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AI-POWERED DIGITAL TRANSFORMATION – ORGANIZATIONAL PERSPECTIVE. LITERATURE REVIEW

Abstract

The integration of new technologies into all areas of a company existence, known as digital transformation, necessitates a fundamental shift in traditional understanding of a business process optimization and human resilience to turbulent socioeconomical and technological environment. Simultaneously, artificial intelligence (AI) emerges as a disruptive force, with immense potential to impact businesses and individuals on an unprecedented scale and at an (exponential) pace. The purpose of paper is to present the theoretical foundations of the concept of AI-powered digital transformation from an organizational perspective (taking ethical aspects also into account). The main research method is a systematic literature review based on the Web of Science (ELSEVIER) database. On the foundation of literature review, the core pillars of AI-Powered digital transformation are presented as a contribution to further theoretical and empirical research.

Keywords: *AI-powered digital transformation; process automation; process optimization; digital transformation; information technology; artificial intelligence; organizational change*

Introduction

The most current multi-perspective landscape, especially considering turbulent changes from the prism of economy (e.g. financial and currency crises), technology (e.g. generative artificial intelligence, meta-universe (metaverse), blockchain, Internet of Things), socio-cultural aspects (e.g. privacy restrictions, digital exclusion) and ecological need, is undergoing unprecedented, exponential change in almost every aspect. That extraordinary dynamics of changes in the economic environment require organizations to be flexible, innovative and permanently optimize the costs of digitalize all the processes. Especially absorption and diffusion of innovation (thanks to the internet revolution) is now becoming not only an increasingly complex and interconnected process, but also open one (Chesbrough, 2007, p. 22), which may contribute to the acceleration of competitive advantages, but also to reducing the barriers to innovation in general, and thus the emergence of competitors characterized by hyper-growth (hyper-scalability). The openness of the innovation process and the dynamic development of technologies, such as generative artificial

intelligence, mean that the concept of innovation is becoming an increasingly interesting object of researchers' interest, also from the perspective of standardization and scalability of the innovation process. However, the foundation on which open innovation and standardization of the innovation process are based is a digitalized company, i.e. either a digital-first company or a company that is planning or is in the process of digital transformation.
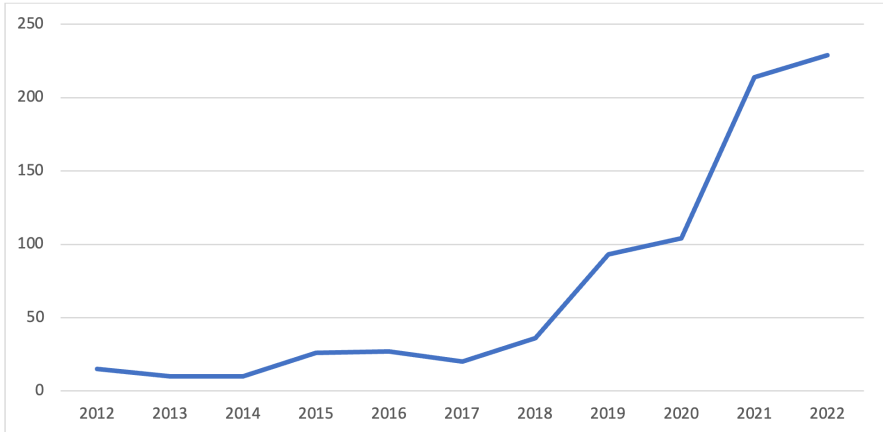
It is worth noting that the concept of digital transformation is gaining popularity among researchers. According to the above quasi-bibliometric analysis (specifically, the analysis of the number of publications in the following years), it can be concluded that the concept of digital transformation is still in the first stages of development of this research area and it can be concluded that the accelerator of this interest was the COVID-19 pandemic, because the increase in the number publications in this area increased tenfold between 2018 and 2021. The ScienceDirect database (Elsevier) was chosen for bibliometric analyzes because, according to researchers specializing in this issue, it offers a reliable coverage of scientific fields and disciplines, as well as a historical overview of high-quality scientific journals.

Literature review of digital transformation and concepts directly and indirectly related and AI-powered digital transformation

In the present day, organizations are undergoing significant changes in their organizational structures and business models. These transformations revolve around digital technology and novel business approaches, driven by strategic digital transformations that leverage emerging technologies. As a result, companies are establishing new ecosystems that extend beyond the confines of traditional corporate environments (Nguyen, Nguyen, Huy, 2021, p. 380–387). These efforts involve integrating process innovation, cultural change, and effective management across development, production, sales, and marketing sectors to facilitate successful digital transformation initiatives (Heinze, Griffiths, Fenton, Fletcher, 2018, p. 6–13), (Lee, Oh, 2020, p. 71–90).

