Sustainability of Digital Transformation

Jiri Tupa
Vice-Dean at FEE and COO Research and Innovation Center for Electrical Engineering
Assistant Professor in the Department of Material and Technologies
University of West Bohemia
Pilsen, Czech Republic
tupa@fel.zcu.cz

Abstract

Digital transformation is a concept that is currently being discussed and emphasized in many policies, industrial and corporate strategies. In the scientific literature, digital transformation is often discussed as one of the pillars of a sustainable economy. On the other hand, the question is how to ensure that the digital transformation process itself is sustainable in the long term. That is, not only the transformation process itself but also the application of digital technologies in companies afterwards. This paper aims to explore the sustainability of digital transformation by analyzing its environmental, economic, and social impact. Through a literature review, this paper identifies several key factors that contribute to the sustainability of digital transformation, including the term energy transformation and education and digital skills, security, and business continuity. Based on the conducted research a model of sustainable digital transformation was proposed. The model presents the key elements for the sustainability of digital transformation. The paper concludes by discussing the implications of these findings for organizations, and individuals.

Keywords
Digital Transformation, Industry 4.0, Sustainability, Digital Skills, Energy transformation, Process Management

1. Introduction
Digital transformation has become a central focus in policies, industrial strategies, and corporate agendas, reflecting the widespread recognition of its potential to shape the future of economies and organizations. This concept refers to the integration of digital technologies into various aspects of businesses and societies, fundamentally altering the way they operate, interact, and create value. The rapid advancement of technology, coupled with increasing connectivity and data availability, has propelled the prominence of digital transformation as a key driver of innovation, productivity, and competitiveness.

The motivation behind the emphasis on digital transformation lies in its ability to unlock new opportunities, address emerging challenges, and foster sustainable growth. In today's dynamic and interconnected world, organizations and economies are facing unprecedented disruption and rapid shifts in consumer expectations, industry landscapes, and global markets. Digital transformation presents a strategic pathway to navigate these complexities, enabling businesses to remain relevant, agile, and resilient in an ever-evolving digital era.

Furthermore, digital transformation is often discussed as one of the pillars of a sustainable economy. By leveraging digital technologies, organizations can optimize resource utilization, streamline processes, reduce environmental impact, and contribute to the transition to a more sustainable future. This aligns with the growing recognition of the need to reconcile economic growth with environmental responsibility and social inclusivity.

1.1 Objectives
However, it is not enough to solely focus on the potential benefits of digital transformation. The question arises of how to ensure that the digital transformation process itself is sustainable in the long term. Sustainable digital transformation encompasses not only the initial process of technological integration but also the ongoing application of digital technologies in companies, ensuring that the outcomes are environmentally responsible, economically viable, and socially inclusive.

In light of these considerations, this paper aims to explore the sustainability of digital transformation by analyzing its environmental, economic, and social impact. Through a comprehensive literature review, this study identifies key factors that contribute to the sustainability of digital transformation, including energy transformation and education and digital skills. By understanding these factors, organizations and individuals can adopt a holistic approach that maximizes the positive impacts of digital transformation while minimizing potential drawbacks.

2. Literature Review

Currently, digitization is an extensively used term, representing the logical endeavour to automate and digitize processes that were previously handled manually by trained personnel. The EU 2030 Digital Compass, titled "The European Way for the Digital Decade"(Europe's Digital Decade: Digital Targets for 2030 2023), outlines a vision for the European Union in 2030, aiming to empower citizens and businesses through a digitalized economy and society built on principles of solidarity, prosperity, and sustainability. The document emhasizes the importance of empowering individuals and organizations while ensuring the security and resilience of the digital ecosystem and supply chains. (A European Green Deal 2023)

In line with the European Commission's 2019 Sustainable Development Plan and the subsequent Green Deal, which prioritized sustainability, there has been a growing focus on the transformative changes occurring in the energy market and the challenges associated with the energy transition in late 2021 and 2022. These energy-related aspects are intricately linked to the upcoming significant transformation of businesses and society commonly referred to as digital transformation, Industry 4.0, or the 4th Industrial Revolution, a concept that emerged in 2013. (Ghobakhloo and Fathi 2021) The current state of the issue takes into account energy transformation, which is reflected in a measurable and evaluable form of the maturity model. The basic development of these transformation directions is described in three areas: digital transformation, energy transformation and their intersection concerning possible and potential risks.

