



Digital Transformation and IT Implementation: Driving Sustainable Development Across Nations

*Collective monograph edited by
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Digital Transformation and IT Implementation: Driving Sustainable Development Across Nations

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This monograph explores the transformative role of digital technologies in achieving sustainable development across diverse global contexts. It focuses on how digital skills, infrastructures, and strategies intersect with key areas such as economic resilience, environmental sustainability, and social equity. As digital tools become fundamental to modern governance, business, education, and personal well-being, the monograph investigates their capacity to drive inclusive growth and systemic innovation.

Organized into three thematic sections, the work delves into macroeconomic impacts of digital transformation, sector-specific strategies, and financial and business adaptation to new digital realities. The contributors examine topics such as the development of robust digital infrastructure, artificial intelligence integration, the digital housing market, corporate sustainability strategies, and the evolving role of digital leadership—especially in wartime and crisis settings. Comparative studies highlight national pathways in countries like Poland, Ukraine, Japan, and Brazil, offering practical insights into global adaptation and digital maturity.

This monograph will serve as a valuable resource for educators, researchers, policymakers, business leaders, and students seeking to understand how digital transformation reshapes sustainable development efforts. The findings offer evidence-based recommendations for advancing digital inclusion, refining regulatory frameworks, and aligning technological innovation with ethical governance and human-centered values. This volume is dedicated to the fifth anniversary of the Scientific Center of Innovative Research.

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Chapter 3.3. Digital Intelligence of Managers During Wartime: From Survival to Development

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Abstract. Digital intelligence is a critical competency in the modern world, extending beyond technical skills to support success in business, education, and personal life. The objective of this chapter is to investigate the role of digital intelligence in the managerial activities of higher education institutions (HEIs) in Ukraine under the conditions of full-scale war. The study focuses on the capacities and limitations of HEI managers in adopting and using digital technologies effectively during wartime disruptions. The research methodology combines qualitative analysis with empirical data collection through a nationwide survey of 91 respondents, including academic staff, administrators, and students from Ukrainian HEIs. The survey explored self-assessed digital intelligence, perceptions of colleagues' digital readiness, the intensity and purposes of digital technology use, and the perceived impact of digital tools on administrative productivity and organizational resilience. The results demonstrate that the majority of respondents rate their digital intelligence as medium or fairly high, and perceive similar levels among their peers. However, a smaller portion report high digital competence, revealing disparities in institutional readiness and skill development. The full-scale war significantly accelerated the adoption of digital tools, with over 80% of respondents indicating intensified use, particularly in teaching, administrative communication, content creation, and external collaboration. The integration of digital tools has been largely perceived as positive, with nearly all respondents recognizing improvements in productivity and efficiency. Nevertheless, respondents also report critical challenges, including information overload, reduced interpersonal communication, increased dependency on technology, and growing concerns over data confidentiality. These issues highlight the psychological and managerial costs of excessive digital engagement, particularly in high-stress wartime environments. The study concludes that digital intelligence is no longer a supplementary skill but a foundational strategic resource in the governance of HEIs. While digital tools have enhanced institutional agility and operational continuity, the uneven distribution of skills and the rise of digital fatigue pose risks to long-term sustainability. To mitigate these effects, HEIs must adopt balanced digital management strategies that prioritize both technological proficiency and human-centered leadership. Digital intelligence enables HEI managers not only to withstand the pressures of war but to lead innovation, promote inclusion, and ensure the continuity and quality of education in times of crisis and beyond.

Keywords: digital intelligence; higher education institutions; digital transformation; security; management.

1. The Importance of Digital Intelligence During War. In the contemporary world, marked by rapid digitalization, armed conflicts, and other crises, digital skills have emerged as indispensable competencies. War, as an extraordinary circumstance, significantly disrupts access to conventional management approaches, necessitating the integration of digital technologies to facilitate coordination, sustain operational activities, and enable adaptive responses to dynamic changes. Managers are required not only to adjust to working under crisis conditions but also to ensure organizational stability and foster development. Digital tools have become fundamental for: maintaining the continuity of organizational processes, managing remote teams with efficiency, conducting real-time monitoring and analysis of evolving situations, securing resources through global digital platforms. Moreover, digital skills contribute to strengthening resilience against cyber threats, a factor of paramount importance during conflicts when information security represents one of the most significant challenges.

The set of digital skills no longer exists in isolation; the concept of Digital Intelligence has been introduced, and a corresponding standard has been established: “Digital Intelligence (DQ) was developed to encompass a comprehensive set of technical, cognitive, meta-cognitive, and socio-emotional competencies, which are grounded in universal moral values and enable individuals to face the challenges of digital life and adapt to its demands. The DQ Framework comprises 8 areas of digital life-identity, use, safety, security, emotional intelligence, literacy, communication, and rights--across 3 levels of experience-citizenship, creativity, and competitiveness. The objective of this standard is to establish a DQ global standard that encompasses a common framework to ensure that digital competency building efforts are coordinated globally. It includes a common set of definitions, language, and understanding of digital literacy, skills, and readiness that can be adopted by all stakeholders worldwide, including national governments, the educational industry, the technology industry, international agencies, private companies, and society as a whole” (IEEE Standard for Digital Intelligence, 2021).

DQ comprises 32 digital competencies and it focuses on eight critical areas of digital life– identity, use, safety, security, emotional intelligence, literacy, communication, and rights. These eight areas can each be developed at four levels: citizenship, creativity, and competitiveness. Connectivity focuses on digital inclusion to ensure that individuals are connected to digital technology. Citizenship focuses on basic levels of skills needed to use technologies in responsible, safe, and ethical ways. Creativity allows problem-solving through

the creation of new knowledge, technologies, and content. Competitiveness focuses on innovations to change communities and the economy for broad benefit. (IEEE Standard for Digital Intelligence, 2021).