Digital transformation (DT) encompasses the alterations and disruptions that businesses experience when leveraging digital technologies to improve their operations, products, and services (Grądzki, 2023, p.458-477; Reis, Amorim, Melão, Matos, 2018, p. 411-421). Digital transformation (DT) has become a prominent topic in recent years due to the rapid advancement of technology. Researchers and experts delve into how technological progress influences organizational strategies and business models (Rogers, 2016; Mahmood, Khan, Khan, 2019). What is worth mentioning at the beginning of the review, Dibbern and Hirschheim (Dibbern, Hirschheim, 2020, p. 1-20) propose that digital transformation extends beyond mere technological shifts; it encompasses a multifaceted process involving people, processes, and governance. To align digital transformation with organizational goals, fostering an innovative and risk-embracing culture is essential. According to the authors, digital transformation can give rise to novel business models that benefit both the organization and its customers (Hess, Matt, Benlian, Wiesböck, 2020, p. 151-173; Matt, Hess, Benlian, 2015, p. 339-343), thus emphasizing the importance of the human factor in the perspective of technological change. They emphasize the significance of customer-centric strategies, agile development, and collaboration with external partners as pivotal components for successful business model innovation. Organizations must recognize the potential

of digital technologies and strategically leverage them to create value for their stakeholders and customers.

Researchers and business practitioners (IBM. 2011) characterizes digital transformation as a strategic approach aimed at reshaping a business model by seamlessly integrating digital and physical elements, ultimately establishing a fresh industry business model. On the other hand, IDC (IDC., 2015) describes digital transformation as an ongoing process of innovation, enabling organizations to adapt to and proactively lead changes in customer expectations and market dynamics, using technology as a foundation of its activities. And the foundation of technology is data, and especially data from hardware and software (human generated and technology-generated) is crucial in that process. Taking that into account, the rapid expansion of big data and the Internet of Things (IoT) has significantly influenced digital transformation. In a comprehensive study, Kaur (Kaur 2020, p. 19-22) explored the impact of big data on businesses, identifying key areas where it can make a substantial difference, including decision-making, customer experience, and operational efficiency. The study also examines IoT subjects and trends, highlighting both the potential benefits and challenges associated with this rapidly evolving technology. While big data offers valuable insights for informed decision-making and operational improvements, the adoption of these technologies introduces hurdles such as data privacy, security concerns, and the need for specialized skills in managing and analyzing large datasets. Businesses must therefore develop a holistic strategy to integrate big data and IoT effectively while addressing these complexities (Kaur 2020, p. 19-22).

Data is the foundation on which business process management is built, which in turn is one of the first steps towards digital transformation. Business process management (BPM) acts as the conductor of organizational excellence, harnessing the power of AI to streamline, enhance, and revolutionize business processes (Watson III, Schwarz, 2023, p. 1385-1400). BPM centers around enhancing corporate performance by efficiently managing and optimizing a company's business processes. It provides a structured approach to viewing and controlling the processes within an organization, breaking them down into various components.

Business Process Management (BPM) involves identifying, designing, executing, monitoring, and continuously improving business processes. When combined with AI-based technologies, it becomes a dynamic catalyst for driving transformation:

1. **Process Identification:** In Business Process Management (BPM), the first step involves identifying existing processes, understanding their intricacies, and creating structured models.

2. **Process Discovery:** This phase includes documenting process steps, responsibilities, and other relevant details.

3. **Process Analysis:** BPM aims to optimize processes by eliminating inefficiencies, bottlenecks, and redundancies. Analytical tools are often used to simulate and benchmark different processes (Dumas, La Rosa, Mendling, Reijers, 2018).

4. **Process Implementation:** AI-powered automation seamlessly integrates into BPM, automating routine tasks, accelerating workflows, and ensuring consistency. This may require role changes, new tools, and adjustments to business rules.

5. **Process Monitoring and Controlling:** AI technologies extract insights from process data, guiding optimization efforts based on real-time and historical information.

6. **Process Optimization:** After implementation, continuous monitoring ensures processes meet desired performance metrics. Dashboards and other tools provide real-time information, allowing for ongoing evaluation and refinement.

BPM (Business Process Management) emerges as the linchpin that unifies AI-based digital transformation. As organizations embrace the holistic integration of BPM and AI, they embark on a journey where automation, optimization, and human ingenuity converge. This journey propels organizations toward a future where digital transformation is not merely a destination but a continuous evolution of excellence. BPM aims to reduce inefficiencies, maintain quality standards, and enhance the flexibility and agility of processes. It combines methodologies, technologies, and human input to achieve these results.

