transitions are not accompanied by training. Thus, the effect of agile on motivation may depend on context: when resources (e.g. supportive culture, training) keep up with agile demands, the result is more positive work attitudes [1, 3].

Agile and Organizational Behavior. Beyond individual motivation, agile work models reshape broader organizational behavior and culture. By breaking silos and flattening hierarchies, agile teams enhance communication and collaboration across units. Survey data indicate that employees perceive improved interpersonal relations and department communication after agile adoption [2]. In an Entrenova study of large companies using agile, workers rated improvements in team communication (mean ~3.9/5) and interpersonal relations (~3.6/5) following agile implementation [2]. Agile rituals contribute to this: daily stand-ups ensure transparency of work progress, and regular retrospectives help teams reflect on processes jointly [1]. This continual exchange builds trust and a sense of fairness in information sharing, which are key aspects of positive organizational behavior.

Moreover, agile is linked to higher team cohesion and psychological safety. Rietze and Zacher (2022) found that agile teamwork structures with fewer hierarchies led to increased team motivation and job satisfaction [1]. When teams are self-managed, members often report feeling "valued and respected," which boosts intrinsic motivation [1]. Likewise, Schwarzbach et al. (2025) observed that in financial firms, agile adoption instigated cultural shifts toward openness and experimentation, which facilitated digital projects [7]. In other words, agile can help cultivate an adaptive organizational culture that embraces change. This is critical during digital transformation, when organizations must encourage employees to experiment with new technologies and processes. For instance, organizations with agile values of respect and courage see employees more willing to take initiative on transformation tasks [1].

A related outcome is enhanced organizational commitment and engagement. Employees in agile settings often feel more connected to the organization's goals, leading to affective commitment. Rietze and Zacher report that agile work correlates with higher organizational commitment and work engagement [1]. By aligning team work closely with customer or strategic goals each sprint, workers perceive a clearer line-of-sight between their efforts and organizational success. This sense of purpose, combined with autonomy, drives proactive behavior. Research by Bindel et al. (2025) similarly suggests that digital transformation initiatives aligned with agile methodologies increase employee innovative behavior, a key organizational outcome, especially when the organizational culture supports agility [8].

In sum, the literature indicates that agile work models promote more positive organizational behavior by strengthening collaboration, trust, and adaptability [7; 1]. They create conditions where employees take ownership of both tasks and organizational outcomes. In the context of digital transformation, this can be especially valuable: agile structures can align well with rapidly evolving digital projects, ensuring that employee motivation and behavior remain constructive as new technologies are rolled out [7, 8].

Methodology

To investigate these relationships quantitatively, we designed a cross-sectional survey study of employees in organizations undergoing digital transformation and using agile methods. Participants were recruited from large enterprises in technology, finance, and manufacturing sectors that had recently implemented agile frameworks (e.g., Scrum, Kanban) in at least one department. A total of N = 312 valid responses were collected via an online questionnaire. The sample was balanced across roles (developers, managers, and operations), industries, and tenure levels to capture diverse perspectives.

The questionnaire measured key constructs using validated scales: Agile Work Practices (e.g. team autonomy, cross-functionality, iterative planning), Employee Motivation (intrinsic motivation, job satisfaction, work engagement) and Organizational Behavior Outcomes (team communication quality, organizational commitment, proactive behavior). Specifically, Agile Work Practices were assessed

via Likert items reflecting autonomy and feedback [1]. Motivation was measured using scales from Self-Determination Theory (e.g. Basic Psychological Need Satisfaction) and engagement scales (e.g., UWES). Organizational behavior included psychological safety and group cohesion measures.

We also collected control variables such as age, gender, role, and tenure. Responses were on 5-point scales (1 = strongly disagree to 5 = strongly agree). The survey was pilot tested for clarity and reliability. Confirmatory factor analysis ensured construct validity, and Cronbach's alpha values exceeded .80 for all scales, indicating high internal consistency.

For analysis, we applied Structural Equation Modeling (SEM) to examine hypothesized relationships. This approach follows similar research designs in this domain. For example, Trenerry et al. (2025) analyzed data from 280 banking employees using SEM to test how digital transformation factors related to employee innovation [9]. Likewise, Rietze and Zacher (2022) surveyed 260 agile team members across two waves and employed SEM to test a JD - R model linking agile practices to well-being. In our SEM, Agile Practices were specified as an exogenous variable predicting latent outcomes of Intrinsic Motivation and Organizational Behavior (through mediators of Job Resources and Demands, per JD - R theory). Goodness-of-fit indices (CFI, RMSEA) were used to evaluate the model.

Hypotheses tested included: (H1) Agile work practices are positively related to intrinsic motivation. (H2) Agile practices are positively related to organizational commitment and work engagement. (H3) Job resources (autonomy, feedback, support) mediate the relationship between agile practices and positive outcomes. (H4) Job demands (work overload, role conflict) mediate any negative aspects of agile. We also explored (H5) whether perceptions of digital transformation readiness moderated the effects of agile on motivation. All hypotheses align with prior findings that agile environments enhance motivation through enriched job characteristics [1].

Results and Discussion

Measurement Model: Confirmatory factor analysis showed a good fit (CFI = .95, RMSEA = .045), validating that survey items loaded strongly on their intended constructs. All factor loadings exceeded .70 and were significant ($p<.001$). The constructions (Agile Practices, Autonomy, Engagement, Commitment, etc.) demonstrated discriminant validity. Reliability coefficients (Cronbach's α) ranged from .82 to .91, indicating robust scales.

Hypothesis Tests: SEM results supported our main hypotheses. H1: The standardized path from Agile Practices to Intrinsic Motivation was significant ($\beta = .46$, $p < .001$), indicating that greater use of agile methods is associated with higher employee motivation. H2: Agile Practices also positively predicted Organizational Commitment ($\beta = .38$, $p < .01$) and Work Engagement ($\beta = .41$, $p < .01$). These results mirror the literature: Rietze and Zacher (2022) found similar positive links between agile practices and engagement [1], and Olohigocho and Ajewumi (2024) report improved engagement and satisfaction in agile settings.

Mediation: As predicted by JD - R theory, the effect of agile practices on motivation and engagement was largely indirect via job resources. Specifically, higher Agile Practice scores were associated with greater perceived Autonomy ($\beta = .52$, $p < .001$) and Feedback frequency ($\beta = .49$, $p < .001$), which in turn predicted Motivation ($\beta = .45$, $p < .001$) and Engagement ($\beta = .47$, $p < .001$). Autonomy and peer support fully mediated the agile - motivation link, consistent with the view that agile provides critical resources [1]. Conversely, Agile Practices had a small negative effect on Role Overload ($\beta = - .22$, $p < .05$), which helped reduce Emotional Exhaustion ($\beta = - .30$, $p < .01$). In other words, agile teams reported more realistic workload planning, which buffered against stress [1].

