



THE IMPACT OF DIGITAL TRANSFORMATION ON ORGANIZATIONS AND CUSTOMER EXPERIENCE

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ABSTRACT

Digital transformation is reshaping global business by redefining operations, customer engagement, and value creation. This study examines the role of advanced technologies—artificial intelligence (AI), big data analytics, the Internet of Things (IoT), mobile platforms, and blockchain—in driving efficiency, personalization, and competitive advantage. It clarifies distinctions between digitization, digitalization, and digital transformation, emphasizing the latter as a strategic, organization-wide process that integrates technology to optimize business models and generate sustainable value. Case studies illustrate how successful adoption accelerates growth, expands market reach, and enhances customer satisfaction, while failure to adapt leads to declining relevance. The research also explores digital maturity, categorizing organizations by readiness, strategic alignment, technological capabilities, and cultural preparedness, and shows how these dimensions influence transformation outcomes. Key themes include automation of processes, customer-centric omnichannel experiences, and data-driven decision-making. Opportunities such as efficiency gains, innovation, and market expansion are balanced against challenges, including implementation risks, cybersecurity, ethical concerns, and workforce upskilling. By analyzing drivers, success factors, and organizational implications, the study demonstrates that digital transformation is essential for sustaining long-term performance, innovation, and resilience. In today's rapidly evolving digital economy, continuous adaptation and investment in both technology and human capital are critical for competitiveness and sustainable growth.

1 INTRODUCTION

Digital technologies are transforming nearly every industry, reshaping business processes, products, and services. Advanced technologies such as the

Internet of Things, mobile devices, big data, augmented reality, blockchain, and social media are creating new opportunities. Businesses can now enhance efficiency, security, and

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personalization, driving operational improvements and innovation. Digital transformation involves integrating digital technologies across all business operations. It fundamentally alters how companies operate, deliver value to customers, and compete in the marketplace. Innovations such as automation, artificial intelligence (AI), and data analytics enable organizations to improve efficiency and enhance customer experience. The acceleration of digital transformation has fueled the growth of electronic commerce (e-commerce), changing how goods and services are bought and sold globally. E-commerce has become an interconnected and dynamic market. Digital technologies allow businesses to reach wider audiences, optimize operations, and offer personalized experiences, reshaping the global economy. E-commerce enables buyers and sellers to exchange information, funds, and products electronically, primarily via the Internet. It offers producers advantages by providing extensive product information and wide-reaching market access. E-commerce began in the mid-1990s with companies like Amazon and eBay. Initially, it faced challenges related to online transactions and consumer trust. Wider Internet access, driven by home computers and broadband connectivity, fueled rapid growth (Peter & Olson, 2007). Mobile technology, especially smartphones, further enabled seamless shopping anytime, anywhere (Lucas et al., 2023). New technologies continue to enhance consumer experiences. Web 2.0 introduced platform-based e-commerce models (Yu, 2018). Social media, big data, and AI accelerated its evolution (Huang & Benyoucef). Digital transformation improves efficiency through process automation, inventory management, optimized supply chains, and lower costs. It also expands market reach by removing geographic barriers (Suntsova, 2024). Digital transformation benefits organizations by improving service quality, reducing costs, gaining competitive advantage, and enhancing customer experience (Sahu et al., 2018). Leveraging consumer data allows personalized recommendations and tailored interactions, increasing satisfaction. By integrating AI, data analytics, and automation, e-commerce platforms optimize supply chains, decision-making, and customer engagement. Digital transformation is essential for growth, adaptability, and competitiveness in a rapidly changing market.

2 RESEARCH METHODOLOGY

This paper employs a *qualitative research approach* based on an extensive literature review of scholarly articles, industry reports, and case studies related to digital transformation and e-commerce. Primary sources include peer-reviewed journals, books, and authoritative reports from Deloitte, KPMG, and the World Economic Forum. Secondary data from company case studies (e.g., Amazon, Nokia, Zillow, Tesco) were analyzed to illustrate practical applications, challenges, and outcomes of digital transformation initiatives. The research method involved:

1. Data collection – compiling relevant studies on digital technologies, e-commerce evolution, and transformation strategies.
2. Content analysis – identifying recurring themes, patterns, and frameworks describing digital transformation processes, benefits, and risks.
3. Comparative analysis – contrasting organizations with varying levels of digital maturity to evaluate the impact of technology adoption on business performance and competitiveness.

