

Review Paper

The Impact of Digital Technologies on the Companies' Strategic Management

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ABSTRACT

Thanks to digital technologies, companies ensure competitiveness in the market, acquire new sources of revenue and transform management strategies. The companies have gained more opportunities to enter global markets and access goods and services in any country worldwide. These opportunities change their strategic development priorities and enable the scaling up of their activities. The article aimed to analyze the impact of digital technologies on the strategic management of companies. Methodology. The authors utilize a statistical analysis approach to assess changes in the strategic management of companies in the context of digital technology integration and solutions. They analyze secondary data from a survey of 414 IT directors in 2020 regarding the strategic priorities in the digitalization era. The research results confirm the shift in strategic priorities of enterprises (during and after the pandemic) due to the active integration of digital technologies. The authors identify the trends of increasing investments in direct digital business transformation and digital transformation expenditures, from \$1,6 trillion in 2022 to \$3,4 trillion in 2026. Starting in 2020, digital transformation and changes in business processes, operational efficiency improvement, optimization of customer experience, and support for remote work have become key strategic priorities for businesses. The need for enhancing cybersecurity and protection, optimizing digital employee experience, improving workforce productivity, and increasing profitability are identified among important business initiatives. The following challenges and opportunities for enterprises during the implementation of digital technologies have been identified: (1) data becomes a foundation of competitiveness; (2) development of the Internet of Things allows large companies to enter markets and expand internationally; (3) digitalization of business and economic sectors, active development of new segments (biotechnology, digital communications, medical technologies, etc.); (4) virtualization of IT systems as physical infrastructure; (5) the use of artificial intelligence for facilitating strategic decision-making through processing and analysis of large volumes of data.

HIGHLIGHTS

- The article aimed to analyze the impact of digital technologies on the strategic management of companies. The research results confirm the shift in strategic priorities of enterprises (during and after the pandemic) due to the active integration of digital technologies.

Keywords: Digital technologies, digital business models, digital business transformation, corporate governance, strategic management, digital business strategies

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Digital technologies are dynamically integrating into service, trade, financial, education, and public administration sectors. The positive effects of this integration are significant for the private sector. The positive consequences of integration processes are particularly crucial for the private sector. The advantages of digital technologies are evident and include the following:

- ♦ Agility.
- ♦ Cost reduction in transactions (online services being much cheaper).
- ♦ New revenue sources.
- ♦ Management strategies that involve digital communication channels with stakeholders.

Furthermore, the companies have gained more opportunities to enter global markets and access goods and services worldwide, which shapes their strategic development priorities and enables scalable operations. If necessary, products can be quickly modified more innovatively to meet additional customer requirements, even if production facilities are geographically dispersed within a system. The advanced technologies that are constantly being improved and applied in practice (big data, blockchain technology, quantum technologies, artificial intelligence, cloud computing, and virtual reality) have a significant impact on the strategic management of companies. As a result of such influence, corporate governance transforms, and one of its key components is the subsystem of managing digital changes.

The impact of digital technologies on the strategic management of entrepreneurial activities primarily manifests in the proliferation of digital enterprise management systems and the development of big data to shape strategic development priorities (structuring and analyzing vast amounts of data). This impact is also manifested through e-commerce, the use of robotics, and AI technologies (mainly neural networks) in the business practices of companies of all sizes and industries. Digitization creates significant advantages for companies in terms of implementing their chosen strategies. Therefore, more and more companies strive to implement digital business strategies or integrate them into sustainable development. The widespread adoption of modern technologies and management systems positively impacts service quality, customer

service, and information support for enterprise leaders.

The aforementioned impact dimensions require further detailed empirical research on the state and characteristics of strategic management in companies under the active integration of digital technologies. This article aims to analyze the influence of digital technologies on companies' strategic management.

LITERATURE REVIEW

The advantages, disadvantages, effects, prospects, and trends in integrating digital technologies into firm operations and their role in strategic management are actively discussed in foreign literature. For example, Mathews *et al.* (2016), based on a study of 224 Australian companies, demonstrate that international strategic orientation is a key aspect of digital technology adoption by companies, enabling information gathering for network development in global markets and profit growth. Mathews *et al.* (2019), focusing on Japanese small and medium-sized enterprises, emphasize the importance of digital technology utilization for market competition, risk reduction, and operational efficiency improvement.