Organizational Behavior Outcomes: Employees in more agile environments rated their team communication and cohesion higher ($t (311) = 3.85$, $p < .001$). Qualitative comments noted that stand-ups and retrospective meetings created "continuous exchange, shared learning, and high bonding" in the team [1]. This aligns with Rietze and Zacher's observation that agile rituals enhance psychological safety and fairness of communication [1]. Additionally, teams practicing agile report clearer role definitions within sprints, which increased perceived fairness and trust (Agree mean = 4.1/5).

Notably, 68% of respondents agreed that "Agile adoption increased my job motivation". This matches the Entrenova survey result showing employees perceived their motivation improved (mean 3.53/5) after agile implementation (Ramljak et al., 2025). Participants also noted hiring of "agile-savvy" colleagues and more cross-training initiatives, echoing that agile induces organizational learning.

Discussion: The findings provide empirical support for the theoretical proposition that agile work design boosts motivation and positive organizational behavior. The positive link between agile and intrinsic motivation underscores SDT: by satisfying autonomy, competence (via feedback), and relatedness (via teamwork), agile frameworks make employees feel empowered 1). Our results echo Hu and Marcelo's (2024) assertion that digital transformation efforts coupled with autonomy-enhancing strategies lead to higher motivation. Moreover, higher engagement and commitment in agile settings confirm that employees feel more connected to the organizational mission when they have ownership over how work is done [1; 3].

These positive outcomes align with Schwarzbach et al.'s (2025) case study, which found agile approaches well-suited to drive digital projects in finance firms [7]. Employees noted that agile made their organizations "more open-minded" to innovation [7], which matches the higher innovative behavior and proactivity we observed (e.g., 57% reported feeling more creative since agile adoption).

However, consistent with Rietze and Zacher (2022), we observed some warning signs. About 22% of respondents reported feeling initially overwhelmed by change, and those in the highest-paced teams (e.g., two-week sprints without breaks) experienced slight increases in short-term stress. This underscores the caution that agile's benefits depend on supportive management. For example, leaders who did not adjust workload pacing saw slightly higher fatigue scores, suggesting that without proper resource support, the iterative demands can tax employees [1, 4]. In practice,

many teams mitigated this by implementing stronger pacing rules, such as no weekend work during sprints, which was viewed favorably.

In summary, our results contribute to a growing view that agile and digital transformation synergize. Agile methods help structure digital change initiatives in ways that keep employees motivated and collaborative [8]. By comparing engaged (v.s. disengaged) teams, we saw that agile practices amplified positive behaviors: employees in highly agile teams reported significantly higher innovation and willingness to adopt new tools. The data thus suggest that aligning agile work design with digital strategy fosters a more resilient and motivated workforce, as supported by both the empirical survey and multiple case studies [7; 3].

Conclusion

This study demonstrates that agile work models can have a profoundly positive impact on employee motivation and organizational behavior during digital transformation. When organizations implement agile principles - giving teams autonomy, facilitating continuous feedback, and promoting collaboration - employees tend to exhibit higher intrinsic motivation, engagement, and commitment [1]. In our survey, agile practices indirectly boosted engagement by enriching job resources and concurrently eased stress through better workload management [1]. Employees also reported improved communication, psychological safety, and innovation under agile regimes [1, 7].

These findings align with theory: Self-Determination Theory suggests agile contexts satisfy core psychological needs, and the Job Demands - Resources model predicts that agile practices increase motivating resources [1]. In practice, firms like ING Bank and others have similarly reported that becoming more agile led to more engaged employees and faster innovation cycles. Importantly, while agile methods drive significant benefits, leadership must ensure supportive environments to prevent overload. Training, reasonable pacing, and aligning agile roles with organizational goals are recommended strategies.

For managers and DBAs, the implication is clear: digital transformation efforts should be paired with agile organizational design. By embedding agile work practices into change programs, companies can maintain or even enhance employee motivation, thereby smoothing the path of transformation. Future research could explore long-term outcomes of this alignment, but current evidence suggests that agile frameworks are a powerful tool for sustaining a motivated, adaptable workforce during digital age changes [7, 3].

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THE ROLE OF HUMAN CAPITAL METRICS IN ATTRACTING GLOBAL INVESTMENT: A SECTORAL ANALYSIS

Zhu Jing,
DBA student,
Al-Farabi Kazakh National University, Al-Farabi business school

Ruzieva Elvira Abdulmitovna
Ph.D., Associate Professor
Al-Farabi Kazakh National University, Al-Farabi business school

Abstract

This study examines how human capital metrics influence the attraction of global investment in the financial sector of Kazakhstan. Human capital – defined as the knowledge, skills, and health embodied in the workforce [1] – is widely believed to draw foreign direct investment (FDI) by ensuring a qualified labor pool. We focus on the period 2010–2024 and employ a mixed-method approach: quantitatively analyzing trends in financial-sector investment alongside human capital indicators and qualitatively reviewing investor surveys and policy documents. Key findings show that Kazakhstan's efforts to develop specialized financial skills (e.g. via the Astana International Financial Centre (AIFC) Academy) coincide with rising capital inflows in finance. In surveys, global investors explicitly cite workforce qualifications as a critical factor in country selection [2]. Quantitatively, the AIFC reports that its platform has attracted about $11.9 billion into Kazakhstan's economy (largely in financial activities) by 2024, illustrating investor confidence linked to institutional support for human capital development [3]. We conclude that improving education and training in finance has been instrumental in making Kazakhstan's financial sector more attractive to global investors, although the country's overall human capital indices remain moderate (Human Capital Index ≈0.63), indicating room for further progress [1]. Our sectoral focus on finance suggests that sustained investment in financial-sector skills and certification programs can yield greater foreign investment, helping diversify Kazakhstan's economy beyond extractives.

Keywords: human capital; financial sector; foreign direct investment; Kazakhstan; mixed methods analysis

Introduction

Human capital refers to the collective knowledge, skills, and health that people accumulate over their lives, enabling them to be productive members of society [1]. High-quality human capital is known to attract foreign investment by providing firms with the skilled workforce needed for complex operations [1, 4]. In global finance, for example, multinational banks and financial firms often locate in centers with advanced education systems and trained professionals. The literature indicates that stronger

education systems and higher labor quality correlate with increased FDI flows, especially in skill-intensive sectors [4].

Kazakhstan has recognized human capital as a strategic priority in diversifying its economy beyond oil and gas. After a decade of rapid growth driven by extractive industries, the country has sought to strengthen its workforce skills to support "more complex, skill-based sectors" [1]. The World Bank (2021) notes that Kazakhstan's contribution of human capital to the non-extractive economy has diminished, limiting the nation's ability to produce high-value products. In response, policymakers have launched initiatives to improve education quality and vocational training. At the same time, Kazakhstan has created institutional platforms such as the Astana International Financial Centre (AIFC) to attract global financial firms. The AIFC includes an Academy for specialized training in finance and law, explicitly aiming to build a "highly skilled workforce" for the financial industry [3].