BPM is the first step to process automation (using code, no-code or even AI). Process automation simplifies systems by removing human input, decreasing errors, accelerating delivery speed, enhancing quality, reducing costs, and optimizing business processes (Moreira, Sílvia, Henrique, Mamede, Santos, 2023, p. 244-254). One of the most attractive advantages of automation is its capacity to transfer routine and repetitive tasks from human employees to AI systems. Automation enables scalability, permitting businesses to smoothly expand their operations without a corresponding increase in human resources. In the modern era of swift technological advancement, studies on automation and process optimization in the realm of AI-driven digital transformation have surfaced as a crucial field of investigation (Gołąb-Andrzejak, 2023, p. 397-404). This area of research investigates the collaborative relationship between automation, AI, and process optimization, revealing innovative strategies, models, and insights that transform industries and enhance organizational competencies. The growing interest in research on automation and process optimization for AI-enabled digital transformation is driven by a number of interrelated factors:

- **technology advancements**: rapid advancements in AI technologies, machine learning, and automation tools have unlocked new possibilities, prompting researchers to explore innovative ways to harness their potential (Masoodifar, Mahmood, Arslan, Nurdan, 2023);
- **business imperatives**: the digital age demands organizations to remain agile, efficient, and customer centric. Researchers seek to identify how AI-powered automation can catalyze these imperatives (Petrillo, Antonella, De Felice, Achim, Mirza, 2022);
- **competitive edge**: as industries become increasingly competitive, research focuses on uncovering how AI-driven optimization can differentiate organizations and drive market leadership (Candelon, François, Reeves, 2022);
- **operational efficiency**: organizations are under pressure to optimize their operational processes for cost savings, reduced errors, and improved resource allocation.

Automation powered by AI ensures an unparalleled degree of precision and accuracy in performing tasks. AI systems can execute complex processes flawlessly, thereby reducing the likelihood of human errors that could have substantial consequences. This precision is especially vital in industries where accuracy is paramount, such as healthcare, finance, and manufacturing. The fusion of AI with process automation and optimization transcends traditional operational models, offering a multitude of benefits that transform the way organizations function and interact with stakeholders.

The integration of AI and automation is a widely discussed subject in modern business studies. However, there is still a considerable lack of knowledge on how businesses can methodically merge AI-powered automation with process enhancement to realize AI-led digital transformation. While the advantages of automation and AI, such as improved operational efficiency and superior customer experiences, are recognized, there is a scarcity of extensive research offering a systematic strategy or method for businesses to navigate this intricate field more efficiently.

AI increases automation by providing agility, while process optimization uses AI to fine-tune operations. This symbiosis increases efficiency, flexibility and customer focus. As companies leverage these synergies, they move from incremental adaptations to pioneering innovations, positioning themselves at the vanguard of the digital transformation era (Ughulu, Dr John, 2022). Thanks that in organization we can see amplifying automation with AI. AI revolutionizes automation by granting it cognitive abilities once exclusive to human decision-making. While traditional automation excels at executing predefined tasks, coupling it with AI enables learning, adaptation, and evolution in dynamic environments. This synergy finds embodiment in AI-powered robotic process automation, where software robots equipped with AI can understand unstructured data, make context-aware decisions, and autonomously navigate complex workflows (Martínez-Rojas, Antonio, Sánchez-Oliva, López-Carnicer, Jiménez-Ramírez, 2021, p. 38-48). AI-powered process optimization represents a significant departure from traditional analysis methods. By leveraging machine learning models, organizations ingest historical data, allowing AI to learn and generate predictive insights. These insights drive informed decisions and lead to dynamic process optimization. In real time, workflows are refined

based on changing data inputs. AI identifies bottlenecks, recommends alterations, and predicts outcomes, creating a continuous cycle of improvement. As a result, organizations can eliminate waste, reduce resource consumption, and achieve operational excellence. The collaboration between AI-driven automation and process optimization heralds an era of agile, responsive operations. When orchestrated by AI, automation ensures precise and efficient execution of routine tasks, regardless of scale or complexity. Furthermore, AI's predictive capabilities facilitate proactive decision-making, allowing organizations to anticipate challenges, adapt to changing conditions, and swiftly pivot strategically. In the domain of process optimization, AI's real-time insights empower organizations to dynamically adjust workflows as conditions evolve. This agility enables businesses to navigate market disruptions, fluctuations in customer demand, and unexpected events with resilience.

Taking everything into account, the main *pillars* of AI-driven digital transformation (based on literature on the matter) could be:

1. **Data-driven insights:** this foundational pillar underscores the importance of collecting, analyzing, and leveraging data to inform decisions and actions. By harnessing data-driven insights, organizations drive process optimization, ensuring that improvements are grounded in factual evidence rather than assumptions.

2. **Seamless automation:** This foundational pillar emphasizes the smooth incorporation of AI-powered automation into existing processes. It involves seamlessly integrating technology, processes, and people1. By achieving this harmonious fusion, organizations ensure that new technologies become an integral part of their daily operations, striking a delicate balance between technological advancement and organizational adaptation.