Thus, the importance of digital intelligence is hard to overestimate, as it represents not just a set of skills but a new type of competency that ensures success in the modern world. In business, education, or personal life, digital intelligence enhances effective communication, productivity, and security. However, the role of digital intelligence goes beyond the digital framework of the globalized world; its importance increases significantly in times of crisis, in particular during wars – especially the current war of Russian aggression against Ukraine. In such circumstances, the presence of well-developed digital intelligence becomes a critical prerequisite for ensuring security. Digital intelligence plays a special role in increasing security in educational institutions, where its development is important not only for physical security, but also for the effective management and maintenance of the quality of education. Despite the existence of a standard, holistic research on the development of digital intelligence is practically absent, while research on individual digital skills is quite extensive. This study concerns the importance of digital intelligence for managers of higher education institutions.

2. The Multifaceted Impact of Digital Transformation on of Higher Education Institutions Managers During Wartime. Wartime management requires unique abilities such as quick decision-making, adaptability, and transparent communication (Rudenko et al., 2024; Semenchuk & Kushnir, 2024). Managers must navigate numerous changes, requiring foresight and strategic planning (Rudenko et al., 2024). Digital literacy and adaptability are essential competencies for managers in the digital age, enhancing their overall managerial capabilities (Neumeyer & Liu, 2021). The development of digital skills is particularly important in Ukraine, where there is a need to bridge the gap between rapid technological advancement and the population's low digital literacy (Bondar-Pidhurska & Glebova, 2023). To address this, a comprehensive approach to digital education for various age groups is proposed, focusing on developing skills in using digital technologies and services (Bondar-Pidhurska & Glebova, 2023). This approach can contribute to satisfying the vital interests of individuals, society, and the state during wartime and post-war periods.

During wartime, the role of managers becomes crucial as they navigate through unique challenges that differ significantly from conventional crisis management. The digital skills of managers are particularly important as they transition from survival to development in such conditions. Managers must be

able to make rapid decisions and adapt to constantly changing circumstances. This requires a high level of foresight and strategic planning to ensure the organization remains resilient and successful during wartime (Rudenko, O., Malovanyi, Y., & Mandybura, Y. (2024). Transparent Communication open and clear communication channels with the team is essential. This transparency helps in managing the uncertainties and complexities that arise during wartime, ensuring that all team members are aligned and informed (Rudenko, O., Malovanyi, Y., & Mandybura, Y. (2024).

Digital transformation has become a critical component of management strategies, especially during crises. The integration of digital technologies into business processes can enhance organizational resilience, improve crisis management, and foster sustainable development. This synthesis explores the role of digital transformation in management during crises, drawing insights from various research studies. Wartime management demands a unique set of digital skills and strategic approaches. Managers must be adaptable, maintain transparent communication, and continuously develop their digital competencies to lead their organizations from survival to development successfully (Rudenko, O., Malovanyi, Y., & Mandybura, Y. (2024). So, during wartime digital intelligence of higher education institutions managers have to be Adaptability and Quick Decision-Making, Continuous Training and Development, Strategic Innovation and Agility.

The collective insights from these sources underscore the importance of digital intelligence and transformation in handling contemporary challenges in management, education, and crisis response. They all reflect a pressing need for adaptability, innovative thinking, and the integration of technology, particularly in turbulent environments such as wartime or post-crisis recovery. Each source contributes valuable perspectives on harnessing digital tools and frameworks to navigate complexity effectively.

Digital Transformation in Higher Education. The digital transformation of higher education has become a pivotal force in reshaping academic institutions, particularly in contexts marked by crisis or rapid societal change. One critical perspective is offered by Kolodiziev et al. (2024), who examine how digital transformation serves as a tool for fostering an inclusive economy during wartime. Their analysis emphasizes that digital technologies not only ensure continuity in education but also create economic opportunities by expanding access and participation, especially in conflict-affected regions. This approach highlights the role of education as a stabilizing and inclusive mechanism within broader socio-economic systems.

Building on this foundation, the strategic integration of artificial intelligence (AI) into higher education is a central theme in the work published by MDPI (2023). This study focuses on how AI technologies can be leveraged to manage institutional transformation and facilitate the development of “smart universities.” These smart institutions utilize AI to enhance decision-making, personalize learning experiences, and optimize administrative functions, thereby fostering innovation and long-term sustainability in the educational sector.

Complementary to this strategic focus is the need for cultivating digital competencies within academic communities. A 2023 study published by IEEE Xplore explores how universities are developing digital skills among both students and faculty. It identifies targeted strategies such as updated curricula, digital literacy training, and cross-disciplinary programs aimed at closing skill gaps and preparing learners for the demands of the digital economy.

Further insights are provided by Emerald’s 2024 volume *Digital Transformation in Higher Education, Part A*, which examines the broader impacts of AI and digital technologies on the structure and function of higher education systems. It discusses how digital transformation is altering pedagogical models, reshaping research collaboration, and influencing institutional governance, thereby reinforcing the need for adaptive and forward-looking educational policies.

Lastly, Springer’s (2024) publication *Digital Transformations: Artificial Intelligence in Higher Education* offers a bibliometric analysis of the scholarly discourse on AI’s role in higher education. This meta-level study maps the evolution of research themes, identifies influential authors and institutions, and sheds light on emerging areas of interest, thus contributing to a deeper understanding of the trajectory and impact of digital transformation in academia.

Together, these works form a coherent and comprehensive picture of how digital transformation—especially through the application of AI—is not only modernizing higher education but also playing a crucial role in broader societal resilience and economic inclusion.

Leadership and Crisis Management. Effective leadership in times of crisis has become a critical competency, particularly in the context of higher education. The Harvard Graduate School of Education emphasizes the importance of preparing academic administrators to respond decisively and strategically to crises, equipping them with tools for effective crisis management. This aligns with insights from the Association of Governing Boards (AGB, 2023), which highlight the significance of adaptive leadership and the role of digital transformation in navigating complex institutional challenges. Similarly, the

resource “Crisis Management and Transformation in Changing Higher Ed” underscores the necessity of strategic leadership capable of guiding educational institutions through periods of disruption and transformation. Further reinforcing this perspective, the ERIC (2023) report titled "The Impact of Digital Transformation and Leadership on Organizational Resilience in Distance Education Institutions" explores how strong and visionary leadership can enhance institutional resilience, particularly in distance learning environments. Collectively, these perspectives illustrate that leadership in higher education must be agile, technologically informed, and strategically focused to successfully guide institutions through crises and foster long-term transformation.

