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Digitalization in Supply Chain Management

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ABSTRACT

Purpose: Digitalization is one of the major buzzword in today's global supply chain management. There is a fundamental shift in supply chain management- from a traditional supply chain to a digital supply chain (DSC), every organization is moving towards a digital transformation approach for supply chain management. The use of Industrial Revolution 4.0 has prompted the digitization of supply chain management in general due to recent technological advancements. In the new business environment, only organisations that can prepare for and welcome change will survive. The need to survive in this competitive era is to continuous upgrade the services software in accordance with market demands. In general, this does not indicate that technology must be changed quickly. However, the idea is to be prepared for evolution when something new means something better. The evolution and implementation of supply chains in the digital environment of operational functions and what are the challenges being faced are briefly presented in this study.

Design/Methodology/Approach: To identify the challenges in implementation of digitalization in company's supply chain descriptive research design is used. Both primary and secondary data has been used. Primary data is collected using questionnaire get filled from 62 respondents working in supply chain industry. Analysis is done by Microsoft excel.

Findings: The digital Supply Chain vision of the companies is at the developing phase. Factors like agility, Performance and visibility in real time and also the ability to connect to the internet from anywhere in the world affect the implementation of digitalization in supply chain management in an organization. The study find several benefits of digital supply chain management in an organization like Internet of Things (IoT), artificial intelligence (AI), expert systems, machine learning, robots, block chain, and big data analytics help organisations achieve strategic goals. But still there are several technological, organisational and strategic challenges remain to overcome to foster the success of the digital supply chain management.

Originality Value: The paper used both primary and secondary data. The secondary data is collected from the article, journals, reports and websites. And primary data was collected by using the structured questionnaire. The finding suggested that for a company to become competitive digitalization of the supply chain is necessity.

Paper Type: Empirical Research Paper

KEYWORDS: Digitalization | Global Supply Chain Management | Digital Supply Chain (DSC) | Digital Transformation

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Introduction

A "Supply Chain" is a network of enterprises and suppliers developed for the manufacture and distribution of a given product. The steps required to deliver a product or service to clients are represented by a supply chain. Because efficient supply chains result in lower costs and shorter production cycles, supply chain management is a critical activity. However, the traditional supply chain lacks some characteristics that would be required in future business requirements. The typical supply chain is made up of a succession of disconnected phases that are rarely integrated. When a traditional supply chain is transformed into a digital supply chain (DSC), the former becomes an integrated, interconnected system. A digital supply chain does not mean that the products or services are good or bad.

Many organisations across a wide range of industries are heavily investing in digitalising their company operations and supply networks. Logistics companies such as DHL, Fedex, and UPS are examples of these projects. Amazon,Flipkart, Alibaba, for example, have spent heavily in digitising every link in their supply chain.

A digital supply chain can be defined in a variety of ways. It is an intelligent supply chain, according to some authors, because it takes advantage of technological improvements to integrate supply chain actors. In order to take use of Web-enabled features, they also synchronise processes, such as warehousing, inventory management and transportation systems. These networks are distinguished by outstanding cooperation and communication across the chain's stakeholders' hardware and software. The idea is to make the interactions between organisations more synchronised. Digital Supply Chain integrates cutting-edge technology (e.g., augmented reality, big data, block-chain, and many others), focuses on customers/consumers, lowers intra- and inter-organizational expenses, and adds value to businesses Atzori et al. (2010). As a result, it will be critical to address issues such as implementation, optimization, and development, as well as new managerial techniques connected to Digitization of Supply Chain Management, in order to better serve customers.

Literature Review

The American Council of Logistics Management (1991) described logistics and Supply chain as "a process of planning, implementing, and controlling the efficient and effective flow and storage of commodities, services, and related information from point of origin to point of destination." The mix of information, material, is what logistics and supply chain is all about handling, warehousing, packaging, transportation, inventory management, and shipping security. Procurement and customer service are two of the most important aspects of a business. The goal of logistics and supply chain industry is to reduce cycle times in order to save costs and in order to increase the value they provide to their customers as explained by Chandra and Jain (2007). Lezoche et al. (2020) explains that with the era of globalisation and technology, the logistics and Supply chain industry is regarded as the most important and relevant in today's business environment. Logistics activities, according to the Council of Logistics Management, are concerned with the planning and control of materials in the organization's flows and related information .An organization's main mission or objective is to get the right goods to the right place at the right time for the best price fulfilling a set of requirements In today's business world, every company has an online presence to stay in the market, strive to increase your competitiveness on a regular basis. As a result, it's critical to comprehend the changes that are occurring In order to move ahead from traditional supply chain management towards a digitally-driven end-to-end (E2E) supply chain, there is a fundamental shift in how planners and managers manage and deploy their planning and production processes explained by Li et al. (2020) Digitalization in Supply chain Management involves the development of information systems and the adoption of emerging innovations technologies to improve supply chain integration and agility, as well as customer service and the long-term success of the business as explained by Schniederjans et al. (2020) Businesses benefit from digitalization not only in terms of efficiency and effectiveness, but also in terms of new opportunities. Wilkesmann and Wilkesmann (2018)explains that there are various benefits of Supply Chain Digitization for Businesses as It enables firms to operate more efficiently and effectively by providing them with the flexibility and reactivity they require to handle and prevent disruptions in demand planning, production, transportation, and yard or container management.