At the end, Table 1 summarizes the number of relevant articles in the world databases for the combination of the keywords digital transformation and sustainability.

Table 1. Name of relevant papers in selected databases

Database	**Number of papers**
Web of Science	1 685
Sciencedirect	32 819
Google Scholar	16 600
IEEE explore	116
IEOM	9

2. 1 Digital Transformation

The concept of digital transformation is discussed in many recent scientific papers. For example, author Vail in the paper Veil in his review article (Vial 2019), which includes a systematic review. The current digital transformation was rooted in 2013 when it began to be referred to first as Industry 4.0 (Lasi et al. 2014). This concept addresses the technological side of things, i.e., technical trends (today mainly Internet of Things (IoT), telecommunication standard 5G, blockchain technology, artificial intelligence...) and then this area is referred to as digital transformation (Zaoui and Souissi 2020) (Zhu, Ge, and Wang 2021) (Davids, 2023).

The perception of the Industry 4.0 initiative varies in the articles, whitepapers, and even in the professional literature. It is possible to find studies that have attempted to grasp this topic holistically. A study focused on the fundamentals of Industry 4.0 (Roblek, Meško, and Krapež 2016). This study defines essential concepts such as smart factories and smart manufacturing, new systems for the development of products and services, self-organization in manufacturing and supply chains, smart products, new systems for the individualization of distribution and procurement, adaptation to human needs, cyber-physical systems (CPS), Smart Cities, and digital sustainability with a focus on resource efficiency; and important components that include: IoT, Internet of Services (IoS), Big Data, integration with systems such as ERP and CRM systems, M2M communication, etc. Because the realization of Industry 4.0 is accompanied by the transformation of an organization, it indicates the importance of non-technical aspects.

Therefore, it can be noted that Industry 4.0 is changing the concept of the entire supply chain (Bányai and Zaher Akkad 2021). New technologies are being applied to transform conventional supply chain solutions into cyber and physical supply chain solutions. This transformation makes it possible to increase the entire value chain's efficiency, availability, quality, and cost-effectiveness while reducing energy consumption and greenhouse gas emissions. This innovation in conventional operations can lead to greener and more sustainable procurement, production and distribution processes. The successful future of the entire green supply chain is based on various factors, such as production management, logistics management, and the social and regulatory environment. However, Industry 4.0 technologies are expected to have a significant positive impact on the performance of the entire supply chain (Bányai and Zaher Akkad 2021).

The digital transformation of Europe stands as a paramount priority for the EU, representing a crucial initiative. This process of revolutionizing businesses and trade poses a significant challenge to Europe, while simultaneously offering immense prospects for innovation and growth. Leveraging their expertise in advanced digital technologies, traditional industries in Europe can capitalize on their strengths, thus enabling them to capture a greater market share in the emerging markets for future products and services. The European Union employs the DESI (Digital Economy and Society Index) monitor to effectively gauge the progress of this objective in real-world implementation. In the context of the digital transformation of the European Union (EU), DESI is an important benchmarking tool used to assess and measure the progress of EU member states in terms of their digital performance and competitiveness (Digital economy index 2023). The DESI overall index is calculated as the weighted average of the five main DESI dimensions with the weights selected by the user: 1 Connectivity, 2 Human Capital, 3 Use of Internet, 4 Integration of Digital Technology, and 5 Digital Public Services .