Innovations in Response to Crisis. Periods of crisis often act as powerful catalysts for innovation, particularly in the field of education. Ukrainian universities, facing the unprecedented challenges of wartime conditions, have actively embraced digital technologies and institutional innovations to maintain educational continuity and quality. As documented in Dialnet (2023), these institutions rapidly implemented digital tools, restructured academic delivery methods, and fostered virtual collaboration to adapt to disrupted learning environments. Similarly, the global COVID-19 pandemic compelled universities worldwide to reimagine traditional learning models. A case study presented by Digital Commons NJIT (2023) highlights how one university effectively strategized its transition to remote education, leveraging technology not only to sustain academic operations but also to foster institutional resilience. This trend is further echoed in the business education sector, where institutions have sought to prepare students for uncertainty and complex global challenges. The Financial Times (2024) discusses how business schools have introduced forward-thinking teaching practices that emphasize leadership, emotional resilience, and digital fluency, ensuring that future leaders are well-equipped to navigate volatile environments. Collectively, these examples underscore a broader movement within higher education to innovate under pressure, using crises as opportunities to transform learning ecosystems for long-term adaptability and growth.

Collaborative Strategies and Institutional Efficiency. In the context of growing financial pressures and the rapid evolution of the digital economy, universities are increasingly exploring collaborative strategies to enhance institutional resilience and long-term efficiency. One such approach gaining momentum is the strategic merger of higher education institutions. According to *The Times* (2024), experts in university mergers advocate for the consolidation of resources and academic infrastructures as a practical solution to financial instability. By joining forces, universities can reduce administrative costs,

streamline academic offerings, and maintain educational quality, ultimately improving their chances of survival and growth in a competitive global landscape.

Simultaneously, institutions are also investing in the development of future-ready academic programs that align with the demands of the digital age. As *The Guardian* (2025) reports, a newly launched postgraduate program aims to equip emerging digital leaders with advanced knowledge in areas such as artificial intelligence and quantum computing. This initiative reflects a broader trend in higher education, where universities are not only seeking structural reforms through mergers but are also adapting their curricula to remain relevant and future-oriented. Together, these efforts illustrate a dual strategy: enhancing institutional efficiency through collaboration while fostering innovation and leadership in cutting-edge technological domains.

Digital transformation plays a crucial role in enhancing management strategies within higher education institutions, especially in times of crisis. It strengthens organizational resilience, ensures efficient crisis management, and fosters sustainable development. By strategically integrating digital technologies into university processes, higher education institutions can more effectively navigate and thrive in uncertain and rapidly changing environments. As universities continue to face challenges such as economic instability, geopolitical changes, and evolving educational needs, the importance of digital transformation in institutional management will only increase. This underscores the need for continuous research and adaptation of management practices to meet emerging technological demands and maintain a competitive edge in the educational sector.

3. Methods for Assessing Digital Intelligence. In the contemporary digital era, **Digital Intelligence (DQ)** has emerged as a critical construct that reflects an individual's ability to navigate, adapt to, and thrive within complex digital environments. Unlike traditional measures of digital proficiency that focus narrowly on technical skills, DQ encompasses a broad and interwoven set of competencies—cognitive, technical, emotional, and ethical—that together define one's capacity to use digital technologies responsibly, safely, and effectively. As the digital transformation of society accelerates, understanding and assessing these competencies becomes vital not only for individual development but also for fostering resilient, informed, and ethical digital communities.

At its core, DQ is not simply about operating digital tools. It involves the deeper ability to critically analyze online environments, safeguard one's digital identity, engage in empathetic and respectful digital communication, and adapt to technological change with agility. This complexity demands that assessment efforts move beyond isolated skill checklists to embrace a **multidimensional and**

integrated approach capable of capturing both visible behaviors and underlying values.

To assess DQ meaningfully, it is essential to first recognize its *seven interdependent domains*:

- Technical Proficiency represents foundational digital skills such as operating hardware, software, and navigating online platforms. It is the gateway to engaging meaningfully in digital spaces.

- Digital Literacy expands upon technical ability by focusing on the ability to search for, evaluate, and synthesize digital information critically. It also includes an awareness of how digital systems—like algorithms and platforms—shape information consumption.

- Cybersecurity and Digital Safety centers on the knowledge and behaviors necessary to protect personal information, avoid cyber threats, and manage one’s digital footprint responsibly.

- Social and Emotional Intelligence in Digital Contexts refers to the ability to communicate respectfully online, demonstrate digital empathy, and build inclusive digital environments free from harmful behavior such as cyberbullying.

- Critical Thinking in Digital Spaces equips individuals to detect misinformation, assess credibility, and understand the broader social and ethical implications of technology.

- Adaptability and Lifelong Learning underscores the necessity of continuous learning and flexibility in a world where digital tools and ecosystems evolve rapidly.

- Ethical and Legal Awareness emphasizes understanding and respecting digital rights, privacy norms, copyright laws, and the responsibilities of digital citizenship.

These domains form a holistic picture of digital competence, highlighting that DQ is not static or purely technical—it is dynamic, contextual, and rooted in values. Assessing DQ, therefore, requires tools that are as complex and interlinked as the skills themselves.

Given the multifaceted nature of DQ, its assessment must rely on a **composite strategy** that incorporates both qualitative and quantitative methods. No single instrument can capture the full depth of digital intelligence. Instead, a diversified and layered assessment architecture is necessary to uncover both surface-level technical capabilities and deeper behavioral and cognitive dimensions.

