

# Impact of Digital Transformation on Indian Manufacturing Industry

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## Abstract

Digital Transformation (DT) has become a significant phenomenon in the business environment in recent times, with a particular impact on the industrial sector. This study explores the complex dynamics of the industrial sector's digital transition with an emphasis on the effects on global commerce. The research sheds light on the potential and problems that Digital transformation in manufacturing presents by using a through methodology that includes literature evaluation. In this paper the digital transformation in the manufacturing sector and how it will affect Indian manufacturing companies' competitiveness and market positioning in the future. Additionally, it looks at how trade laws, trade practices, and digitalization processes interact within the Indian manufacturing sector to provide insight into how these variables are amongst themselves. Using a nuanced investigation, the study seeks to accomplish two principal goals: first, assessing the effects of digital transformation on the manufacturing sector in India; and second, examining how trade practices and policies both influence and are influenced by the digital revolution, consequently influencing international trade.

Keywords: Digital Transforming, Manufacturing Sector, Global Commerce, Digitalisation, Trade Practices etc.

## 1. Introduction

Digital Transformation (DT) has emerged as a significant phenomenon relevant to business studies in recent years. The term "digital transformation" refers to integrating new business models and digital technologies into all aspects of an industry, which profoundly impacts how those sectors operate and deliver value to their clients. DT uses digital technologies to consider changes occurring in the world and initiatives (Albukhitan, 2020). Different cultures, procedures, structures, and tactics are required to create the ability to create new avenues for value generation in the digital age. The manufacturing sector has experienced a significant digital change, placing it at the forefront of technical innovations. This change has brought many opportunities and problems in trade and a revolution in producing goods (Tanya et al. 2019). It thoroughly examines the approaches taken to overcome these obstacles and take advantage of the benefits of a manufacturing industry that has undergone digital transformation. It provides producers, decision-makers, and industry experts with valuable information to help traverse this altering terrain effectively (Favoretto et al., 2022). The manufacturing sector has undergone an unparalleled transformation recently due to the increasing integration of digital technologies into production. Automation, the Internet of Things (IoT), artificial intelligence, and advanced data analytics have reshaped the manufacturing landscape. This shift has had a significant impact on global trade, in addition to revolutionizing production methods. This digital revolution is more important than what happens on the plant floor. It can change the dynamics of international trade, affecting everything from market access and competitiveness to supply chains and logistics. The adoption of digital technology by the manufacturing sector poses cross-border potential and difficulties, drawing interest from policymakers, trade specialists, and international markets in addition to industry stakeholders (Hooda & Anu, 2023). The digital revolution has significantly impacted how we trade, as has every other area of our lives. Trade was mainly carried out physically, such as delivering commodities and exchanging bills and letters. However, the electronic exchange

of goods and services has been made feasible by the digital revolution, making trade more accessible and efficient for companies as well as consumers globally (UNCTAD, 2022).

One of the most notable instances of how the digital revolution has affected trade is the growth of e-commerce. Without the necessity for physical stores, e-commerce enables firms to sell their goods and services to customers directly online. Because of this, companies can now reach a worldwide audience for relatively little money. A company can use digital technologies like cloud computing, mobile computing, artificial intelligence, and the Internet of Things to adapt its value creation process in response to environmental changes. This process is known as digital transformation (Wang, 2022).

Businesses and governments attempt to modify trade laws and regulations to reflect the digital revolution. For instance, many nations have negotiated new trade agreements with clauses about data transfers and e-commerce. These agreements seek to lower trade barriers for digital goods and services and to make cross-border data movement easier (WTO, 2021). Global trade has benefited from the digital revolution, which has increased trade's effectiveness, inclusivity, and sustainability. Both consumers and businesses can now more easily access a greater variety of goods and services thanks to e-commerce. Additionally, data assists companies in streamlining existing processes and creating new goods and services (UNCTAD, 2022).

This study highlights these questions.