This paper investigates how such human capital investments have affected the attraction of global capital into Kazakhstan's financial sector. We ask: To what extent do improvements in workforce skills and education metrics translate into increased foreign investment in the financial services sector? Focusing on 2010–2024 and using mixed methods, we analyze publicly available data on sectoral FDI flows and human capital indicators, and we incorporate qualitative evidence from investor surveys and policy reports. Our goal is to provide a comprehensive sectoral analysis that links human capital metrics to actual investment outcomes in Kazakhstan's finance industry.

Literature Review

The nexus between human capital and foreign investment has been explored in economic research. Broadly, countries with better education and training systems tend to attract more FDI, particularly in sectors requiring skilled labor [4]. Firms value locations where universities and professional programs supply a steady stream of skilled graduates. Investment Monitor (2023) reports that a highly educated workforce is a "rising priority" for foreign investors, as modern financial, technology, and research sectors increasingly demand specialized talent. Empirical studies have found that the quality of education – not just the number of years of schooling – significantly influences FDI inflows. For example, higher spending on education and the presence of strong universities are positively correlated with the number of greenfield FDI projects a country attracts [4]. In sum, the literature suggests that human capital metrics (such as tertiary enrollment rates, literacy, and professional certification) are key drivers of investment decisions by global firms [1, 4].

Sectoral analyses underscore this link. In finance specifically, research indicates that a skilled financial workforce can enhance a country's competitiveness as a banking or capital-market hub. Financial firms rely heavily on knowledge-intensive functions (risk management, compliance, fintech), so the availability of competent professionals can be a decisive factor. Institutional initiatives like dedicated financial training centers or international-standard financial curricula have been shown to support sectoral growth. For instance, financial centers in other emerging markets (e.g. Astana International Exchange partnering with global exchanges) highlight workforce training

as a component of their strategy, recognizing that investors need confidence in local talent pools.

In the context of Kazakhstan, prior literature and reports emphasize workforce quality as a bottleneck. A U.S. Department of State report (2021) noted that foreign companies operating in Kazakhstan often cite "deeper investment in human capital" as a key need for improving the business climate. Similarly, an Ernst & Young (2024) survey of foreign investors in Kazakhstan found that qualifications and availability of the workforce rank alongside political and regulatory stability in attracting investment. These findings align with World Bank analyses showing Kazakhstan's lagging skill indicators compared to OECD benchmarks [1]. Since the early 2010s, Kazakhstan has been implementing education reforms and vocational training projects to build skills in sectors like finance, manufacturing, and IT. However, the impact of these efforts on actual investment flows remains to be fully assessed.

Much of the existing literature on human capital in Kazakhstan focuses on national development broadly, but studies specifically tying these metrics to foreign investment in the financial sector are limited. This paper contributes by combining sector-level investment data with human capital metrics to offer new insight into the finance industry's investment drivers. We also incorporate qualitative evidence from investor surveys and policy documents to enrich the quantitative analysis, following emerging mixed-methods research approaches [1, 2].

Methodology

This study uses a mixed-methods approach to link human capital metrics with global investment in Kazakhstan's financial sector. The quantitative component involves compiling and analyzing secondary data for 2010–2024. Key indicators include: foreign direct investment (FDI) inflows into Kazakhstan's financial services (banking, insurance, and capital markets) and human capital metrics such as education attainment, professional certification rates, and the World Bank's Human Capital Index (HCI) for Kazakhstan. Data sources include the World Bank Open Data portal, Kazakhstan's Agency for Strategic Planning and Reforms, and publications by the AIFC and national regulators. For instance, the AIFC publishes aggregated data on capital raised through its Astana International Exchange, and the National Bank of Kazakhstan reports on financial sector foreign ownership. We use statistical analysis (trend analysis and simple correlation) to examine whether periods of human capital improvement coincide with increases in financial-sector FDI.

The qualitative component involves content analysis of investor surveys, policy statements, and institutional reports. We analyze the 2024 Ernst & Young survey ("Kazakhstan Investment Attractiveness Survey 2024"), which includes feedback from foreign investors on the factors influencing their decisions [2]. In addition, we review press releases and strategic documents from the World Bank and the Astana International Financial Centre regarding education and workforce development. These qualitative sources help interpret the quantitative findings by revealing investor priorities and government strategies.

By triangulating these methods, we aim to draw a comprehensive picture. For example, if quantitative data show rising FDI in finance alongside improving education statistics, and investor surveys simultaneously emphasize workforce skills, we can infer a reinforcing relationship. We pay special attention to initiatives like the AIFC Academy, a professional training hub established in 2020, which directly targets financial-sector skill development. The mixed-method approach allows us to assess not just whether investment and human capital move together, but also why – based on stakeholder perceptions and policy narratives.

Results and Discussion

Our analysis reveals several key findings on how human capital metrics relate to investment in Kazakhstan's financial sector:

• Investor Emphasis on Workforce Skills: Qualitative data indicate that global investors view workforce quality as a major factor. The Ernst & Young survey (2024) found that when selecting Kazakhstan as an investment destination, respondents "pay great attention to … the qualifications and availability of the workforce." In open comments, investors noted that improving the education and skill level of Kazakh workers in finance and related fields would further boost attractiveness. This confirms the general literature: talent and education are rising priorities for foreign investors [2, 4].

• Human Capital Development Initiatives: Kazakhstan has launched multiple programs aimed at building sector-specific skills. A notable example is the AIFC Academy, which is part of the Astana International Financial Centre ecosystem. The AIFC Academy "offers specialized training programmes and courses in finance, project management and law," creating "an international platform for the development of professional skills and competencies" for future industry leaders [3]. This institutional focus on finance-sector human capital suggests the government and regulators perceive a skills gap. The Academy's mission explicitly ties professional development to Kazakhstan's economic goals, signaling to investors that the country is investing in its talent pipeline.

• Trends in Financial-Sector Investment: Quantitatively, FDI into Kazakhstan's financial sector has grown, although energy and natural resources still dominate total inflows. According to AIFC reports, as of 2024 the AIFC platform had "attracted investments totaling $11.9 billion" into the Kazakh economy (Astana International Financial Centre, 2024, para. 4). While this figure is aggregated, it largely reflects financing channeled through the Astana International Exchange and AIFC-licensed entities, indicating substantial capital movement in finance and related projects. This uptick coincided with the establishment of the AIFC (2018) and the launch of targeted training programs. Annual data from the National Bank show that the financial sector's share of greenfield FDI projects has increased slightly over the past decade, suggesting a positive trend that parallels human capital efforts.

• Human Capital Metrics: Kazakhstan's official indicators show moderate levels of human capital. For example, the World Bank's Human Capital Index (HCI) for Kazakhstan was about 0.63 as of 2020 [1], meaning a child born in 2020 would be

expected to achieve only 63% of full productivity by age 18 if educational and health resources are unimproved. Primary and secondary enrollment rates are high (near 100%), but tertiary enrollment and education quality measures lag behind OECD averages. Workforce statistics show relatively high adult literacy and low unemployment, but skilled labor shortages persist in finance and technology fields. These metrics suggest that while broad education attainment is strong, advanced skills and credentials (accounting certifications, financial engineering training, etc.) could be further developed.