1) Surveys and Questionnaires. Structured questionnaires remain useful for capturing self-perceived digital competence across various DQ domains. They

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offer a scalable way to screen for knowledge, attitudes, and behavioral tendencies, asking individuals to reflect on their comfort and frequency of engagement with digital tools. However, self-assessments carry limitations such as subjectivity, bias, and overestimation, and thus should serve as one component within a broader evaluation system.

2) Skills-Based Testing. To provide more objective measurements, standardized digital skills tests can be implemented. These involve performance-based tasks such as searching for credible information online, formatting documents, or demonstrating safe browsing habits. Such simulations can accurately assess specific sub-competencies and are especially effective in educational settings where benchmarking against standards is essential.

3) Real-World Behavioral Observation. Unlike controlled testing, observational methods assess how individuals apply their digital intelligence in everyday contexts. For example, evaluators might examine how students collaborate on digital group projects or how professionals respond to simulated cyber threats. This approach enables a richer understanding of applied knowledge and behavior, though it requires careful standardization to ensure validity and mitigate observer bias.

4) Project-Based Evaluation. Assigning complex digital tasks—such as developing a website, conducting data-driven research, or managing a social media campaign—allows evaluators to assess the integration of multiple DQ domains. Projects offer insights into not just technical skills but also creativity, collaboration, problem-solving, and ethical reasoning. The evaluation process often emphasizes both the outcome and the strategy behind task completion.

5) Portfolio Assessment. Portfolios offer a longitudinal perspective by compiling artifacts of digital engagement, such as blog posts, coding projects, or video tutorials. They showcase growth over time, reflect depth of learning, and provide qualitative context for assessing the originality, quality, and ethical standards of digital work. Portfolios are particularly suited to formative assessment and personalized feedback.

6) Technology Usage Analytics. Digital trace data—collected with ethical transparency and consent—can reveal patterns in technology use, engagement levels, and digital behaviors. By analyzing app usage, search histories, platform interactions, and digital time management, educators and organizations can infer digital habits and behavioral competencies that are otherwise difficult to capture through traditional means.

A comprehensive and effective assessment of DQ requires the *integration of multiple complementary methods*. For instance, a digital education initiative

might begin with a questionnaire to gauge initial self-awareness, proceed with a skills test to assess baseline capabilities, and culminate in a portfolio-based project that reflects the learner's applied competencies and personal growth. Supplementing this with usage analytics and real-world observations ensures a well-rounded evaluation that encompasses knowledge, behavior, context, and change over time.

Crucially, DQ assessment frameworks must be *adaptive and inclusive*, accounting for the rapid evolution of technology and the diverse cultural, educational, and infrastructural backgrounds of participants. One-size-fits-all approaches risk marginalizing individuals or misrepresenting abilities. Instead, assessment tools must be flexible, context-aware, and grounded in ethical principles that uphold privacy, transparency, and equity.

Assessing digital intelligence in the 21st century is both a necessity and a challenge. As society becomes increasingly digitized, the ability to measure not just technical fluency but also ethical judgment, critical thinking, adaptability, and emotional intelligence is essential. A robust and nuanced evaluation of DQ provides more than an academic or employment benchmark—it serves as a foundation for fostering responsible digital citizenship and ensuring inclusive digital participation. By combining diverse methods into an interconnected assessment framework, stakeholders can gain deeper insights into digital competencies and design meaningful interventions that prepare individuals for the digital realities of today and tomorrow.

4. Survey Results on Digital Intelligence (DQ) in Higher Education Institutions in Ukraine. A total of 91 respondents from across Ukraine (excluding temporarily occupied territories) participated in the survey. The survey was conducted during November 2024. Among them, 58% are students at higher education institutions (HEIs), while 42% are faculty members and/or hold administrative positions.

Respondents' answers to the question "Self-Assessment of Digital Intelligence (DQ)" provide insight into how people assess their own digital skills and readiness in the context of an increasingly digital society.

The data reveal that the majority of respondents perceive their digital intelligence to be at a medium (45%) or fairly high (30%) level, indicating a strong sense of digital competence among the surveyed group. A notable portion (15%) rated their skills as high, while only a small fraction identified with below medium (3%) or low (1%) levels. The 6% who found it difficult to assess their abilities highlight the need for more accessible frameworks or tools for self-evaluation. Overall, the Figure 1 suggests a generally positive self-perception of

digital skills, though targeted support may be beneficial for individuals with lower confidence or unclear self-assessment.

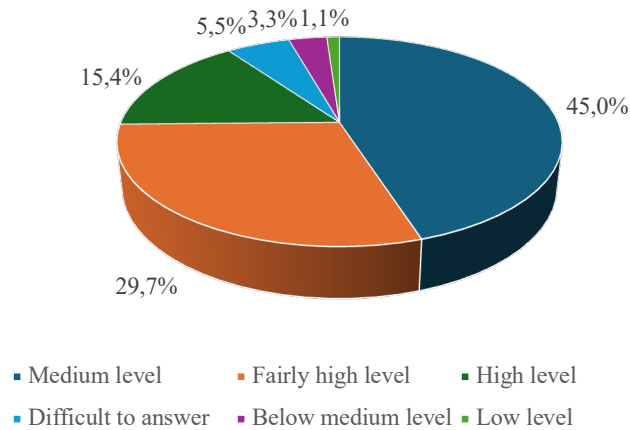


Figure 1. Self-Assessment of Digital Intelligence (DQ) Among Respondents

Source: created by the authors based on the results of the survey

The figure 2 presents a breakdown of how participants assess the digital intelligence (DQ) of their colleagues within their main higher education institution. This visual snapshot provides insight into the prevailing views of digital competence among academic peers.