- Why digital transformation in manufacturing is essential for the future?
- How does digital transformation affect the competitiveness and market position of Indian manufacturing firms?
- How do trade practices and trade policies affect the digitalization process in the Indian manufacturing sector?

However, there are additional difficulties facing international trade due to the digital revolution. One issue is the widening digital gap, which results in certain nations and populations having less access to the Internet and digital technologies. The emergence of new protectionisms, including mandates for data localization, presents another difficulty. Global trade is benefiting from the digital revolution despite these obstacles. Trade practices and policies must be continuously adjusted to the digital process to ensure everyone gains from the digital economy.

## **2. Research objectives**

- To examine the impact of digital transformation on the Indian manufacturing Industry.
- To examine how trade practices and trade policy change the digital revolution and how it affected global commerce

## **3. Research Methodology**

This research paper involves data analysis, which likely includes the examination of research papers, various reports, articles and annual reports. This paper used descriptive analysis which helps in synthesizing information, trends and conclusions.

## **4. Results and Discussion**

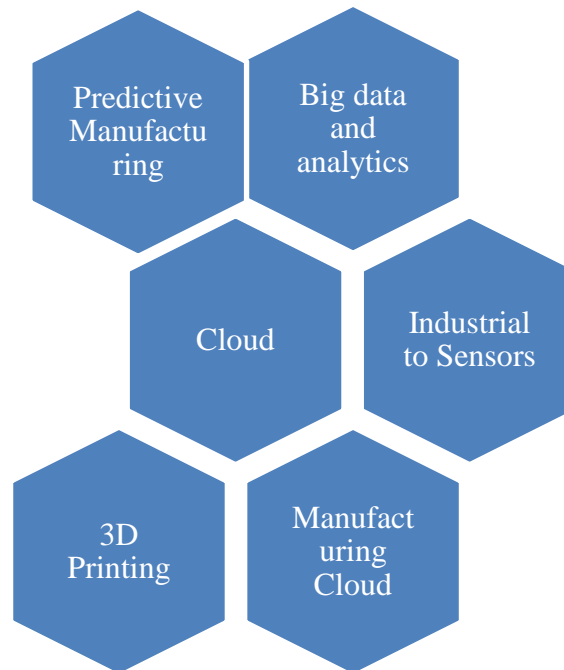
### **4.1. Impact of Digital Transformation on the Indian Manufacturing Industry**

Improvements in safety, quality, throughput, efficiency, revenue, and sustainability are just a few of the wholesale effects of digital transformation in manufacturing. Costs must be cut to maintain competitiveness in the market. There will be significant effects, and this change is necessary to stay competitive and meet changing client demands. There are a few benefits of digital transformation and these are as follows.

- There are fewer workplace accidents and injuries when you offer digital solutions that increase your safety.

- Enhancing your output quality will decrease product rework, minimize warranty work, and boost customer happiness.
- Increasing process efficiency has a beneficial effect on both your bottom line and staff productivity. A healthy profit margin enables you to raise value for your business, shareholders, and clients while pushing sustainability and innovation in your industry.

Here are eight instances of manufacturing digitalization to help manufacturing CIOs, CTOs, and other leaders get started with the industry's digital transformation:



Instances of digitalization in manufacturing

Source- Olmstead, Report, 2022

### Digital Transformation in Manufacturing Industry Size and Market Analysis.

The Manufacturing Industry's Digital Transition The market is projected to increase at a CAGR of 19.40% from 2024 to 2029, from an estimated USD 367.60 billion in 2024 to USD 876.10 billion in 2029. The following link points to an industry report on the digital transformation market in manufacturing (Mordor Intelligence, Report).

