



## **Digitalization and its Impact in Manufacturing Sector - Leveraging Digital Technology to Improve Efficiency and Productivity**

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### **ABSTRACT**

To improve production quality and efficiency, digital technology is being integrated into goods and processes. The key forces behind the manufacturing sector's digital transformation are shifting consumer expectations and fierce competition. By utilizing digital technology, manufacturers may increase speed and efficiency, cut costs, and provide superior consumer experiences. Modern technology has made it possible for the industrial sector to efficiently use digital technology to improve operational procedures and increase supply chain efficiency. Businesses have benefited in several ways from the digital transformation of manufacturing throughout the years. Supply chain systems are now connected thanks to digital transformation, which can assist manufacturers in gathering equipment data by utilizing AI and predictive analytics. Additionally, it has made it possible for them to apply the distributed value chain's distributed value chain and manufacturing operations' real-time data. In the industrial industry, digitization can automate boring manual activities and save money, time, and resources. This study discusses some additional key effects of digitization, in addition to cheap operational costs, increased productivity, competitive advantage, flexibility, and product quality.

**Keywords:** Digital Transformation, Digitalization and its impact, Manufacturing sector efficiency,

### **Introduction**

Digital technologies are now being used by businesses and departments as a result of digital transformation. It has aided in the development of new business procedures, brought value to routine operations, promoted innovation, and provided better client engagement opportunities (Prabhu, 2022). Digitalization is centered on using technology to improve business performance, whether it means creating entirely new products or fundamentally rethinking current processes. It describes a company's plan for creating new technology competitive advantages as well as the techniques it will utilize to make these advancements (Jayandaran Arumugam A, 2022). As the manufacturing sector undergoes a digital transformation, smart technologies, data analytics, and linked devices are assisting producers to greatly improve their efficiency, productivity, and accuracy. Digitalization is transforming how products are designed, produced, consumed, and maintained, in addition to how factories and supply chains operate, follow procedures, and use energy.

One of the main forces behind digitization is the ability of firms to become more responsive and agile in response to changing market conditions and consumer demands. By synchronizing their production cycles with demand throughout the year, manufacturers can lower waste and consumer discontent. It is feasible to improve procedures, performance monitoring, and decision-making while avoiding rework, downtime, errors, and bottlenecks by shifting away from manual operations and employing automated solutions. Time and money will be saved as a result (Jayandaran Arumugam A A. B., 2022). Due to the pandemic, manufacturers are now facing a number of operational difficulties and flaws in their current operations. For instance, they are aware of how crucial it is to have access to real-time supply chain data in order to react to supply and demand fluctuations more quickly. Modern technology has made it possible for the manufacturing sector to efficiently utilize digital technology in order to achieve supply chain efficiency through improved and more dependable operating techniques. Through the use of AI and predictive analytics, the digital transformation of the supply chain has connected systems that can assist manufacturers in gathering equipment data. They can now use the real-time data that was gathered to run industrial operations and the distributed value chain (Prabhu, 2022).

### **Background of Industry 4.0**

The advent of the Internet of Things (IoT) to the industrial sector opened up new potential for businesses. Manufacturing businesses have a chance to take use of digitalization in order to stay ahead of the decades-long rise in global competitiveness from places with cheaper labor costs. Cross-disciplinary engineering, vertical integration of smart production systems, horizontal integration of industrial networks, and acceleration through "exponential" digital technologies are the four key elements that define digitalization (FREMONT, 2021).

It is still unclear how manufacturing companies will approach Industry 4.0, how its guiding principles will be applied in the industrial setting, how businesses should go about integrating digital technologies into their operations, and how this will impact how they collaborate with one another and

create value. Further study is required to better clarify these obstacles for industry practitioners since, more crucially, organizations are still largely unaware of the difficulties associated with implementing such technologies.

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## Impact of digital transformation on the manufacturing sector

The potential benefits of digital transformation, which will have an impact on an organization's IT infrastructure, are analogous to those brought about by the introduction of mass production at the turn of the 20th century. When it comes to R&D, product planning, pricing and launch, and purchasing, enhanced decision-making and process efficiencies are where most of the value of digital will actually be achieved outside of production. Digital technology advancements have given people and businesses alike more power, upsetting business structures and enabling vast size, unmatched speed, and market heterogeneity. Manufacturing businesses of all sizes must comprehend the ramifications and make future plans in accordance with them (NTT DATA, 2017).

**Massive scale:** Thanks to advances in digital technologies, any company can now operate on a worldwide scale. Businesses can now provide services to numerous markets that go across geographical boundaries on a scale that was previously unthinkable. Organizations may now acquire, store, process, and use massive amounts of data to their advantage. For instance, it is evident that digital technologies have the power to scale businesses well beyond their typical footprint.

**Unparalleled speed:** Businesses may quickly enter other markets with little to no changes to their digital business platforms, which will keep their rivals up at night.

**Unprecedented speed:** Companies may enter new markets rapidly and with minimal alteration to their digital business platforms, which will keep their competitors up at night. The disruption brought on by digital business is tangible, movable, and continuous. When given the enormous possibilities of speed, scale, and heterogeneity, businesses may provide value to clients in previously unthinkable ways. However, new market pioneers and leaders will continue to disrupt sectors with digital technology (NTT DATA, 2017).

