# The Impact of Digital Transformation on Business Models and Strategies of Enterprises: Analysis of Trends and Challenges

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## Abstract

The extensive advancement of digital technology within the framework of the fourth industrial revolution presents potential consumers and stakeholders with a plethora of tools. However, determining the optimal digital path for transforming business strategies and models becomes challenging. The objective of this study is to pinpoint the most advantageous areas for investing in the digital transformation of business activities. The use of cross-iteration ranking technology allowed us to identify a wide range of relevant independent expert resources (25 organisations), based on their personal ratings, a set of available digital solutions for transforming business models and strategies (36 digital tools) was formed. Among them, the optimal areas for investment financial flows (5 digital technologies) were selected, which have the highest potential for modernising business processes. The obtained potential investment areas are medium and independent. It was found that the key area of investment in the digital transformation of business models and business strategies is automation and cybersecurity. Further research is aimed at expanding the sample of expert organisations (to increase the level of reliability) and modelling the likely development of certain types of business structures affected by digital transformation (to develop tools for preliminary determination of appropriate areas of digital development). Limitations of the study include the methodological framework, as well as the timeframe and scope of the dataset, which may affect the overall context and universality of the results.

**Keywords:** Artificial Intelligence, Cloud Platforms, Next-Generation Software Development, Digital Immune System, Hyperautomation

## Introduction

In the contemporary global economic landscape, digital transformation emerges as a strategic process that profoundly influences the business models and strategies of enterprises. This transformative journey involves integrating digital technologies to enhance the efficiency of business processes, cultivate stronger customer relations, innovate new products and services, and adjust to evolving competitive dynamics

(Redko, Zaletska & Chyrva, 2023; Tkachuk et al., 2022; Bozhkova & Halytsia, 2022).

Relevant industry statistics evidences the impact of digital technologies on business practices. In particular, according to ZipDo (Essential digital transformation statistics in 2023, 2023), 70% of companies have adopted a digital transformation strategy, with an additional 89% actively implementing a digital business strategy, moreover, 60% of companies that have undergone digital transformation have successfully introduced new business models. In 2022, companies spent USD 2 trillion on digital transformation. It is expected that by 2025, 60% of the world's data will be created by enterprises (the amount of data will reach 175 zettabytes), 60% of organisations will rely on digital technologies to improve business efficiency, and 85% of business procedures will be performed without human intervention. In turn, Quixy (Quixy Editorial Team, 2023a) reports that in 2023, the level of investment in digital business transformation will reach USD 7 trillion. By 2026, companies will spend USD 3.4 trillion on implementing digital strategies and business models. At the same time, the return on investment in digital business transformation is expected to reach USD 100 trillion by 2015. By 2025, 65% of the world's GDP will be digitised (USD 53.3 trillion). Accordingly, FinancesOnline (Eira, 2023) it is noted that 38% of traditional companies have embraced a digital business strategy, and the most popular digital models are in the services sector (95%), financial advisory and audit (93%), and healthcare (92%). With the help of digital transformation, 75% of companies were able to overcome the crisis caused by pandemic restrictions.

Accordingly, the drivers of the intensification of the transition to digital business models and strategies are not only opportunities and competition but also crisis phenomena (economic recession, pandemic, military conflicts, etc.) that require enterprises to develop an adaptive vector, in particular through digital transformation (Verbivska et al., 2023; Nurgaliyeva, Ismailova & Sarybayeva, 2022; Nastenko, 2008; Syrtseva et al., 2022).

## Literature Review

Li et al. (2023) explore the internal mechanisms involved in the role of industrial internet platforms in aiding the digital transformation of small and medium-sized enterprises (SMEs). Drawing insights from ROOTCLOUD's experience, the researchers observe that integration and knowledge sharing are pivotal factors influencing how industrial internet platforms impact the digital transformation of SMEs. These platforms facilitate the integration of supplier-side knowledge, promote the exchange of knowledge across different domains, and contribute to the development of a knowledge-based system that fosters the digital transformation of SMEs.

Skare, de Obesso, & Ribeiro-Navarrete (2023) assert that digital transformation is profoundly reshaping the business processes of SMEs, introducing both advantages and risks. The research aims to evaluate the influence of digital technologies on specific facets of SME operations, including customer accessibility, heightened competition, financial capacities, escalating costs, skill shortages, external challenges, global crises, and regulatory issues. The authors highlight that digital transformation enhances the ability of SMEs to navigate these challenges and bolsters their resilience concerning customer access, competitive dynamics, financial capabilities, cost escalations, external disruptions, and regulatory shifts. Nevertheless, the adoption of digital transformation also entails risks, such as a shortage of skilled workforce and a potential loss of competitiveness.

Zhang, Xu & Ma (2023) highlight that investing in information technology (IT) serves as a crucial mechanism for enabling the digital transformation of enterprises within the digital economy. Employing a resource-based approach, the authors examined the influence of IT infrastructure on the digital transformation of enterprises, specifically in terms of digital transformation strategy. Additionally, the study explored the role of top management in mediating the relationship between IT infrastructure and digital transformation strategy, as well as between digital transformation strategy and the overall digital transformation of the enterprise. The findings indicate that digital transformation strategy acts as a comprehensive mediator in the connection between IT infrastructure and the enterprise's digital transformation. Furthermore, the study underscores the notably positive impact of top management on these relationships.