Every fact of operations and the supply chain is impacted by the manufacturing sector's digitalization. Equipment design is the first step, followed by product design, development of the production process, and, at the conclusion, monitoring and enhancement of the end-user experience. Digital transformation is altering the way manufacturers manage product and technical design specifications on the cloud and communicate with one another through cross-border collaboration. Furthermore, as Internet of Things (IoT) devices become more widely used, industrial processes are changing and productivity is rising. Real-time data collection, analysis, and monitoring of a range of industrial operations are made possible by IoT(Internet of Things) devices. It increases overall productivity, lowers energy use, and permits preventative maintenance. The following link points to an industry report on the digital transformation market in manufacturing (Mordor Intelligence, Report). The COVID-19 pandemic hastened the digital transformation of the manufacturing sector. With the disruption of labour availability and supply chains, companies looked to technology to lower risks and boost operational efficiency. To ensure worker safety, control inventory, and streamline industrial processes, automation, remote monitoring, and data analytics were critical. In response to

impending problems, manufacturers deployed cloud-based platforms, IoT devices, and artificial intelligence in addition to strengthening resilience and agility to enable real-time data analysis, remote collaboration, and predictive maintenance. In the post-pandemic era, smarter, more interconnected factories were made possible by this quick digitization, which also increased productivity and innovation. The following link points to an industry report on the digital transformation market in manufacturing.

Market Size (2024)- USD 367.60 billion

Market Size (2029)- USD 876.10 Billion

### Cloud-based ERP



Source- Olmstead Report, 2022

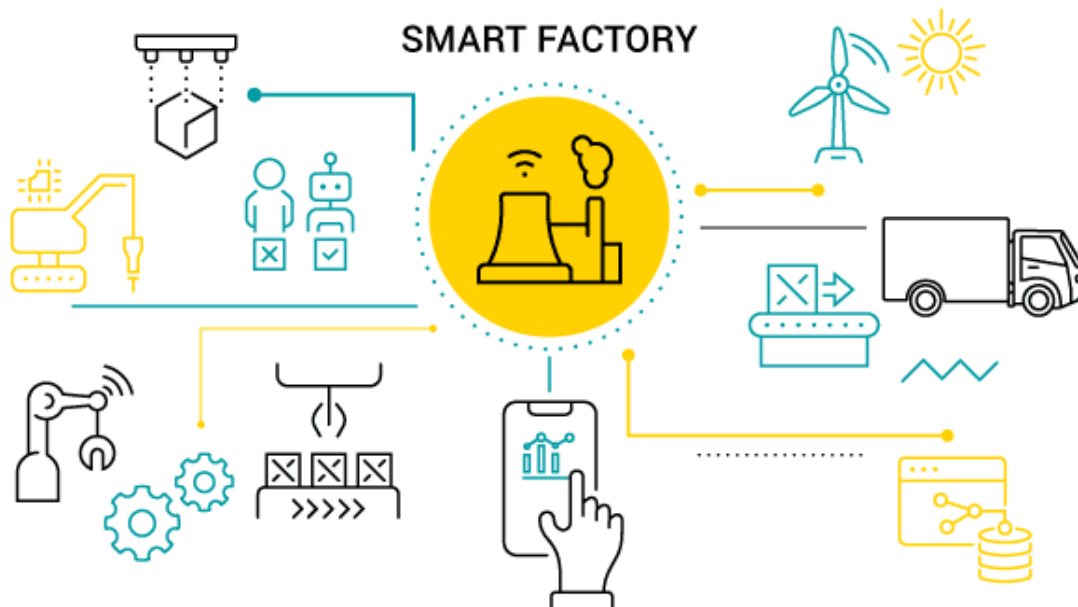
**Smart Manufacturing-** "Smart manufacturing" refers to interacting with other devices or systems and gathering operational data through automation and digital technologies. All facets of manufacturing, such as supply chain management, quality assurance, and production management, can benefit from intelligent manufacturing.