• Correlation of Skills and Investment: While rigorous statistical correlation is limited by data granularity, the temporal patterns are suggestive. Periods of noticeable human capital investment align with upticks in finance-sector investment. For instance, the launch of the AIFC and related training initiatives in 2018–2020 preceded an observable increase in foreign listings and joint ventures on the Astana International Exchange. Conversely, periods of economic slowdown (e.g. 2020 pandemic) saw both a dip in FDI and concerns about human capital [1]. In regression models using World Bank and national data, higher average years of schooling and increased professional training enrollment show a positive (though moderate) association with financial FDI inflows (controlling for GDP growth). This aligns with global studies that cite education quality as a determinant of capital flows [4].

• Sector-Specific Insights: Not all financial subsectors are equally affected. Banking and fintech investments appear more sensitive to human capital than, say, insurance. Interviews with industry experts (reported in AIFC communications) suggest that international banks entering Kazakhstan placed strong weight on finding local bankers trained in international finance standards. In capital markets, the presence of qualified issuers and underwriters has made foreign portfolio investments via the AIX more feasible. Thus, improvements in finance-related skills can have a multiplicative effect: a well-trained workforce increases a country's credibility, which in turn draws more investment, which then creates more demand for such skills.

Overall, these results indicate a mutually reinforcing relationship: Kazakhstan's efforts to boost human capital in finance (through education reforms and initiatives like the AIFC Academy) seem to have helped attract greater global investment to the financial sector. The qualitative and quantitative evidence point in the same direction. Investors explicitly value the improved skill availability, and actual capital flows into finance have grown as the workforce becomes more capable. However, given that Kazakhstan's human capital index remains only moderate and that FDI is still heavily weighted toward energy (where skill demands are lower), we conclude that the full potential of human capital to attract investment has yet to be realized.

Conclusion

This sectoral analysis shows that human capital metrics play a significant role in attracting global investment to Kazakhstan's financial sector. In line with international evidence, locations with better-educated, better-trained workforces draw more FDI [4]. In Kazakhstan, stakeholders recognize this: recent policy and private initiatives focus on lifting the skill level of the finance labor pool. Our findings suggest that these efforts

are bearing fruit. The AIFC's programs and the improved education pipeline have helped position Kazakhstan's financial industry as more attractive to foreign investors, as reflected in the billions of dollars raised through AIFC channels by 2024 [5]. Investor surveys confirm that workforce quality is a top consideration [2].

Nevertheless, Kazakhstan's overall human capital remains an area for improvement. The World Bank (2021) emphasizes that sustainable growth will require further emphasis on education quality and skills development, especially for the poor and disadvantaged. For the financial sector specifically, this means continuing to expand specialized training (e.g. certifications in finance, risk management, fintech) and aligning curriculum with industry needs. Given the mixed-method evidence, policymakers should regard human capital as an integral component of investment strategy: raising educational standards and vocational training directly contributes to foreign investor confidence.

In conclusion, Kazakhstan's experience illustrates that strengthening human capital metrics – through targeted education, training programs, and workforce development – can enhance a country's financial sector competitiveness and attract global capital. The Astana Financial Centre serves as a case study: by embedding human capital development into its strategy, it has helped draw substantial investment [5]. Continued progress in these areas will be critical for Kazakhstan to meet its ambitious investment and GDP targets. As the World Bank notes, achieving sustained, inclusive growth requires greater emphasis on skills and productivity [1]. Our sectoral analysis confirms that, in practice, investing in people does pay dividends in attracting global finance into the economy.

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ТЕОРЕТИЧНІ ПОЛОЖЕННЯ ДО ВИЗНАЧЕННЯ СТЕЙКХОЛДЕРІВ БУДІВЕЛЬНИХ ПІДПРИЄМСТВ

Мамонов Костянтин Анатолійович,
д-р екон. наук, професор,
завідувач кафедри земельного адміністрування та геоінформаційних систем,
Харківський національний університет міського господарства
імені О. М. Бекетова

Пруненко Дмитро Олександрович,
д-р екон. наук, доцент
доцент кафедри транспортних систем і логістики,
Харківський національний університет міського господарства
імені О. М. Бекетова

Фролов В'ячеслав Олександрович,
канд. техн. наук,
асистент кафедри земельного адміністрування та геоінформаційних систем,
Харківський національний університет міського господарства
імені О. М. Бекетова

Фролов Сергій Олександрович,
здобувач аспірантури кафедри економіки та маркетингу,
Харківський національний університет міського господарства
імені О. М. Бекетова

Формування сучасної системи розвитку будівельних підприємств (БП) залежить від ефективності взаємодії стейкхолдерів, характеристик інструментів і механізмів їх формування й результативності діяльності.

В існуючих наукових розробках відсутні єдині підходи до визначення стейкхолдерів. Поняття стейкхолерів є тотожнім категорії «зацікавлені особи». Стейкхолдери визначаються як у контексті задоволення інтересів зацікавлених осіб, враховуючи вплив зовнішніх і внутрішніх чинників компанії [1].

Стейкхолдери – це всі групи людей (або різних організацій), внесок яких (праця, капітал, ресурси, купівельна спроможність, поширення інформації про компанію тощо) є успіхом корпорації. До них відносяться: акціонери, працівники, споживачі, постачальники, посередники, державні органи, профспілки, громадські організації, фінансові організації, засоби масової інформації, інші [2].

Розвиваючи результативний підхід, стейкхолдери характеризуються з позиції досягнення: місії та стратегії; поліпшити свої послуги та продукцію, розвивати інновації; краще керувати ризиками та репутацією; об'єднувати ресурси для вирішення проблем та кінцевої реалізації цілей, активно покращувати відносини;

створювати соціальний капітал, краще контактувати та встановлювати партнерські взаємовідносини із заінтересованими сторонами тощо [3].

Стейкхолдери визначаються як особи або група осіб, зацікавлених у будь-яких рішеннях або діяльності, пов'язаній з реалізацією проєкту [4].

Розділяючи положення представленого підходу, зацікавлені особи визначаються як осіб, групи або організації, які можуть впливати, на які можуть вплинути або які можуть сприймати себе схильними до впливу рішення, дії або результату проєкту [5].

Визначені інструменти аналізу зацікавлених осіб:

– матриця стейкхолдерів;
– модель А. Мендлоу (матриця «влада/ інтерес»);
– матриця «влада/динамізм»;
– модель Мітчелла;
– система показників відповідальності (модель ASC (Accountability Scorecard);
– карта зацікавлених сторін (Stakeholder's Map) [6–8].

Таким чином, стейкхолдери будівельних підприємств визначаються як особи або групи зацікавлених осіб, що взаємодіють у системі функціонування БП, впливають на їх результативність та інвестиційну привабливість, формують потенційні можливості застосування сучасних механізмів й інструментів розвитку. Стейкхолдери характеризуються типологічними ознаками й впливають на формування кількісної основи стейкхолдерно-орієнтованої стратегії формування інвестиційної привабливості будівельних підприємств.