This methodology allows for a comprehensive understanding of the theoretical foundations and real-world implications of digital transformation, providing insights into best practices, success factors, and potential pitfalls. The approach ensures reliability through cross-verification of multiple sources and relevance by focusing on contemporary trends and emerging technologies.

3 DIGITAL TRANSFORMATION

There are clear distinctions among the concepts of digitization, digitalization, and digital transformation. Although often used interchangeably, these terms carry distinct meanings. Digitization is defined as the material process of converting analog streams of information into digital bits. Digitalization, by contrast, refers to the way many domains of social life are restructured around digital communication and media infrastructures. *Digitization* thus represents “the action or process of digitizing; the conversion of analog data, especially images, video, and text into digital form”. Digitalization can be defined as the adoption or increase in the use of digital or computer technology by an

organization, industry, or country. Digital transformation is a sustainable, company-level transformation through revised or newly created business operations and models achieved via value-adding digitalization initiatives, ultimately resulting in improved performance. Fitzgerald et al. (2014) define digital transformation as the use of digital technologies that enable process improvements, including enhanced customer experience, optimized operations, and the creation of new business models. Lucas et al. (2013) emphasize operational activities, defining digital transformation as the fundamental change in how business is conducted through the redefinition of capabilities, processes, and relationships. Westerman et al. (2011, p. 5) describe digital transformation as “the use of technology to radically improve the performance or reach of enterprises.” Unlike other definitions, this one does not specify the elements leading to transformation. To create a unified definition, Gong and Ribiere (2021, p. 12) analyzed 134 definitions and described digital transformation as “a process of fundamental change enabled by the innovative use of digital technologies accompanied by the strategic deployment of key resources and capabilities, aiming to radically improve the organization and redefine the value it provides to all stakeholders.” It is important to emphasize that the implementation of technology in business processes is not an end but a response to the need to create added value for consumers, businesses, and other stakeholders. Hence, companies aiming for successful digital transformation must primarily redefine consumer experience by transforming processes through digital technologies. There are five levels of digital transformation: incremental digitization of data and processes, advanced digitization involving digital platforms, digital transformation covering new markets, digital transformation resulting in new products, and digital transformation involving business-model change (Deloitte, 2022). The digital transformation of business models concerns “individual elements of the business model, the entire model, value-added chains, and the networking of different actors within a value-added network” (Schallmo & Williams, 2021, p.4). The degree of digital transformation can include incremental (marginal) or radical (fundamental) changes to the business model. They also point

out that digital transformation may target single business model elements, yet the question remains how the transformation of one element influences all others. Digital transformation is a continuous endeavor that does not end with the implementation of one technology, platform, or set of skills. Therefore, a long-term investment strategy in technologies supporting strategic initiatives is essential. This requires a mindset shift at all organizational levels and active involvement of all stakeholders to increase the likelihood of success.

3.1 The Significance of Digital Transformation

The digital revolution plays a major role in transforming companies—and in some cases, entire industries. Many start-ups have reshaped traditional business operations through digital technologies, posing serious threats to analog corporations forced to adapt to new circumstances. However, investing in digital tools alone is not sufficient; profound organizational change is required. Companies must seek new business models, fundamentally alter their operational models, attract digital talent, and redefine how success is measured. Historically, Fortune 500 companies needed an average of 20 years to reach a market value of 1 billion USD. Today, start-ups achieve that milestone far faster: Google did so in 8 years, while Uber, Snapchat, and Xiaomi reached it in four years or less, largely due to the effective implementation of digital technologies (World Economic Forum, 2016). Digital transformation leads to performance growth, with one executive sentiment analysis reporting that 63% of executives saw a positive impact from transformation efforts (KPMG, 2023). *Increased Profits:* A study of organizations that completed digital transformations found that 80% reported increased profits; *Revenue Growth:* 56% of CEOs in a Gartner study mentioned that digital advancements have had a positive impact on revenue; *Operational Efficiency:* Digital transformation often leads to improved operational efficiency, productivity, and organizational competitiveness; *Innovation:* Studies show that digital transformation can significantly promote corporate innovation, which in turn enhances performance and competitiveness; *Customer*