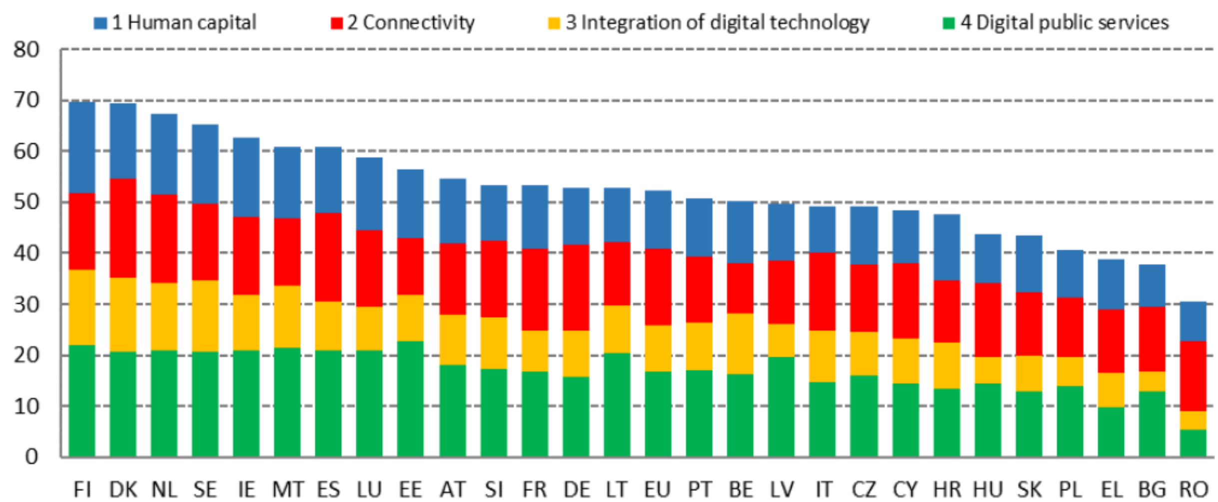

Figure 1. DESI index 2022, source EU commission

DESI helps policymakers and stakeholders gain insights into the digital readiness and development of EU countries, highlighting areas of strength and identifying areas that need improvement. It enables comparisons between member states and facilitates the sharing of best practices to foster a more digitally inclusive and innovative Europe.

2.2 Energy Transformation

The energy transformation has been developing more significantly since 2019 and includes the effects of sustainability, carbon neutrality and reducing energy intensity, and older green ICT trends (Sakshi Popli, Jha, and Jain 2021), (approximately 2010). Since 2019, these trends and efforts have been included under Green Deal's umbrella (Aszódi et al. 2021). "The energy dimension is becoming increasingly important within it, including as a key enabler whose availability and price are increasing in line with efforts to reduce the carbon economy. This is associated with an effort to change the energy mix reflected in cost, controllability and safety. The thesis for this project is whether the digital transformation is (fully/partially) in line with this energy transition.

An important aspect is also the future contribution of Industry 4.0 to energy sustainability. As already mentioned, the Industry 4.0 initiative is also closely linked to changes in energy sustainability (Ghobakhloo and Fathi 2021) and the potential contribution of Industry 4.0 to energy sustainability are also important. Therefore, it is important to map the relationships between the functions of energy sustainability and the use of Industry 4.0.

Another very important topic is electricity security, emphasising the use of renewable sources, as described in the Action Plan for Electricity Security 2.0 (Electricity Security Action Plan 2.0, 2023). At the same time, the requirements for energy management, where for example, low-cost integrations of energy management systems (EMS) and maintenance management systems (MMS) are proposed into the main company management systems, consisting of organisational devices such as enterprise resource planning (ERP), distributed control systems (DCS) or manufacturing execution systems (MES) (Alarcón, Martínez-García, and Gómez de León Hijes 2021).

Last but not least, the increasing share of renewable energy sources (RES) is also associated with intermittent energy production, for example, placing greater demands on ensuring the reliability of supply, e.g., (Scharl and Praktiknjo 2019). Here, the growing number of RES hinders the effort necessary to control and control the system. The deployment of digital or intelligent energy systems is often the next logical step to managing this increasing complexity.

2.3 The Intersection of Digital, Energy Transformation and Sustainability

There is an unavoidable absence where there are no relevant publications exploring the opportunities and risks of the digital transformation of SMEs in energy aspects. The analyses of available maturity models for digital transformation also show a lack of attention to the green dimension (Basl and Benešová 2020), the energy aspects, or the comprehensive energy transformation. These shortcomings and the effort to eliminate them are other clarifying stimuli for creating a new model in this project proposal.

The issue of sustainability in relation to digital transformation is presented by Feroz at col. (Feroz et al. 2021). This paper et al.identifies the disruptions driven by digital transformation in the environmental sustainability domain through a systematic literature review. The results present a framework that outlines the transformations in four key areas: pollution control, waste management, sustainable production, and urban sustainability.