Favoretto et al. (2022) developed a conceptual model that summarises the challenges and shows their relationship with the business model architecture and phases of digital transformation of manufacturing enterprises. The authors, through a systematic review and modelling, identified the main challenges of digital transformation related to organisational commitments, creation, proposal, proof and development of a competitive pricing policy for products, as well as organisation of an appropriate information technology infrastructure and digital security.

Vaska et al. (2021) conducted a structured literature review to uncover the dynamics of digital transformation in business models. The study specifically delves into the role of digital transformation in formulating, validating, and advancing competitive pricing policies across diverse industries. The authors observed that this research domain is relatively new, experiencing dynamic growth since 2014, with no dominant authors, suggesting a dispersion of research contributions. Additionally, the study revealed a gap between practical knowledge and the corresponding academic and scientific support in this field.

Similarly, to the findings of Vaska et al. (2021), we note that among the relevant scientific publications, there are no practical recommendations on the optimal areas of investment in the digital transformation of enterprise strategies and business models. Also, due to the lack of an appropriate level of scientific and academic support for the industry under study, potential investors do not have a methodological basis for determining the optimal directions for directing investment flows into the digitalisation and digital transformation of enterprises and stakeholders.

## Objective

The study aims to pinpoint the most effective investment avenues in the realm of digital transformation for business activities.

## Objectives of the study:

1. Establish an appropriate expert environment that will allow defining a line of digital transformation tools for business activities.

2. To determine the range of available means of digital transformation of business activities, which will allow to form an optimal list of appropriate areas for investment in the digitalisation of business models and business strategies.

3. To identify the most appropriate digital technologies for transforming business activities, which will determine the practical goals of directing investment flows to the industry under study.

4. The objective is to assess the anticipated influence of optimal digital technologies and tools on shaping business models and strategies for entrepreneurial endeavors. This evaluation aims to underscore the practical significance of the current study.

## Methodology

In this study, the method of cross-multi-iteration re-entry is used, the procedure of which is as follows.

Iteration 1: Identification of the relevant expert community that provides personalised ratings for digital transformation tools for business.

A broad sample of expert organizations is employed to mitigate the impact of individual opinions and potential biases, ensuring the formation of a comprehensive and impartial research subject area. The sample consists of 25 independent expert organisations that provide personal ratings and assessments of individual digital solutions in the context of their impact on the digital transformation of business models and business strategies on a free-of-charge basis: Built In (Appel, 2023), Quixy (Quixy Editorial Team, 2023b), Ideassion Technology Solutions (Ideassion Technology Solutions, 2023), McKinsey & Company (Chui et al., 2023), ECM Consultant Company (Malak, 2023), Atlas Communications Ltd( Top tech trends for businesses in 2023, n.d.), Veritis Group Inc. (Veritis, n.d.), Mightybytes (Mightybytes, 2023), Simplilearn Solutions (Simplilearn, 2023), Booth & Partners (Marksons, 2023), National Retail Association (Giardina, 2023), Stormboard (Saraev, 2023), Forbes (Marr, 2022), IntelliSoft Confidential (Mitrofanskiy, 2022), Deloitte (Chonkov & Ganchev, 2023), Zühlke Group (Top 10 key business technology trends for 2023, 2023), AuraQuantic (Gundín,

2022), Harvard Business Review (Baig et al., 2023), Futurum Group (Newman, 2022), Digital Speaker (Mark van Rijmenam, 2022), NetApp Inc. (Perry, 2022), Glue Up (Hanif, 2023), Tencent(Top 10 Digital Tech Trends for 2023, 2023), Gartner (Groombridge, 2022), Medium (Marshallalllen, 2023).

Iteration 2. The analysis of the rating datasets of 25 independent expert organisations allowed us to form a wide range of digital tools and technologies that determine the dynamics of the digital transformation process for business. The sample consisted of 36 clusters of digital solutions and technologies: Artificial Intelligence and Machine Learning, Cutting Down OPEX, AI TRiSM; Edge Computing, AIOps to Support Microservices, Hybrid Clouds, Multi-Cloud Architectures, Industry Cloud Platforms, High-Performance Computing (HPC); Software 2.0: Low-Code / No-Code, Next-Generation Software Development; Hybrid Work Engagement and Retention; Hyperautomation, Superapps, Business Process Automation Solutions, Robots, Autonomous System, Robotic Process Automation (RPA); Clean Energy and Sustainable Tech; Metaverse, Social Platforms; Zero-Trust Cybersecurity and Architecture, Digital Immune System; Responsible Datafication, Corporate Digital Responsibility (CDR); Embedded Finance and Blockchain; Composable Business, Composable Software Platforms; Everything as a Service (XaaS), API-Based Integrations; Customer Data Platform (CDP) for Personalization, (Connected User Experience, User-Generated Content (UGC); Total Experience (TX), Partner Ecosystem, Virtual Bsiness Collaboration; Enterprise Resource Planning; Data-Driven Business, Big Data Analytics, Real-Time Analytics; Internet of Things (IoT); 5G, Advanced Connectivity, Wireless Value Realization; Web3 Includes Platforms and Applications; VR/AR/MR, Extended Reality, Immersive-Reality Technologies, Digital Twins; Quantum Technologies; Mobility Technologies (Mobile First); Bioengineering; Space technologies; Intelligent Search, Voice Search (VoIP), Computer Vision, Semantic Search, Contextual Search and Natural Language Processing, GPT Transformers, Search Engine Optimization (SEO); Impact Business Models (IBM); UX Design; Headless WordPress;

