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# “Supply Chain Management: Application of Artificial Intelligence and Digital Technologies in Enhancing Customer Satisfaction in the Manufacturing Sector”

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**Abstract--** In today's competitive manufacturing environment, supply chain efficiency plays a vital role in improving customer satisfaction. With the rapid growth of Artificial Intelligence (AI) and digital technologies, manufacturing companies are transforming traditional supply chains into smart and responsive systems. This study explores how AI-based tools, automation, data analytics, and digital platforms improve supply chain performance and ultimately enhance customer satisfaction.

The research highlights the role of technologies such as predictive analytics, Internet of Things (IoT), robotics, blockchain, and cloud-based systems in optimizing inventory management, transportation planning, demand forecasting, and order fulfillment. These technologies help manufacturing companies reduce delays, minimize operational costs, and improve product availability.

The findings suggest that companies adopting AI-driven supply chain systems experience higher operational efficiency, faster delivery times, and better communication with customers. As a result, customer satisfaction and loyalty improve significantly. The study concludes that digital transformation in supply chain management is essential for manufacturing organizations seeking sustainable growth and competitive advantage.

**Keywords--** Supply Chain Management, Artificial Intelligence, Digital Technologies, Manufacturing Sector, Customer Satisfaction, Automation, Data Analytics.

## I. INTRODUCTION

Supply Chain Management (SCM) is a critical component of modern manufacturing operations. It involves the coordination of activities such as procurement, production, inventory management, transportation, and distribution in order to deliver products to customers efficiently. In recent years, global competition and increasing customer expectations have forced organizations to improve their supply chain systems.

Traditional supply chain processes often face several challenges such as inaccurate demand forecasting, inventory shortages, transportation delays, and lack of real-time information. These problems directly affect customer satisfaction because customers expect faster delivery, accurate orders, and consistent product availability.

The emergence of Artificial Intelligence (AI) and digital technologies has revolutionized supply chain management. Technologies such as machine learning, Internet of Things (IoT), cloud computing, and blockchain allow companies to collect and analyze large amounts of data. This helps organizations make better decisions regarding production planning, inventory control, and logistics operations.

Manufacturing companies are increasingly adopting AI-driven systems to improve operational efficiency and customer service. These systems enable real-time monitoring of inventory, predictive demand analysis, automated warehouse management, and optimized transportation routes.

This research aims to analyze how the application of AI and digital technologies in supply chain management contributes to improved customer satisfaction in the manufacturing sector.

## II. LITERATURE REVIEW

### 2.1 Supply Chain Management in Manufacturing

Supply Chain Management refers to the integrated management of materials, information, and financial flows across suppliers, manufacturers, distributors, and customers. According to Christopher (2016), an efficient supply chain helps organizations deliver the right product at the right time and at the right cost.

In manufacturing industries, SCM ensures the smooth flow of raw materials into production facilities and finished products to customers. Poor supply chain coordination often leads to production delays, excess inventory, and customer dissatisfaction.

### 2.2 Artificial Intelligence in Supply Chain

Artificial Intelligence refers to the use of intelligent algorithms and data analytics to automate decision-making processes. AI applications in supply chain management include demand forecasting, route optimization, predictive maintenance, and warehouse automation.



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Machine learning algorithms analyze historical sales data to forecast demand more accurately. This allows companies to maintain optimal inventory levels and avoid stockouts or overstocking situations.

### 2.3 Digital Technologies in Supply Chain

Several digital technologies support modern supply chain operations:

*Internet of Things (IoT):* Enables real-time tracking of goods, vehicles, and warehouse operations.

*Blockchain:* Provides transparency and security in supply chain transactions.

*Cloud Computing:* Facilitates data sharing and collaboration among supply chain partners.

*Robotics and Automation:* Improves warehouse efficiency and reduces human errors.

These technologies improve supply chain visibility and coordination, which directly enhances service quality for customers.

### 2.4 Supply Chain Efficiency and Customer Satisfaction

Customer satisfaction is highly dependent on product availability, delivery speed, and service reliability. Efficient supply chain systems ensure timely deliveries and accurate order fulfillment.

Research shows that organizations using digital supply chain systems experience higher levels of customer trust, better service quality, and improved brand reputation.