Another interesting perspective in her article presents the paper (Guandalini 2022). In this paper *the crucial research question of "How can sustainability improve through digital transformation?" was approached through a rigorous literature review of 153 academic articles with the purpose of shedding light on the information available within the current academic offer.*

Publications on the sustainability of information systems can also be found in published papers (Junker and Farzad 2015). The sustainability of an information system generally refers to the system's ability to maintain and provide information in an efficient and appropriate manner, considering long-term viability, reliability, and environmental impact. The definition of sustainability for an information system may vary depending on the context, but below is a broader framework for its definition:

Efficiency: A sustainable information system should be capable of efficiently processing, storing, and transmitting information. This involves minimizing unnecessary repetitive tasks, optimizing resource utilization (such as computational power, storage), and ensuring that information is correctly delivered and used.

Viability: A sustainable information system should be able to adapt and respond to changes in the environment and user requirements. This includes the ability to update and expand the system to reflect new technologies, requirements, and business needs.

Reliability: A sustainable information system should be reliable and resilient to failures. This includes the ability to prevent failures, recover from them, and minimize their impact on information availability and integrity. Information system security is also an important component of reliability.

Environmental Impact: A sustainable information system should minimize its negative impact on the environment. This entails reducing energy consumption, using renewable energy sources, minimizing the amount of waste generated (such as paper, and electronic waste), and promoting recycling.

Ethical and Social Considerations: The sustainability of an information system also involves adhering to ethical principles and social responsibility. The system should respect privacy and personal data protection, promote inclusivity and non-discrimination, and have a positive impact on users and society as a whole.

These aspects are interconnected, and their importance may vary depending on the specific context and goals of the information system. The definition of information system sustainability is therefore complex and can be further expanded in accordance with the specific needs and challenges of the system. The sustainability of information systems is also defined by the international standard ISO/IEC 19395:2015 "Information technology — Sustainability for and by information technology".

3. Methodology

A literature review was conducted to obtain relevant information on the topic of sustaintability and digital transformation. The following procedure was followed:

Identification of keywords and phrases: Key words and phrases that accurately captured the research topic were identified. The keywords included digital transformation; Industry 4.0., Sustaintability and Information systems, which were used to narrow down the search results to relevant studies.

Search in the ScienceDirect database: A search for relevant literature was conducted in the ScienceDirect database. A combination of keywords and phrases was used, and boolean operators were employed to create precise search queries. Subsequently, the search results were reviewed, and relevant studies were selected based on titles, abstracts, and keywords.

Search in the IEEE Xplore database: To expand the research scope, a search was performed in the IEEE Xplore database. Once again, the keywords and phrases were utilized, and specific filters and research categories were used to narrow down the results to relevant studies in the field of interest.

Selection of relevant studies: The abstracts and key points of the selected studies from the ScienceDirect and IEEE Xplore databases were read. Those that best addressed the research questions and objectives were chosen. Focus was placed on their methodology, results, and conclusions.

Analysis and synthesis of the studies: A critical analysis of the selected studies was conducted, and key points and ideas from each study were recorded. The main trends, similarities, and differences among the studies were identified. These findings were then used to formulate the conclusions that are presented in this article.

5. Design of sustainable digital transformation model

Based on the conducted research a model of sustainable digital transformation was proposed. The model presents the key elements for the sustainability of digital transformation (see Figure 2). The 4 basic pillars and the common background have been identified.

All these help to create a system that will help to achieve sustainability not only of the whole digital transformation process but also of the system that is the very outcome of the digital transformation. Other pillars that can be included are for example economic health, social and societal factors, technological maturity, etc.