Prioritizing Performance; Digital Marketing; Ad-Supported, Freemium, On-Demand, Sharing, Subscription, Open-Source; eCommerce, Marketplace; Contactless Solutions, Digital Payment, Buy Now Pay Later (BNPL); Email Marketing Software; Video Marketing; Mainframe Technology.

Iteration 3. Based on the experts' assessments, a set of personal ratings and corresponding rankings was formed for each of the selected digital solutions.

Iteration 4. According to the analysis of personal ratings of expert organisations, a relative rating was formed by the frequency of mentions of individual solutions for the digital transformation of business models and business strategies (1):

$$RRMF_i = \frac{\sum_{i=1}^{n} IR_i}{FM_i}, \qquad (1)$$

where $RRMF$ is the relative ranking is determined based on the frequency of mentions digital transformation solutions for business activities in the expert; $\sum_{i}^{n} IR_i$ is the sum of individual ratings from each expert organisation contributes to the overall assessment or rankingfor digital transformation solutions for business models and business strategies;$_iFM$ is the frequency of mentioning digital transformation solutions for business activities in the expert community.

Iteration 5. A relative priority rating is established based on the number of times each of the considered solutions for the digital transformation of business activity attains the leading position according to the individual assessments provided by each independent expert organisation participating in the study (2):

$$RRP_i = RRMF_i \times \left( \begin{array}{l} 1NTO1LP + \frac{1}{2}NTO2LP + \frac{1}{3}NTO3LP + \\ + \frac{1}{4}NTO4LP + \frac{1}{5}NTO5LP \end{array} \right), \qquad (2)$$

where $RRP_i$ is the priority ranking of each considered solution is determined based on various factors, such as the frequency of taking the leading position in individual assessments from independent expert organisations involved in the study for the digital transformation of

business activities; $NTO1LP........NTO5LP$ is the frequency with which each solution for the digital transformation of business models and business strategies is ranked first through fifth in individual assessments by independent expert organisations determines the respective number of occurrences.

Iteration 6. Utilising the outcomes of the priority cross-iteration ranking, an optimal set of solutions for the digital transformation of business activities has been established. This set is deemed to possess the highest potential for attracting suitable investments.

Iteration 7. The probable transformational impact of the identified optimal (based on the results of cross-iteration re-rating) digital tools, technologies, and means on the processes of forming business models and business strategies is determined.

## Results and Discussion

In accordance with the developed methodology of cross-multi-iteration ranking, a variable set (input dataset) of personal (individual) ratings and impact assessments of digital transformation tools (in the amount of 36 clustered areas and solutions) is formed, identified from open data obtained from 25 independent relevant expert organisations (Table-1 ).

**Table-1 .A set of 32 digital transformation solutions for marketing communications with individual ratings by 25 expert organisations**

| Digital tools and technologies transforming business models and business strategies | Built In | Quixy | Ideassion Technology Solutions | McKinsey & Company | ECM Consultant Company | Atlas Communications Ltd. | Veritis Group Inc. | Mightybytes | Simplilearn Solutions | Booth & Partners | National Retail Association | Stormboard | Forbes | IntelliSoft Confidential | Deloitte | Zühlke Group | AuraQuantic | Harvard Business Review | Future Group | Digital Speaker | NetApp Inc. | Glue Up | Tencent | Gartner | Medium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Artificial Intelligence and Machine Learning, Cutting Down OPEX, AI TRiSM | 1 | 6 | 3 | 1 | 3 | | 1 | | 1 | 2 | | 1 | 1 | 7 | 3 | 3 | 1 | 3 | 5 | 5 | 2 | 4 | 3 | 2 | 2 |
| Edge Computing, AIOps to Support Microservices, Hybrid Clouds, Multi-Cloud Architectures, Industry Cloud Platforms, High-Performance Computing (HPC) | 2 | 10 | 5 | 7 | 2 | 6 | 7 | | | 9 | | | | 2 | 4 | 4 | 6 | 5 | 3 | | 1 | 8 | 1 | 3 | 9 |
| Software 2.0: Low-Code / No-Code, Next-Generation Software Development | 3 | 1 | 10 | 2 | 1 | | 8 | | | | | 8 | | 1 | 5 | 5 | | 6 | | | | | | 4 | |

