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## DIGITALIZATION AND TECHNOLOGY AS MAIN TOOLS TO ASSURE THE COMPANY'S PERFORMANCE

**Abstract:** Digitalization is focused on implementing digital technologies into business processes, with digital technologies being often referred to as the new industrial revolution. Digitalization presents new opportunities for radical and gradual process innovation. In the context of our manuscript, digitization can be considered as the process of data collection from machinery, its evaluation, process monitoring, process simulations, and integration of multiple systems and technologies. From this aspect, digitization can be understood as a path towards digital transformation - which already requires change at the management level, and therefore, many people are in favour of the exchange of digitization and digital transformation. A significant challenge companies encounter is the need to acquire knowledge about these new digital technologies, including their potentials and disadvantages. To increase the competitiveness of their processes, they often require technical knowledge lacking in the company or existing only at a basic level. The goal of the manuscript is to evaluate the proposal for applying individual elements of digitalization within a production company and to focus on a paperless automated station that will facilitate the work of production employees and, ultimately, middle managers and senior management of the company.

**Keywords:** Industry, Digitalization, Company, E-workstation, Employers

## 1. Introduction

Digitalization brings new values for customers built on the application of digital technologies (Wang et al., 2016). The result of a digital solution is a significant advantage, feature, and functionality that customers are willing to pay for. Digitalization model of the company is based on a radical rethinking of how a business interacts with its customers, bringing a fundamental change in performance (Wang et al., 2016; Ahmad & Murray, 2019).

The new digital business model links processes comprehensively digitized from the beginning to the end outputs. Opportunities exist for companies in every industry, and they occur in two critical dimensions: understanding the end customer and expanding the breadth of product, i.e. breadth of product and service offerings (Ahmad & Murray, 2019). Digital transformation of the company is a complex and extensive process which often involves digital modifications or even the creation of new business processes to meet business and market requirements effectively (Irwan et al., 2022). Digital

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transformation requires a significant redesign to become digital and the redesign of experiences to secure the digital environment (Ahmad & Murray, 2019; Stolterman & Fors, 2004). In other words, digital transformation uses digital technologies and data to create profit, improve business, replace or transform business processes, competencies, management and production models (not just digitize them), and create an environment for digital business and collaboration (Mlynynskyi, 2023). In the business context, digitization is important and often used in transferring analogue information through ordinary scanning of paper documents, production areas, halls used for further processing, or, for example, in creating energy consumption records. However, it is important to remember that information is digitizing, not processes (Wang et al., 2016; Mlynynskyi, 2023). Prerequisites for the digitization of logistics processes include high-quality data, the possibility of data connections, and thus finding the right solution, hand in hand with readiness for changes. The beginning of a new era in the company can look like letting go of paper, assumptions and opinions of workers, reducing the error of the human factor, and identifying the waste of resources (Mlynynskyi, 2023; Kohli & Melville, 2019). The digital transformation will aim to collect data, providing real-time insights into process status and capacity utilization. It is possible to create metrics and make decisions that improve supply chain management and logistics operations from the relevant data (Mlynynskyi, 2023; Daneshjo, et al. 2023). If the company strives for progress, digitization must be implemented sooner or later into the production logistics processes. The result will be flexibility and fluidity of production, electronicization of processes, and more efficient management of production and people (Hagberg et al., 2016). Digitization has become one of the most trending topics in manufacturing, with digital technologies often referred to as the new industrial revolution. It promises reduced