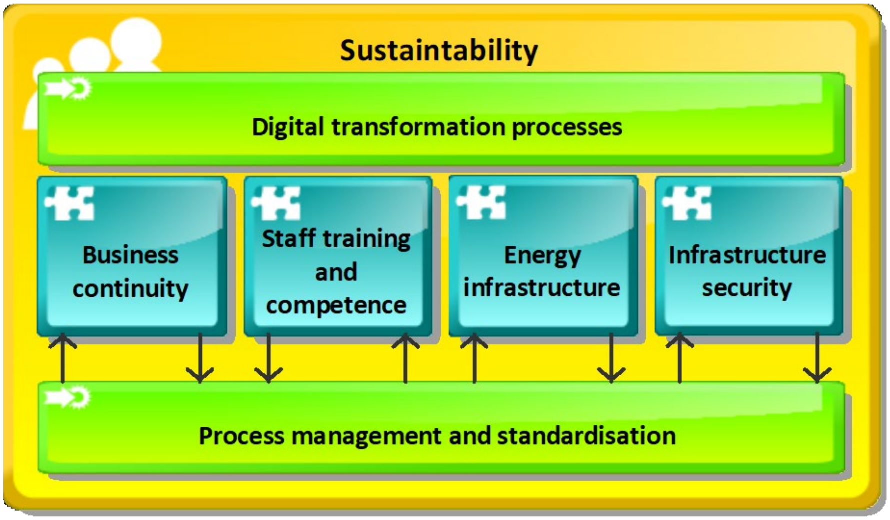

Figure 2. Designed model of sustainable digital transformation

5.1 Business Continuity

Business Continuity Management (BCM) is a crucial process that organizations implement to address the risks associated with unexpected disruptions (Frikha et al. 2021). It encompasses a range of activities, including emergency response, risk management, planning, business continuity plans (BCP), training, testing, and continuous improvement. The primary objective of BCM is to enhance an organization's resilience to potential business disruptions and minimize their impact. By proactively identifying and addressing risks, organizations can effectively manage crises, maintain essential operations, and safeguard their reputation and stakeholder confidence (Schmid, Raju, and Jensen 2021). One widely recognized standard in the field of BCM is ISO 22301. ISO 22301 provides guidelines and requirements for establishing, implementing, operating, monitoring, reviewing, maintaining, and continually improving a documented Business Continuity Management System (BCMS). It offers a framework for organizations to develop a comprehensive approach to BCM and ensure its alignment with business objectives and regulatory requirements.

The BCM process begins with conducting a thorough risk assessment to identify potential threats and vulnerabilities. This assessment helps organizations understand the potential impact of disruptions on critical business functions, processes, and systems. Based on this analysis, appropriate strategies are formulated to mitigate and manage these risks effectively. Emergency response plans are an integral part of BCM. They define the actions and procedures to be followed during and immediately after a disruptive event. These plans outline roles and responsibilities, communication protocols, evacuation procedures, and strategies to mitigate further damage. Regular training and awareness programs ensure that employees are familiar with the emergency response protocols and can act swiftly and decisively in a crisis.

Business continuity planning involves developing comprehensive strategies to ensure the continuity of essential business operations during disruptions. This includes identifying alternate facilities, establishing backup systems and data recovery processes, and implementing redundancy measures for critical resources. The objective is to minimize downtime, maintain customer service levels, and recover business functions within specified recovery time objectives (RTOs) and recovery point objectives (RPOs). Testing and exercising the business continuity plans are essential to validate their effectiveness. Through simulation exercises, organizations can assess their preparedness, identify gaps, and refine their strategies. This iterative process allows for continuous improvement and enhances the organization's ability to respond to and recover from disruptive events.

Regular reviews and evaluations of the BCM program are necessary to ensure its ongoing relevance and effectiveness. This includes monitoring key performance indicators (KPIs) to measure the success of BCM initiatives, conducting internal audits, and seeking external certifications, such as ISO 22301 compliance, to demonstrate a commitment to best practices.

5.2 Staff Training and Competence

Staff training and competence must be part of the human resources development strategy. The core competency framework states report (Elhussein, Leopold, and Zahidi 2020). Thus, it can be characterized that the following attributes are important for the education and development of human resources.

Skillset Development: Education enables individuals to acquire the necessary skills for effectively utilizing digital technologies and processes within Industry 4.0. This includes the ability to work with automated systems, analyze large volumes of data, and program and control robots and other devices. Education should focus on developing digital skills and technical know-how that are crucial for the sustainability of digital transformation.

Flexibility and Adaptability: Given the rapid pace of change in the digital environment, education is crucial for fostering flexible and adaptable individuals and workforces. People should be able to quickly learn new technologies, adapt to new work processes and innovations, thereby preventing technological obsolescence.