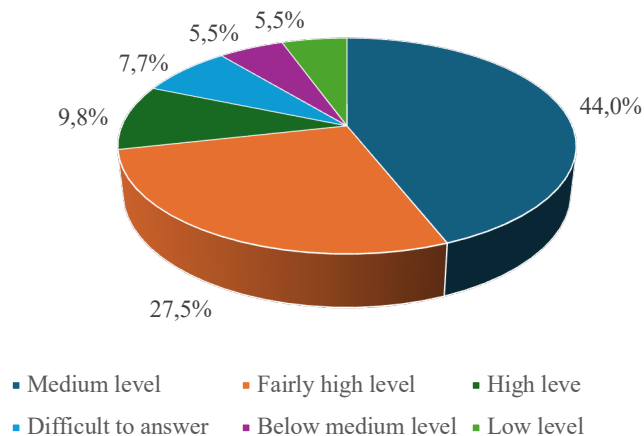


Figure 2. Perceived DQ of Colleagues at Their Primary HEI

Source: created by the authors based on the results of the survey

The Figure 2 reveals that nearly half of the respondents (44%) perceive their colleagues' digital intelligence as being at a medium level, while 27.5% rate it as

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fairly high, and 9.8% as high. Smaller segments identified below medium (5.5%) or low (5.5%) levels of DQ, and 7.7% found it difficult to assess. These results suggest that while a significant majority recognize at least moderate digital competence among their colleagues, there is still a portion of the academic community perceived to have either limited skills or uncertain digital capacity—highlighting the need for continuous professional development in digital literacy within higher education institutions.

The figure 3 illustrates how the use of digital tools has evolved among respondents under the conditions of wartime disruption and highlights varying degrees of change, from significant increases to complete non-usage, offering insight into how external crises influence digital adoption in professional and educational contexts.

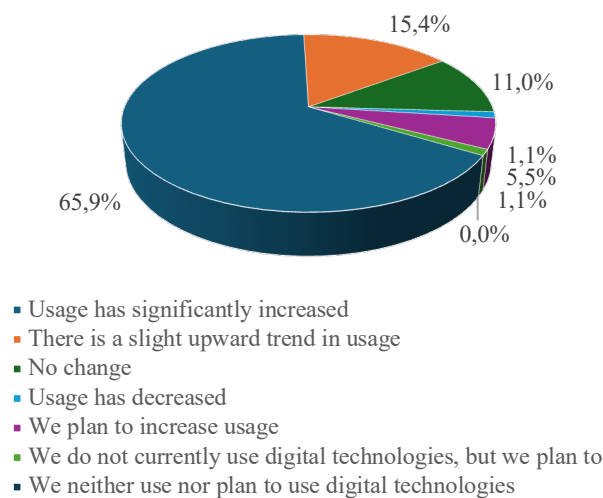


Figure 3. Changes in the Intensity of Digital Technology Usage (Including AI and GenAI) During the Full-Scale War

Source: created by the authors based on the results of the survey

The data show that a substantial majority (65.9%) of respondents reported a significant increase in their use of digital technologies, including AI and generative AI, during the full-scale war. An additional 15.4% observed a slight upward trend, reinforcing the notion of a general shift toward digital reliance. Meanwhile, only a small fraction reported no change (11%), a decrease (1.5%), or expressed future intentions to adopt digital tools (1.5%). None of the respondents indicated that they do not currently use or plan to use digital technologies in the future. Overall, the Figure 3 underscores a pronounced acceleration in digital transformation driven by crisis conditions, highlighting both the adaptability and growing importance of digital tools in sustaining operations during times of disruption.

Figure 4 illustrates the key areas where digital technologies are used in higher education institutions and reflects respondents' views on the most common functions supported by digital tools, ranging from administrative processes to learning and communication, highlighting the multifaceted role of digitalization in academia.

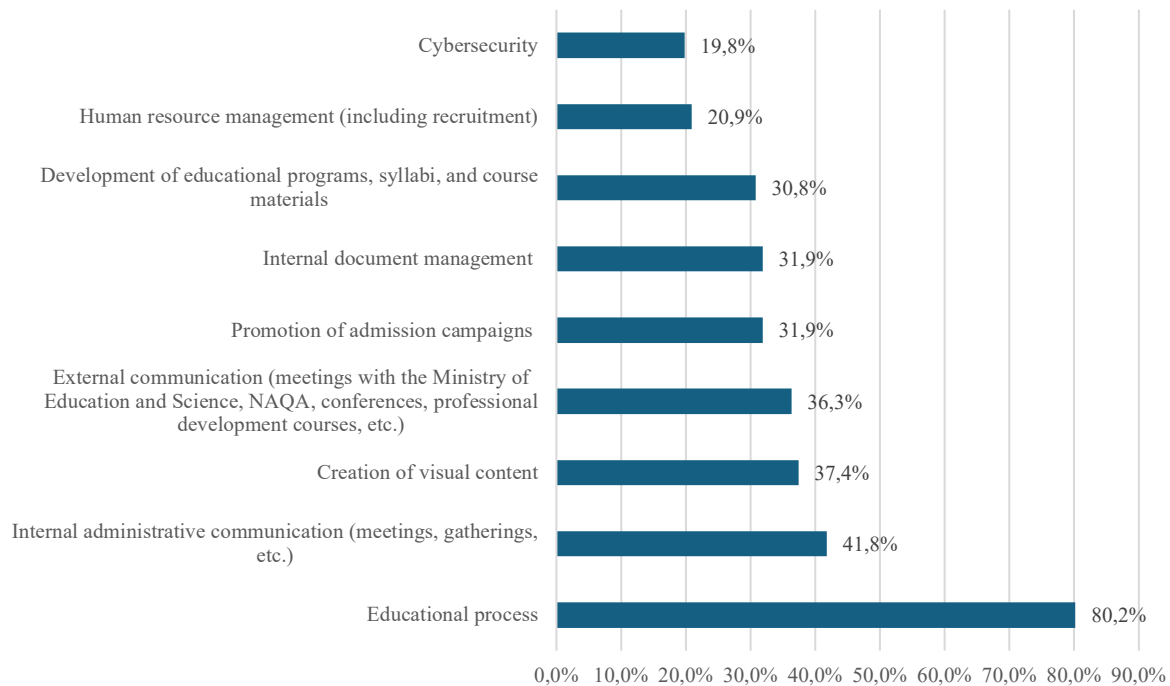


Figure 4. Primary Purposes of Digital Technology Implementation in HEIs
Source: created by the authors based on the results of the survey

The Figure 4 indicates that the most prominent application of digital technologies is in the educational process, cited by an overwhelming 80.2% of respondents. This is followed by uses in internal administrative tasks (41.8%) and the creation of visual content (37.4%). Functions such as external communication (36.3%), promotion of admission campaigns (31.9%), and development of educational programs (30.8%) also rank notably. In contrast, areas like cybersecurity (19.8%) and human resource management (20.9%) appear to receive less digital support. These results suggest that while digitalization is primarily focused on enhancing teaching and academic delivery, there remains significant potential to expand its integration into institutional management and operational security within HEIs.