Taylor, Reilly & Wren (2020) assert that through digital tools, companies manage customer relationships, conduct business analytics, and transform product design, ultimately supporting targeted marketing efforts. Galati *et al.* (2017) argue that many companies have integrated social media (particularly social networking sites) into their communication and media plans, leading to profound organizational model transformations and shifts in marketing dynamics.

Based on data from 45 winemaking companies in Sicily, various dimensions of company performance utilizing social platforms were evaluated (Galati *et al.* 2017). The results indicate that predominantly, small firms led by managers with higher education levels use digital technologies to a greater extent. At the same time, larger companies show lower levels of digital channel usage (social media) in physical and economic terms (Galati *et al.* 2017).

The survey of small and medium-sized enterprises (SMEs) in Belgium demonstrates the evident benefits of implementing market-oriented marketing

strategies through Internet technologies. Digital solutions and Internet technologies should be integrated with traditional strategic marketing, ultimately helping build long-term relationships with customers and clients. Among the key advantages is the ability to obtain comprehensive information about customer needs and target audiences, as well as developing products that align with market demands (Caniëls, Lenaerts & Gelderman, 2015). Consequently, companies can respond to market changes and more efficiently serve their customers. Companies formulate targeted marketing strategies by understanding customer behavior based on data (Lo & Campos, 2018). In general, digital technologies combine digital and traditional marketing, ensuring the joint formation of products and services' value as well as the value of the companies' business (Balaji & Roy, 2017).

The key managerial consequences of employing DT (Digital Technologies) in small and medium-sized enterprises, particularly in overcoming the repercussions of COVID-19 and ensuring business continuity, involve adopting an SME socio-technical approach in management and DT strategies. The latter address organizational issues and support their operations based on DT (Papadopoulos, Baltas & Balta, 2020).

There are two leading schools of thought regarding ensuring business continuity through DT. The first is ensuring processes and services' functioning with DT support (continuity). The second is having appropriate mechanisms through support systems that guarantee vital business processes and personnel interaction can occur in a digital format while creating backup processes and data. The first school emphasizes that DT directly ensures business continuity by continuously providing computational infrastructure, distinguishing between "technology in normal use" and "technology in an incident." The second school emphasizes that even though DTs are at the epicenter of modern organizations (and thus SMEs), the people are the ones who deal with business continuity issues (Niemi, 2015). Both schools aim to help small and medium-sized enterprises stay connected and ease their work situation, but this may have a negative impact on user privacy and data confidentiality (the right to prevent disclosure of personal information to others) (Vial, 2019).

A literature review reveals a lack of comprehensive research on digital technologies' transformative impact on enterprises' strategic management, particularly the overall management system and corporate governance. The scholars focus on the short-term effects of digital technologies mainly in the marketing subsystem, specifically their impact on product promotion channels or communication means (Bondarchuk, 2017; Guk & Tyshchenko, 2018; Kovin'ko & Pasichnyk, 2017; Melnyk & Korinchenko, 2015). It is advisable to analyze the impact of digital technologies and digitalization on transformative changes in the strategic management of companies, especially in the post-pandemic context and the realization of the need for businesses to transition to digital business strategies.

MATERIALS AND METHODS

The article employs a statistical analysis methodology to assess changes in the strategic management of companies in the context of digital technology integration and solutions. The secondary data from a survey of Statista (2023) among 414 IT directors in 2020 was used to identify key company priorities for supporting operations and business activities during crises and evaluating business initiatives. Additional data sources for assessing digital business transformation included statistical materials and reviews from the World Economic Forum (2023). In particular, the authors focus on the new components of corporate governance as part of the digital transformation of business.

RESULTS AND DISCUSSION

Management is one of the most critical factors in the activities and development of enterprises in modern times. The global economy's shift towards rapid development and practical application of digital technologies (Industry 4.0) has created a new model of economic relations and led to significant changes in management practices. In modern enterprises, business and management processes undergo digital transformation. It changes the concepts, approaches, methods, and tools of strategic management and the increasingly active use of digital business strategies.

Classical methods of managing industrial societies have become outdated, giving way to a new type of management, culture, and organization, which some scholars call flexible management. Digital

technologies provide flexibility and adaptability in management since they accelerate the flow of information, data exchange, knowledge, and information about consumer preferences, behavior, demand, supply, competitors, suppliers, etc.

Under the influence of digital technologies, a new paradigm and concept of management are formed. Technological advancements in the field of management have had a significant impact on shaping this new management paradigm. For instance, artificial intelligence and new technologies such as virtual assistants and chatbots can perform various operations and functions of lower-level managers, such as real-time data collection, processing, and analysis. Routine task automation frees managers' time to focus on strategic problem-solving, the nature of which is also changing.