Digital Literacy: Education should encompass the development of digital literacy, which involves the ability to understand and critically evaluate digital information, communicate effectively using digital tools, protect privacy and security online, and ethically utilize digital technologies. Education should provide individuals with the necessary tools and awareness to actively participate in the digital world and responsibly utilize digital technologies.

Innovation and Creativity: Education should encourage innovative and creative thinking, which is crucial for the development of new and sustainable technologies, processes, and models in the digital environment. People should be encouraged to think critically, seek new approaches and solutions, and collaborate on innovative projects.

Sustainability Awareness: Education should incorporate a sustainability perspective into teaching and educational programs. People should understand the impacts of digital transformation and Industry 4.0 on the environment, society, and the economy. Education should also promote sustainable practices and values, such as energy efficiency, waste reduction, and the use of renewable resources.

Figure 3. The World Economic forum education 4.0 framework

Overall, education is a fundamental pillar for the sustainability of digital transformation and Industry 4.0. It helps individuals acquire the necessary skills, develop flexibility and adaptability, enhance digital literacy, foster innovation and creativity, and create sustainable awareness and practices (Benešová et al. 2021).

5.3 Energy Infrastructure

Efficient management of energy infrastructure is crucial for businesses in terms of ensuring continuity and reducing costs. In this article, we will focus on three main challenges faced by business energy infrastructure and present solutions based on modern technologies and innovative practices.

1. Resilience and stability of electricity transmission and distribution for technologies:
The importance of technology in today's businesses is constantly increasing, along with the dependence on electrical energy. To enhance the resilience and stability of electricity transmission and distribution for these technologies, investment in infrastructure improvements is essential. Modern approaches include advanced monitoring, automation, and the utilization of smart grids. These enable the identification and prompt resolution of faults, minimizing their impact on business operations.

2. Availability of energy resources and utilization of self-generation:
Dependency on centralized electricity sources can bring risks and high costs. Businesses are increasingly focusing on diversifying their energy sources and utilizing self-generation. For instance, the installation of photovoltaic systems allows businesses to generate a portion or even the entire required electricity internally. This reduces reliance on external suppliers and provides greater energy independence.

3. Monitoring electricity consumption and predictive analytics using artificial intelligence and Big Data technologies:
Efficient management of electricity consumption is crucial for minimizing waste and reducing costs. Modern technologies such as artificial intelligence and Big Data analytics enable businesses to monitor real-time electricity consumption and gain valuable insights from large datasets. Based on this information, predictive consumption models can be developed, facilitating better planning and optimization of energy resources within the business.

Efficient management of business energy infrastructure is pivotal for ensuring continuity and reducing costs. Approaches focused on resilience, diversification of sources, and the utilization of modern technologies and innovative practices enable businesses to achieve more efficient and sustainable energy operations. Investments in these areas not only provide competitive advantages but also contribute to minimizing the negative environmental impact.

5.4 Infrastructure security

Infrastructure security is another important element. The actual level of security of key technologies and processes is related to the level of risk management. The manufacturing technologies used - machines, robots etc. - are part of Information and Communication Technologies (ICT) in present time. It can be started discussion about a new term - Information, Communication and Manufacturing Technologies (ICMT) - that reflects the requirements of Industry 4.0. The reason is that manufacturing infrastructure autonomous intelligent manufacturing system, machines and robots communicate with each other.

The important question is how to protect the ICMT against cyber-attacks, loss of data integrity or problems with availability of information. An implementation of information security management systems can answer this question. The information security management system (ISMS) is used namely in the IT sector. The ISO/IEC 27001 (Survey of ISO/IEC 27001 2023) standard is a globally recognized framework for establishing and maintaining an effective information security management system (ISMS). It provides organizations with a systematic approach to identify, assess, and mitigate information security risks. The standard is built on several fundamental principles that form the foundation of information security. In this article, we will explore the implementation of ISO/IEC 27001 and its key principles: confidentiality, integrity, availability, stability, and resilience of information systems.

The implementation of this standard can be a solution for manufacturing companies adopting the concept of Industry 4.0. The similarity with other ISO standards (ISO 9001 for example) is important for building a certified integrated management system based on the management of quality, information and environmental requirements. On the other hand, the standard ISO 270001 can be effectively integrated into the Enterprise Risk Management System.

