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Supply Chain Management and E-commerce

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Abstract:-This paper takes a close look at how e-commerce and supply chain management (SCM) are connected in today's business world. E-commerce, or online shopping, has grown rapidly in recent years and has changed how supply chains work. This means businesses need to rethink how they manage their supply chains. We've looked at a lot of recent research to understand what's happening at the intersection of e-commerce and SCM. One big change we've seen is that supply chains are becoming more flexible and adaptable, thanks to new digital technologies and the way people shop online. E-commerce has really shaken things up in traditional supply chain practices like buying goods, keeping track of inventory, and getting products to customers. We've also explored how technologies like data analytics, artificial intelligence, and blockchain are helping businesses improve their supply chains, making them more efficient and transparent, especially in the world of e-commerce.

Keywords:- *Supply Chain Management, E-Commerce, Digital Transformation, Logistics, Omnichannel Fulfillment, Data Analytics, Artificial Intelligence, Blockchain.*

I. INTRODUCTION

Supply chain management is like a big puzzle, where materials, information, and money all move from one place to another - from suppliers to manufacturers to wholesalers to retailers, and finally to customers. It's about making sure everything flows smoothly, both within each part of the process and between them. Think of it as the natural next step after a company has gone through downsizing and re-engineering to become more efficient and competitive.

Nowadays, supply chain management is super important for businesses. It's all about figuring out the best ways to get products from where they're made to where they're needed. This involves three main things:

- Product flow: This is about physically moving goods from suppliers to customers, and back again if needed.
- Information flow: This is all about keeping everyone in the loop - sending orders, tracking deliveries, and updating everyone on what's happening.
- Finance flow: This is about dealing with the money side of things - sorting out payment schedules, credit terms, and ownership arrangements.

In retail, supply chain management is crucial for keeping track of what's in demand and making sure there's enough supply to meet it. But sometimes, companies don't react well to changes in how things are distributed. For example, big supermarket chains and discount stores have gained a lot of power, which has made things tricky for some manufacturers.

➢ *In E-Commerce, Supply Chain Management Looks a Bit Different. it Involves Things Like:*

- Being able to get materials or products from anywhere in the world.
- Having a big-picture strategy that works globally but can be executed locally.
- Making sure everyone in the chain has the info they need to do their jobs well.
- Using smart accounting to keep costs down.
- Putting together teams that work really well together, from the factory floor to the top bosses.

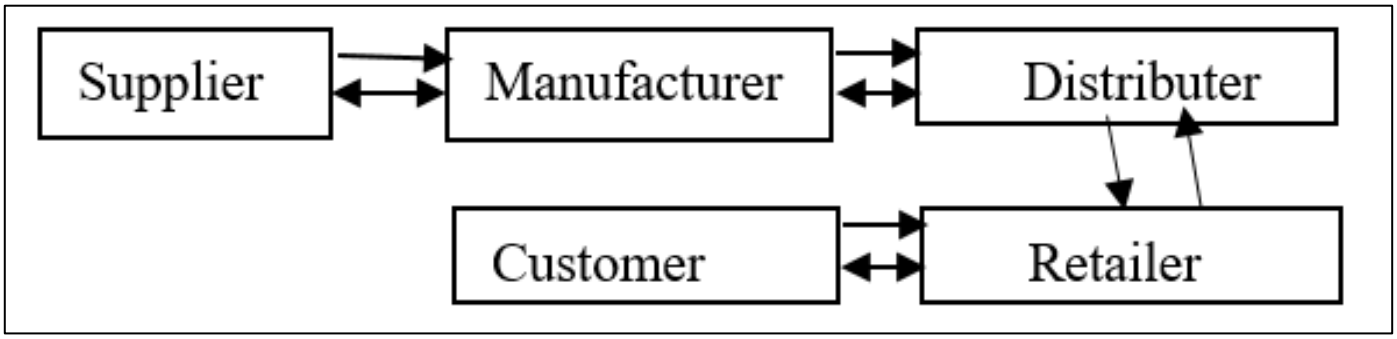

Fig 1: SCM Supply Chain

Overall, a supply chain is like a big team effort to make sure customers get what they need. It's not just about the company making stuff - it's also about all the people and businesses involved in getting those things to the customers. Everyone has their part to play, and together they all make the supply chain work smoothly.