### 2.5 Research Gap

Although many studies discuss the importance of digital technologies in supply chain management, limited research focuses specifically on how AI-driven supply chains influence customer satisfaction in the manufacturing sector. This study attempts to bridge that gap.

## III. RESEARCH METHODOLOGY

### 3.1 Research Design

This study uses a descriptive research design to analyze the impact of Artificial Intelligence and digital technologies on supply chain performance and customer satisfaction in the manufacturing sector.

### 3.2 Nature and Scope of the Study

The research focuses on manufacturing companies that have adopted AI-based supply chain technologies. The study examines how these technologies improve logistics efficiency, inventory management, and customer service.

### 3.3 Sources of Data

The study is based on secondary data, which includes:

- Academic research papers and journals
- Industry reports on supply chain technologies
- Company reports of manufacturing organizations
- Online databases and supply chain publications

### 3.4 Variables of the Study

- Independent Variables
  - Artificial Intelligence adoption
  - Digital technologies (IoT, automation, blockchain, cloud systems)
  - Data analytics and forecasting tools
- Dependent Variables
  - Customer satisfaction
  - Delivery speed
  - Product availability
  - Service quality

### 3.5 Tools and Techniques Used

The following analytical tools were used:

- Descriptive analysis
- Comparative analysis
- Conceptual interpretation
- Secondary data evaluation

## IV. RESULTS AND ANALYSIS

### 4.1 Role of AI in Demand Forecasting

Artificial Intelligence significantly improves demand forecasting accuracy. AI algorithms analyze historical sales data, seasonal patterns, and market trends to predict future demand.

Accurate demand forecasting helps manufacturing companies:

- Maintain optimal inventory levels
- Avoid stock shortages
- Reduce storage costs
- Improve product availability

As a result, customers receive products on time, leading to higher satisfaction.

### 4.2 Digital Technologies and Supply Chain Visibility

Digital technologies such as IoT sensors and cloud-based platforms provide real-time visibility across the supply chain. Companies can monitor shipments, track inventory levels, and detect operational issues instantly.



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This transparency allows companies to respond quickly to disruptions, ensuring that customers receive their orders without delays.

#### *4.3 Automation in Warehousing and Logistics*

Automation technologies such as robotic systems and automated storage solutions improve warehouse operations by increasing speed and accuracy.

*Benefits include:*

- Faster order processing
- Reduced human errors
- Efficient inventory management
- Lower operational costs

#### *4.4 Impact on Customer Satisfaction*

Manufacturing companies using AI-driven supply chain systems experience several benefits:

- Faster delivery times
- Better product availability
- Improved order accuracy
- Real-time order tracking

These factors increase customer trust and long-term loyalty.

### V. RECOMMENDATIONS

Based on the findings of this research, the following recommendations are suggested for manufacturing organizations:

#### *5.1 Adoption of AI-Based Forecasting Systems*

Manufacturing firms should invest in AI-driven forecasting tools to improve demand prediction and inventory planning.

#### *5.2 Implementation of IoT Technology*

Companies should implement IoT devices to monitor inventory levels, track shipments, and enhance supply chain visibility.

#### *5.3 Digital Integration Across Supply Chain Partners*

Manufacturers should integrate suppliers, distributors, and logistics partners through digital platforms to ensure smooth information flow.

#### *5.4 Investment in Automation and Robotics*

Automation in warehouses and logistics operations can improve efficiency and reduce operational errors.

#### *5.5 Employee Training in Digital Technologies*

Organizations must train employees to effectively use AI systems and digital tools in supply chain operations.

### VI. CONCLUSION

This study highlights the growing importance of Artificial Intelligence and digital technologies in supply chain management within the manufacturing sector. Traditional supply chain systems often struggle with inefficiencies such as inaccurate forecasting, delays in transportation, and lack of coordination among stakeholders.

The adoption of AI and digital technologies provides innovative solutions to these challenges. Technologies such as predictive analytics, IoT, automation, and cloud platforms improve supply chain efficiency and transparency. These advancements enable manufacturing companies to respond quickly to market demands and deliver products more efficiently.

The findings indicate that companies implementing digital supply chain systems experience improved operational performance, reduced costs, and enhanced customer satisfaction. Therefore, digital transformation is no longer optional but a strategic necessity for manufacturing organizations seeking long-term competitiveness.

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