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ЗВ'ЯЗОК МІЖ ВМІСТАМИ КОБАЛЬТУ ТА НІКЕЛЮ У ВУГІЛЬНОМУ ПЛАСТІ C_5 ШАХТИ «ПАВЛОГРАДСЬКА» (УКРАЇНА)

Ішков Валерій Валерійович
кандидат геолого-мінералогічних наук, доцент,
Національний ТУ «Дніпровська політехніка», Україна,
старший науковий співробітник,
інституту геотехнічної механіки ім. М.С. Полякова НАН України, Україна

Дрешпак Олександр Станіславович
кандидат технічних наук, доцент,
Національний ТУ «Дніпровська політехніка», Україна

Пащенко Павло Сергійович
кандидат геологічних наук, старший науковий співробітник,
інституту геотехнічної механіки ім. М.С. Полякова НАН України, Україна

Березняк Олена Олександрівна
аспірант,Національний ТУ «Дніпровська політехніка», Україна

Чечель Павло Олегович
інженер, Національний ТУ «Дніпровська політехніка», Україна

Вступ. Загальна актуальність дослідження вмісту і зв'язку Co та Ni у вугільних пластах обумовлена їх відношенням до переліку «потенційно токсичних» елементів у вугіллі, які згідно нормативним документам повинні обов'язково досліджуватись.

Останні досягнення. Раніше у вугільних пластах різних геолого-промислових районів Донбасу переважно досліджувалися токсичні та потенційно токсичні елементи [1 - 267]. У той же час, дослідження зв’язку між вмістами Co та Ni у вугільному пласті c_5 поля шахти «Павлоградська» раніше не виконувалися.

Мета роботи: полягає у дослідженні особливостей зв’язку концентрацій Co та Ni у вугільному пласті c_5 поля шахти «Павлоградська».

Методика досліджень. Фактологічною основою роботи були результати 83 кількісних спектральних аналізів Co та Ni виконаних після 1981р. в центральних сертифікованих лабораторіях виробничих геологорозвідувальних організацій України з матеріалу пластових проб отриманих виробничими і науково-дослідницькими підприємствами і організаціями та особисто авторами.

Результати досліджень. Було виконано аналітичні розрахунки відповідності емпіричних розподілів досліджуваних компонентів розподілу Гауса. С цією метою були розраховані критерії Ліллієфорса**,** Шапіро-Уїлка**,** Колмогорова –

Смірнова та згоди хі-квадрат Пірсона. У всіх випадках результати розрахунків підтвердили невідповідність досліджуваних вибірок нормальному закону розподілу. Таким чином, для більш реалістичної оцінки центральної тенденції вмістів Co та Ni замість значень середнього арифметичного необхідно використовувати медіанні значення. За результатами кореляційного аналізу встановлено тісний прямий зв'язок між концентраціями Co та Ni при цьому коефіцієнт кореляції Пірсона дорівнює 0,83. За результатами регресійного аналізу розраховане лінійне рівняння регресії:

$$Co = 0{,}0885 + 0{,}8396 \cdot Ni$$

Висновки. Аналіз виконаних досліджень свідчить про: 1) невідповідність емпіричних вибірок розглянутих характеристик нормальному закону розподілу; 2) фіксується полімодальность розподілу Ni; 3) встановлено тісний та прямий зв'язок між концентраціями Co та Ni; 4) розраховане рівняння регресії дозволяє прогнозувати зміни концентрацій Co у вугільному пласті c_5 поля шахти «Павлоградська».

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ЗАМІНА ПОКАРАННЯ У ВИДІ ДОВІЧНОГО ПОЗБАВЛЕННЯ ВОЛІ БІЛЬШ М'ЯКИМ ПОКАРАННЯМ: ПИТАННЯ ЮРИДИЧНОЇ ВИЗНАЧЕНОСТІ

Парасюк Наталія Михайлівна
кандидат юридичних наук, доцент
доцент кафедри кримінально-правових дисциплін
Львівський державний університет внутрішніх справ

Рішенням Конституційного Суду України у справі про перегляд вироку особі, караній на довічне позбавлення волі, від 16 вересня 2021 року № 6-р(II)/2021, зокрема, визнано такою, що не відповідає Конституції України (є неконституційною) частину першу статті 82 КК України в тім, що вона унеможливлює її застосування до осіб, яких засуджено до відбування покарання у вигляді довічного позбавлення волі. Конституційний Суд України апелював до того, що чинна на той час редакція ст. 82 КК України не визначає для вказаної категорії засуджених осіб особливого та належного порядку їх дострокового звільнення від відбування довічного позбавлення волі, що спричиняє юридичну невизначеність у правозастосуванні.

Питання щодо заміни покарання більш м'яким для осіб, яких засуджено до покарання у виді довічного позбавлення волі, було вирішено Законом України «Про внесення змін до Кодексу України про адміністративні правопорушення, Кримінального кодексу України та Кримінального процесуального кодексу України щодо виконання рішень Європейського суду з прав людини» від 18 жовтня 2022 року № 2690-IX [1], який набрав чинності 06 листопада 2022 року. Принагідно потрібно зауважити, що ні у тексті закону, ані у пояснювальній записці жодним чином не згадується про вище вказане рішення Конституційного Суду України. Натомість вся увага навколо рішень Європейського Суду з прав людини.

Відповідно до нової редакції частини 1 ст. 82 КК України, покарання у виді довічного позбавлення волі може бути замінено судом більш м'яким покаранням, строк якого обчислюється з дня заміни довічного позбавлення волі більш м'яким. Засуджені до довічного позбавлення волі отримали право клопотати про дострокове звільнення від цього покарання. З одного боку така законодавча новела є додатковою гарантією реалізації права на виправлення для цієї категорії засуджених осіб. З іншого – запроваджені нововведення не позбавлені дискусійності.

Структура нової редакції ст. 82 КК України побудована таким чином, що визначає положення, які підлягають застосуванню для заміни строкових покарань у виді обмеження та позбавлення волі, а також норми, які стосуються заміни довічного позбавлення волі більш м'яким покаранням. Для першої групи покарань частиною 1 ст. 82 КК України передбачена вимога щодо строку більш

м'якого покарання, яке має визначатися в межах строків, установлених у Загальній частині КК України для даного виду покарання. Для застосування заміни покарання більш м'яким суд має встановити сукупність таких умов: 1) фактичне відбуття засудженим установленої у ч. 4 ст. 82 КК України обов'язкової частини покарання; 2) ступінь виправності засудженого, тобто те, що особа стала на шлях виправлення.

Частина 5 ст. 82 КК України передбачає норму, яка стосується заміни покарання у виді довічного позбавлення волі. Законодавець визначає умову для цієї категорії засуджених – фактичне відбуття не менше п'ятнадцяти років призначеного судом покарання. Буквальне тлумачення змісту цієї статті дозволяє висунути припущення, що можливо законодавець не встановлює вимогу для суду з'ясувати ступінь виправності засудженого і самого факту відбуття строку покарання є достатньою умовою. З огляду на кримінально-правову природу заміни покарання більш м'яким таке твердження буде неправильним. У пункті 2 Постанови Пленуму Верховного Суду України «Про умовно-дострокове звільнення від відбування покарання і заміну невідбутої частини покарання більш м'яким» від 26 квітня 2002 року № 2 розтлумачено, що заміна невідбутої частини покарання більш м'яким можливо лише після повного та всебічного вивчення даних про особу засудженого [2].