Satisfaction: Digital initiatives focused on customer experience can lead to a 20% to 30% increase in customer satisfaction and **Higher Profitability for Mature Companies:** Digitally mature companies are reportedly 23% more profitable than their less advanced counterparts. For instance, the real estate platform Zillow improved workforce diversity through digital technology. Using machine learning, the company identified and corrected gender-biased wording in job advertisements, resulting in a 12% increase in female applicants (Staley, 2018). Likewise, the British multinational retailer *Tesco* used AI to measure its environmental impact and meet carbon-reduction targets (Deloitte, 2020). When analyzing the meaning of digital transformation, it is important to distinguish companies by their level of *digital maturity*. This concept denotes the advanced stage of digital transformation, in which firms that attain it experience significant operational enhancements and markedly higher levels of customer satisfaction. They define three scales: digitalization strategy, organizational digitalization level, and readiness for digitalization, each with four maturity levels (Aslanova & Kulichkina, 2020):

- *Beginners* – traditional companies lacking a digital-transformation strategy, with limited skills and outdated equipment.
- *Catching-ups* – organizations that are aware of the need for transformation and possess managerial vision and a willingness to change.
- *Off-track* – firms with a strategy but implementation challenges due to HR or technical constraints.
- *Leaders* – modern organizations with implemented strategies, adapted business models, strong leadership, advanced technical bases, and digitally skilled staff.

To assess digital maturity, organizations must evaluate the presence or absence of a digital-transformation strategy, managerial and employee readiness for change, the availability of technological resources, and proper data management structures.

Digital transformation’s significance lies not only in its benefits but also in mitigating risks. It can reshape organizations, create new opportunities,

and alter value chains (Parviainen et al., 2017). Companies like Nokia and Blockbuster failed to adapt to technological shifts, relying on outdated models and underestimating changing consumer behavior (Abdou & Hussein, 2020; Harvard Business School, n.d.). These examples highlight that continuous innovation and adaptability are essential for long-term success in the digital economy.

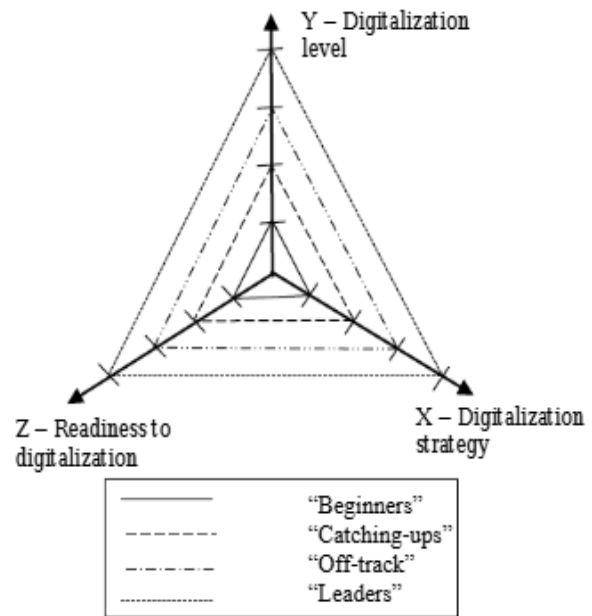


Figure 1. Structure Classification of Companies According to the Level of Digital Maturity
 Source: Aslanova & Kulichkina (2020, p. 446)

3.2 Development of E-Commerce

E-commerce, the digital transaction of goods and services, has rapidly grown into a key global market segment. Definitions vary broadly; it includes network infrastructure, hardware, and software; narrowly, it covers all electronic transactions; most restrictively, it involves online buying and selling of goods and services (Semerádová & Weinlich, 2022). E-commerce originated in the late 1970s with early B2B systems like Baxter Healthcare’s modem orders, and B2C evolved in the 1980s with France’s Minitel system, which enabled millions of users to conduct transactions such as travel booking and banking (Laudon & Traver, 2021).