manufacturing costs and increased flexibility – two competitive capabilities traditionally seen as trade-offs. Thanks to these potentials, many manufacturers are working strategically to introduce new digital technologies into their businesses. Therefore, they often use the services of external companies to innovate their processes, which lack technological knowledge in the company or exist only at a basic level. Digitization radically changes the basic assumptions of the way of life and the organization of work in a postmodern society that is becoming more globalized and digitized. Therefore, it is increasingly important for organizations to plan digital transformation quickly, efficiently, and appropriately to achieve flexibility and maintain competitiveness in the market (Irwan et al. 2022). In this context, it is essential to understand digitization with the related concept (Clerck, 2017). Digitization is a term that has been increasingly used in public debate in recent years, with many variants that are often misused or misleading. In general, we use the term digitization to change the impact and consequences of information and communication technologies on society and its systems (e.g. economic, political, cultural, and social) (Lenka et al., 2017). Care must be taken when using this term, as different conceptual meanings define other digitization processes and their role in the impact of information and communication technologies on society and its systems. The world is increasingly interconnected. Companies in various industries are trying to use new technologies to create new opportunities for themselves and their customers. Therefore, understanding the technologies and their progress becomes crucial for these companies (Yoo et al., 2010). The first definition is from Gartner. He defines digitization as: "the use of digital technologies to change the business model and provide new opportunities for revenue and value creation. It is the process of transitioning to a digital business". (Irwan et al., 2022) This definition examines digitization from a business perspective

(Hagberg et al. 2016; Valenduc & Vendramin, 2017). As companies adopt digital technologies, it is clear that the nature of people's work is changing. If we take an enterprise as an example, instead of working on the assembly line themselves, workers will use computer-controlled tools and robots to perform their old work (Kaufmann, 2008). The essence of digitalization is the change of jobs and, thus, the competencies needed to fulfil new and old jobs (Perez, 2015). When a business digitizes a process, jobs will likely be automated. The second definition is "how

many areas of social life are being restructured around digital communication and media infrastructures" (Yoo et al., 2010; Machekhina, 2017). The focus of this definition is on the business aspect of digitization and the social area digital technologies into everyday life (Machekhina, 2017; Parviainen et al., 2017). The research gap in the use of the terms demonstrates that it is necessary to explore and suggest future direction of research on this topic. The individual definitions of the presented research are summarized in Table 1.

**Table 1.** Literature review in the context of digitalization as a keyword [Authors own processing

Author (s)	Definition
Daneshjo et al. (2023)	Digital technology needs data for its existence. By transforming an analogue signal into discrete parts, digitization enables the manipulation of information, text, graphics, software code, sound and video in a way that has not even been considered until now, as well as its informational, transformative capabilities.
Hagberg et al. (2016)	Digitization is one of the important aspects of this time. It is part of our everyday life as a transition from traditional to new.
Clerck (2017)	Digitization is characterized by using digital tools that improve an individual's business and affect the entire company.
Lenka et al. (2017)	In the field of industrial management, we talk about human-machine-digitalization connection and communication.
Valenduc and Vendramin (2017)	The term "digitalization" does not mean interrupting a new revolution but the cooperation of all stakeholders and their contribution to society.
Machekhina (2017)	Digitization means transforming all types of information in the digital language.
Parviainen et al. (2017)	Digitization is converting the classic approach to obtaining and storing data to a modern and efficient one.
Thorseng and Griot (2017)	The conversion of the original data, which was obtained by laborious collection and storage, to today's digital and modern version, which is accessible 24/7.
Devereux and Vella (2018)	Digitization is the improvement of the entire value chain and its efficiency. Using digitalization in the company, the process supports all users to make the digitization process simple, efficient, and beneficial.
Eling and Lehmann (2018)	It combines the old with the new and improves the impact of modern technologies on business processes.
Gobble (2018)	Digitization is successful if it uses all elements of the transformation process in the form of digitized data and their subsequent use.
Morley et al. (2018)	Digitization and technologies are changing the current world in the intensity of technology use and access to them and, in this context, contribute to changing human behaviour.
Ringenson et al. (2018)	Digitization is a complete change in social and business thinking.
Gebre-Mariam and Bygstad (2019)	Digitization refers to developing and implementing ICT systems and accompanying organizational changes. It includes transforming traditional artefacts into structures mediated by digitized artefacts.
Srai and Lorentz (2019)	Digitization is all around us, and its components affect the daily lives of individuals and society.

