THE POTENTIAL OF DIGITAL TECHNOLOGIES IN THE DEVELOPMENT PROCESS OF COMPANIES

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Abstract:

The main objective is to highlight the contribution of digital technologies to the sustainable development of companies in the manufacturing industry. Based on the consultation of numerous specialized works and the processing of available data, it was found that although companies embrace digitalization, they encounter obstacles in terms of integrating digital technologies. In the context of the presented aspects, the most appropriate solutions capable of ensuring the elimination of barriers and ensuring long-term performance are identified.

Keywords: *digitalization, technology, competitiveness*

JEL classification: *L23, O3, O30*

Introduction

Companies, regardless of their sector of activity, are facing increasing pressure to integrate digital solutions in order to remain competitive. Digital transformation is not just a technological process, but also a strategic and cultural change that affects the way they operate, interact with customers and generate value.

One of the most obvious contributions of digital technologies is increased operational efficiency. Process automation or the use of artificial intelligence solutions in data analysis helps reduce costs and minimize human error.

Digital transformation is one of the main drivers of economic and organizational progress. Digital technologies are not only supporting tools, but true engines of innovation, competitiveness and adaptability. In the context of fierce competition, this study aims to highlight the importance of integrating and leveraging digital technologies in manufacturing companies, the obstacles they face, and the solutions they should adopt to remove these barriers.

Literature Review

In the immediate future, the ascent of digital platforms will be significant and the role of transparent systems that reduce uncertainty will be decisive. Presenting digital opportunities

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and introducing them into the business sector are also essential and will contribute significantly to increasing the competitiveness of companies (Kovács et al., 2021).

As some studies show, artificial intelligence could replace human resources, especially in sectors where repetitive tasks are common (Monaro et al., 2022), with approximately a quarter of current work tasks being automatable (Hatzius et al., 2023). Therefore, it is predicted that the average level of automation of current work tasks through digitalization will be achieved between 2030 and 2060 (Chui et al., 2023).

Hashmi (2023) considers understanding the importance and role of digitization to be fundamental, and according to Enholm (2021), the integration of digital technologies can have a strong impact on companies' financial and operational performance.

Companies are optimistic about the integration of artificial intelligence and the role that employees will play within companies. Mainly, there is an expectation that the two concepts will be treated in an integrated vision, at least for a significant period of time (Brock and Von Wangenheim, 2019).

Aggarwal et al., (2022) highlighted the essential role of artificial intelligence-based applications in the operational performance of companies, enabling better management of operational costs and leading to higher profits. These can be used in production planning, determining future requirements, and optimally configuring production lines (Jónás et al., 2014).

McKinsey&Company's study highlights the importance of implementing strategies that allow businesses to integrate advanced technologies into innovative business models, with the primary goal of increasing competitiveness (Banlholzer et al., 2023).

The auto industry, one of the most important industrial sectors, has faced significant changes. This is the area where digital technology has penetrated the most easily, with artificial intelligence transforming automobile factories into *intelligent factories* (Tăpîrdea et al., 2021). Sustainable development has become a primary goal, with a focus on developing vehicles with zero carbon emissions (Dumitrașcu et al., 2020).

Methodology and Data

Adopting digital solutions significantly improves the manufacturing, supply and distribution processes, ensuring more transparency and control over operational flows.

The primary objectives of the European Union are the digital transformation of thecompanies by 2030. 90% of IMMs should have at least a basic level of digital intensity and 75% of EU companies should use cloud computing services, big data analysis or artificial intelligence.

Despite the fact that digitalization facilitates expansion into international markets, according to Eurostat, in 2024, just 3.1% of romanian companies would use advanced digital technologies, placing Romania last among EU member states (the average is 13%).

The success of digitalization depends on a balance of technological investments, human resource development and organizational culture change. In a competitive environment that is constantly changing, digital technologies are those that ensure sustainable development. As a result, based on the data and information provided by *Renault Group Romania*, the factors that determine the performance of *Automobile Dacia* are highlighted.

Results

Automobile Dacia was founded in 1960, on the basis of a partnership between the Romanian state and the French National Renault Companyand has its origins in the *Pitești Automobile Factory*.