The foundations of modern e-commerce, as they are understood in contemporary scholarship, emerged in the early 1990s with the rise of the

Internet. Zheng et al. (2009) identify three major phases in its evolution.

1. Phase 1 – EDI-Based E-Commerce:

Emerging in the 1960s and widely adopted in the 1980s, EDI enabled paperless document exchange between computers, reducing errors and improving efficiency, though its high-cost limited accessibility.

2. Phase 2 – Internet-Based E-Commerce:

In the late 1990s, the Internet offered a cheaper, more accessible alternative, allowing SMEs to participate. Companies like Dell, Amazon, and eBay leveraged it for direct sales, expanding reach and flexibility.

3. Phase 3 – E-Concept E-Commerce:

From the early 2000s, e-commerce integrated digital technologies across sectors, including education, healthcare, and government, giving rise to B2B, B2C, and e-Government models, shaping today's hyper-connected world. Three chronological periods in e-commerce's development are distinguished (Sharma et al., 2023):

- During the *invention* period (1995–2000), e-commerce mainly involved selling simple products online. Marketing relied on static advertisements and basic search engines; company websites were largely informational.
- In the consolidation period (2001–2006), traditional firms began using the Internet to strengthen market positions. E-commerce expanded to include complex services such as travel and finance, enabled by broadband adoption and wider access to personal computers. Marketing advanced through search-engine ads, video, and targeted campaigns. Despite challenges, e-commerce grew by more than 10% annually during this phase.
- Reinvention Period (2007 – Present), marked by Web 2.0, mobile devices, and cloud computing. This era emphasizes social, mobile, and local commerce. Social media, user-generated content, and mobile platforms became central to marketing, expanding businesses' global reach and reshaping consumer experiences.

3.3 Factors Influencing Digital Transformation

Digital transformation is a complex and costly endeavor that carries risks but offers long-term efficiency and productivity gains. Success depends on understanding the purpose, scope, technologies, and expected outcomes of transformation. Key factors for effective implementation include defining digital enablers and drivers, cultivating a digital culture, developing a digital vision, establishing a digital organization, identifying transformed sectors, and determining impact (Morakanyane et al., 2020). Additionally, internal and external factors such as supportive culture, engaged management and employees, knowledge use, dynamic capabilities, clear digital strategy, well-managed activities, IT-business integration, and IS capacity growth significantly influence outcomes (Zhang et al., 2022; Osmundsen et al., 2018).

McKinsey (2018) identifies 21 factors for successful digital transformation, grouped into five key areas:

- Digitally Competent Leadership.
- Building Digital Capabilities in the Workforce,
- Encouraging New Ways of Working,
- Digitally Upgrading Everyday Tools and
- Frequent and Transparent Communication.

Leadership with digital expertise, employee skill development, fostering behavioral change, integrating digital tools into daily operations, and consistently sharing a clear transformation narrative all significantly increase success. Digital transformation is crucial not only for large corporations but also for small and medium-sized enterprises (Zhang et al., 2022). SME digital transformation depends on three main factors: environmental, technological, and organizational. Environmental factors like government support and partnerships enhance organizational capacity, while IT infrastructure and management capabilities are critical technological enablers (Vial, 2019; Kraja et al., 2014; Lin et al., 2020). Organizational factors, particularly a clear digital strategy, committed top management, and digitally skilled employees, mediate the effective use of technology and resources, determining transformation success (Zhang et al., 2022; Cichosz et al., 2020). Digital transformation rests on three pillars: technology, processes, and

people (Verina & Titko, 2019). Technology has evolved through five phases: from early IT automation in the 1970s, the rise of the Internet, integrative applications, the SMACIT era (social media, mobile, analytics, cloud, IoT), to emerging technologies like BRAICQ (blockchain, robotics, AI, cognitive and quantum computing) (Van Veldhoven & Vanthienen, 2021; Sebastian et al., 2017).