| Digital tools and technologies transforming business models and business strategies | Built In | Quixy | Ideassion Technology Solutions | McKinsey & Company | ECM Consultant Company | Atlas Communications Ltd. | Veritis Group Inc. | Mightybytes | Simplilearn Solutions | Booth & Partners | National Retail Association | Stormboard | Forbes | IntelliSoft Confidential | Deloitte | Zühlke Group | AuraQuantic | Harvard Business Review | Future Group | Digital Speaker | NetApp Inc. | Glue Up | Tencent | Gartner | Medium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hybrid Work Engagement and Retention | 4 | 7 | | | | 3 | | | | 5 | | | | | | | | 12 | | | | | 7 | | |
| Hyperautomation, Superapps, Business Process Automation Solutions, Robots, Autonomous System, Robotic Process Automation (RPA) | 5 | | | | 5 | | | 14 | | 4 | 5 | 8 | 6 | | | 7 | 3 | 7 | 1 | | | 3 | 6 | 6 | 5 |
| Clean Energy and Sustainable Tech | 6 | 9 | | 12 | | | | 1 | | | | | 7 | | | 4 | 2 | 2 | | | | | 4 | 8 | |
| Metaverse, Social Platforms | 7 | | | | | 1 | | | | | | | | 2 | 1 | 8 | 2 | 4 | | | | | | 7 | |
| Zero-Trust Cybersecurity and Architecture, Digital Immune System | 8 | 4 | 6 | 3 | | | 2 | 12 | | 5 | 7 | | | 5 | | 1 | 7 | 8 | | | | | 8 | 1 | 7 |
| Responsible Datafication, Corporate Digital Responsibility (CDR) | 9 | | | | | | | 4 | 1 | | | | | | | | | | | | | | | | |
| Embedded Finance and Blockchain | 10 | | | 6 | | | | | | | | | | 9 | | | | | | 2 | | | | | |
| Composable Business, Composable Software Platforms | | 2 | | | | | | 2 | | | | | | | | | 8 | | | | | | | | |
| Everything as a Service (XaaS), API-Based Integrations | | 3 | | | 9 | | | | | 10 | 3 | | | 8 | | | | 6 | | | | 7 | | | 10 |
| Customer Data Platform (CDP) for Personalisation, (Connected User Experience, User-Generated Content (UGC) | | 5 | 2 | | 8 | | 4 | 15 | 5 | | 4 | 2 | | 4 | | | | | | | | | | | |

| Digital tools and technologies transforming business models and business strategies | Built In | Quixy | Ideassion Technology Solutions | McKinsey & Company | ECM Consultant Company | Atlas Communications Ltd. | Veritis Group Inc. | Mightybytes | Simplilearn Solutions | Booth & Partners | National Retail Association | Stormboard | Forbes | IntelliSoft Confidential | Deloitte | Zühlke Group | AuraQuantic | Harvard Business Review | Future Group | Digital Speaker | NetApp Inc. | Glue Up | Tencent | Gartner | Medium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Experience (TX), Partner Ecosystem, Virtual Business Collaboration | 8 | 9 | | 7 | | | 9 | 3 | 4 | | 6 | 6 | | | | 6 | | | | | | | | | |
| Enterprise Resource Planning | | | 1 | | | | 3 | | | | | | | | | | | | | | | | | | |
| Data-Driven Business, Big Data Analytics, Real-Time Analytics | | | 4 | | | | 5 | | 7 | | 4 | | | | | 2 | | | | | 3 | 6 | | | 8 |
| Internet of Things (IoT) | | | 7 | | | | 9 | | 8 | | | | | 10 | | | | | | | | 4 | 2 | 2 | 4 |
| 5G, Advanced Connectivity, Wireless Value Realisation | | | 8 | 5 | | 4 | 10 | | | | | | | 3 | | 6 | 5 | 11 | | | 5 | | | 5 | |
| Web3 Includes Platforms and Applications | | | | 4 | | | 8 | | | | | | | 3 | | 9 | | 10 | | 3 | | | | 5 | 1 |
| VR/AR/MR, Extended Reality, Immersive-Reality Technologies, Digital Twins | | | | 6 | | 2 | | | | | | | | 4 | | | 2 | 4 | | 1 | 6 | 5 | | | 6 |
| Quantum Technologies | | | | 8 | | | | | | | | 6 | | | | | | | | | | | | | 11 |
| Mobility Technologies (Mobile First) | | | | 9 | | | | 7 | | | | | | | | | | | | | | | 1 | | 3 |
| Bioengineering | | | | 10 | | | | | | | | 5 | | | | | | 9 | | | | | | | |
| Space technologies | | | | 11 | | | | | | | | | | | | | | 1 | | | | | | | |
| Intelligent Search, Voice Search (VoIP), Computer Vision, Semantic Search, Contextual Search and Natural Language Processing, GPT Transformers, Search Engine Optimisation (SEO) | | | | | 4 | 5 | | 13 | | | 2 | | | | | | | | | 4 | | | | | |