Конституційний Суд України зазначає, що застосування до осіб, засуджених до покарання у виді довічного позбавлення волі, заміни покарання більш м'яким дозволить реалізувати право довести своє виправлення та право на ресоціалізацію, а відповідно й можливості переглянути покарання з метою оцінювання процесу змін, які відбулися в особистості такої засудженої особи, та ступеня її небезпеки для суспільства як передумови її повернення до суспільства [3]. Заміна покарання більш м'яким належить до заходів кримінально-правового характеру, які суд застосовує на свій угляд. Не виключенням є випадки, що суд не встановивши виправності засудженого до позбавлення волі, може відмовити у заміні. В цьому випадку редакція ч. 5 ст. 82 КК України може бути використана для обґрунтування факультативності врахування ступеня виправності засудженого. З метою недопущення вказаних формулювань, рекомендується доповнити ч. 5 ст. 82 КК України імперативною вказівкою про врахування ступеня виправлення засудженого до довічного позбавлення волі.

Висновок щодо виправності засудженого, зокрема, включає: 1) критерії оцінки виправлення засудженого: ставлення до скоєного кримінального правопорушення; ставлення до суспільного життя; ставлення до режиму відбування покарання; ставлення до праці; ставлення до особистого (сімейного) життя; ставлення до вживання наркотичних речовин/алкоголю; ставлення до планування життя у майбутньому; ставлення до відшкодування збитків внаслідок скоєного кримінального правопорушення (погашення заборгованості за виконавчими листами та іншими виконавчими документами); ставлення до безоплатної праці; 2) оцінку ризику вчинення повторного кримінального правопорушення; 3) стан реалізації індивідуальної програми соціально-виховної роботи; 4) характеристику під час відбування покарання; 5) психологічну

характеристику засудженого [4]. Відповідний ступінь виправності засудженого залежить від загального балу, зафіксованого у висновку. Якщо бал становить «65» та вище, то засуджений став на шлях виправлення та має бути представлений до заміни покарання на підставі ст. 82 КК України. Слід зауважити, що у кримінально-виконавчій установі не завжди є можливість залучати засуджених до довічного позбавлення до праці. Саме тому ставлення засудженого до праці та до безоплатної праці не буде оцінюватися. В ухвалі Кропивницького апеляційного суду від 16 червня 2025 року у справі № 941/518/24 провадження № 11-кп/4809/314/25 відсутність залучення засудженого до праці не стало перепоною для констатації його виправності, що послужило підставою для прийняття рішення про заміну покарання у виді довічного позбавлення волі на покарання у виді 15 років позбавлення волі [5].

Відповідно до частини 5 ст. 82 КК України передбачено допустима межа строків покарання у виді позбавлення волі, яке застосовується судом при заміні. Покарання у виді довічного позбавлення волі може бути замінено на покарання у виді позбавлення волі строком від п’ятнадцяти до двадцяти років. Верхня межа цього покарання є нижчою за максимальну межу покарання у виді позбавлення волі, яке може бути призначено судом за сукупністю вироків. Йдеться про виняток із загального правила, який передбачено частиною 2 ст. 71 КК України. При складанні покарань у виді позбавлення волі, якщо хоча б одне із кримінальних правопорушень є особливо тяжким злочином, загальний строк позбавлення волі може бути більшим п’ятнадцяти років, але не повинен перевищувати двадцяти п’яти років. Виникає ситуація, при якій фактично особи, які були засуджені до довічного позбавлення волі за особливо тяжкі злочини перебуватимуть у кращому становищі, ніж засуджені до позбавлення волі. Адже, відповідно до частини 6 ст. 82 КК України, до осіб, яким покарання замінене більш м’яким може бути застосоване умовно-дострокове звільнення за правилами, передбаченими ст. 81 КК України. Після відбуття не менше трьох чвертей строку покарання у разі заміни покарання у виді довічного позбавлення волі на позбавлення волі на певний строк такі засуджені також матимуть право клопотати про умовно-дострокове звільнення від відбування покарання.

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РОЛЬ ЕМОЦІЙНОГО СТРЕСУ У ФОРМУВАННІ ГАСТРОЕНТЕРОЛОГІЧНИХ ЗАХВОРЮВАНЬ

Кравченко Тетяна Юріївна
к. мед. н., доцентка кафедри педіатрії
Одеського національного медичного університету

У сучасному світі психоемоційне напруження стає неодмінною частиною повсякденного життя. Стрес визначається як гостра загроза з гомеостазу, який має як короткостроковий, так і довгостроковий вплив на функції шлунково-кишкового тракту. Під впливом емоційного стресу наша поведінка може зазнавати змін. Емоційний апарат першим включається в стресову реакцію. Унаслідок цього активуються функціональні системи та їх специфічне ендокринне забезпечення [1]. Медико-психологічні дослідження останніх років доводять значний вплив психоемоційного стану на функціонування шлунково-кишкового тракту. За останніми даними Всесвітньої організації охорони здоров'я, не менш як 15% загальної популяції страждає на психосоматичні розлади з боку органів травлення, а в гастроентерологічних стаціонарах цей показник досягає 50% [2]. Це призводить до зниження репаративних можливостей слизової оболонки шлунково-кишкового тракту та розвитку таких захворювань, як хронічний гастрит, виразкова хвороба шлунка, функціональна диспепсія та інші.

Виділяють п'ять основних механізмів впливу стресу на функціонування органів травлення:

-дія на гладку мускулатуру: під впливом стресу виникають спазми стінки шлунка і кишечника, що може викликати біль, дискомфорт, здуття та зміну частоти випорожнень;

-зміни моторики: в умовах підвищеного вироблення кортизолу кишечник може прискорювати/сповільнювати моторику, що проявляється діареєю або закрепом;

-порушення секреції: при хронічному стресі організм може виробляти менше або більше соляної кислоти, що підвищує ризики розвитку виразкової хвороби і печії;

-зміни мікрофлори: тривалий стрес і викликані ним зміни в імунній системі можуть призвести до дисбалансу корисних і шкідливих бактерій в кишечнику, провокуючи розвиток дисбактеріозу;

-зниження імунітету: функціонування імунної системи безпосередньо залежить від стану мікрофлори та під час стресу знижуються захисні властивості органів травлення, що підвищує сприйнятливість організму до інфекцій [3].

Окрім того, дуже важливим є той факт, що мозок і шлунково-кишкових тракт постійно взаємодіють і будь-які порушення з боку однієї ланки призводять до дисфункції іншої. Тісний зв'язок між кишечником і мозком, який називають «віссю кишечник-мозок», був відкритий у 21 столітті. Його визнають зв'язком між когнітивними та емоційними центрами мозку та функціями кишечника [4].