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➢ *Algorithm of a Supply Chain Management:*

- Let demand be x, supply be y.
- Manufacture (i) = 0
- If x = y; then
- manufacturing level is maintained
- If x < y then
- ✓ i++
- ✓ else
- i is maintained

This algorithm shows that if demand is equal to supply than manufacturing process is maintained as it is. If demand is greater than supply than there is necessity to increase the manufacturing level up to the demand level and if it is otherwise than manufacturing activities should be slowed down to a level to maintain balance between the demand and also have a sufficient buffer stock

II. IDEAS

As defined by American professional association, Supply Chain Management focus the planning and management of all the activities such as: - sourcing, logistic, conversion & procurement management. In essence, Supply Chain Management integrates all the possible suppliers and customers. The main idea behind the SCM is Quality of the product and cost of that product which is provided from the suppliers to customer. Supply Chain Management are tools and techniques used for the handshake between the suppliers and customers. It is also type of software from which the quality of product is measured.

A. Developments in the Supply Chain Management Field-

➢ *There are Some Major Phases in the Developments of SCM:*

- **Creation era**: - In the early 1980's, the term supply chain management was given by an American consultant and has a great impact on the 20th century. The main features of the SCM in this era was large scale changes, re-engineering, downsizing driven by cost reduction programs, etc.
- **Integration era**: - This phase saw the raw materials assembled from supplier and forwarded to manufacturer for the designing & developing of new innovative product. EDI importance was developed in supply chain management with the development of new technologies for measuring quality of product through software, i.e. ERP. In this phase Internet –based collaborative system was also designed.
- **Globalization era**: - It is the 3rd phase which is developed in the SCM field. Although the use of global sources in the supply chain of organizations can be traced back to several decades ago. It is characterized by increasing competitive advantage, creating more value, and reducing the costs through global sourcing.

B. Functions and Objectives of SCM-

A supply chain encompasses all the facilities and processes involved in the provision of goods and services, including the procurement of raw materials, manufacturing operations, and the delivery of goods and services to the end user. Supply Chain Management (SCM) involves overseeing all operations within a company that impact and interface with other parts of the supply chain to enhance overall performance.

➢ *The Primary Functions of SCM Include:*

- *Defining business boundaries and relationships*
- *Managing demand and supply*
- *Logistics*
- *Purchasing*
- *Selling system interface*
- *Manufacturing system interface*

- *Defining Business Boundaries and Relationships*

This is fundamental to all SCM activities. Key decisions revolve around outsourcing—determining what to produce in-house versus what to source from suppliers. This also involves defining the roles of suppliers and buyers in each other's operational activities and business decisions.

- *Managing Demand and Supply*

Demand management involves overseeing all demands for goods and services throughout the supply chain. It focuses on meeting the end user's demand for the final product or service. This requires coordinating various links in the supply chain to ensure timely and adequate provision of goods or services.

- *Logistics*

Logistics encompasses the processes involved in storing, moving, and transporting materials. Historically recognized for its role from the pre-manufacturing stage to post-manufacturing transportation to the customer, logistics significantly influences the cost and efficiency of the supply chain.

- *Purchasing*

Purchasing plays a critical role in the supply side of the supply chain, linking vendors and the company. It impacts strategic decisions and implementation regarding business boundaries and manages the specifications, lot sizes, and transportation packing of purchased materials.