| Digital tools and technologies transforming business models and business strategies | Built In | Quixy | Ideassion Technology Solutions | McKinsey & Company | ECM Consultant Company | Atlas Communications Ltd. | Veritis Group Inc. | Mightybytes | Simplilearn Solutions | Booth & Partners | National Retail Association | Stormboard | Forbes | IntelliSoft Confidential | Deloitte | Zühlke Group | AuraQuantic | Harvard Business Review | Future Group | Digital Speaker | NetApp Inc. | Glue Up | Tencent | Gartner | Medium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Impact Business Models (IBM) | | | | | | | | 5 | | | | | | | | | | | | | | | | | |
| UX Design | | | | | | | | 6 | | | | | | | | 10 | | | | | | | | | |
| Headless WordPress | | | | | | | | 9 | | | | | | | | | | | | | | | | | |
| Prioritising Performance | | | | | | | | 10 | | | | | | | | | | | | | | | | | |
| Digital Marketing | | | | | | | | 11 | | | | | | | | | | | | | | | | | |
| Ad-Supported, Freemium, On-Demand, Sharing, Subscription, Open-Source | | | | | | | | | 2 | | 1 | | | | | | | | | | | | | | |
| eCommerce, Marketplace | | | | | | | | | 3 | | | | | | | | | | | | | | | | |
| Contactless Solutions, Digital Payment, Buy Now Pay Later (BNPL) | | | | | | | | | | 3 | | | | | | | | | | | | | | | |
| Email Marketing Software | | | | | | | | | | 6 | | | | | | | | | | | | | | | |
| Video Marketing | | | | | | | | | | | 3 | | | | | | | | | | | | | | |
| Mainframe Technology | | | | | | | | | | | | | | | | 7 | | | | | | | | | |

Source: created by the author

A preliminary analysis of the dataset of individual ratings by expert organisations, formed randomly based on open data (Table-1), shows that modern digital solutions provide entrepreneurs and stakeholders with numerous opportunities to implement a digital transformation strategy, but the expert ranking is also rather random, which disorients a typical user in search of trendy solutions for developing their own business. A preliminary analysis of the existing set of digital transformation solutions in the context of business shows that most representatives of the relevant independent expert community see the potential for a fundamental change in business processes using AI, machine learning, cloud services, automation, and cybersecurity. This cross-section of expert opinions demonstrates the current situation among business organisations that are unable to decide on the direction of the investment for fear of economic losses and levelling results. Therefore, it is necessary to introduce an additional cross-industry ranking mechanism, the mathematical principles of which are described in iterative steps 4 and 5 of this study.

The calculation of $FM_i \; NTO1LP...NTO5LP \; RRMF_i$ and finally $RRP_i$ is presented in Table-2.

According to the calculated dataset (Table-2), it is possible to approximate the median of individual ratings, with some differences between the functions of $RRMF_i$ and. Given that certain digital technologies have received very low relative and priority cross-ratings, we set the limit parameters below which the relevant digital solutions are not taken into account (3):

$$RRMF_i \leq 0,367;$$
$$RRP_i \leq 0,0235. \tag{3}$$

**Table-2. Dataset of cross-multi-iteration ranking of the individual rating of expert organisations on the potential of solutions for the digital transformation of business models and business strategies**