In 1999, the *Dacia Factory* was privatized and purchased by Renault, which acquired 51% of its capital. Currently, the majority stake is held by *Renault Group* with 25,271,553,077 shares (99.43%) which includes multiple subsidiaries and constitutes a multinational group based in France.The company's goal is to produce, at its Mioveni factory, high-quality passenger and commercial vehicles that are affordable for romanian and foreign customers.

The success of the *Dacia* brand is based, among other factors, on satisfying customer requirements to the highest possible standard and on the high quality/reliability of its vehicles.

The company's evolution requires, above all, knowledge and implementation of the digitization process. The Mioveni factory has reached a degree of automation of approximately 60%. In this regard, an important role is played by robots, part of the automated production flow that presses, welds and transports parts. In the *Pressing Department*, steel sheets are cut to millimeter precision, their shape being calculated by software in such a way as to minimize sheet waste. Approximately 800 tons of sheet metal are processed daily. The cut shapes are then sent to automatic presses that mold the sheet metal into future doors, hoods or roofs.

The department has benefited from significant investments in automation, which began in 2013 when the first automatic press line was installed. In 2023, only two lines were still manual, and in 2025, following an investment of 36 million euros, all presses were robotized, which led to a reduction in the number of employees (from 700 to 400 in the last two years). Some of them were trained and reassigned to maintenance and robot-related jobs. It is also expected to replace 10-14 employees working in the verification operation department, with robots, following an investment of approximately 5 million euros.

In the *Car Body Department*, where vehicle components are welded, there are 1400 employees and over 550 industrial robots manufactured by Kuka and ABB. The automation rate in this department has reached 60%, with only 40% of the work being done manually. Industrial robots with artificial intelligence systems or video monitoring measure the quality of the welding. If the welding does not respect the quality standards, the line stops automatically and an operator intervenes to fix the problems.The entire vehicle manufacturing process takes approximately 10 hours. The body line can produce 40 vehicles per hour.

In *Logistics*, another 270 autonomous AGV (Automated Guided Vehicle) robots, without human operators and priority of passing, transport parts from one place to another.

Automobile Dacia is embracing a comprehensive process of profound transformation of the entire industrial system through digitalization in order to reinvent automobile production.In order to train employees in ICT and digital skills it implemented the *Digitization for Change project* between May 31, 2021, and May 30, 2023. The project, co-financed by the European Union and the Romanian State from the European Social Fund through the Human Capital Operational Program 2014-2020, involved 367 employees (139 men and 228 women). Of the total number, 365 were certified. In addition, 31 employees aged between 55 and 64 were trained.The employees developed advanced ICT skills and basic digital skills, which will add value to the company's activity.

The specialized nature of the 44 programs implemented will enable the development of new digital solutions, products or services at the company level.*The Digitalization in Maintenance* project, implemented during the same period, involved 292 employees (146 men and 146 women), of whom 291 were certified. In addition, 51 employees aged 55-64 were trained.

Between June 9, 2021, and June 8, 2023, *Renault Technologie Roumanie* (RTR) implemented the *Digital Training for SMART Engineering* project. A total of 263 employees (202 men and 61 women) participated in the 25 professional training programs, all of whom were certified.

The automotive production transformation plan, *Re-Industry*, which will reduce industrial costs for thermal vehicles by 30% and for electric vehicles by 50% by 2027, will also contribute to reducing vehicle development time from three to two years. The *Renault Group* is accelerating its digitalization with the first *Industrial Metaverse* (a digital space based on physical simulations, combining virtual reality (VR), augmented reality (AR), digital twins and other technologies to optimize processes, remote collaboration and testing without major physical investments). Launched in 2022 at the Flins factory in France, the system which is connected to 100% of production lines (8500 pieces of equipment), 90% of supply flows, and absolutely to all data in the supply chain, has reduced delivery times by 60%, carbon footprint by 50%, and enabled savings of 320 million euros.The system is divided into four fundamental pillars:

1. *Massive data collection* – The *Renault Group* has connected all production lines (equipment and workstations) and developed a platform in partnership with IT company ATOS to develop unique technological solutions for large-scale manufacturing data collection and analysis;
2. *Digital Twins* – digital replicas of factories, processes and supply chain components that enable monitoring, simulation and control;
3. *Extended ecosystem* – includes external data (data on suppliers, transport, quality, sales forecasts, exogenous factors) for predictive planning and the adoption of solutions to avoid possible disruptions;
4. *Advanced technologies* – use of cloud, AI, Big Data, 3D/VR/AR, communication networks (Wi-Fi/mobile), immersive training tools, real-time control platforms.