- *Selling System Interface*

The selling function is closely linked to the demand side of the supply chain. It helps customers select, purchase, pay for, and consume the company's products, whether sold directly or through a distribution network. Sales significantly influence the design of the distribution network and are integral to its daily operations.

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- *Manufacturing System Interface*

Manufacturing forms the core of a company's internal operations and cannot function in isolation from SCM policies. It supports SCM by reducing manufacturing time and ensuring timely material supply to customers. Major supply chain functions such as marketing, manufacturing, procurement, operations, inventory, warehousing, distribution, and customer service are all interconnected and crucial for effective**.**

III. OBJECTIVES

The objectives of Supply Chain Management (SCM) are to fulfill the desired customer service levels in targeted markets or segments and to optimize the overall investment and costs within the supply chain. This service/cost paradigm has long been considered a cornerstone of effective supply chain management, necessitating that companies have a comprehensive understanding of both aspects.

Customer service is a critical component for customers within the supply chain. Achieving the desired service level at the optimal cost requires a focus on eliminating "non-value-adding activities" (NVAs) throughout the supply chain. The goal is to maximize the value of the supply chain, where value is defined as the worth of the final product to the customer minus the effort expended to deliver that product. The primary objective of the supply chain is to maximize overall profitability, which is generated from customer-related costs incurred across the entire chain.

IV. PRINCIPLES & COMPONENTS OF SCM

➢ *Principles of SCM*

A competitive advantage in a supply chain is achieved only when several key attributes are present. The following five guiding principles are essential for driving company trends:

- Minimizing the number of stages between the customer and the goods provider: Fewer stages lead to a more efficient supply chain.
- Comprehensive IT support at every stage: Ensuring that each stage is fully integrated with IT systems enables better and faster information processing for both local and SCM decisions.
- Alignment of IT infrastructure with business strategy: IT infrastructure must be designed to support and enhance the overall business strategy.
- Utilization of B2C and B2B e-business models in IT infrastructure design: Incorporating these models ensures a versatile and efficient IT infrastructure that caters to both business-to-consumer and business-to-business interactions.

➢ *Components of SCM*

- *The Components of Supply Chain Management Include:*

✓ Planning and Control: Establishing strategies and monitoring the supply chain to ensure efficient operation.
✓ Work Structure and Product Flow Facility Structure: Designing the physical and operational layout for product movement and handling.
✓ Information Flow Facility Structure: Setting up systems for seamless information exchange across the supply chain.
✓ Management Methods: Implementing effective management practices to optimize supply chain activities.
✓ Power and Leadership Structure: Defining the hierarchy and decision-making authority within the supply chain.
✓ Risk and Reward Structure: Developing frameworks for managing risks and distributing rewards.
✓ Culture and Attitude: Fostering a positive and collaborative culture within the supply chain network.

The framework comprises an access control engine, database support, and four layers of integrated functionalities: a communication layer, a portal interface layer, a business application layer, and an extensible computing layer. This framework emphasizes the integration of various nodes within the supply chain. These nodes represent the different layers utilized in this scenario to manage operations within a company.

- **Communication layer**: - It gives a flow or channel for accessing the system by a user.
- **Portal interface layer**: - It provides a unified and customizable platform for interactions between user and system.
- **Business applications layer: -** The business applications layer offers an environment for compiling and executing various business processes. It facilitates decision-making and connects to external data sources, applications, and services.