| Digital tools and technologies transforming business models and business strategies | Mention Frequency | Ranking Based on Mention Frequency | Frequency of Achieving the Top Position | Frequency of Securing the Second Top Position | Frequency of Attaining the Third Top Position | Frequency of Securing the Fourth Top Position | Frequency of Securing the Fifth Top Position | Priority Ranking Based on Relevance |
|---|---|---|---|---|---|---|---|---|
| Artificial Intelligence and Machine Learning, Cutting Down OPEX, AI TRiSM | 22 | 0,101 | 7 | 4 | 6 | 1 | 2 | 1,173 |
| Edge Computing, AIOps to Support Microservices, Hybrid Clouds, Multi-Cloud Architectures, Industry Cloud Platforms, High-Performance Computing (HPC) | 19 | 0,087 | 2 | 3 | 2 | 2 | 2 | 0,439 |
| Software 2.0: Low-Code / No-Code, Next-Generation Software Development | 12 | 0,055 | 3 | 1 | 1 | 1 | 2 | 0,246 |
| Hybrid Work Engagement and Retention | 6 | 0,028 | 0 | 0 | 1 | 1 | 1 | 0,021 |
| Hyperautomation, Superapps, Business Process Automation Solutions, Robots, Autonomous System, Robotic Process Automation (RPA) | 15 | 0,069 | 1 | 0 | 2 | 1 | 4 | 0,186 |
| Clean Energy and Sustainable Tech | 10 | 0,046 | 1 | 2 | 0 | 2 | 0 | 0,114 |
| Metaverse, Social Platforms | 8 | 0,037 | 2 | 2 | 0 | 1 | 0 | 0,119 |
| Zero-Trust Cybersecurity and Architecture, Digital Immune System | 15 | 0,069 | 2 | 1 | 1 | 1 | 2 | 0,239 |
| Responsible Datafication, Corporate Digital Responsibility (CDR) | 3 | 0,014 | 1 | 0 | 0 | 1 | 0 | 0,017 |
| Embedded Finance and Blockchain | 4 | 0,018 | 0 | 1 | 0 | 0 | 0 | 0,009 |
| Composable Business, Composable Software Platforms | 3 | 0,014 | 0 | 2 | 0 | 0 | 0 | 0,014 |
| Everything as a Service (XaaS), API-Based Integrations | 8 | 0,037 | 0 | 0 | 2 | 0 | 0 | 0,024 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Customer Data Platform (CDP) for Personalisation, (Connected User Experience, User-Generated Content (UGC) | 9 | 0,041 | 0 | 2 | 0 | 3 | 2 | 0,088 |
| Total Experience (TX), Partner Ecosystem, Virtual Business Collaboration | 9 | 0,041 | 0 | 0 | 1 | 1 | 0 | 0,024 |
| Enterprise Resource Planning | 2 | 0,009 | 1 | 0 | 1 | 0 | 0 | 0,012 |
| Data-Driven Business, Big Data Analytics, Real-Time Analytics | 8 | 0,037 | 0 | 1 | 1 | 2 | 1 | 0,055 |
| Internet of Things (IoT) | 8 | 0,037 | 0 | 2 | 0 | 2 | 0 | 0,054 |
| 5G, Advanced Connectivity, Wireless Value Realisation | 10 | 0,046 | 0 | 0 | 1 | 1 | 4 | 0,063 |
| Web3 Includes Platforms and Applications | 8 | 0,037 | 1 | 0 | 2 | 1 | 1 | 0,077 |
| VR/AR/MR, Extended Reality, Immersive-Reality Technologies, Digital Twins | 9 | 0,041 | 1 | 2 | 0 | 2 | 1 | 0,111 |
| Quantum Technologies | 3 | 0,014 | 0 | 0 | 0 | 0 | 0 | 0,000 |
| Mobility Technologies (Mobile First) | 4 | 0,018 | 1 | 0 | 1 | 0 | 0 | 0,024 |
| Bioengineering | 3 | 0,014 | 0 | 0 | 0 | 0 | 1 | 0,003 |
| Space technologies | 2 | 0,009 | 1 | 0 | 0 | 0 | 0 | 0,009 |
| Intelligent Search, Voice Search (VoIP), Computer Vision, Semantic Search, Contextual Search and Natural Language Processing, GPT Transformers, Search Engine Optimisation (SEO) | 5 | 0,023 | 0 | 1 | 0 | 2 | 1 | 0,027 |
| Impact Business Models (IBM) | 1 | 0,005 | 0 | 0 | 0 | 0 | 1 | 0,001 |
| UX Design | 2 | 0,009 | 0 | 0 | 0 | 0 | 0 | 0,000 |
| Headless WordPress | 1 | 0,005 | 0 | 0 | 0 | 0 | 0 | 0,000 |
| Prioritising Performance | 1 | 0,005 | 0 | 0 | 0 | 0 | 0 | 0,000 |
| Digital Marketing | 1 | 0,005 | 0 | 0 | 0 | 0 | 0 | 0,000 |
| Ad-Supported, Freemium, On-Demand, Sharing, Subscription, Open-Source | 2 | 0,009 | 1 | 1 | 0 | 0 | 0 | 0,014 |
| eCommerce, Marketplace | 1 | 0,005 | 0 | 0 | 1 | 0 | 0 | 0,002 |
| Contactless Solutions, Digital Payment, Buy Now Pay Later (BNPL) | 1 | 0,005 | 0 | 0 | 1 | 0 | 0 | 0,002 |
| Email Marketing Software | 1 | 0,005 | 0 | 0 | 0 | 0 | 0 | 0,000 |
| Video Marketing | 1 | 0,005 | 0 | 0 | 1 | 0 | 0 | 0,002 |
| Mainframe Technology | 1 | 0,005 | 0 | 0 | 0 | 0 | 0 | 0,000 |

Source: created by the author

The application of the limit filter allowed us to identify 15 digital technologies that, based on the cross-iteration ranking of expert organisations' opinions, received the most favourable ratings in terms of the potential for transformational impact on business and entrepreneurship -

