The Impact of Digitalisation on the Efficiency of Business Processes in the Modern Economy

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Abstract. *Digitalisation is among the most significant factors driving the development of the modern economy. It encompasses a broad array of technologies and solutions that transform the organisation of business processes, optimise resource utilisation, and create conditions for enhancing the competitiveness of companies. In today's world, where globalisation and rapid technological changes have become integral to economic activity, digitalisation is no longer merely a competitive advantage – it has become a strategic necessity for ensuring the long-term sustainability of businesses. The implementation of digital technologies facilitates the automation of routine processes, reduces costs, enhances labour productivity, and improves the accuracy and speed of decision-making. For example, the adoption of cloud computing ensures easy access to real-time data, big data analytics provides deeper insights into customer needs, and artificial intelligence (AI) optimises the execution of complex tasks. The Internet of Things (IoT) is revolutionising manufacturing processes, while blockchain creates new opportunities in finance, logistics, and data security. In addition to enhancing operational efficiency, digitalisation has a significant impact on the strategic aspects of organisational activities. It opens up opportunities for the development of new business models and the creation of additional revenue streams. For instance, the adoption of digital commerce platforms or subscription-based models enables firms to significantly expand their customer base and maintain continuous customer engagement. However, the process of digitalisation is accompanied by significant challenges. These include the need for employees to adapt to new technologies, the high cost of implementing innovations and cybersecurity issues such as data protection. Despite these challenges, the benefits of digital transformation are clear, as they open up new opportunities for economic growth and innovation. This article aims to analyse the impact of digitalisation on the efficiency of business processes, identify the key technologies driving digital transformation, and assess its broader significance for the economy. Particular attention shall be given to both the benefits and the challenges encountered by organisations in their journey towards digital transformation.*

Keywords: *digitalisation, digital transformation, technologies, cybersecurity, IT, AI, IoT, business.*

JEL Classification: *L86, M21, O33*

1 Introduction

Digitalisation has emerged as a pivotal driver of contemporary economic development, fundamentally reshaping the organisation of business processes, the utilisation of resources, and the maintenance of competitive advantage. As the world becomes increasingly interconnected, the adoption of advanced technologies is no longer an option but a necessity for businesses seeking long-term sustainability and growth. The rapid pace of technological innovation and the integration of digital tools across various sectors have

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redefined operational, strategic, and organisational frameworks globally. Organisations now face the dual challenge of adopting cutting-edge technologies, including cloud computing, big data analytics, artificial intelligence (AI), blockchain, and the Internet of Things (IoT), whilst addressing critical issues such as cybersecurity, data privacy, and a shortage of skilled IT professionals.

In 2023, global trends in technology adoption revealed a heightened inclination among organisations to innovate their operational frameworks. However, this progression is tempered by a significant shortfall in skilled IT personnel, which constrains the ability of businesses to fully leverage digital tools. Moreover, as reliance on digital systems grows, the risk of cyberattacks has become increasingly acute. A substantial proportion of organisations worldwide have reported experiencing severe cyber incidents over the past decade, particularly between 2014 and 2023. This dual challenge of adopting digitalisation while addressing its associated risks has emerged as a central concern for organisations worldwide.

The aim of this study is to examine the impact of digitalisation on the efficiency of business processes, with particular attention to technological trends, challenges, and strategic approaches to implementing new technologies within the modern economy. This research investigates the influence of digitalisation on key dimensions, including operational efficiency, business model innovation, strategic decision-making; the technological innovations underpinning this transformation, such as cloud computing, AI, big data, and IoT, will also be examined, along with the challenges related to cybersecurity and the growing need for IT expertise.

The study employs a mixed-methods research design, combining qualitative and quantitative approaches. It integrates a comprehensive literature review, case studies, and empirical data to provide a nuanced understanding of the implications of digitalisation for business performance and competitiveness.