Figure 5 presents a visual distribution of participants' perceptions of the integration of digital tools in higher education institutions.

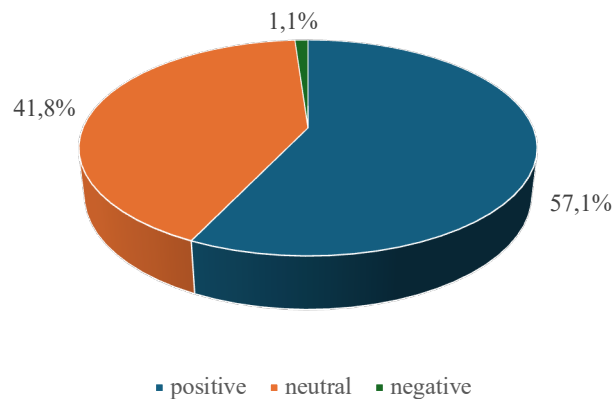


Figure 5. Perceived Impact of Digital Technologies on HEI Management and Productivity

Source: created by the authors based on the results of the survey

The majority of respondents (57.1%) expressed a positive attitude toward the implementation of digital technologies in HEIs, indicating broad support for digitalization in the academic sector. A significant portion (41.8%) held a neutral view, suggesting either a wait-and-see approach or mixed experiences. Only a small fraction (1.1%) reported a negative attitude, reflecting minimal resistance or dissatisfaction. Overall, the data suggest that digital transformation in higher education is largely welcomed, with limited opposition and a substantial base of passive or cautiously optimistic acceptance.

The figure 6 illustrates how participants perceive the influence of digital technologies on administrative efficiency within higher education institutions.

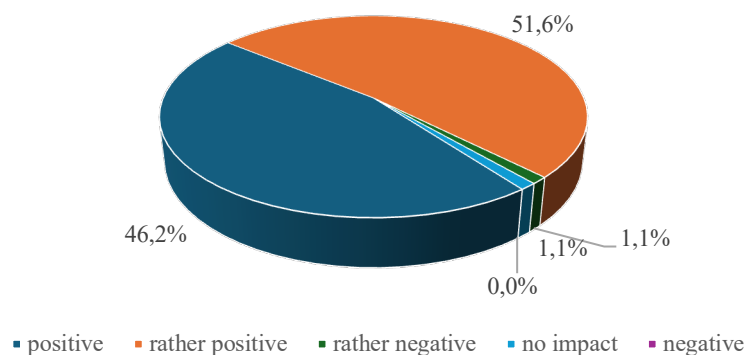


Figure 6. Regarding the impact of digital technology on administrative productivity

Source: created by the authors based on the results of the survey

According to the data, a strong majority of respondents viewed the impact of digital technologies on administrative productivity favorably, with 51.6% describing it as rather positive and an additional 46.2% as positive. Only a marginal share of participants indicated a rather negative (1.1%), no impact (1.0%), or negative (0.1%) effect. These results demonstrate a clear consensus on the beneficial role of digitalization in streamlining administrative processes, suggesting widespread approval and perceived value of digital tools in institutional management.

The survey also allowed multiple-choice responses regarding the most significant risks associated with the active use of digital technologies in HEIs (Figure 7).

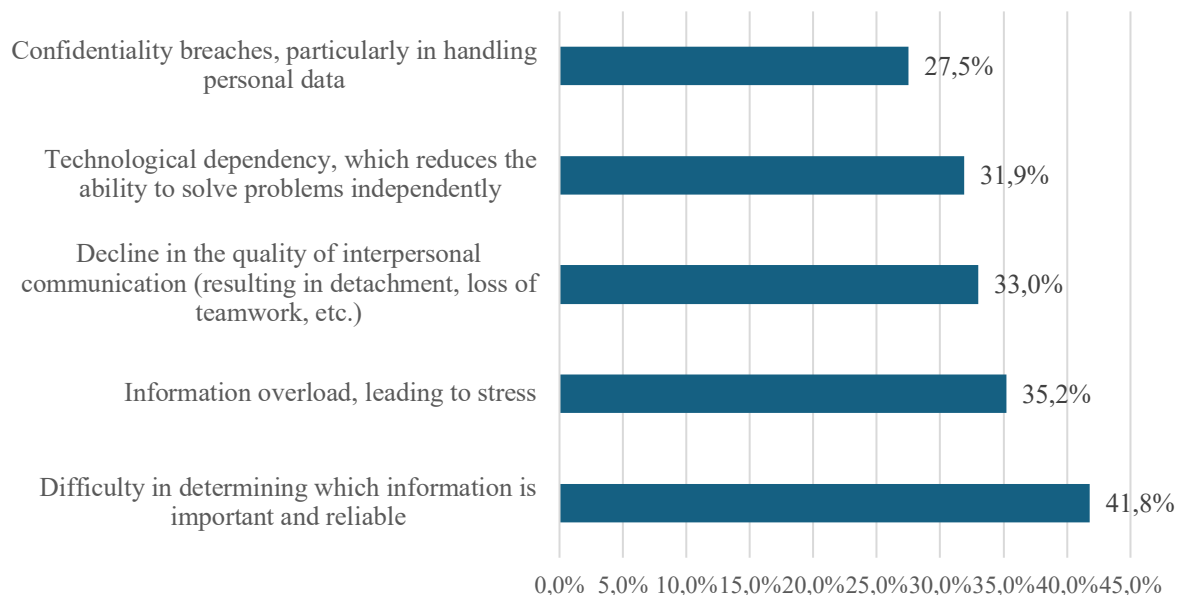


Figure 7. Perceived Risks and Negative Consequences of Digital Technology Usage

Source: created by the authors based on the results of the survey

According to the responses, the most frequently cited risk was difficulty in determining which information is important and reliable (41.8%), followed by information overload leading to stress (35.2%) and a decline in the quality of interpersonal communication (33.0%). Concerns about technological dependency (31.9%) and confidentiality breaches (27.5%) were also significant. These findings suggest that while digital technologies offer substantial benefits, they also introduce critical challenges—particularly in terms of cognitive load, communication dynamics, and data security. Addressing these concerns will be