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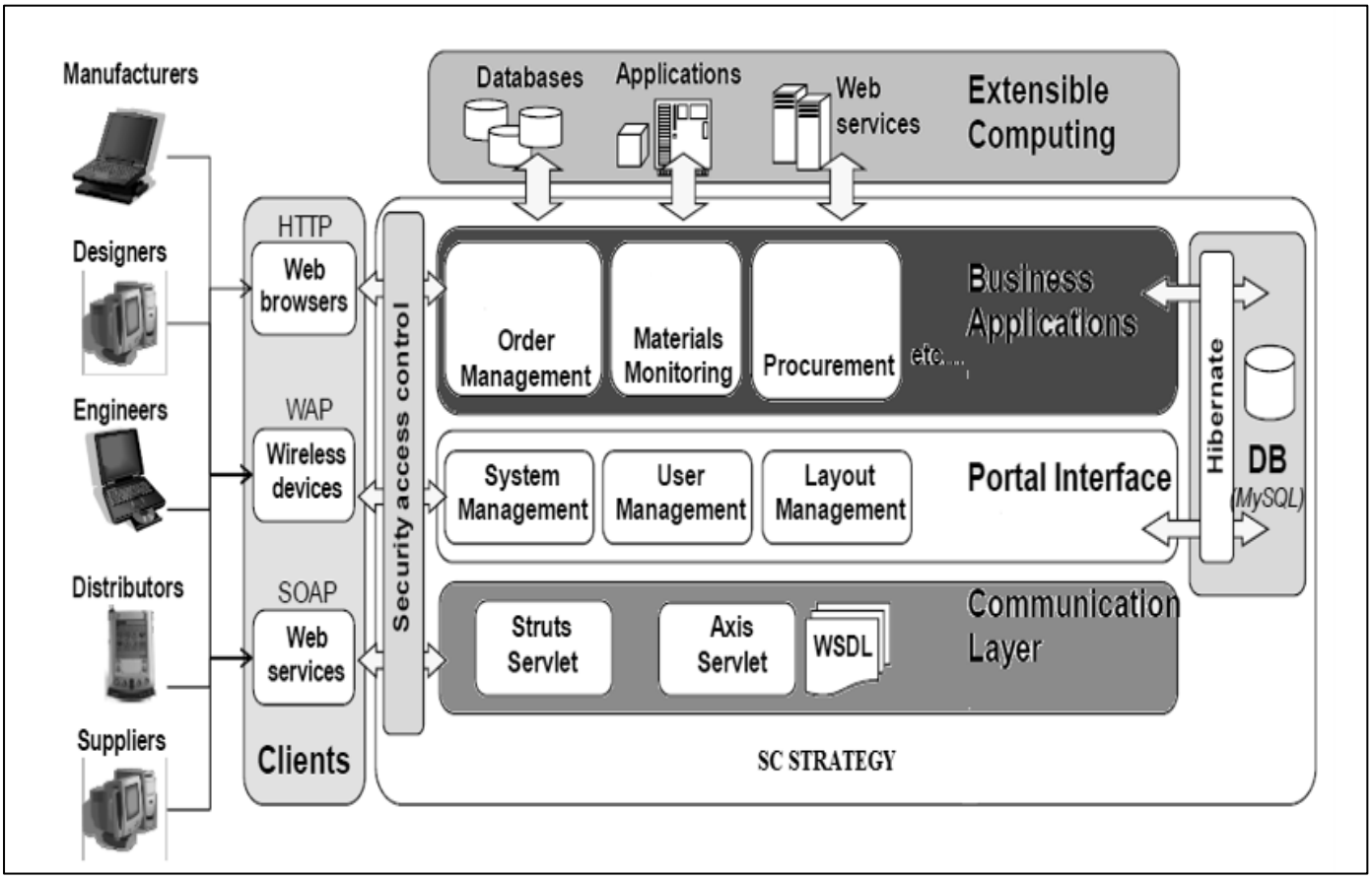

Fig 2: Framework for SCM

➢ *Applications of SCM:*

Supply Chain Management (SCM) has extensive applications in the IT sector. Extensible Markup Language (XML) is emerging as the new communication standard, poised to become the standard for business-to-business communications. XML facilitates seamless data exchange between various applications, enabling companies to conduct business over the web without the complexities of traditional programming languages. Information technology provides a cross-platform environment for information exchange. With XML technology, corporations can integrate with other business systems through the exchange of business documents.