The significant impact of technological changes and digitization on employees' jobs and qualification needs is observed (Srai, J., Lorentz, H., 2019). It is interesting to see how, to a large extent, employees use digital technologies in their daily tasks and how technological changes affect their skills and learning needs. With the digital revolution that is currently underway, companies are constantly confronted with new situations and new tools, such as mobile integration, analytical tools, and laws on IT security and data protection (Hellsten & Pekkola, 2019). On the one hand, this new market requires employees to refine their skills; on the other hand, it requires recruiters to seek out individuals possessing these necessary skills (Ringenson et al., 2018; Gebre-Mariam & Bygstad, 2019). This is why technology is causing a real revolution, too, regarding the structure of personnel in the company. With the advent of new technologies, the labour market significantly changed and created job positions that did not exist until recently (Eling & Lehmann, 2018; Srai & Lorentz, 2019).

### 1.1. Definition of the Problem

The main goal of the article is to manage a paperless automated station that will facilitate the work of production employees by eliminating daily and non-value-added redundant operations for production and also for managers (Hellsten et al., 2015). To increase productivity, expand production capacities and develop processes that add value, digital technologies are used in next-generation manufacturing (De Mauro et al., 2015). Customers are currently demanding a better standard of service as businesses introduce technological concepts. The digitization of production facilities helps companies stay competitive and provides the following benefits (Lyytinen et al., 2016).

- *Increase productivity and efficiency:* Centralized device management makes it easier to oversee everything and take responsibility when necessary. A human

workforce can monitor the entire enterprise simultaneously, working more centrally without a physical presence on the production floor.

- Accelerating innovation:* It is clear that It is clear that digital manufacturing technologies support innovation in process development and design.

Given the enormous progress in CAD systems, the question is not whether a company should use them but how quickly (Lyytinen et al., 2016; Degryse, 2016).

Digital manufacturing technologies support innovation in process development and design. Given the enormous progress in CAD systems, the question is not whether a company should use them but how quickly (Lyytinen et al., 2016; Degryse, C., 2016).

## 2. Materials and Methods

Smart technologies, data analysis, and connected devices help manufacturers significantly increase efficiency, productivity, and accuracy in the digital process of the manufacturing industry (Machekhina, 2017; Thorseng & Grisot, 2017; Venkatraman et al., 2014). addition to affecting the operation, processes and energy footprint of factories and supply chains, digitization is also changing how life cycle products work (Circular economy: definition, importance and benefits. 2023) The ability of manufacturers to increase their responsiveness and respond flexibly to changing market conditions and consumer needs is one of the main factors of digitization. Producers can reduce losses and customer dissatisfaction by adjusting their production cycles to yearly demand (Devereux & Vella, 2018; Mandičák et al., 2018). By reducing manual work in the company and replacing it with a fully automated method, it is obvious that there is an increase in the efficiency of the production process. The result is time and cost savings (Irwan et al., 2022; Gobble, 2018; Straka et al., 2018).The speed of the manufacturing

process is the first change visible in connection with digitalization transforming the industry. Digital technologies are used in next-generation manufacturing to increase productivity, expand production capacities and develop processes that add value. Customers care about quality services. Product genealogy and traceability: Automated traceability is enabled by current technologies by recording data from production lines, product components, and machine parts that are continuously monitored. Every detail and product is logged from start to finish, including inspection findings, assembly information, and time spent at each station.

-Connectivity and communication: Better connectivity opens up three options for manufacturers:

-Digitization of the entire supply chain eliminates the variability of product production.

The quality of each product is the same throughout production. Thanks to established platforms and tools, workers can use more modern technologies to increase productivity.

-Connectivity reveals further chances to improve procedures. Manufacturers can consider optimizing industrial production using intelligent data analysis (Degryse, C., 2016).