essential to ensuring that digital transformation efforts remain both effective and sustainable.

Cause-and-Effect Relationships from the Survey on Digital Intelligence (DQ) in Higher Education Institutions in Ukraine. The rapid digital transformation of higher education institutions (HEIs) in Ukraine—accelerated by the demands of wartime adaptation—has brought both opportunities and challenges. A national survey conducted to assess the current state of Digital Intelligence (DQ) in Ukrainian HEIs revealed key trends in perceptions, usage patterns, benefits, and risks associated with digital technologies. The findings reflect not only how digital tools are being integrated into academic and administrative workflows but also highlight the underlying cause-and-effect relationships that explain these trends. This includes increased digital technology adoption due to external pressures, uneven distribution of digital competencies, growing acceptance of digital tools for institutional management, and emerging concerns related to data security and communication dynamics. The table below summarizes these cause-and-effect relationships, offering a structured overview of the main insights from the survey.

Table 1. Cause-and-Effect Relationships from the Survey on Digital Intelligence (DQ) in Ukrainian HEIs

Survey Finding	Cause-and-Effect Relationship
1. Increasing Digital Intelligence Awareness but Uneven Perceptions 74.7% assess their DQ as medium to fairly high; only 16.5% rate it as high or very high	<ul style="list-style-type: none"> - Uneven digital skill development across HEIs due to lack of institutional upskilling programs - Self-assessments may be inflated compared to peer evaluations - High DQ may be concentrated in specific groups (e.g., IT staff, administrators)
2. The Full-Scale War Has Driven an Increase in Digital Technology Adoption 65.9% report significantly increased usage	<ul style="list-style-type: none"> - War conditions necessitated rapid adoption of digital tools for continuity in education and administration - Increased remote learning and virtual collaboration - Urgent need for communication with government and partners - Investments in cybersecurity and infrastructure for operational resilience
3. Digital Technologies Are Primarily Used for Educational and Administrative Purposes 80.2% use digital tools for education; 41.8% for administration	<ul style="list-style-type: none"> - Shift to online and hybrid models prompted prioritization of educational tools - Gradual digitalization of internal communication and document workflows - Lower adoption in HR and cybersecurity suggests uneven integration across departments
4. Digital Technologies Are Perceived as Enhancing HEI Management and Productivity 98.9% view impact as positive or rather positive	<ul style="list-style-type: none"> - Forced adaptation during wartime accelerated digital acceptance - Digital tools enhance automation, communication, and decision-making - Challenges are perceived as manageable rather than obstructive

Survey Finding	Cause-and-Effect Relationship
5. Identified Risks and Negative Consequences of Digital Technology Usage Top concerns include difficulty verifying information (41.8%) and information overload (35.2%)	<ul style="list-style-type: none"> - Heavy reliance on digital and AI-generated content contributes to misinformation and stress - Remote environments reduce interpersonal connection and teamwork - Increased automation may reduce independent thinking - More digital workflows heighten the risk of data breaches, demanding stronger cybersecurity

Source: created by the authors based on the results of the survey

This structured analysis emphasizes that while digital transformation in Ukrainian HEIs is largely perceived as positive and necessary, there remains a critical need to address disparities in digital competence, improve support structures, and mitigate the risks that accompany widespread digital integration.

5. The Negative Impact of Excessive Use of Digital Technologies on Managerial Activities. Using data from the 2018 round of the International Computer and Literacy Survey (ICILS), this study looks at the effect of non-cognitive skills (e.g., motivation, ambition, and conscientiousness) on digital competences as measured by the Computer and Information Literacy (CIL) test score. Non-cognitive skills may be especially important in low-stakes tests such as ICILS, where students face no consequences — positive or negative — as a result of their performance. The empirical results show that several non-self-reported measures acting as proxies for non-cognitive skills are significant determinants of CIL test scores. Furthermore, the findings point at differences in non-cognitive skills across gender, immigrant background, and socioeconomic status. This suggests that one should be cautious when inferring about inequality in digital competences along these dimensions using low-stakes test scores, and underscores the importance of controlling for non-cognitive skills. (Karpinski, Z., Di Pietro, G. and Biagi, F., 2023)

The excessive use of digital technologies in the managerial activities of higher education institutions (HEIs) is a phenomenon that, despite its numerous advantages, is accompanied by several negative consequences. This issue affects not only managerial productivity but also the quality of decision-making, the psychological well-being of employees, and the overall organizational climate. A deeper understanding of this matter is essential for developing an effective digital strategy in higher education.

One of the key aspects of the negative impact is information overload, which arises due to an excessive amount of electronic correspondence, constant messages in instant messengers, and the necessity to process large volumes of information within short timeframes. This leads to attention dispersion, decreased

concentration, and chronic stress among employees. Instead of facilitating rapid decision-making, information excess often complicates analytical activities, thereby negatively affecting the efficiency of managerial processes.

Another significant factor is the loss of personal contact in managerial interactions. The transition to online communication through video conferencing, emails, and instant messaging alters the dynamics of interpersonal communication. A reduction in the frequency of face-to-face meetings results in a decline in trust, the emergence of communication barriers, and an increased risk of conflicts. In remote management conditions, the ability to interpret nonverbal cues—essential for decision-making and team collaboration—becomes significantly limited.