The overarching aim is to offer a detailed analysis of how organisations can effectively integrate digital technologies into their operations while navigating the associated challenges. The paper will also identify the strategic decisions necessary for maintaining competitiveness in the digital economy, thereby contributing to the academic discourse on digital transformation.

This research endeavours to provide actionable insights for business leaders, policymakers, and academics, enhancing their understanding of the transformative potential of digital technologies and the complexities involved in their implementation.

2 Analysis of Recent Research and Publications

Digitalisation research explores critical aspects of digital transformation, including automation, resource optimisation, the adoption of innovative technologies, and their impact on productivity and competitiveness. Particular attention is given to technologies such as AI, big data analytics, cloud computing, and IoT, which are reshaping traditional approaches to global business management.

The digitalisation of business processes in industrial enterprises, particularly the integration of digital technologies in customer interactions, internal infrastructure management, and value proposition development, is analysed in the works (Zub P., Kalach H., 2021). The authors underscore that digital transformation significantly enhances business process automation through advanced information systems and advocate for the creation of digital transformation roadmaps to better allocate resources to high-potential areas of development.

The implications of digitalisation for business and management are examined in the studies (Khadzhynov I. V., Ishchuk A. Ye., 2023). Their findings identify the benefits, challenges, and risks associated with implementing digital technologies in business process management. The authors highlight the transformative effects of digitalisation on core management functions, including planning, organisation, motivation, and control. For instance, they observe its influence on planning through driver-based budgeting, its impact on organisational structures and remote working arrangements on employee motivation, and its role in enhancing control via customer interaction and business analytics.

Trends in digitalisation and their role in business process management are explored in the research (Dolha H., Khtyrova O., 2024). The authors emphasise the pivotal role of digital technologies in managing business processes within the context of Industry 4.0. They further examine the trends shaping these processes, drawing on contributions from both Ukrainian and international scholars to provide insights into global digitalisation trends.

The transformative influence of digitalisation on business strategies and models is investigated (Matoušková D., 2022). The author highlights the growing recognition among modern organisations of the critical link between success and the adoption of advanced technologies, which are driving changes in competition, operations, and overall enterprise performance.

The relationship between digitalisation and the achievement of the United Nations Sustainable Development Goals (SDGs) is addressed in the

work of (Bikan B., Brem A., 2020). The authors stress the importance of adapting business practices to tackle economic and environmental challenges. However, they also note ambiguities in terms such as "digital business models," "digital transformation," and "digital entrepreneurship," which complicate their conceptualisation and practical application.

Finally, the potential of SMEs to enhance outcomes through innovative business models in the context of digital transformation is studied by (Bouwman H., Nikou S., Mark Reuver D., 2019). The authors highlight that while digitalisation necessitates significant adjustments to business models, SMEs often face constraints related to time and resources, which can limit their capacity for experimentation and the adoption of new strategies.

3 Presentation of the Primary Research Material

Digitalisation represents a pivotal force in contemporary economic development, fundamentally transforming business processes to enhance efficiency, adaptability, and competitiveness. Through the integration of digital technologies, organisations are able to optimise resource utilisation, automate routine tasks, improve customer engagement, and foster the creation of innovative business models. In the context of globalisation and accelerated digital transformation, the importance of digitalisation is increasingly evident across diverse economic sectors. This research examines the impact of digitalisation on the efficiency of business processes, with a focus on identifying key trends and addressing associated challenges.

Moreover, digitalisation drives the development of advanced technologies that act as critical enablers for informed decision-making and cost optimisation. However, the adoption of these technologies is not without difficulties. Key challenges include a shortage of skilled professionals, cybersecurity threats, and significant implementation costs, all of which necessitate meticulous strategic planning and management (Figure 1).

Data on the adoption of emerging technologies by organisations worldwide in 2023 reveal overarching trends in their integration. The analysis indicates that the majority of organisations are at an advanced stage of large-scale implementation of modern technologies, with only a minimal proportion yet to consider their adoption.