Every day, one billion pieces of data are collected at industrial sites. *Metaverse Industrial* monitors industrial operations in real time, ensuring increased efficiency and quality of production and supply chain.

For an environmentally friendly ecosystem, *Renault Group* constantly monitors all energy consumption through the *Ecogy* portal and reacts immediately in case of deviation. It is aiming for a 40% reduction in energy consumption by the end of the year and, in terms of emissions, is targeting Net Zero Carbon for *the ElectriCity* hub and the *Cléon*factory by the end of the year, for its factories in Europe by 2030 and for its factories worldwide by 2050.

The *Renault Group's* industrial system currently uses 300 operational artificial intelligence applications that respond to the growing challenges of image and sound analysis and aims to increase this number by 3000 applications by the end of the year.

It is well known that digitization plays an essential role in the development of companies and the integration of digital technologies into internal operations brings substantial benefits to them, such as: *increased visibility and control* – real-time monitoring of operations, detection of deviations, proactive interventions; *operational efficiency* – reduced production time, optimised resource utilisation; *sustainability* – energy consumption monitoring, emissions optimisation and carbon footprint reduction; *better quality* – reduced errors, improved quality control processes; *flexibility and accelerated innovation* – testing capabilities.

The integration of digital technologies within companies brings numerous major benefits but also significant obstacles: *organizational* – employee resistance to change; rigid organizational culture, poor internal communication between departments, lack of digital leadership (management does not have a clear digital transformation strategy); *financial* – high implementation costs (equipment, licenses, maintenance); difficulties in attracting financing or funds for digitization projects; *technological* – lack of adequate digital infrastructure (incompatibility between new and old systems), cybersecurity issues; *human* – lack of digital skills, need for continuous training, fear of automation (perception that digitization reduces the number of jobs); *cultural* – rigid organizational culture, reluctance to share data and information, low level of trust in digital technologies; *external factors* – legislative and fiscal framework insufficiently adapted to digital transformation, lack of strategic partnerships with technology companies, shortage of IT specialists, automation, etc., complex regulations – data protection rules, competitive pressure, volatility of the technology market.

Conclusions

This article aimed to highlight the contribution of digitization to improving company performance.

Digitization plays a decisive role in maintaining and increasing competitiveness, the need for which is highlighted by the complexity of the economic activities of companies under the strong influence of international markets.

In this context, the implementation of digital technologies becomes a *sine qua non* condition for companies to withstand competition.

Although the topic has been addressed in numerous reference works, it remains a topical and interesting subject, and further study is imperative given that many companies are reconfiguring their positions in a market where the role of digitization is becoming increasingly important.

Identifying the challenges faced by many companies requires outlining the main courses of action for increasing the contribution of digital technologies:

- *Strategic and planned investments* – developing a phased digital modernization plan; prioritizing critical sectors for gradual modernization;
- *Accessing European funds and government programs for digitization* – National Recovery and Resilience Plan (PNRR) – Component C7 – Digital Transformation, Digital Europe Program (DEP), Horizon Europe, EIT Digital;
- *Adopting cloud solutions* – cloud services such as: IaaS (Infrastructure as a Service); PaaS (Platform as a Service); SaaS (Software as a Service); BaaS/DaaS – reduce initial costs through monthly subscriptions instead of massive investments in infrastructure; offer increased security, automatic updates, global accessibility;
- *Partial outsourcing of IT services* – instead of building costly internal teams, companies can collaborate with specialized partners;
- *Collaboration with IT companies and digital solution providers* to implement modern infrastructure;adopting common protocols to facilitate communication between equipment and applications;
- *Human resources training* – developing a training plan (setting employee training objectives, selecting training methods; partnerships with universities or digital innovation

centers to attract talent); continuous assessment and improvement (monitoring performance after training, assessing the impact on productivity and quality); creating an organizational culture geared towards digital innovation;

- *Implementation of a cybersecurity plan* by establishing clear rules on data access, passwords, multi-factor authentication, regular backups; use of modern firewalls, AI-powered antivirus software, intrusion detection systems (IDS/IPS); continuous network monitoring; compliance with regulations (GDPR)

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