The digital economy will shortly encompass a significant portion of the global economy. The emergence of digital media (Internet, mobile phones, and other means of information collection, storage, analysis, and delivery) enables fast, accurate, and efficient dissemination of data in digital form. The widespread adoption and assimilation of digital technologies for creating, processing, exchanging, and transmitting information and data represent the process of digitizing the socio-economic system, including the enterprise system.

According to the Worldwide Digital Transformation Strategies research, the compound annual growth rate (CAGR) of direct digital transformation investments is estimated at 17,5% between 2020 to 2023 and is expected to reach approximately \$7,1 trillion. According to Statista's estimates (2023), digital transformation spending is expected to reach \$1,6 trillion in 2022, and global spending on digital transformation is projected to reach \$3,4 trillion by 2026. Companies driving this rapid growth need to digitize their existing business strategies, incorporating new digital business models that enhance competitiveness in the digital platform economy (IDC, 2020).

During the COVID-19 pandemic, companies further accelerated their transition to digital business models and management strategies, including digital supply chains. However, how effective are the results of such rapid management transformation and digital changes? Small and medium-sized

enterprises (SMEs) are the most vulnerable to digital changes, as they undergo slower transformations and face significant vulnerabilities due to limited financial resources, experience, and knowledge in integrating digital solutions.

According to surveys of business IT CEOs in 2020, the main priorities for supporting businesses during the crisis were digital transformation and support for remote personnel work (Fig. 1) (Statista, 2023d).

Furthermore, in the context of the pandemic, increasing operational efficiency (62%), transforming existing business processes (56%), and optimizing customer experience (55%) were identified as key business initiatives by IT directors surveyed in 2020. Among the important initiatives, respondents also highlighted the following:

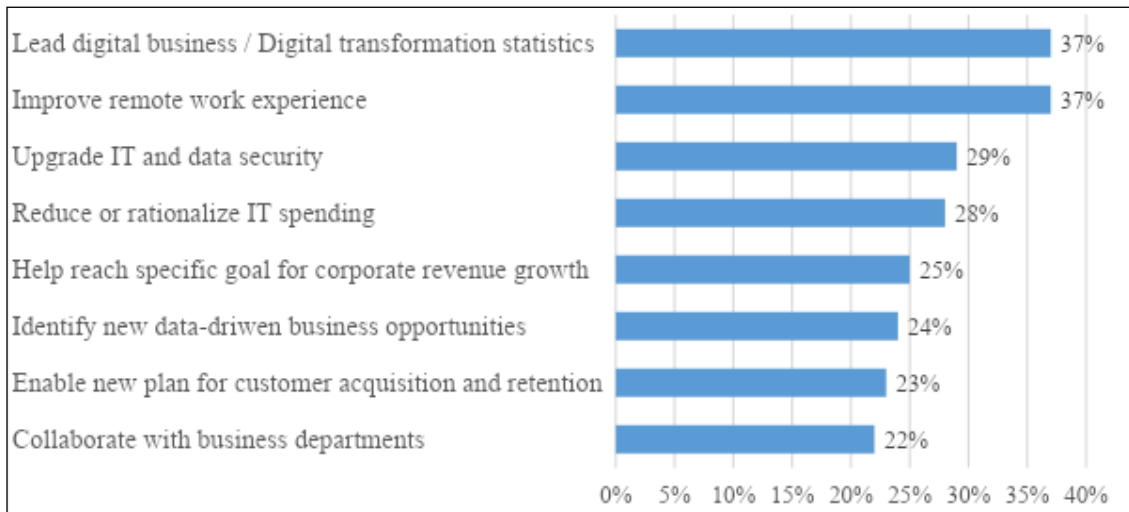
- ◆ enhancing cybersecurity and protection (55%),
- ◆ optimizing digital employee experience (48%),
- ◆ improving employee productivity (47%),
- ◆ increasing profitability (40%) (Statista, 2023e).

According to the World Economic Forum, digital business transformation encompasses the following dimensions (components) of changes (World Economic Forum, 2023a):

- ◆ New values and markets.
- ◆ "Digital" enterprise.
- ◆ The success of the digital transformation.
- ◆ Significance of inclusiveness, trust, and resilience.
- ◆ New digital business models.