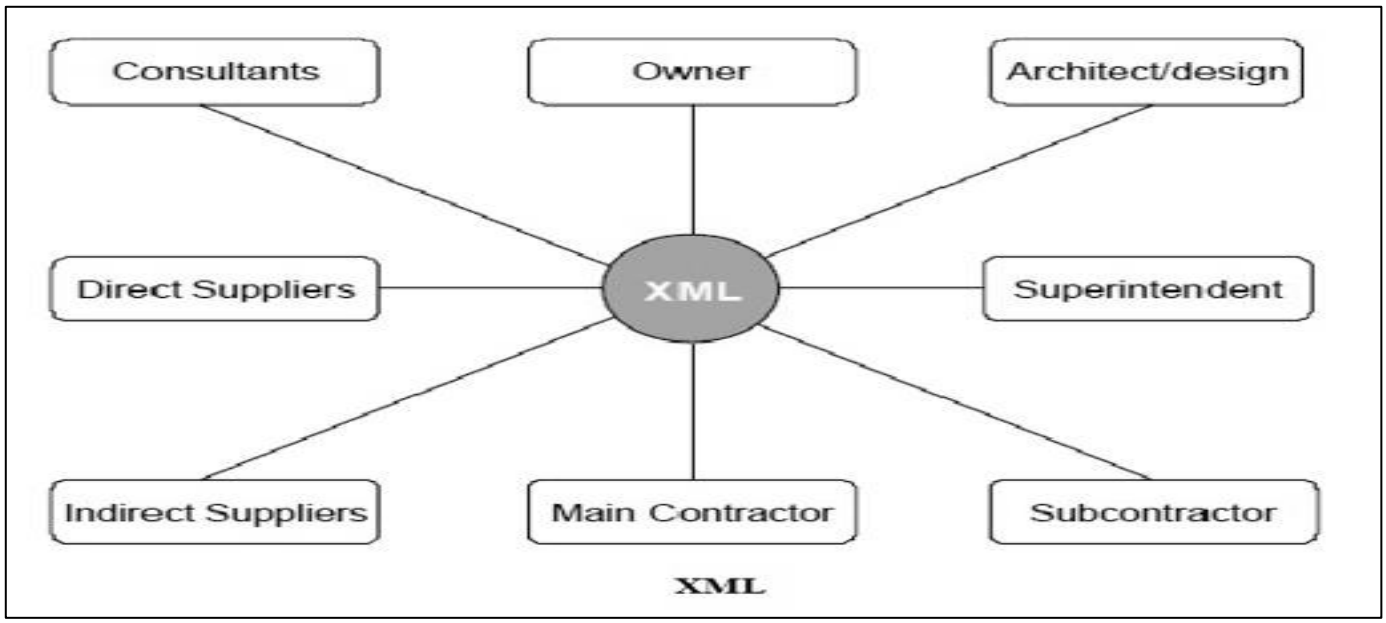

Fig 3: XML: The Integrative Force in SCM

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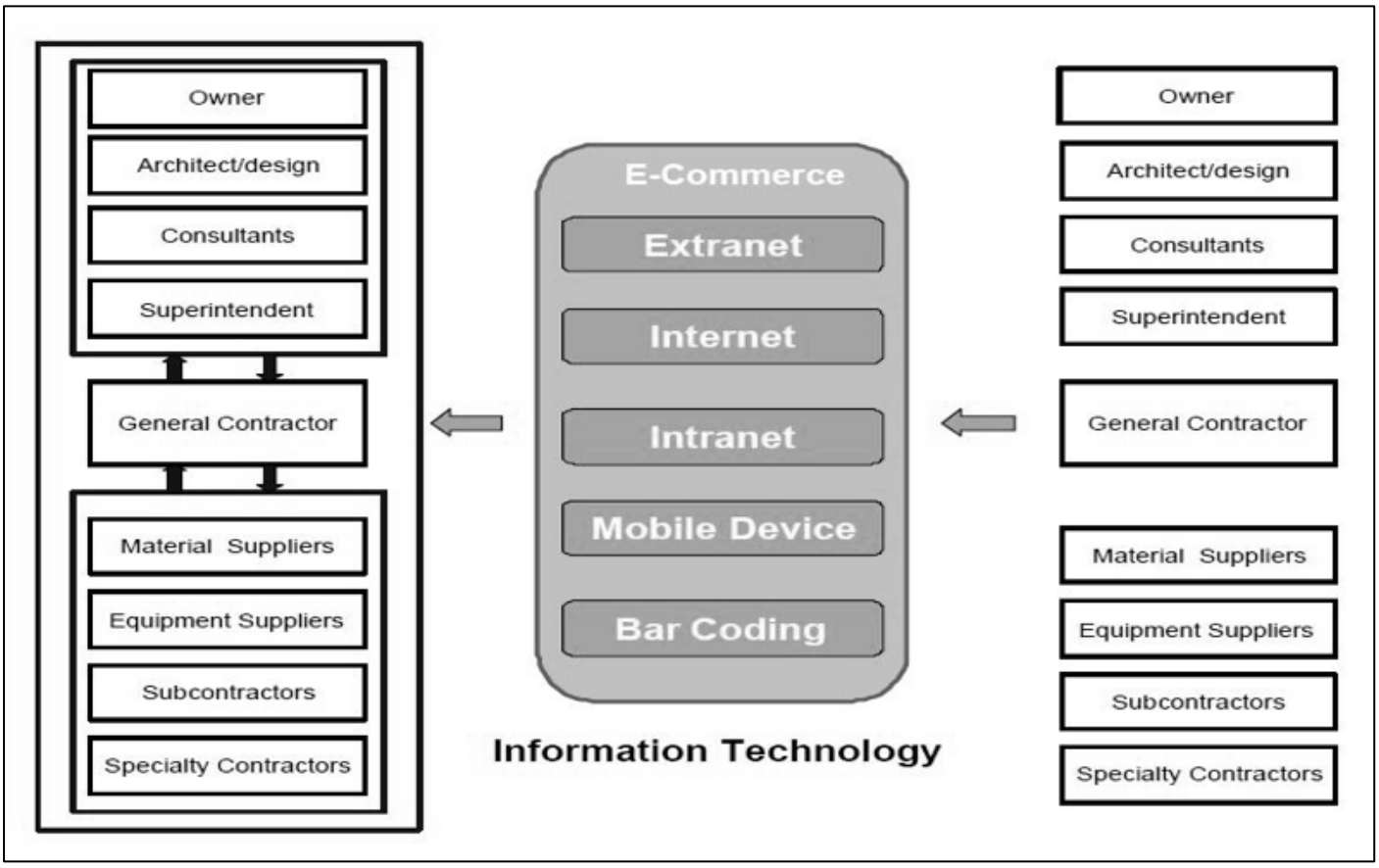

. Fig 4: E-Commerce IT Ecosystem: Connecting Technology and Commerce

V. TECHNOLOGIES IMPROVING SCM & E-COMMERCE

➢ *Data Analytics:*

Data analytics allows businesses to derive actionable insights from the extensive data generated throughout the supply chain. This leads to informed decision-making and improved efficiency. For instance, analyzing historical sales data can enhance demand forecasting accuracy, ensuring optimal inventory levels and minimizing the risk of stockouts.

- **Data:** According to a study by McKinsey, companies that leverage data analytics in their supply chains experience a 10% to 20% increase in efficiency and a 5% to 10% reduction in total logistics costs.

➢ *Artificial Intelligence:*

AI empowers businesses to automate and optimize various aspects of supply chain management, from demand forecasting to route optimization. Machine learning algorithms can analyze complex datasets in real-time, identifying patterns and trends that humans may overlook. This enables proactive decision-making and agile responses to changing market conditions.