**Enhanced product innovation:** Manufacturing businesses are confronted with rising expectations for product differentiation, adaptation, and refinement that necessitate internal development activities while the market is defined by an expanding variety and elaboration of client needs. The effectiveness of product innovation can be significantly increased by the use of digital technologies. Digital tools, such as idea management systems or sophisticated simulation tools, can speed up the conceptualization and design of a product by facilitating the acquisition and processing of technical knowledge specific to that product. They can also help feed in customer requirements and specifications. The distance between consumer demands and requirements, product design and production, and marketing can be closed thanks to digitalization (Kroll, Horvat, & Jäger, 2018).

Even from a somewhat short-term viewpoint, digitalization is likely to have a favorable impact on the number of new items that are ultimately introduced to the market. Additionally, digitalization can support product lifecycle management (PLM) techniques that aim to facilitate the effective integration of product-related knowledge beginning with the generation of ideas, the description of concepts, the analyses of business cases, the product design and solution, technical implementation and testing, to the successful entrance into the market, service, maintenance, and product improvement. In other words, the digitalization of PLM enables the fusion of the digital and physical worlds, from product design to manufacturing to customer relationship management.

**Eco-Positivity:** As consumers' demands for eco-friendly activities grow, technology advances to supply solutions. Machines that are controlled by AI are more efficient and use less energy. Increasing efficiency frequently encourages less material consumption as well. The ecosystem benefits greatly from less resource use.

**Lower Costs, Higher Margins:** Costs for manufacturers are reduced by digital transformation. With the help of the Internet of Things (IoT), manufacturers can more quickly identify and fix problems. Manufacturers can gain from connected machinery's range of advantages, including the ability to diagnose issues before they develop and schedule maintenance for increases in output.

**Personalization, agility, and a greater focus on the customer :** Customizing items at scale may be one of the largest hurdles for producers. Although personalized products cost more, consumers still want the same responsiveness and speed that generic goods offer. A customer-centric business is made possible by an agile manufacturing process. Production lines can be directly changed by using data-driven production equipment that comprehends and applies customization settings.

**Resiliency:** Resilience is essential to succeeding in challenging business situations. Although operations are resilient, adaptation is essential for long-term success. To stay ahead of the competition, manufacturers need to be able to foresee problems and find solutions.

By utilizing flexible automation, operating remotely, and tying the supply chain together with a cloud-based infrastructure, digital technologies support manufacturers (TIBCO, n.d.).

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## Conclusion

The value of digital transformation in the manufacturing sector was estimated to be USD 263.9 billion by 2020 and to reach USD 767.8 billion by 2026. Plants are now more likely to employ digital technology as a means of innovating, modernizing, enhancing, and automating the majority of industrial

operations thanks to the rise of Industry 4.0 in the sector. Data-driven planning, supply chain modernization, and chances for enterprises to stay ahead in their specialized markets have all been made possible by digital transformation in the manufacturing sector (Prabhu, 2022). Organizations need to accept the reality of digital commerce. All types and sizes of businesses are already closely analyzing how digital technology may affect their value chain. Additionally, businesses will face competition from unexpected sources, which could harm their ability to compete. According to a survey, some organizations will fall behind their competitors due to poor digital business practices. Therefore, it is crucial that businesses make plans for a solid, cutting-edge IT infrastructure. They must put in place the proper model, which enables business units to take advantage of a broad variety of knowledge and services, if they are to flourish.

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## References

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- FREMONT, V. (2021). *The Digital Transformation of the Manufacturing Industry*. Uppsala, Sweden: Digital Comprehensive Summaries of Uppsala Dissertations.
- Jayandaran Arumugam A, A. B. (2022). A Review on Digitalization - Driving Innovation in Manufacturing Industry through Digitalization. *International Journal of Research Publication and Reviews*, 1404-1407.
- Jayandaran Arumugam A, A. B. (2022). Digitalize or Die: A Strategic Approach to the Digitization of the Manufacturing Sector. *United International Journal for Research & Technology (UIJRT)*, 01-03.
- Kroll, H., Horvat, D., & Jäger, A. (2018). Effects of automatisisation and digitalisation on manufacturing companies' production efficiency and innovation performance. *Econstor*, 1-24.
- NTT DATA. (2017). *managed-mfg-digital-transformation-whitepaper.pdf*. Retrieved from [nttdataservices.com: https://us.nttdataservices.com/-/media/assets/white-paper/managed-mfg-digital-transformation-whitepaper.pdf](https://us.nttdataservices.com/-/media/assets/white-paper/managed-mfg-digital-transformation-whitepaper.pdf)
- Prabhu, R. J. (2022, April 14). Impact of Digital Transformation and Evolving Tech on Manufacturing. Retrieved January 5, 2023, from <https://www.spiceworks.com/>: <https://www.spiceworks.com/tech/innovation/guest-article/impact-of-digital-transformation-and-evolving-tech-on-manufacturing/>
- TIBCO. (n.d.). *why-digital-transformation-in-manufacturing-is-essential-for-a-future-advantage*. Retrieved from [www.tibco.com: https://www.tibco.com/reference-center/why-digital-transformation-in-manufacturing-is-essential-for-a-future-advantage](https://www.tibco.com/reference-center/why-digital-transformation-in-manufacturing-is-essential-for-a-future-advantage)