5.5 Business Process Management and Standardization

This area is a core area that is connected to the pillars described above. Properly setting up and describing processes and implementing appropriate standards are key to the proper functioning of the whole system to ensure its sustainability. The implementation of process management system can be demonstrated using the PDCA cycle (Figure 4).

Process design and modelling are the initial activities of process management implementation. This activity aims to find and describe existing processes and suggest a "to be" state. Areas of focus include process representation, and attributes, such as inputs, outputs, resources, and related documentation. Process modelling is a useful tool to capture, formalise and structure the knowledge of business processes. **Process execution** means that instances of a process are performed or enacted, which may include automated aspects. Automation of business processes is based on using the Business Process Execution Language (BPEL) (Weske 2012). The BPEL language is perfectly suited to a clear description of the processes by which processes can be then mechanically exercised.

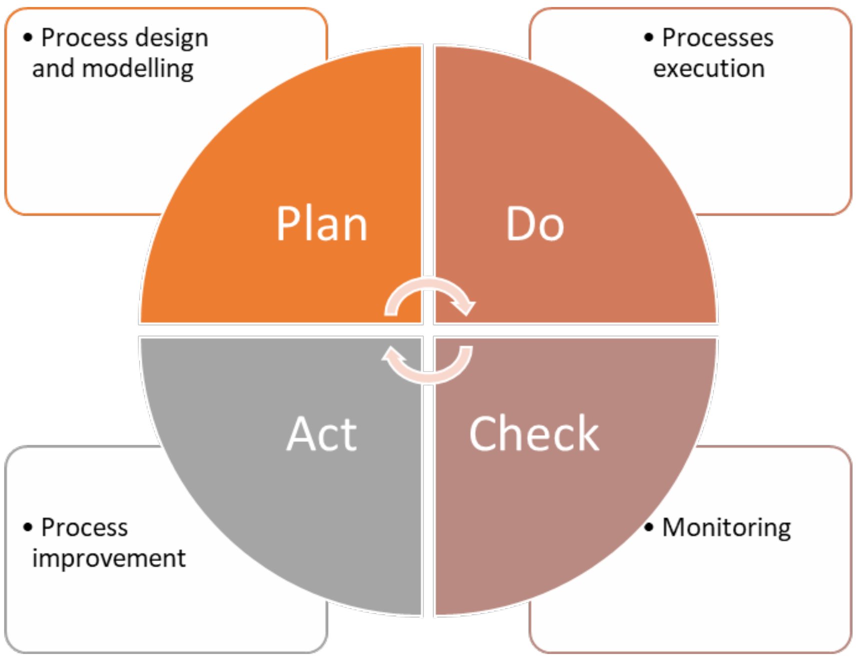

Figure 4. Implementation of a process management system

The main principles of a **process monitoring** are described by many authors, and a lot of them discuss the phrase 'process performance measurement'. Process performance measurement is the combination of processes, methodologies, metrics and technologies to measure, monitor and manage the performance of the process. Basic performance parameters are defined, which are time, quality and cost (Hwang et al. 2017). Specifically, for example, we can measure implementation costs, resource use and waste; time using cycle time, waiting time or no value added time; and quality through customer satisfaction and error rates. To measure and execute process performance, we can use different Key Performance Indicators (KPIs). Some KPIs can be measured relatively easily, such as cycle time.

The implementation of IoT or Internet of Services, Process and People (Internet of Everything) and related technologies helps to implement a system for automated and real-time process monitoring. These technologies help to display the state of processes. The automated system of measurement enables data storage in data warehouses, and we are speaking about the analysis of Big Data. Big data analysis can be defined as the process of examining large and diverse data, identifying hidden patterns, unknown correlations, trends, and other useful information that can help organizations improve their decision-making processes at all levels of management. Data can be used for:

- Dynamic organisational analysis
- Process optimization
- Right-time monitoring
- Process mining for automated weak point analysis
- Process simulation.