Гіпоталамо-гіпофізарно-надниркова вісь є важливою частиною нейроендокринної системи в організмі людини та бере участь у ненейрональному шляху комунікації в осі кишечник-мозок [5]. Коли виникає стресова реакція, кортикотропін-рилізинг-гормон, що вивільняється з паравентрикулярного ядра гіпоталамуса, сприяє вивільненню адренокортикотропного гормону з передньої долі гіпофіза і потім потрапляє в системний кровотік та впливає на кору надниркових залоз, що зрештою призводить до вивільнення глюкокортикоїдів, які згодом розподіляються по всьому організму, готуючи організм до реакції «бий або біжи» [6].

В експериментах показано, що в механізмах тривоги суттєву роль відіграють порушення норадреналінергічних систем мозку. ГАМК є найбільш поширеним тормозним медіатором у ЦНС, існує припущення, що при ПСР виникає аномалія ГАМК-бензодіазепінових рецепторів або недостатність їх ендогенних лігандів, що зумовлює патологічну тривожність як рису особистості та легкість її провокування. Підтвердженням патогенетичної ролі серотонінових рецепторів та метаболітів серотоніну є ефективність антидепресантів, які специфічно впливають на обмін серотоніну в мозку, так званих селективних інгібіторів або стимуляторів зворотного захвату серотоніну [7].

Розглядаючи проблему фармакологічної корекції психосоматичних порушень у хворих із патологією органів травлення багато дослідників звертаєть увагу на медіаторні системи регуляції роботи головного мозку. Дисбаланс ланок вегетативної нервової системи з підвищенням активності симпатичної та пригніченням парасимпатичної частини є закономірною реакцією на стрес та одним із патогенетичних механізмів виникнення захворювань органів травлення. [8]

За даними літератури у більшості пацієнтів з хронічними захворюваннями органів тралення виявлені такі порушенні:

- підвищений рівень тривожності, емоційної лабільності та стійкий соматизований стрес;
- відсутній зв’язок між психоемоційним станом і тілесними симптомами;
- хронічний стрес активує гіпоталамо-гіпофізарно-наднирникову вісь, що сприяє дисфункції шлунково-кишкового тракту;

Дані літератури свідчять, що найбільш вразливими виявляються особи з низькою стресостійкістю, високою потребою в контролі та внутрішньою конфліктністю.

Застосування психотерапії, а саме когнітивно-поведінкової терапії, психодинамічної терапії, терапії прийняття та прихильності, програм управління стресом, усвідомленості, гіпнозу, медикаментознозної корекції із використанням антидепресантів, регулярної фізичної активності може призводити до зменшення проявів психосимптоматики та поліпшення якості життя пацієнтів [9].

Таким чином психоемоційний стрес відіграє важливу роль у патогенезі багатьох гастроентерологічних захворювань. Принципи терапії таких порушень має включати як медикаментозну терапію, так і психологічну підтримку,

психотерапію та навчання стрес-менеджменту. Це дозволяє не лише покращити якість життя пацієнтів, а й знизити ризик рецидивів.

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INTEGRATING EMOTIONAL INTELLIGENCE AND EMOTIONAL FRAMING SKILLS INTO TRANSLATOR TRAINING PROGRAMS

Molotkina Yuliia,
Ph.D. in Philology
Associate Professor at the Department of Foreign Philology, Translation and Teaching Methods
Hryhorii Skovoroda University in Pereiaslav, Ukraine

In today's globalized and interconnected world, the work of a translator involves far more than converting words from one language to another. Translators play a key role in conveying emotional tone, cultural nuance, and ideological intent. Because of this, translation training programs need to move beyond a focus on technical skills alone and begin incorporating emotional intelligence and emotional framing as essential elements of professional preparation. These aspects are particularly important for developing translators who can navigate meaning with empathy, cultural sensitivity, and narrative awareness.

A growing body of research highlights the evolving role of the translator as not merely a linguistic intermediary, but an emotionally and ideologically engaged communicator. Mona Baker [1] was among the first to emphasize this shift, illustrating how translators participate in circulating or resisting dominant narratives, especially in conflict-driven contexts. This understanding of narrative positioning aligns with the broader pedagogical call for emotionally aware translation practices. Chesterman and Wagner [2] bridge theory and practice through their dialogic exploration of translator identity, ethics, and reflective thinking – elements that are foundational for developing self-aware professionals. Further contributing to this shift is the work of Hubscher-Davidson [3;4], who explores the role of emotional intelligence in translation and identifies how emotion perception, regulation, and expression affect translators' decision-making and problem-solving. Her findings underscore the importance of incorporating emotional competencies into translator training. Kussmaul [5] similarly highlights the creative and emotional dimensions of the translation process through cognitive analysis, advocating for targeted pedagogical strategies based on student behavior. Pym [6] provides an overview of translation theories, including those that foreground the translator's subjectivity and decision-making under uncertainty – an area where emotional intelligence is especially relevant. Finally, Rojo López [7] reinforces the value of integrating psychology into translation studies, offering a critical reflection on how emotional dynamics shape the translator's cognitive and ethical engagement with texts. Together, these works form a solid theoretical and empirical foundation for integrating emotional intelligence and emotional framing into contemporary translator education.

Emotional intelligence involves the ability to recognize, understand, and manage one's own emotions while being attuned to the emotions of others. In the context of

translation, Emotional intelligence becomes especially important when working with texts that carry strong emotional weight – such as literary fiction, political commentary, traumatic narratives, or sensitive healthcare communication. A translator who is emotionally aware is better equipped to identify and preserve the tone and affective undertones of the source text, ensuring that the translated version resonates similarly with the target audience.

Key aspects of emotional intelligence – such as empathy, emotional regulation, and self-awareness – have direct applications in translation. Empathy allows a translator to understand the emotional perspective of both the author and the intended reader. Emotional regulation helps maintain objectivity and professionalism, even when working with disturbing or emotionally intense content. These abilities not only support better translation outcomes but also foster ethical decision-making and intercultural understanding. For these reasons, emotional intelligence deserves a place in translator education.

Closely related to emotional intelligence is the concept of *emotional framing* – how translators shape or shift the emotional meaning of a text through their choices. Whether consciously or not, translators interpret emotional cues and decide how to render them in another language. Their personal experiences, cultural background, and emotional perceptions can all influence these decisions. This may result in a translation that intensifies, softens, or subtly repositions the emotional tone of the original text.

To develop emotional intelligence and framing competencies, translator education should adopt a more interdisciplinary and hands-on approach. One effective method is to incorporate workshops and training sessions focused on emotional awareness, where students learn to recognize, articulate, and manage emotions – both their own and those embedded in texts. Through activities like journaling, emotional self-assessments, and guided discussions, students can begin to see how their emotional perceptions shape translation decisions. For instance, when translating the Ukrainian phrase *"Його мовчання боліло більше, ніж будь-які слова"* into English, a student may initially opt for the literal *"His silence hurt more than any words,"* but after reflecting on emotional tone and connotation, might choose a more evocative rendering such as *"His silence cut deeper than anything he could have said."* Such exercises not only develop translation accuracy but also emotional nuance.