The majority of organisations are now fully deploying technologies such as cloud computing, big data analytics, the Internet of Things (IoT), artificial intelligence (AI), green energy solutions, blockchain, and others. This reflects the high maturity of these technologies and their substantial practical value for businesses. A notable proportion of organisations are employing these technologies on a limited scale. This cautious approach indicates either the testing of specific applications within the business or a phased strategy towards broader integration. A small percentage of organisations remain at the initial stages of technology testing, suggesting that most have either progressed beyond

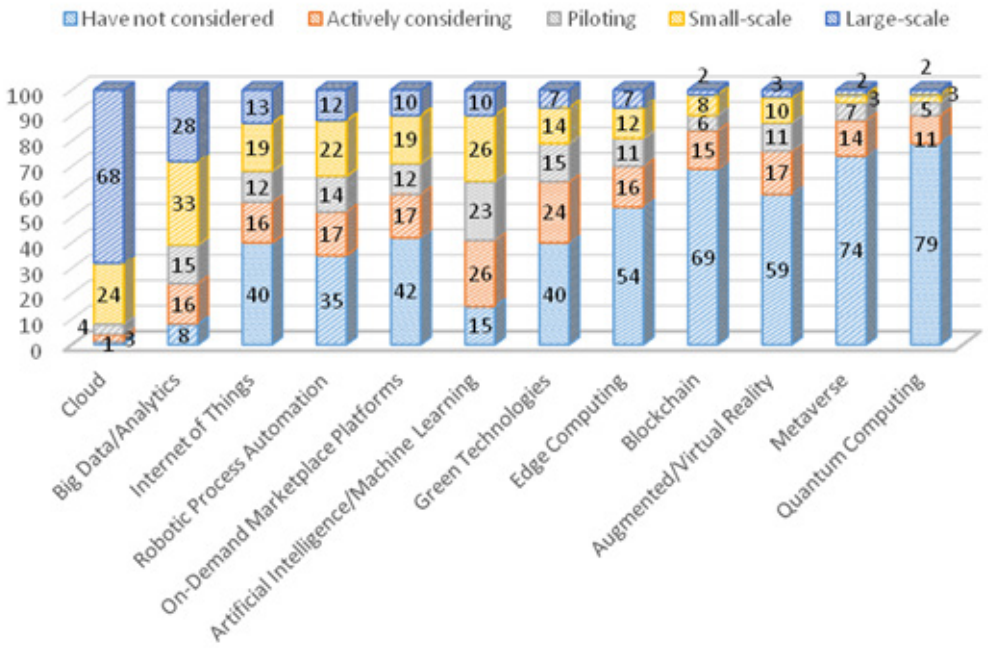


Figure 1 Implementation of new technologies in companies around the world 2023, %

Source: built by the authors on the basis of the Statista.com database

this phase or have not yet commenced engagement with particular innovations. A very limited number of organisations are currently assessing the feasibility of adopting these technologies. This underscores their widespread acceptance and recognition as essential tools for contemporary business.

The near-universal engagement with these technologies is evidenced by the fact that almost all organisations are either actively implementing or considering their integration. The minimal lack of interest, at approximately 1%, highlights their significance and near-total acceptance within the business landscape.

These findings demonstrate that technologies such as cloud computing, AI, big data, the IoT, and Block Chain are increasingly integral to the operational frameworks of most organisations. Their widespread adoption reflects a high level of digital maturity across the business environment in 2023. However, organisations at earlier stages of implementation face challenges in scaling these solutions effectively to realise competitive advantages (Figure 2).

The most acute shortage is observed in the field of cybersecurity, accounting for 43% of unmet demand. This is driven by the escalating frequency and sophistication of cyber threats, the rising incidence of attacks on businesses, and the increasingly stringent requirements for data protection within the digital economy. The persistent gap in cybersecurity expertise can be attributed to the complexity and extended duration of specialist training programmes.

A significant deficit also exists among data processing and analysis professionals, comprising 40% of the shortage. This reflects the growing reliance on big data analytics for strategic decision-making. Despite the increasing demand for such expertise, the labour market has struggled to supply a sufficient number of qualified professionals to meet organisational needs.