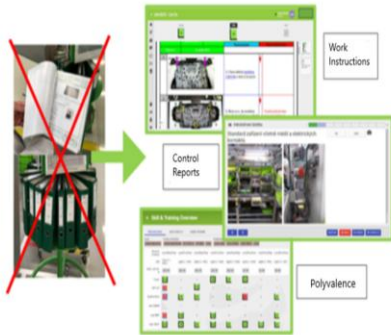
-Increased quality: every business element can change significantly thanks to the advantages of digitization. Manufacturers can obtain new operational information at all workplaces using data from connected devices. It is the basis for important operational improvements, such as introducing preventive maintenance programs. Thanks to the earlier identification and solution of equipment difficulties, factory digitalization reveals quality problems and prevents them (Hellsten & Pekkola, 2019; Venkatraman et al., 2014). Decision-making based on paperless data: thanks to real-time business information, businesses can make decisions faster, gaining an advantage over competitors because they react more quickly to market fluctuations. The benefits of

paperless manufacturing extend to many operational areas and have the potential to completely transform operations, especially when considering the dynamic nature of the production floor and the number of stakeholders that need to communicate (Machekhina, 2017; Gobble, 2018). Costs and downtime: Predictive maintenance must be performed frequently to keep production equipment running for longer without breakdowns. Workers are informed that the machine needs to be repaired through connected gadgets (Parviainen et al., 2017). Thanks to the ability of company executives to schedule machine maintenance, the demand for maintenance workers to be constantly on call is reduced. Less downtime inevitably results in lower costs and higher profits. In addition to discovering which devices consume the most energy, improvements to save energy costs can be made (Circular economy: definition, importance and benefits, 2023). More effective safety management: How safety is managed in manufacturing companies is evolving, and safety is a key component of lean manufacturing. Many companies use software to improve their safety programs, helping with paperwork, incident tracking, and overall safety culture (Degryse, 2016). Digitizing the management of safety instructions eliminates paper-based processes by enabling the rapid uploading of pre-existing instructions and the collection of digital signatures (Mandičák et al., 2018). Communication: The pandemic has forced millions of workers to continue working remotely. The primary factor to consider is seamless communication (Valenduc & Vendramin, 2017). Therefore, approximately 60% of industries have adopted digital tools to centralize communication. Digitization has given many manufacturing industries greater advantages for maintaining or increasing productivity (Srai & Lorentz, 2019). Thanks to digitization, the workflow was preserved, and productivity was not negatively affected. Digitization improves data communication between employees and individual

departments. In addition, digitization provides wide accessibility regardless of time or place (Straka & Rosova, 2018).

## 2.1 e-Workstation – solution for the digitization of the line in the manufacturing company

Digital manufacturing techniques help with product prototyping and testing, quality control, training, and supply chain synchronization. From this point of view, e-Workstation was developed by a group of manufacturing companies. E-Workstation (eWS) is a highly productive, connected and automated station without the use of paper and pen, with robust "Kaizen" tools for the automatic flow of material and information across the entire documentation (Fig.1). This digital tool aims to automate (Pollák & Kočíško, 2022; Hosford, 2010), the documentation at the station and its certification.



**Figure 1.** Automatized workstation [Authors own processing]

The e-Workstation application is displayed on large screens in each area and can be extended to additional screens near the workstation (Gobble, 2018; Straka et al., 2018). An example is enabling more effective teaching (Dodds et al., 2000) at the workplace using video sequences of the work process (Fig. 2).



**Figure 2.** e-Workstation [Authors own processing]

## 2. Results

The goal is to make the work of production employees easier by eliminating daily and redundant actions and actions without added value for production and managers (captures, information checks, data transfer, etc.).

Some of the key features and benefits of e-workstations are as follows (Mlynynskyi, 2023; Ringenson et al., 2018; Kaufmann, 2008).

1. Instructions for work certification are directly on the screen with a checklist.
2. Online display of employee qualifications at the workplace.
3. Monitoring the team's qualifications to achieve optimal flexibility, Poka-Yoke for the presence of persons in training.
4. Implement online checklists on the screen (e.g. release of the first part, Flash audit).
5. An integrated document management system for storing instructions with an associated digital approval process and support for Google Drive files.
6. Ability to play instructions as videos on screen to make instructions even more effective.