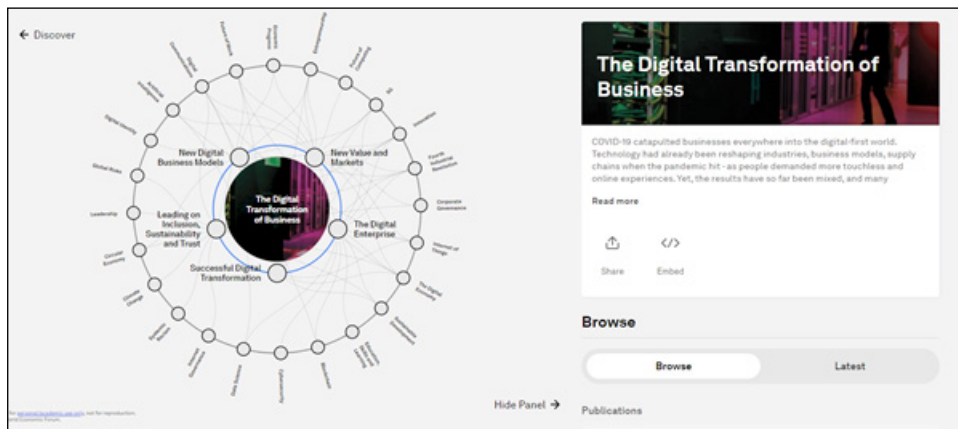
The concept of digital business transformation has emerged in the context of Industry 4.0, changes in corporate governance, the Internet of Things, the digital economy, sustainable development, the development of digital skills, blockchain and cybersecurity, Internet Governance, and a range of other vital changes in the external environment.

As a component of digital business transformation, corporate governance should ensure decision-making in the interests of all stakeholders (customers, employees, suppliers and partners, regulators, local communities, and shareholders). Digital technologies influence corporate governance; therefore, a new element called "Governing Disruption" is distinguished within its structure. This element includes managing digital changes,



Source: Source: Statista (2023d)

Fig. 1: Given the current state of the business, what are the CEO’s top three priorities for you to help the company preserve through the recent disruption?



Source: World Economic Forum (2023a)

Fig. 2: Digital transformation of business

5G integration, Internet governance, digital identity, mobility, data science, and considering trends and challenges of the digital economy (Fig. 2).

Among the key challenges and opportunities for companies in the process of implementing digital technologies, the following stand out:

Data becomes the foundation of competitiveness. Processing and analyzing data enables companies to obtain valuable market information and become more competitive quickly. However, data is concentrated in the hands of large technology companies (Google, Samsung, Apple Inc., Foxconn, Microsoft, Hitachi, Huawei, Dell Technologies, IBM, Sony) operating in the Internet environment, which entails risks and challenges related to data

security, cybercrime, and more. At the same time, technological companies can research consumer behavior, understand significant trends in changing product demand, and reflect them in their strategies.

The development of the Internet of Things, which involves a network of interconnected physical objects (or things) or devices, allows large companies to enter new markets and expand internationally. However, small and medium-sized companies have limited access to the opportunities presented by the Internet of Things.

Digitization of business and economic sectors. Digital technologies serve as the basis for creating new products, values, and characteristics, thus providing competitive advantages. Digitization

enables companies to develop and bring new products to market as quickly as large enterprises. IT system virtualization as physical infrastructure and shifting to a service model can significantly reduce initial capital expenditures for implementing the necessary digital infrastructure.

Artificial intelligence, based on processing large volumes of data, contributes to process optimization and enhances the quality of products and services.

All these digital trends are gradually being introduced into various business sectors, such as services, manufacturing, and government administration. Each of them affects strategic management in different ways.

Considering the rapid digitization of the global economy, it is estimated that within the next decade, around 70% of new business value will be created through digital platform-based business models (World Economic Forum, 2023b). However, one of the major challenges in the complete transition to digital strategic business management is the lack of internet access for nearly 2,7 billion people (World Economic Forum, 2023b).

Digital technologies have significant potential for creating new value for various stakeholders. However, digitization also poses risks of uneven distribution of power, resources, wealth, and social inequality due to the lack of technological

access for some companies and consumers while others have such access. Currently, the benefits of technology utilization are mainly concentrated in transnational corporations and governments of the most developed countries, especially China (Table 1).

Table 1: Intellectual property right: PCT* 2001 – 2022 by region

Region	2001-2010	2011-2015	2016-2022
Africa	5046	2447	3179
Asia	327406	372186	863531
Europe	475602	281491	415850
Latin America and the Caribbean	8539	6574	10513
North America	477628	277879	415790
Oceania	21808	10131	14481
Total PCT, unit	1316029	950708	1723344

Source: the authors calculated based on the WIPO Statistics Database (2023) data.