Process improvement is the last, important phase of business process management. The aim is continual improvement of business processes based on monitoring and data collection (Wagner, Herrmann, and Thiede 2017). Especially in the context of digital processes, the identification of existing pain points can be realized through the performance of continuous software tests. Another definition explains process improvement as the proactive task of identifying, analysing and improving upon existing business processes within an organisation for optimisation and meeting new quotas or standards of quality. The companies collect data, not only from manufacturing processes but from all processes during the product life cycle.

Standardization together with process management will help to establish the architecture and set the rules of the organization. The concept of Industry 4.0 uses a reference architecture model. Reference Architectural Model Industry 4.0, abbreviated RAMI 4.0 (Reference Architectural Model Industry 4.0, 2023), consists of a three-dimensional coordinate system that describes all crucial aspects of Industry 4.0. Indicated on the right horizontal axis are hierarchy levels from IEC 62264, the international standards series for enterprise IT and control systems. The architecture RAMI and related standards help to analyse and describe basic processes at the smart factory and all processes related with the digital supply chain. All the business processes can be adopted in this model, and this model can set up business rules and architecture for a smart factory (Tupa and Steiner 2019).

5.6 Discussion

A SWOT analysis can be employed to provide a concise summary of the advantages and disadvantages of the proposed model. This analysis considers the model's internal strengths and weaknesses, as well as its external opportunities and threats. By assessing these factors, a comprehensive understanding of the model's pros and cons can be achieved. The SWOT analysis in Table 2 is a summary of the strengths, weaknesses, opportunities and threats of the designed model based on the previous subchapter and the related literature.

Table 2. SWOT analysis

Strengths	• Theoretical background • Standards for business continuity • Existing standards for process digitalization • Technologies for digital transformation • Focus on education
Weaknesses	• Cost for implementation • Training of staff and personal • Time to implement • Resource availability for new technologies
Opportunities	• Develop new lead markets for products and services • Open a new challenge for markets • Development of effective supply chains
Threats	• Cybersecurity and IT criminality • Lack of IPR protection • Vulnerability to and volatility of the economy • Global threats

6. Conclusion

In this paper, research was conducted to explore the sustainability of digital transformation. As a result, a model for sustainable digital transformation has been proposed, encompassing key elements essential for achieving long-term sustainability in this process. The model identifies four fundamental pillars and emphasizes the importance of a common background. The identified pillars serve as the foundation for creating a sustainable system, not only during the digital transformation process but also for the resultant system itself. However, it is worth noting that additional pillars can be included in the model to further enhance sustainability. Examples of such pillars may include economic health, social and societal factors, technological maturity, and more.

By adopting the proposed model, organizations can ensure that their digital transformation initiatives are not only successful in the short term but also contribute to long-term sustainability. The model provides a holistic approach, addressing various dimensions of sustainability and encouraging organizations to consider the broader impact of their digital transformation efforts. Organizations must recognize that sustainable digital transformation is not solely about technological advancements but also encompasses economic, social, and environmental aspects. By considering these dimensions and integrating them into their strategies and practices, organizations can create a sustainable digital ecosystem that benefits all stakeholders.

In conclusion, the proposed model of sustainable digital transformation offers valuable insights and guidance for organizations embarking on digital transformation journeys. By embracing the identified pillars and considering additional relevant factors, organizations can navigate the complexities of digital transformation while ensuring long-term sustainability and maximizing the benefits derived from their efforts.

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Biography

Jiří Tupa received his MSc (2002) and PhD (2006) in Electrical Engineering from the Faculty of Electrical Engineering, the University of West Bohemia in Pilsen in the Czech Republic. He is a Vice-dean of faculty and Senior Lecturer at the Department of Technologies and Measurement. Dr Tupa is a member of executive management at the Research and Innovation Centre for Electrical Engineering of the Faculty of Electrical Engineering at the University of West Bohemia in Pilsen. He is also a PhD supervisor, reviewer of journal and conference publications and co-organizer of conferences. His research interests include Business Process Management, Quality Management, Risk and Performance Management in the Electrical Engineering Industry, Industrial Engineering, Electronics Manufacturing and Diagnostics, Financial and Project Management, copyright and patents law, information law and transfer of IPR. Jiri Tupa is responsible for several international research and development projects with industrial and University partners. Jiri Tupa was appointed as IEOM Fellow in 2020.