The need for technical architects (34%) and DevOps specialists (32%) stems from the transition of organisations towards more flexible and modern working methodologies. Technical architects play a critical role in establishing IT infrastructure, while DevOps specialists are essential for automating development and deployment processes.

Cloud technologies, development, and enterprise architecture each account for 28% of the shortage. This demand highlights the rapid proliferation of digital solutions, particularly cloud platforms, which now underpin many modern business processes. However, the scarcity of skilled personnel in these domains continues to hinder the effective implementation of these technologies.

Despite the rising prominence of artificial intelligence, there remains a 26% shortage of specialists in this field. Such roles require advanced expertise in programming, mathematics, machine learning, and big data, creating barriers to workforce development in this area.

Project management (25%) and business analysis (26%) are also areas of significant shortfall, primarily due to the need for professionals who possess a unique combination of technical expertise and organisational acumen. These skill sets are increasingly critical, particularly within the context of digital transformation initiatives.

While demand is comparatively lower for automation, agile methodologies, and change management (18–21%), these competencies remain

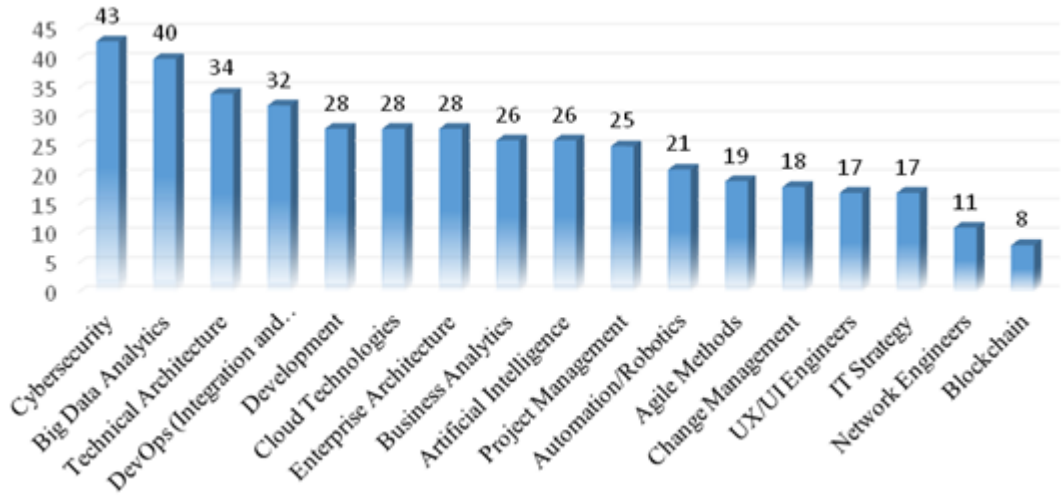


Figure 2 The IT skills shortage facing IT leaders around the world, %

Source: built by the authors on the basis of the Statista.com database

vital for enabling organisations to adapt swiftly to evolving conditions. The identified shortage suggests that many companies lack the necessary expertise to implement these transformations effectively.

UX/UI engineers (17%) and IT strategy professionals (17%) highlight the importance of user-centred design and comprehensive digital strategy development. Conversely, the relatively lower shortage of network engineers (11%) and blockchain specialists (8%) indicates that these fields are either less prioritised or supported by a larger pool of qualified professionals.

The data underscore a critical imbalance between the demand for IT professionals and their availability within the labour market. The most pronounced shortages are observed in areas that are pivotal to security, analytics, automation, and system architecture. Addressing these gaps necessitates significant investments by organisations in workforce development, partnerships with educational institutions, and the implementation of employee retraining initiatives.

Furthermore, while prior research has outlined the extent of the IT skills shortage, it is equally crucial to examine the consequences of this disparity, including the notable increase in cyberattacks experienced by global organisations between 2014 and 2023 (Figure 3).