3. **Human-centric collaboration:** This foundational pillar highlights the significance of collaboration between AI systems and human employees. It places a strong emphasis on user-centered design, ensuring that AI-driven interfaces are intuitive, user-friendly, and promote effective interaction between humans and machines.

4. **Ethical and responsible AI:** This foundational pillar underscores the importance of clear guidelines, governance frameworks, and transparency

in AI decision-making processes. By addressing ethical considerations— such as data privacy and algorithmic fairness organizations build trust with stakeholders and uphold the integrity of AI-driven operations.

5. **Strategic alignment:** The strategic alignment pillar emphasizes integrating automation and process optimization with an organization's overarching goals and strategies 1. It goes beyond merely adopting AI as a technological tool; instead, it involves a profound integration that resonates across every facet of an organization's operations. By aligning AI technologies with the organization's vision, businesses can achieve a holistic transformation that transcends individual components and drives overall success.

6. **Scalability and innovation:** The scalability and innovation pillar underscores AI's capacity to drive transformative change. Organizations should design processes that can scale, enabling AI to handle larger data volumes and adapt to evolving business requirements. Beyond scalability, this pillar encourages exploration of innovative AI applications, uncovering new opportunities. By prioritizing both scalability and innovation, organizations can achieve efficiency improvements, market differentiation, and tap into untapped potential.

These approaches leverage AI technologies to enhance efficiency, accuracy, and innovation across various industries within the context of AI-powered digital transformation. The proposed pillars address critical aspects that influence the success of automation and process optimization within the context of AI-powered digital transformation. These pillars serve as a guiding framework, offering organizations a structured approach to navigate the intricate landscape of integrating automation and optimizing processes using AI. By embracing these pillars, businesses can create a holistic approach that combines technology, human collaboration, strategic vision, and ethical considerations. This convergence leads to a future characterized by efficiency, innovation, and sustainable growth in the digital age.

Ethical issues of implementation of artificial intelligence in digital transformation process

The expansion and development of artificial intelligence is leading to a new wave of innovation, automation, and data privacy and security issues. While the potential of AI to facilitate everyday tasks and provide lifesaving services is undeniable, the lack of transparency and the vast amounts of data collected raise serious problems that governments and organizations need to urgently address. Governments, organizations and individuals alike are responsible for protecting data privacy and security. Governments should create regulations and provisions to protect personal data against unauthorized access, making it available only to verified and trusted entities. Organizations must comply with regulations and best practices established by governments to ensure the highest levels of data security and privacy. They should also ensure that the collected data is used only for the purposes for which it was collected and that it is not exposed to unauthorized access. People should be aware of how their data is being used and protect critical information such as Social Security numbers and credit card information from unauthorized disclosure. The algorithms used to process and interpret data constitute one of the main challenges related to data privacy and security in AI (Bini, 2018, p.2358–2361). They can identify trends and make decisions about people's behavior and characteristics, which threatens the privacy of personal data. These algorithms should be carefully researched and compliant with the law to ensure that no person's data is used without their consent. A key topic of AI research should be creating systems that are both interpretable and explainable (Sultan, Elgharib, Tavares, Jessri, Basile, 2020, p. 849–856). To achieve this, AI researchers must use computer-understandable representations and methods such as symbolic and statistical AI, natural language processing (NLP), and machine learning (ML).

While AI offers many benefits to society, governments, organizations and individuals must take the necessary steps to ensure that data privacy and security are not compromised. Governments must establish appropriate regulations and organizations should take proactive measures to ensure that the information collected is used responsibly and safely. Finally, individuals should be aware of the use of their data and vigilant against potential threats from malicious actors.

Conclusion

The objective of this research was to explore the concept of AI-powered digital transformation and looking up the main ethical aspects of that process. While existing literature has primarily focused on defining and implementing digital transformation, few studies have thoroughly examined its potential effects and categorized them. The digital revolution and machine learning have significantly impacted risk management and supply and demand assessment. These technologies enable effective networking across multiple supply channels and contribute to the establishment of a stable supply chain. Ultimately, their integration provides opportunities for profit optimization and competitive advantage. The convergence of automation and process optimization with AI-powered digital transformation marks a new era for organizations across industries. Intelligent automation, driven by AI algorithms, not only streamlines routine tasks but also empowers complex decision-making. It harmoniously blends human expertise with machine capabilities. Recognizing that automation and process optimization are more than tools—they drive holistic change—is crucial. Cultural shifts toward collaboration, continuous learning, and data-driven mindsets are essential for successful integration. By harnessing automation, process optimization, and AI, businesses can reimagine operations, enhance decision-making, and deliver unprecedented value. Challenges exist, but the rewards include a future where technology amplifies human potential, innovation thrives, and organizations lead in an AI-powered world.

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