7. Display multiple digital documents in the application to support paperless production and complete and easy access to documents and history.
8. Internal digital intelligence system to inform workers and recruiters.
9. View Customer Poka-Yoke Shipping Packaging Instructions for Current SAP Delivery.

The eWS project consists of eWS applications and AODocs (Smart Docs). AODocs is a new document management tool (Alharthi, G. & Khayyat, M., 2022). This service is based on the Google application engine and a cloud-based document management solution that relies on Google

Drive technology for document storage (Cvitić, I., Peraković, D., Periša, M., Botica, M., 2019). It is used to reduce paper consumption. It is a service developed internally by our team, part of the SmartDocs service provided by the Group IS Office (Srai, J., Lorentz, H., 2019; Guenov, M.D., 2002). The goal is to be notified in time during development and always to be trained on the latest version of the documents. Consultation of this master list is available at the operator's station in PDF format. Figure 3 shows the procedure for archiving old Master lists, updating to new versions of documents, creating a new record, and sending it for approval (Hellsten et al., 2018).

Checklists 4 [New Checklist](#)

- ☒ Preventive maintenance Exp. in 11h 12m 24s Launched: 3 hours ago
- Uvolnenie skusobného zariadenia - Kalibrácia meradiel Exp. in 19h 12m 24s Launched: 3 hours ago
- ☒ Preventive maintenance Exp. in 19h 12m 24s Launched: 3 hours ago
- ERIM Exp. in 19h 12m 24s Launched: 29 minutes ago

**Preventive maintenance**

Boli vyčistené armovacie hlavy?   0 / 1

Bolo vykonané čistenie stroja podľa QSK003-16000014?   0 / 1

Boli skontrolované nádotky na kondenzát?   0 / 1

Bola skontrolovaná funkčnosť STOP tlačidla a všetkých dverových zábran?   0 / 1

Bola skontrolovaná zberná nádoba na olej?   0 / 1

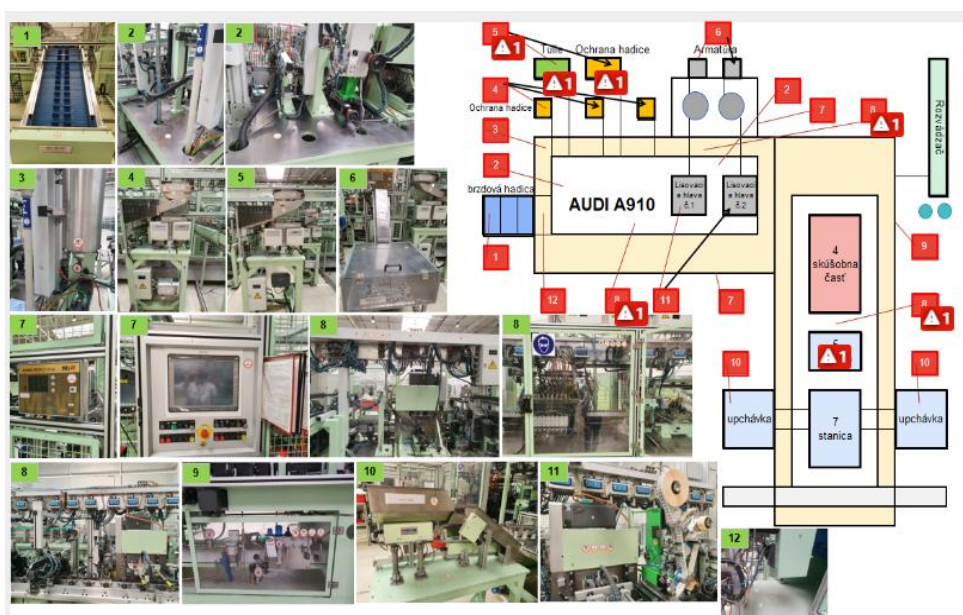
Figure 3. Checklist for weekly maintenance [Authors own processing]