An analysis of the proportion of global organisations experiencing major cyberattacks between 2014 and 2023 reveals significant trends over the period. From 2014 to 2018, there was a steady increase in the share of organisations affected, peaking at 33% in 2018. This upward trajectory underscores the growing frequency and sophistication of cyberattacks during those years. Following this peak, the proportion of affected organisations stabilised at approximately 30%, with minor fluctuations. A temporary decline to 27% in 2020 is likely linked to the COVID-19 pandemic, as the shift to remote operations may have reduced the number of viable targets. However, the figure rose again to 28% in 2022.

In 2021, the proportion decreased to 24%, reflecting potential improvements in cybersecurity measures and organisational responses to earlier incidents. This decline also suggests that many organisations adopted enhanced protection strategies in response to increased awareness of cybersecurity risks. By 2023, the proportion of organisations impacted by major cyberattacks had further reduced to 23%. This decline indicates ongoing progress in strengthening cybersecurity measures. However, it may also reflect the increasing sophistication and targeted nature of cyberattacks, which could obscure traditional metrics used to evaluate the prevalence of such incidents.

Overall, the data reveal that cyber threats have remained a persistent and evolving challenge for global organisations over the last decade. Although the proportion of affected organisations has decreased in recent years, this trend likely represents a combination of enhanced cybersecurity practices and changes in the nature of cyber threats. The shift towards more targeted and complex attack methods highlights the need for organisations to continuously refine their defence strategies to address these emerging challenges effectively.

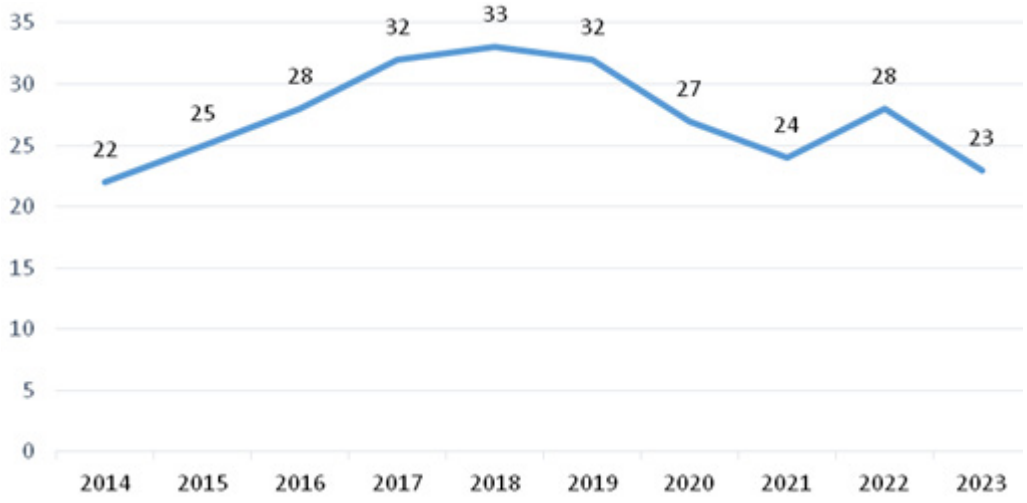


Figure 3 Share of global organizations
that suffered major cyberattacks in the last two years from 2014 to 2023, %

Source: built by the authors on the basis of the Statista.com database

4 Conclusions

The persistent shortage of IT expertise in critical domains such as cybersecurity, big data analytics, and cloud technologies underscores the urgent necessity of investing in workforce development to enable the effective integration of advanced technologies into organisational processes. This skills deficit poses a potential risk to organisations' capacity to adapt to the rapidly evolving technological landscape and maintain competitive advantages.

The increasing prevalence of major cyberattacks highlights the critical need for ongoing advancements in cybersecurity strategies. The escalating sophistication of these attacks necessitates the adoption of innovative approaches to safeguarding data and resources by both organisations and governmental bodies.