SMACIT and BRAICQ technologies create opportunities and risks, driving investments in AI, robotics, and data analytics to enhance competitiveness. AI, particularly generative AI like ChatGPT, has transformed productivity and user interaction, while robotics combined with AI improves manufacturing, logistics, and automation (OECD, 2023; Lorenz et al., 2023). Despite rapid adoption, human oversight remains essential due to AI limitations. Ultimately, technology alone does not ensure successful transformation; organizations must align technological adoption with clear strategic goals and business vision

(Schwertner, 2017). The digital-transformation market is projected to grow from USD 911.2 billion in 2024 to USD 3.28 trillion by 2030, reflecting its central role in modern business (MarketsandMarkets™, 2024; Gartner, 2022).

3.4 Challenges and Risks of Automation

A key outcome of digital transformation is business process automation, which increases efficiency, accuracy, and cost savings by replacing repetitive human tasks with technology-driven workflows (Deloitte, 2020). Automation ranges from robotic process automation (RPA) for tasks like data entry to AI-driven cognitive solutions for complex functions such as fraud detection and chatbots. Beyond efficiency, automation enables cost optimization, strategic resource allocation, and improved customer service, potentially adding \$15.7 trillion to the global economy by 2030 (Rao et al., 2017).

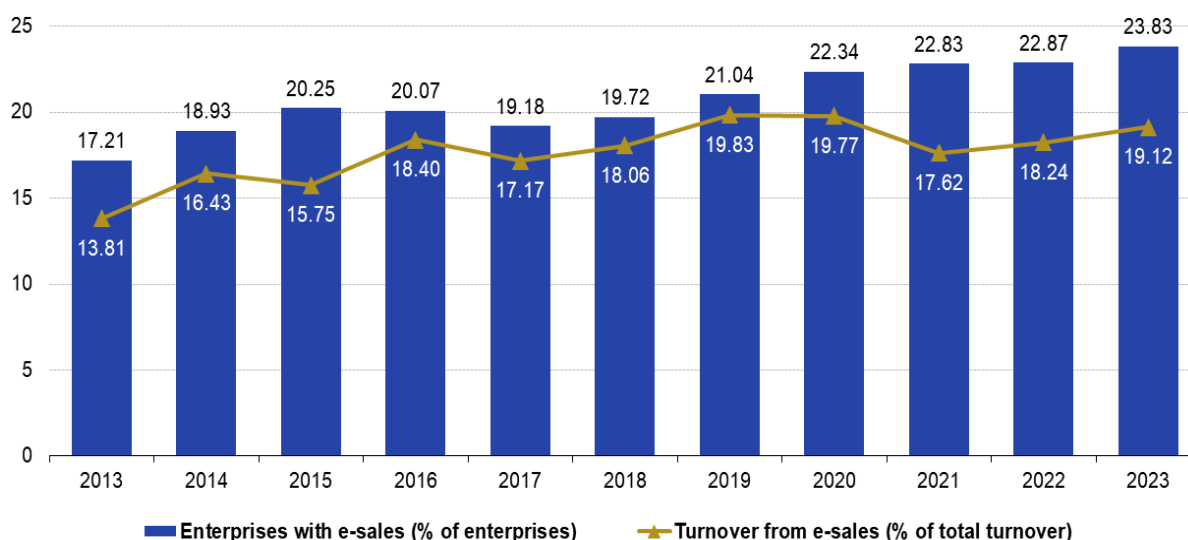


Figure 2. E-sales and turnover from e-sales, EU, 2013 to 2023 (% of enterprises, % of total turnover)

Source: Eurostat (2025)

Although automation provides numerous advantages, it also introduces organizational, ethical, and social challenges. A primary concern is job displacement. Frey and Osborne (2017) estimate that approximately 47% of U.S. jobs are at risk of automation. Nevertheless, research indicates that digital transformation often generates new roles requiring human creativity, problem-solving, and emotional intelligence skills that machines cannot easily replicate (Brynjolfsson & McAfee, 2014). E-commerce