- **Data**: Research by Deloitte indicates that 83% of organizations using AI in their supply chains have seen significant improvements in revenue and cost reduction.

➢ *Blockchain:*

Blockchain technology ensures transparency and traceability by creating an immutable ledger of transactions across the supply chain. Each transaction, from procurement to delivery, is recorded on the blockchain, providing a tamper-proof audit trail. This enhances trust among supply chain partners and allows consumers to verify the authenticity of products.

- **Data:** A report by IBM found that blockchain technology can reduce transaction costs by 30% and increase efficiency by 50% in supply chain processes.

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➢ *Comparison Chart:*

Fig 5: Tabular Comparison

Technology	Benefits	Data Analytics	Artificial Intelligence	Blockchain
Efficiency	Improved decision-making based on data-driven insights	10-20% increase in efficiency	Proactive decision-making and agile responses to changes	30% reduction in transaction costs, 50% increase in efficiency
Transparency	Enhanced visibility and traceability	-	-	Tamper-proof audit trail and authenticity verification
Cost Reduction	Optimization of inventory levels and logistics costs	5-10% reduction in total logistics costs	Significant improvements in revenue and cost reduction	-
Customer Trust	Assurance of product authenticity and quality	-	-	Increased trust among supply chain partners

VI. CONCLUSION

The world economy is becoming increasingly borderless and integrated, driven by global market forces, technological advancements, cost considerations, and political as well as macro-economic influences. This integration and the global competitive landscape are transforming traditional business operations. Companies now experience geographical and functional integration, creating a truly global playing field and resulting in global supply chains. Consequently, global supply chain management is crucial for maintaining global competitiveness, especially in the IT sector.

REFERENCES

[1]. Global Competitiveness: Role of Supply chain Management (*Prof. Shailendrakumar Uttamrao Kale*)*
[2]. R. Arunachalam, J. Eriksson, N. Finne, S. Janson, and N. Sadeh. The supply chain management game for the trading agent competition 2004. http://www.sics.se/tac/tacscm 04spec.pdf. Date accessed: Apr 8, 2004, 2004. [2]
[3]. R. Bellman. Dynamic Programming. Princeton University Press, Princeton, NJ, 1957.
[4]. Christopher, M., & Peck, H. (2004). Building the resilient supply chain. International Journal of Logistics Management, 15(2), 1-14.
[5]. Simchi-Levi, D., Kaminsky, P., & Simchi-Levi, E. (2008). Designing and managing the supply chain: Concepts, strategies, and case studies (3rd ed.). McGraw-Hill.
[6]. Talluri, S., & Baker, R. C. (2002). A taxonomy for selecting global supply chain strategies. International Journal of Production Economics, 83(1), 37-51.
[7]. Lee, H. L. (2004). The triple-A supply chain. Harvard Business Review, 82(10), 102-112.
[8]. Rogers, D. S., & Tibben-Lembke, R. S. (1998). Going backwards: Reverse logistics trends and practices. Reverse logistics: Quantitative models for closed-loop supply chains, 29(4), 1-27.
[9]. Ma, L., Wang, J., & Yu, Y. (2020). The role of blockchain technology in supply chain management: A bibliometric review. Computers & Industrial Engineering, 145, 106499.
[10]. Stock, J. R., & Lambert, D. M. (2001). Strategic logistics management (4th ed.). McGraw-Hill.
[11]. Swaminathan, J. M., Smith, S. F., & Sadeh, N. M. (1998). Modeling supply chain dynamics: A multiagent approach. Decision Sciences, 29(3), 607-632.
[12]. Chopra, S., & Meindl, P. (2016). Supply chain management: Strategy, planning, and operation (6th ed.). Pearson.
[13]. Sun, S., & Lai, K. (2019). Predictive analytics in supply chain management: A review. Expert Systems with Applications, 115, 195-216.