A further negative consequence is technological dependency. Excessive automation of managerial processes creates the risk of diminishing critical thinking. Managers increasingly rely on algorithms and software solutions, limiting their ability to apply creative problem-solving approaches. This trend may also lead to a decline in analytical skills and independent decision-making, as managers prefer pre-configured digital solutions while neglecting alternative scenarios.

Another critical issue is emotional burnout resulting from continuous engagement with digital tools. Constant accessibility through emails, messengers, and mobile applications blurs the boundaries between work and personal life. The inability to fully disengage from work, heightened expectations for rapid responses, and continuous monitoring of digital platforms elevate stress levels, reduce motivation, and, in the long term, lead to exhaustion.

Table 2 systematizes the factors that negatively affect management activities in higher education institutions (HEIs) as a result of the excessive use of digital technologies.

All these challenges necessitate a systematic approach to managing digital technology usage. Digital management strategies should aim to balance the benefits of technological advancements with the preservation of traditional forms of communication and leadership. Implementing information hygiene practices, limiting time spent on digital platforms, introducing "digital detox" policies, and encouraging face-to-face interactions can significantly mitigate the negative effects. Additionally, improving the digital literacy of managers is crucial to ensuring more effective technology use while maintaining psychological well-being and a healthy work environment.

Table 2. Negative Impact of Excessive Use of Digital Technologies on Managerial Activities in HEIs

Negative Effect	Description	Consequences	Proposed Solutions
Information Overload	Excessive volume of emails, messages, and digital content that managers must process rapidly.	Dispersed attention, reduced concentration, chronic stress, and lower efficiency in analytical and decision-making tasks.	Introduce information hygiene protocols; limit volume and frequency of digital communication; prioritize and filter messages.
Loss of Personal Contact	Reliance on video conferencing, emails, and instant messaging over in-person interactions.	Weakened interpersonal trust, communication barriers, difficulty interpreting non-verbal cues, and increased potential for conflict.	Encourage face-to-face meetings; blend digital tools with traditional interpersonal communication; promote team-building practices.
Technological Dependency	Over-reliance on automation, software tools, and algorithmic decision support.	Diminished critical thinking, reduced creativity, weakened analytical skills, and passive decision-making.	Promote creative problem-solving; balance digital automation with manual analysis; encourage scenario-based thinking.
Emotional Burnout	Constant connectivity via emails, messengers, and mobile apps; inability to disconnect from work.	Increased stress, reduced motivation, blurred work-life boundaries, and eventual exhaustion.	Implement "digital detox" policies; define digital working hours; promote healthy work-life balance and psychological support.
Inequality in Digital Competences (Based on ICILS 2018 study)	Non-cognitive skills (e.g., motivation, conscientiousness) affect digital test outcomes, with variance across gender, SES, and immigrant status.	Risk of biased conclusions regarding digital competence; overlooked disparities in actual skills.	Control for non-cognitive factors in digital skill assessments; tailor digital training initiatives to diverse needs.

Conclusions. The findings of this study underscore the transformative role of digital intelligence (DQ) in the management of higher education institutions (HEIs) during times of crisis, particularly in wartime Ukraine. The evidence presented demonstrates that digital intelligence has evolved from a peripheral competency to a foundational pillar of institutional resilience, administrative continuity, and educational accessibility. Managers with high levels of digital intelligence were better equipped to navigate uncertainty, implement strategic decisions, and foster sustainable development under unprecedented conditions.

First, the research confirms that digital transformation has been essential not only for the survival but also for the progression of HEIs during the full-scale war. The widespread adoption of digital technologies—particularly AI, generative AI, and remote learning platforms—enabled universities to maintain operations, preserve academic quality, and uphold institutional governance. This shift toward digital reliance was not limited to educational delivery but also

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encompassed administrative functions, communication strategies, and external collaborations. The ability to transition quickly to digital formats highlights the agility and adaptability of institutions with digitally literate leadership.

Second, while the integration of digital technologies has positively influenced productivity and decision-making (as acknowledged by over 97% of respondents), the study also reveals emerging challenges that cannot be overlooked. These include cognitive strain from information overload, the erosion of interpersonal communication, emotional burnout due to constant connectivity, and growing technological dependency that threatens critical thinking and creative problem-solving. Such negative effects suggest that digital transformation must be approached holistically, with equal attention to human-centered management and digital efficiency.

Third, the study emphasizes the urgent need for structured digital upskilling among HEI managers and faculty. Despite general progress, digital intelligence development remains uneven, often concentrated among IT personnel and digitally advanced departments. The absence of institutionalized training programs hampers the strategic use of digital tools and increases vulnerabilities related to cybersecurity, data privacy, and ethical AI usage. As digital technologies continue to reshape the academic landscape, proactive investment in comprehensive DQ training is necessary for sustainable institutional growth.

Fourth, the research highlights the psychological dimensions of digital transformation, stressing the importance of information hygiene, digital detox strategies, and blended communication approaches to mitigate burnout and stress. Preserving face-to-face interaction, setting boundaries for digital communication, and promoting mental well-being must be integral components of any digital management framework in higher education.

Finally, the transition from reactive digital survival to strategic digital development reflects a broader paradigm shift in higher education governance. Institutions that embrace digital intelligence as a long-term investment—rather than a temporary fix—are more likely to innovate, remain competitive, and contribute to social resilience. The war, while tragic, has accelerated a digital awakening that now demands thoughtful governance, ethical leadership, and inclusive technological policies.

In conclusion, digital intelligence is not only vital for effective HEI management during wartime but is also a strategic asset for long-term institutional modernization. Ukrainian universities have demonstrated remarkable adaptability, but sustained success will depend on embedding DQ into leadership development, organizational culture, and educational policy. This

research contributes to a growing body of knowledge that views digital intelligence as a catalyst for innovation, inclusion, and resilience in higher education.

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