Share of Total Turnover: Across the EU, the share of total turnover generated from e-sales was 19.12% in 2023. The value varies by enterprise size, with large enterprises reporting 24.44%, medium enterprises 14.99%, and small enterprises 9.49% of their total turnover from e-sales in 2023. (Figure 2). Cybersecurity and data protection represent another significant challenge. As organizations automate processes and digitize large volumes of sensitive data, they become increasingly vulnerable to cyberattacks and

breaches. The World Economic Forum (2023) ranks cyber risks among the top five global threats to economic stability. Therefore, cybersecurity must be integrated into every stage of digital transformation, from system design to employee training. The empirical analysis uses secondary data from Eurostat (2024) and OECD to illustrate the trajectory of digital transformation in the European Union and among OECD members.

SME Online Sales: The share of SMEs globally and within the EU engaging in e-commerce has seen a steady increase since 2019. For example, in the EU, the share of small enterprises engaging in online sales grew by 6.6 percentage points between 2013 and 2023, while medium enterprises grew by 5.8 percentage points in the same period.

Organizational resistance to change can also impede successful automation implementation. Employees may fear job loss or struggle to adapt to new technologies, leading to reduced morale and productivity. Leadership must communicate effectively, offer reskilling opportunities, and foster a culture that frames technology as an enabler rather than a threat.

Finally, ethical considerations arise when automating decision-making. Algorithmic bias, lack of transparency, and accountability gaps can erode trust among customers and stakeholders.

Establishing ethical AI frameworks and governance mechanisms is essential to ensure fairness and compliance with regulations such as the European Union's General Data Protection Regulation (GDPR; European Commission, 2016). Effective digital-transformation strategies combine automation with human judgment. Davenport and Kirby (2016) describe this approach as augmentation, wherein technology supports rather than replaces human intelligence. Automation can manage repetitive, data-intensive tasks, while human experts contribute contextual understanding, creativity, and ethical oversight. Effective digital transformation emphasizes human-technology collaboration, where employees supervise automated processes, interpret outputs, and make strategic decisions. In practice, AI can flag anomalies in financial transactions, leaving final judgments to humans,

while predictive-maintenance systems in manufacturing alert technicians, who then determine optimal responses. These hybrid systems demonstrate that the future of work emphasizes human-technology partnerships rather than complete automation, optimizing efficiency while preserving ethical and creative capacities.

3.5 Digital Transformation and Customer Experience

Digital transformation has fundamentally reshaped the relationship between businesses and customers. Beyond internal efficiency, its goal is to enhance customer experience, satisfaction, and loyalty. Kotler et al. (2021) note that modern consumers expect personalized, seamless, and meaningful interactions across multiple digital channels. External environmental factors such as market competition, customer expectations, and regulatory frameworks shape the pace of transformation. The European Commission's Digital Decade Policy (2021–2030) emphasizes digitalization as a foundation for resilience and sustainability, setting targets for skills, infrastructure, and digital public services (European Commission, 2021). Technologically, the emergence of cloud computing, big data, and artificial intelligence (AI) has lowered entry barriers for SMEs. Vial (2019) stresses that technology becomes transformative only when it is embedded in business processes and used strategically for value creation.

The Commission will allocate €1.3 billion for the deployment of critical technologies that are strategically important for the future of Europe and the continent's tech sovereignty through the Digital Europe Programme (DIGITAL) work programme for 2025 to 2027. The work programme focuses on the deployment of Artificial Intelligence (AI) and its uptake by businesses and public administration, cloud and data, cyber resilience, and digital skills. More specifically, key priorities under the Digital work programme include: (European Commission, 2025)

- Improving the availability and accessibility of generative AI applications, including in the health and care sectors. Available funding will go towards testing immersive environments, known as 'virtual worlds', implementing the AI

Act, and deploying energy-efficient common data spaces. These measures are key to the implementation of the AI Factories initiative to develop generative AI models for businesses and the public sector.