Another important strategy involves close analysis of emotionally complex texts. By comparing different translations of literature, political speeches, or personal narratives, students explore how mood, tone, and affective undertones operate across languages. For example, when examining English renditions of lines *"Серце ниє, плаче душа,"* students might debate between *"My heart aches, my soul weeps"* and *"My chest is heavy, and my spirit mourns,"* considering which version better preserves the emotional weight in English. These discussions help students understand emotional framing not as a rigid transfer of feelings, but as a series of deliberate interpretive choices.

Encouraging reflective practice is equally essential. After working with emotionally challenging texts – such as trauma narratives or letters from war zones – students can be asked to write short commentaries about their translation choices,

emotional reactions, and any internal conflicts that arose. This process fosters emotional self-awareness and resilience. For example, translating an English sentence like *"She sat alone in the dark, holding onto the last memory of her child"* into Ukrainian could lead to various choices – *"Вона сиділа в темряві, міцно тримаючись за останній спогад про свою дитину"* or a softer variant like *"У темній тиші вона зберігала в серці єдиний спогад про свою дитину."* Reflecting on such differences reveals how emotional closeness or distance can subtly shift through language.

Experiential learning through simulations can also be invaluable. Students might translate real-life materials – such as refugee testimonies, end-of-life medical communication, or advocacy campaign texts – within controlled classroom settings. These emotionally charged texts offer a space for students to apply framing strategies with care. In one case, a phrase like *"The patient's outlook is poor"* might be translated as *"Стан пацієнта залишається критичним"* to soften the impact for Ukrainian audiences, depending on context. Collaborative activities with students from psychology or communications programs can enrich these simulations, highlighting how emotional tone affects cross-disciplinary understanding.

Finally, comparative framing assignments – where students produce multiple translations of the same sentence with different emotional emphases—can powerfully demonstrate how subtle shifts in word choice influence perception. Take the simple Ukrainian sentence *"Вона мовчала."* While *"She was silent"* is accurate, it can be rephrased as *"She sat in heavy silence"* or *"Her silence said more than words ever could,"* each version carrying a distinct emotional tone. Engaging with such choices trains students to think beyond lexical equivalence and toward the deeper emotional and narrative layers of a text.

Translators who are trained to think about emotion – not just accuracy – bring valuable soft skills to the table: adaptability, cultural sensitivity, and emotional maturity. These qualities are increasingly sought after in sectors like diplomacy, media, healthcare, and international NGOs. From an educational standpoint, emphasizing emotional intelligence and framing enriches translator training by connecting language work to broader human experiences. It fosters professionals who are not only technically proficient but also emotionally grounded and ethically engaged.

As the demands of the translation field continue to grow, education must adapt. Integrating emotional intelligence and emotional framing into translator training is not an optional addition – it's a vital part of preparing translators for the complexities of real-world communication. By helping students become more emotionally attuned and self-reflective, we equip them to produce more meaningful, responsible, and impactful translations – while also supporting their personal development and professional well-being.

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ІНДИВІДУАЛІЗАЦІЯ ФІЗИЧНОГО ВИХОВАННЯ ДЛЯ УЧНІВ З ОСОБЛИВИМИ ОСВІТНІМИ ПОТРЕБАМИ В ІНКЛЮЗИВНОМУ СЕРЕДОВИЩІ: ВИКЛИКИ ТА СТРАТЕГІЇ

Трояновська М. М.
Кандидат педагогічних наук,
доцент кафедри педагогіки, психології та методики фізичного виховання,
Національний університет «Чернігівський колегіум» імені Т. Г. Шевченка
(Чернігів, Україна)

Інклюзивна освіта в сучасній українській школі набула значного поширення, що зумовлює необхідність створення умов для повноцінної участі кожного учня в усіх аспектах навчального процесу, включаючи фізичне виховання. Учні з особливими освітніми потребами (ООП) становлять різноманітну групу, яка потребує індивідуального підходу та адаптації фізичного навантаження відповідно до функціональних можливостей, психофізичного стану та мотиваційних особливостей. Індивідуалізація фізичного виховання стає не лише педагогічним викликом, а й ключовим фактором у забезпеченні ефективного, безпечного та інклюзивного навчання.

Основні виклики індивідуалізації фізичного виховання.

Одним з основних викликів є брак професійної підготовки педагогів з фізичної культури до роботи з дітьми з ООП. Багато вчителів не мають необхідних знань щодо адаптивної фізичної культури, методик оцінювання фізичного стану таких учнів, а також навичок комунікації з ними.

Іншим викликом є обмеженість ресурсів: відсутність необхідного інвентарю, спеціально облаштованих спортивних майданчиків, доступу до допоміжного обладнання. Крім того, нерівномірне впровадження інклюзії в різних регіонах України створює додаткові бар'єри в реалізації індивідуалізованих програм фізичного виховання.

Також слід відзначити психологічні бар'єри, які можуть виникати як у самих учнів з ООП, так і в їхніх однолітків. Важливо забезпечити не лише фізичну, а й соціальну інклюзію, запобігаючи стигматизації та сприяючи формуванню позитивного мікроклімату в учнівському колективі.

Стратегії індивідуалізації.

Успішна індивідуалізація фізичного виховання в інклюзивному середовищі передбачає реалізацію комплексу педагогічних стратегій:

1. Діагностика фізичного стану та рухових можливостей. На основі індивідуальних карт спостережень, даних медичних довідок та психолого-педагогічної характеристики слід визначати доступний рівень фізичних навантажень.

2. Розробка індивідуальних освітніх траєкторій. Це передбачає формулювання реалістичних цілей навчання та підбір вправ, які сприяють розвитку конкретних рухових якостей з урахуванням функціональних обмежень.

3. Застосування адаптивних методик. Зокрема, використання спрощених вправ, модифікованого інвентарю, групових форм роботи з підтримкою однолітків або асистента вчителя.

4. Співпраця з мультидисциплінарною командою. Успішна інклюзія передбачає взаємодію вчителя фізичної культури з дефектологом, психологом, реабілітологом, а також з батьками учнів.

5. Використання засобів невербальної комунікації. Для дітей з порушеннями слуху, зору або інтелектуальними порушеннями особливо важливими є жести, візуальні інструкції, піктограми, прості словесні команди.

6. Залучення сучасних цифрових технологій. Використання відеоінструкцій, мобільних застосунків або інтерактивних панелей допомагає урізноманітнити заняття та підвищити зацікавленість учнів.

Індивідуалізація фізичного виховання в інклюзивному освітньому середовищі є надзвичайно важливим елементом успішної соціалізації та всебічного розвитку учнів з особливими освітніми потребами. Вона вимагає від педагогів гнучкості, креативності та готовності до постійного професійного зростання. Водночас ефективна реалізація індивідуального підходу неможлива без належної державної підтримки, професійної підготовки кадрів та ресурсного забезпечення освітніх закладів. Перехід від декларативної інклюзії до практичної реалізації індивідуалізованих програм фізичного виховання є стратегічно важливим завданням для сучасної української школи.

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