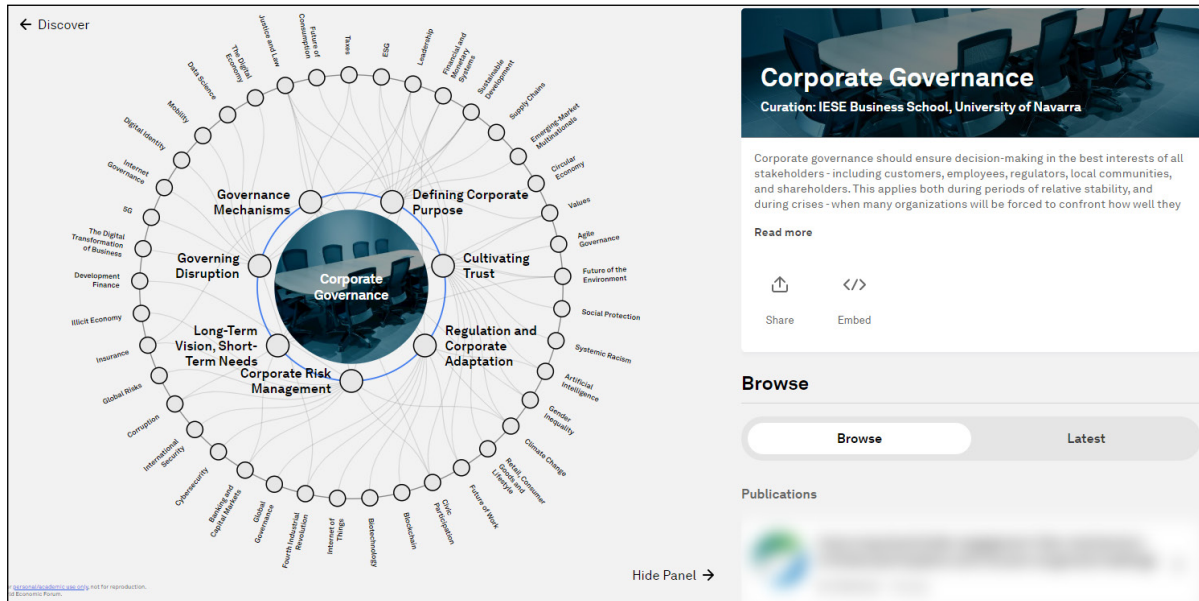
* *International Patent Cooperation Treaty (PCT) and the patent law.*

It is evidenced by the increasing dynamics of registered intellectual property rights in leading technological sectors, such as digital communication, computer technology, electrical machinery, apparatus, energy, audio-visual technology, medical technology, measurement, telecommunications, and biotechnology (Table 2).

Table 2: Intellectual property right: PCT 2016 – 2022 by region and by Fields of technology, total units

Region / Fields of Technology	Africa	Asia	Europe	Latin America and the Caribbean	North America	Total
Total	3179	863531	415850	10513	415790	1708863
Computer technology	107	86534	18101	323	49863	154928
Digital communication	79	90698	21313	309	34219	146618
Electrical machinery, apparatus, energy	178	71900	28860	397	16629	117964
Medical technology	255	42703	28976	901	42518	115353
Measurement	115	38459	21642	350	18055	78621
Transport	162	31732	29384	446	10040	71764
Pharmaceuticals	161	23173	17505	654	28952	70445
Audio-visual technology	42	46973	6439	90	10504	64048
Semiconductors	10	36649	6271	31	11430	54391
Optics	16	34802	8432	93	9738	53081
Biotechnology	81	17545	13087	416	21065	52194
Other special machines	202	18577	16742	644	11668	47833
Civil engineering	255	14216	14447	583	13191	42692
Telecommunications	53	26148	6329	79	9527	42136
Others	1463	283422	178322	5197	128391	596795

Source: The authors calculated based on the WIPO Statistics Database (2023) data.



Source: World Economic Forum (2023c)

Fig. 2: Corporate governance under the digital changes

In 2022, China, Japan, the United States, and Korea were the leaders in terms of the share of Top PCT Applicants (applicants with more than 10 PCT applications), accounting for 26,57%, 24,36%, 20,19%, and 7,80%, respectively. Specifically, China’s leadership is driven by the innovative activities of companies in the technological sectors of the economy. In China, most applications for new inventions and developments are filed by residents, and the following companies ranked as the top PCT applicants from 2019 to 2022: Huawei Technologies Co. Ltd., BOE Technology Group Co. Ltd, Guang Dong Oppo Mobile Telecommunications Corp. Ltd, Ping An Technology (Shenzhen) Co. Ltd., and ZTE Corporation.