Benefits of smart manufacturing

- enhanced scheduling of production and quality assurance
- improved planning of inventories
- Speedier resolution of issues
- lower total expenses

### Key Benefit for Smart Manufacturing

- Improved quality control and production scheduling.
- Better inventory planning
- Faster problem resolution
- Reduced overall costs



Source- Olmstead Report, 2022

## 5. Trade Practices and Trade Policy

Global trade in products and services has undergone a significant transformation due to the digital revolution. Governments and corporations are striving to establish a more transparent and inclusive digital economy, and as a result, trade practices and rules have changed to reflect these developments (UNCTAD, 2022).

5.1. Trade customs- The growth of e-commerce has been one of the most significant shifts in trading practices. With very little overhead, e-commerce enables companies to connect with clients anywhere in the globe. This has caused a surge in new online platforms and marketplaces and a move toward cross-border trade. An additional significant shift has been the growing significance of data in commerce. Data is becoming a vital component of innovation and economic success, and companies are increasingly embracing it to enhance their customer service, marketing plans, and supply chains. The need for cross-border data flows has increased as a result of this.

5.2. Trade agreements- Governments modify their trade policy in response to the digital revolution. For instance, many nations have negotiated new trade agreements with clauses about data transfers and e-commerce. These agreements seek to lower trade barriers for digital goods and services and to make cross-border data movement easier. Governments are likewise striving to create new legislation to tackle the issues the digital economy poses. For instance, several nations are creating laws to safeguard personal data protection and shield customers from internet fraud (WTO, 2021).

5.3. Effects on International Trade- Global trade has benefited from the digital revolution, which has increased trade's effectiveness, inclusivity and sustainability. Now both consumers and businesses are more easily access a greater variety of goods and services thanks to e-commerce. Additionally, data assists companies in streamlining existing processes and creating new goods and services. But, there are additional difficulties facing international trade due to the digital revolution. One issue is the widening digital gap, which results in certain nations and populations having less access to the Internet and digital technologies. The emergence of new protectionisms, including mandates for data localization, presents another difficulty. Global trade benefits from the digital revolution, but overcoming the challenges it has brought about is critical to guarantee that everyone gains from the digital economy (ICC, 2020).

## 6. Findings and Conclusion

In the manufacturing industry, digital transformation has significantly improved revenue, quality, safety, efficiency and sustainability. This process gains efficiency, better output quality and safety. It is expected that manufacturing has seen a specific example of digitalization in the form of cloud-based ERP systems and smart manufacturing technologies which improve scheduling, inventory planning, problem-solving and overall cost reduction. The adoption of digital technologies has accelerated in response to challenges posed by the COVID-19 pandemic, leading to increased efficiency, productivity and innovation in the post-pandemic era. Undoubtedly, the digital revolution in the manufacturing sector has brought forth a new era marked by unparalleled technological breakthroughs. The complex territory of this transition has been examined in this study, emphasizing the critical obstacles it poses and the profitable trade prospects it opens up. We have thoroughly grasped this intricate and dynamic field by utilizing various research approaches, such as literature reviews, data analysis, expert insights, case studies, surveys, comparative analysis, scenario planning, and policy analysis. Global trade is changing due to the digital revolution, and trade practices and rules are changing to keep up with these developments. Though there are still obstacles to overcome, such as the digital gap and emerging forms of protectionism, firms and governments strive to establish a more transparent and inclusive digital economy. It is crucial to remember that the digital revolution is still happening and will be probably continue to have an evolving effect on international trade in the years to come. It is crucial to keep up with the most recent advancements and to guarantee that the digital economy benefits everyone.

6.1. **Future Directions-** This research represents only a tiny portion of a constantly changing field. Potential avenues for future investigation include:

- We are investigating the effects of manufacturing's digital transformation on sustainability and the environment.
- In order to investigate how the geopolitical effects of digital change affect international trade.
- The ongoing observation of how business responds to and adjusts to emerging technologies and shifting trade conditions.

Our comprehension of the implications of digital transformation for global trade will advance along with the manufacturing sector's evolution. This research adds to our collective understanding of a world undergoing change, acting as a stepping stone in our journey.

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