The quality of production, the performance of deliveries and the success of the business depend to a large extent on the people who work in production. It is why, despite the growing robotization and digitization in the manufacturing industry, human capital remains one of the strengths of contemporary organizations (Gray, J., Rumpe, B., 2015; Cvitić, I., Peraković, D., Periša, M., Botica, M., 2019). In this context, education and the professional training of workers in the activities performed are crucial for each company to prosper and maintain its position in an increasingly competitive and changing environment (De Mauro, A., Greco, M., Grimaldi, M., 2015; Cvitić, I., Peraković, D., Periša, M., Botica, M., 2019). In some industries, such management of operator skills training is even more important due to the complexity of production processes and work shifts caused by different volumes of

activities or variability in demand.

Preventive maintenance in production (Devereux, M., Vella, J., 2018; Hosford WF., 2000) is an activity aimed at keeping machinery in good and operable condition to function with 100% efficiency. This will save maintenance costs due to unexpected breakdowns and downtimes that may occur and have significant consequences for the company's financial results (Degryse, 2016). This type of preventive maintenance in production guarantees industrial machines' correct operation and performance (Alharthi, G. & Khayyat, M., 2022; Cvitić et al., 2019). Preventive maintenance in production is a set of activities carried out comprehensively and systematically to verify that the operation of the machine develops in perfect conditions (Fig.4).



**Figure 4.** Problem detection in eWS [Authors own processing].

When an operator identifies an issue, they can click on the corresponding problem area on the eWS monitor, select the Red Tag type, and detail all the information about the problem. This notification is

automatically sent to the maintenance email. Maintenance will solve the problem, and the operator can continue working on the line immediately. The main advantage is that there is complete and easy access to



the history of all issues in the database (Guenov, 2002).

We encountered several problems (Herrmann, 2018):

- physical monitoring of red blood cells;
- no real-time communication for security issues;
- difficulty to decipher operators handwritten notes made with red markers ;
- some red labels will be lost (tear off due to oil dust etc.)

All these factors lead us to the solution of finding alternatives to follow the red labels. These tags are used in normal manufacturing operations and autonomous maintenance activities when technical assistance is required to solve a problem related to cleaning, inspection, lubrication, and in step 1 of autonomous maintenance when initial equipment cleaning is performed (Alharthi, G. & Khayyat, M., 2022). The main autonomous maintenance deals with breakdowns, minor breaks, and quality losses. Autonomous maintenance helps detect and fix minor problems that can later lead to breakdowns or outages (Herrmann, 2018). The first step of autonomous maintenance is initial cleaning. The goal of the initial cleaning is to perform the cleaning thoroughly, identify, and correct abnormalities that may lead to any downtime. Abnormality detection is done by cleaning and marking the abnormalities. Tags are used to identify abnormalities - Red Tags. Red labels are placed for abnormalities that operators cannot correct and require assistance from the maintenance team (Cvitić et al., 2019). Tags are a powerful visual communication tool for identifying problems - manufacturing, service, support, or administration. Labels should be used to

inform people that a problem has occurred and been formally recorded.

### 3. Conclusions

The company's digitalization aims to transfer the real production and all logistic processes to the digital one, as precisely as possible with the preservation of mutual connections between processes, objects, etc., and with the conservation of know-how related to the given methods, operations, and procedures. In this context, it also supports continuous innovation, because every manufacturing company changes during its life cycle. Changes that take place over time can be handled much easier and more efficiently thanks to the digitization of processes. It can enable the achievement of results that would be otherwise unattainable. Experiences stored within digital models eliminate the need for lengthy, labor-intensive, and costly searches when seeking to reuse them for process or procedure innovations. Innovations brought about by using computers and communication technologies are causing various significant changes in every aspect of our lives. Along with Industry 4.0; digitization, algorithms, and software for data classification and conversion are also developing by leaps and bounds. Considering the noticeable progress of digital technologies, the question is how digitalization is used in practice and to what extent businesses follow this progress.

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