## Figure 1
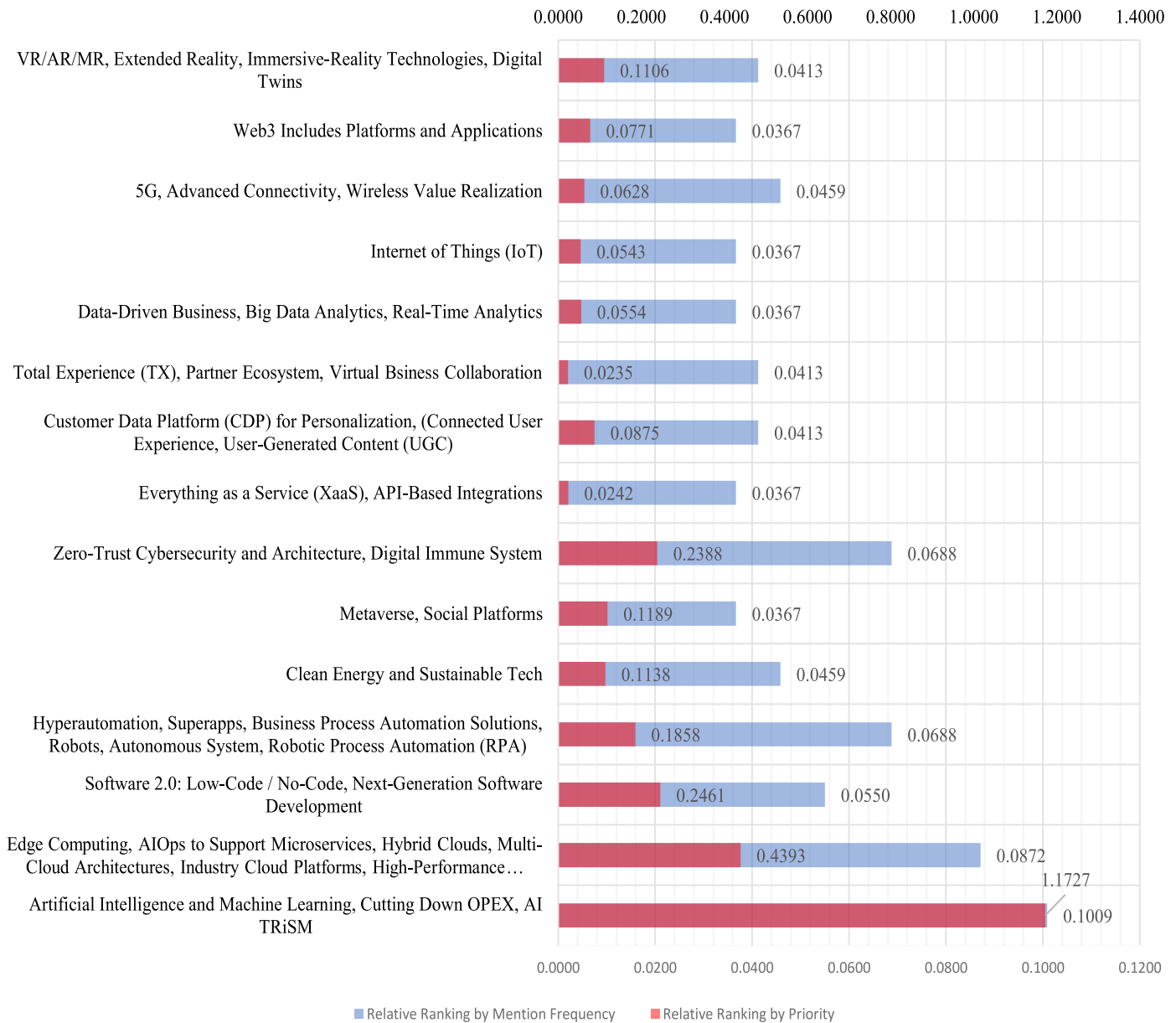


Source: created by the author

**Figure-1. Determining the optimal range of digital technologies for modernising business models and strategies that have the greatest potential for investment attraction as part of the digital transformation of business.**

In accordance with the obtained values (Figure 1), the optimal composition of tools for digital transformation of business models and business strategies has been established:

1. Artificial Intelligence and Machine Learning, Cutting Down OPEX, AI TRiSM with results at RRMF=0,1009 and RRP=1,1727;

2. Edge Computing, AIOps to Support Microservices, Hybrid Clouds, Multi-Cloud Architectures, Industry Cloud Platforms, High-Performance Computing (HPC) with results at RRMF=0,0872 and RRP=0,4393;

3. Software 2.0: Low-Code/No-Code, Next-Generation Software Development with results from RRMF=0,0550 and RRP=0,2461

4. Zero-Trust Cybersecurity and Architecture, Digital Immune System with results and RRMF=0,0688 AND RRP=0,2388;

5. Hyperautomation, Superapps, Business Process Automation Solutions, Robots, Autonomous System, Robotic Process Automation (RPA) with results from RRMF=0,0688 AND RRP=0,1858;

Let us assess the impact of the selected digital technologies on the formation of business models and business strategies **- Table-3.**