- Supporting the European Digital Innovation Hubs (EDIHs). This is a network of hubs that provides companies and the public sector with access to technical expertise and testing of technologies, as well as advice, training, and skills to adopt the latest technologies. It will promote the widespread take-up of AI in private and public organizations across Europe.
- Building up the award-winning Destination Earth initiative that is working to build a digital model of Earth to support climate adaptation and disaster risk management. Funding will build a more powerful model that more researchers can access.
- Boosting cyber resilience. Cybersecurity solutions such as the EU Cybersecurity Reserve will improve the resilience and security of critical infrastructures, including hospitals and submarine cables.
- Developing EU education and training institutions' capacity in digital skills so they may nurture and attract talent while boosting advanced skills in the European workforce.
- Facilitating the new EU Digital Identity Wallet architecture and the European Trust Infrastructure, as well as promoting its adoption in Member States.
- Stimulating the transformation of the public sector by developing efficient, high-quality, interoperable digital public services.

Innovation will also be accelerated by the new Strategic Technologies for Europe Platform (STEP), which awards the STEP Seal quality label to promising projects to improve their opportunity to access public and private funding.

Customer-Centric Focus: Customers' experiences have become one of the most important competitive differentiators, often influencing purchasing decisions and brand loyalty more strongly than traditional marketing efforts. Digital transformation allows organizations to use big data, AI, and machine learning to gain deeper insights into customer behavior, deliver personalized recommendations, and proactively

anticipate customer needs. For example, Amazon's recommendation system drives over 35% of sales (Lejhro, 2025), while Netflix tailors content based on viewing patterns (Krysiak, 2024).

Omnichannel Experience - Customers engage through multiple touchpoints—websites, apps, social media, chatbots, and physical stores. Digital transformation integrates these into seamless journeys, ensuring consistent messaging and brand identity. Starbucks' mobile app combines ordering, loyalty, and payment, merging digital and physical experiences (Starbucks, 2022).

Customer Empowerment and Co-Creation-Digital platforms shift power to consumers, who shape brand perceptions via reviews, social media, and user-generated content (UGC). Trusted by 92% of consumers, UGC enhances engagement and loyalty (Nielsen, 2021). Companies now view customer participation as a strategic asset.

AI - Enhanced Customer Service - AI-driven chatbots and virtual assistants provide 24/7 support, reduce costs, and improve satisfaction. For instance, Sephora's Messenger chatbot offers personalized recommendations, while Bank of America's "Erica" provides financial guidance (IBM, 2023; Bank of America, 2023). Optimal service combines AI efficiency with human empathy (Lemon & Verhoef, 2016).

Data Ethics and Privacy- Ethical data handling is critical. GDPR mandates consent, transparency, and user control (European Commission, 2016). Ethical data management is essential, requiring consent, transparency, and user control. Organizations that adopt responsible practices build trust and gain a competitive edge, as most consumers are willing to share data with transparent brands.

Emotional and Experiential Value - CX increasingly relies on emotional engagement. AR, VR, and immersive storytelling create memorable experiences, as seen in IKEA Place for furniture visualization (IKEA, 2022) and virtual tourism experiences.

Measuring Customer Experience - CX metrics include CSAT, NPS, CES, and AI-driven analytics capturing sentiment and engagement. Real-time feedback analysis enables continuous improvement and adaptive personalization.

4 CONCLUSION

Digital transformation represents both an unprecedented opportunity and a complex challenge for modern organizations. While automation and advanced technologies can significantly enhance efficiency, productivity, and data-driven decision-making, they also introduce risks related to cybersecurity, ethical governance, and workforce adaptation. Effective digital strategies recognize that technology alone is insufficient; human expertise, creativity, and ethical oversight remain critical for sustainable success. Furthermore, the transformation of customer experience has become a central driver

of competitive advantage. Organizations that leverage digital tools to deliver personalized, seamless, and engaging experiences—while maintaining ethical data practices—can build loyalty, trust, and long-term value. The integration of human judgment with technological capabilities, coupled with a customer-centric approach, provides a roadmap for organizations to navigate the evolving digital landscape. In essence, the future of business lies in achieving a balanced partnership between humans and technology, where efficiency, innovation, and ethical responsibility coexist, ultimately enabling organizations to thrive in an increasingly digital world.

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