Data on technology adoption in 2023 indicate that the majority of organisations have entered the stage of large-scale deployment of innovations, including cloud computing, big data analytics, the Internet of Things (IoT), artificial intelligence (AI), blockchain, and related technologies. This trend reflects a high degree of digital maturity within the business sector. However, a subset of organisations remains in the pilot testing or cautious adoption phases, likely due to constraints in resources or the need for adaptation to specific operational conditions.

Future directions for development should focus on the following:

1. Investigating the efficacy of workforce training and qualification programmes is crucial to bridging the skills gap and supporting the seamless integration of advanced technologies into business operations.
2. Continued development of innovative cybersecurity solutions, such as leveraging AI for attack detection and prevention, is imperative to mitigate risks, particularly given the increasing complexity of cyber threats.
3. Research into the factors influencing the successful scaling of digital technologies is essential for understanding how organisations can optimise their deployment to achieve competitive business advantages.

In conclusion, digitalisation has emerged as a transformative force in enhancing the efficiency of business processes within the modern economy. By enabling automation, optimising resource utilisation, and fostering innovation, it not only streamlines operational activities but also drives strategic growth and competitiveness. However, the successful integration of digital technologies requires addressing critical challenges, including skills shortages, cybersecurity risks, and the complexities of technological adoption. As organisations continue to navigate these dynamics, digitalisation remains pivotal in shaping sustainable economic development and redefining traditional business paradigms.

References

Zub, P., & Kalach, H. (2021). Tsyfrovizatsiia biznes-protsesiv promyslovyh pidpryiemstv – [Digitalisation of business processes of industrial enterprises]. *Economy and Society*, no. (26). DOI: https://doi.org/10.32782/2524-0072/2021-26-52 (accessed December 18, 2024).

Khadzhynov I., Ishchuk A. (2023). Vplyv suchasnykh protsesiv tsyfrovizatsii na biznes ta yoho menedzhment – [The impact of modern digitalisation on business and its management]**.** *Economics and organization of management*. no. 4(52). Available at: https://jeou.donnu.edu.ua/article/view/14863 (accessed December 18, 2024).

Dolha, H., & Khytrova, O. (2024). Rozvytok i tendentsii tsyfrovyzatsii upravlinnia biznes-protsesamy – [Development and trends in the digitalisation of business process management]. *Sustainable Development of Economy*, no. (2(49), pp. 141–145. DOI: https://doi.org/10.32782/2308-1988/2024-49-22 (accessed December 18, 2024).

Matoušková, Dana. (2022). Digitalisation and Its Impact on Business. *Theory, Methodology, Practice*. no. 18. pp. 51-67. DOI: https://doi.org/10.18096/TMP.2022.02.03

Bican, Peter & Brem, Alexander. (2020). Digital Business Model, Digital Transformation, Digital Entrepreneurship: Is There A Sustainable "Digital"? *Sustainability*. no. 12. DOI: https://doi.org/10.3390/su12135239.

Bouwman, W. A., Nikou, S., & Reuver Mark, D. (2019). Digitalisation, business models, and SMEs: How do business model innovation practices improve performance of digitalizing SMEs? Digitalisation, business models, and SMEs. *Telecommunications Policy*, no. 43(9). DOI: https://doi.org/10.1016/j.telpol.2019. 101828 (accessed December 18, 2024).

Adoption of emerging technologies worldwide 2023 | Statista. *Statista*. Available at: https://statista.com/statistics/661164/worldwide-cio-survey-operational-priorities/#:~:text=As%20of%202023,%20nearly%2092,of%20respondents%20reporting%20the%20same (accessed December 18, 2024).

Global IT skill shortages 2021. *Statista*. Available at: https://www.statista.com/statistics/662423/worldwide-cio-survey-function-skill-shortages/ (accessed December 18, 2024).

Share of organizations experiencing major cyber attacks 2023. *Statista*. Available at: https://www.statista.com/statistics/662937/ worldwide-cio-survey-cyber-fears/ (accessed December 18, 2024).

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