**Table-3. Assessment of the likely impact of digital technologies on the formation of business models and business strategies**

| Optimal technology | Likely impact |
| --- | --- |
| Artificial Intelligence and Machine Learning, Cutting Down OPEX, AI TRiSM | Technological innovations, such as artificial intelligence and machine learning, together with initiatives to reduce operating expenses (OPEX) and implement AI TRiSM, can have a significant impact on the evolution of business models and business strategies. The introduction of artificial intelligence technologies allows automating processes, analysing large amounts of data, and enabling businesses to make decisions based on real-time information analysis. This opens up new opportunities for optimising operating costs and increasing productivity. AI TRiSM, based on the integration of artificial intelligence and transformation strategies, helps businesses to be more adaptive and create new business models that meet modern market requirements. Such innovations can define a competitive advantage and help businesses stay competitive in a dynamic environment. |
| Edge Computing, AIOps to Support Microservices, Hybrid Clouds, Multi-Cloud Architectures, Industry Cloud Platforms, High-Performance Computing (HPC) | The adoption of these technologies has a significant impact on business models and business strategies. They provide enterprises with the ability to optimise operating costs through automation and increase productivity through data processing at the network edge. The flexibility of hybrid clouds and multi-path architectures allows enterprises to adapt to change and expand as needed. Industrial cloud platforms facilitate collaboration in specific industries and the development of new business models. As a result of implementing these technologies, enterprises become more competitive and can improve the efficiency and innovation of their operations. |
| Software 2.0: Low-Code / No-Code, Next-Generation Software Development | The development of software technology can have a significant impact on the formation of business models and business strategies. The use of these approaches simplifies the process of developing programmes and applications, allowing businesses to respond more quickly to changes and implement innovative solutions. Reducing software development costs can also lead to optimised operating costs and increased competitiveness. Such technological tools can help enterprises rethink their business models and strategies, focusing on innovation and rapid adaptation to changes in the market environment, creating opportunities to build competitive advantage and sustain successful operations. |

| Optimal technology | Likely impact |
|---|---|
| Zero-Trust Cybersecurity and Architecture, Digital Immune System | The introduction of this technology has a significant impact on the formation of business models and business strategies. Zero   -Trust Cybersecurity provides a higher level of cybersecurity by requiring authentication and authorisation for every request or connection to the network. The Digital Immune System concept uses artificial intelligence and machine learning to detect and prevent cyber threats at an early stage. This allows businesses to respond more quickly to potential threats and ensure reliable protection of critical assets. This approach can impact business models by helping to reduce cyber risks and influence business development strategies, as cybersecurity becomes a key component of strategic planning and requires appropriate investment and resources. |
| Hyperautomation, Superapps, Business Process  Automation Solutions, Robots, Autonomous System, Robotic Process Automation (RPA) | The introduction of these technologies has the potential to significantly change business models and strategies. Hyperautomation combines various innovative automation solutions to simplify operational processes and increase productivity. Superapps create universal digital ecosystems that allow consumers to access different services in one application, influencing consumer behaviour and habits. Automation of business processes and the use of robots and autonomous control systems simplify operations and can  reduce costs. Robotic Process Automation (RPA) allows you to automate routine tasks and operations, increasing efficiency and accuracy. By incorporating these technologies into their strategic planning, businesses can adapt to rapid market changes, rethink their business models, and increase their competitiveness. |

*Source: created by the authors*

According to the results of cross-iteration re-rating, it forms the appropriate areas of investment in the digital transformation of business models and business strategies - Figure 2.



*Source: created by the author*

Figure-2. Ranking of appropriate areas
for investment in digital transformation of business models
and business strategies

It was found that automation and security are the leading areas of digital transformation, and, accordingly, investments in this industry.

## Conclusion

According to the results of the study, the following can be established. The multidirectional development of digital technologies within the paradigm of the fourth wave of industrial development creates a "white noise" interference for potential consumers and stakeholders, namely a wide range of tools that make it impossible to directly choose the appropriate transformational digital vector of the business strategy.

The technology of cross-iteration ranking allowed us to identify a wide range of relevant independent expert organisations (25) resources, based on their personal ratings, a set of currently available tools for the digital transformation of business models and business strategies (36 digital solutions) was formed, among which the optimal vectors for directing investment and financial flows (5 digital technologies) with the greatest potential for modernising business processes were selected. The obtained vectors of potential investment vectors are median and independent.

Thus, it is established that the main investment direction in the digital transformation of business models and business strategies is automation and security.

In the future, research is aimed at expanding the sample size of expert organisations to increase the reliability of the results. It is also planned to model the possible development of certain types of business structures affected by digital transformation and develop tools to predict the optimal directions of digital development in the future. Expanding the sample of expert organisations will allow for more representative data and more generalised conclusions. Modelling the possible development of business structures based on the knowledge gained during digital transformation will help to predict and develop strategies for the future successful development of enterprises. This will help to improve the quality of the research and provide more accurate and useful results for business and the scientific community.

## Limitations

Important limitations of this study include:

- Methodological limitations: the study is based on the use of certain methodology and tools, which may affect the results and limit the overall scope of the study.

- Variable limitations: the study may not take into account all possible variables that affect the formation of business models and business strategies and does not take into account all possible scenarios.

- Time constraints: the study can only be relevant for a specific time period and does not take into account the dynamics of technology development and market conditions in the future.

- Limitations in the amount of data used: the study may not cover all aspects of the impact of the technologies under consideration on business models and business strategies, as this is a broad and complex topic.

In the future, it is planned to expand the methodological basis of the study, take into account the dynamics of technology development and consider a wider range of variables to obtain more comprehensive results.

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