The data in Table 2 confirms that digital technologies create innovative sectors such as medical technologies, biotechnology, and digital communications, where innovative products are actively developed. In these sectors, strategic management is primarily built around innovation activities.

Denmark was ranked first in the Digital Competitiveness Index in 2022, indicating a high level of the country’s ability to integrate and adapt digital technologies and implement them in businesses and government organizations. Among other competitive countries in Northern Europe, Sweden, Finland, and Norway also held high

positions, making it into the top fifteen. The United States secured second position as the most digitally competitive country in 2021 (Statista, 2023b).

In 2021, global spending on information technology (IT) and devices (PCs, mobile phones, tablets, printers, data center systems, enterprise software, and communication services) reached \$4,26 trillion. Estimates suggest that global IT spending will increase to \$4,43 trillion in 2022 and \$4,66 trillion in 2023. The IT and communication services constitute the largest share of expenditures, receiving the majority of investment flows. These segments encompass a wide range of diverse services and tools that remain crucial in performing various operations and business functions. For example, unified communication services are vital for virtual employee collaboration and, therefore, enhance business productivity. Investments in IT sectors accelerate companies’ digital transformation and strategic management. Digital transformation includes using artificial intelligence for strategic decision-making, automation of strategic management processes, and the shift of data to cloud services (Statista, 2023c). The availability of vast amounts of data stored in cloud services and the utilization of big data analytics significantly simplify strategic decision-making processes. In times of turbulence and high levels of environmental volatility, technologies greatly facilitate the transfer

of information across different management centers in time and space. Considering the importance of data as a production factor, the technologies optimize strategic management.

Despite significant direct investments in digitization by companies in recent decades, European Union countries have experienced slow overall productivity growth and GDP growth (Vivian *et al.* 2019). According to Anderton, Botelho & Reimers (2023), digitization contributes to productivity growth in highly productive companies, but its impact is limited for most enterprises. It can be attributed to the initial stage of digital economy development, where challenges in the digital skills of human capital still persist (van Ark, 2016). The success of investments in digital technologies relies on a precise understanding of goals and tasks that different types of technologies need to accomplish, making digitization an unsuitable 'one-size-fits-all' policy or strategy for productivity enhancement, growth, or management.

In another article, Anderton *et al.* (2023) argue that while digitization, on average, accelerates the growth of total factor productivity (TFP) for European companies, not all firms become more productive with higher levels of investment in digital technologies. The impact of digital investments on TFP growth depends on the sector of activity and the firm's productivity relative to its competitors.

Overall, digitization stimulates productivity growth for companies that are already relatively more productive than their competitors, whereas less effective lagging firms are less capable of harnessing the potential productivity gains from digitization.

CONCLUSION

The research demonstrates the shift in strategic priorities in times of change and the need for integrating digital technologies during and after the pandemic. The authors have identified trends toward increased investment in direct digital business transformation and digital transformation expenditures, from \$1,6 trillion in 2022 to \$3,4 trillion in 2026. Since 2020, digital transformation and business process change, operational efficiency improvement, optimization of customer experience, and remote work support have become key strategic priorities for businesses. The need to

enhance cybersecurity and protection, optimize digital employee experience, increase workforce productivity, and improve profitability were identified among the important business initiatives.

The following are the key challenges and opportunities for companies in implementing digital technologies:

1. Data becomes the foundation of competitiveness.
2. The Internet of Things development allows large companies to enter markets and reach international levels.
3. Digitization of businesses and economic sectors, active development of new segments (biotechnology, digital communications, medical technologies, etc.).
4. Virtualization of IT systems as physical infrastructure.
5. Artificial intelligence for simplifying strategic decision-making through processing and analysis of large data volumes.

Integrating digital solutions into the company's strategy ensures dynamic technological development, accelerates service delivery, simplifies complex business processes, enhances customer interaction efficiency, and significantly reduces marketing costs while simultaneously experiencing rapid revenue growth. It signifies the transformation of traditional strategic management through technology integration. Digitalization is becoming a priority component of the organization's strategy, which defines the goals of the activity - the quality of services, fast operational service, the formation of a positive customer experience, and relationships with customers.

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