However, as digitalization becomes more important across the supply chain, planners and managers must consider the challenges and risks of restructuring their supply chains to conform to a more digital platform. As a result, firms must address a number of crucial issues too Tachizawa et al. (2015b) Today's supply chain consists of a succession of mainly distinct, segregated steps that lead from marketing, product development, manufacturing, and distribution to the customer's hands. Xue (2014) Digitization removes those barriers, and the chain becomes fully integrated ecosystem that is completely transparent to all participants —suppliers of raw materials, components, and parts to the manufacturers transporters of those materials and finished commodities, and then to the final destination Customers expect to be satisfied Barata et al. (2018).

According to the Jurlina Alibegović (2018) digitalization and automation of supply chain management provide limitless exploration opportunities as market dynamics change. Economies, regions, temperature zones, and time

zones all differ significantly for example as per the countries, zones, political systems, and population demographics. As the world becomes more integrated, the chain continues to improve. Huge worldwide market, and the academics are working on it from time to time, The following aspects of the supply chain are highlighted like Supply network in a circle/ supply chain that is sustainable, Devices that can be worn, Visibility in logistics, Manufacturing Execution Systems (MES) is a term that refers to a set of software (MES), Inventive factory, Vehicles that are self-driving. Jacobs and Mafini (2019) The most recent technological developments to the smart supply chain, is more efficient, effective, and adaptable than traditional methods.

This advancement in technology opens a new door to many business and improvement in existing business. Considering that all of this was made possible by the Internet of Things, which was able to provide traceability and follow-up to all of the data provided by the various devices by using distinct IPs. Because it would result in better and more widely shared cloud communication methods

People, on the other hand, have benefited from Industry 4.0's Digital Architecture by being able to better how they conduct their regular activities. Allowing people to accomplish tasks in a more efficient and systematic manner, based on how they are performed rather than the task themselves.

Another example is the Digital Supply Chain (DSC), is the significance of keeping suppliers, companies, distributors, and supply chains connected, taking into account all of the information they communicate on a daily basis. It defines this as an intelligent, efficient, and value-based approach for generating additional revenue through the use of digital technologies. It's crucial to note that DSC isn't about employing these; rather, it's about leveraging digital technology to manage the supply chain.

However, combining all of the information gathered from the ERP with blockchain, which manages to bring transparency, efficiency, and cost reduction, is another option to streamline Supply Chain processes. The improvement also happens in the sales and production operations, as well as planning and demand.

The Supply Chain is now characterized as a set of interconnected operations that will seek out new techniques in order to generate competitive value. These transformations include barcode scanning and location-based services, all of which are possible owing to smart technologies that work in tandem with the Supply Chain.

In this section, it is described how the process was carried out for the literature search, in order to select the most appropriate for the article. Considering that the main objective is to map and evaluate existing literature to identify new or future fields of study. As well as an analysis was carried out on the reviewed articles, with the main objective of looking for trends on the topic studied.

Objectives of the Research

- To identify the challenges and obstacles in the implementation of Digitalization and Reengineering in company's Supply Chain.
- To discuss the benefits of digitalization in company's Supply Chain.

Research Design

In this section, describes how the research process was carried out. The descriptive research design method was used. Based on the objectives of the study, primary data as well as the secondary data was used. The secondary data is collected from the article, journals, reports and websites. The primary data was collected by using the structured questionnaire. The questionnaire got filled from the respondents working in the logistics and Supply chain Industry. The total numbers of respondents were 62 and the analysis was done by using Microsoft excel.

Analysis

The information was gathered from respondents in the logistics and supply chain industries.

The total number of respondents was 62, and the figure 1 explains the respondents' designation level.

11.3 percentages point the Top Management. Mid-level Management accounts for 21% of the total. Senior management accounts for 9.7%. Team Leaders account for 29% of the total. Others account for 29%.

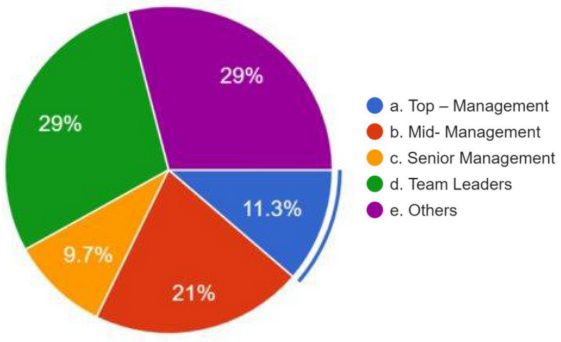

Figure 1: Designation Level

Figure 2, depicts that more than half of the responders were from the logistics and supply chain management fields

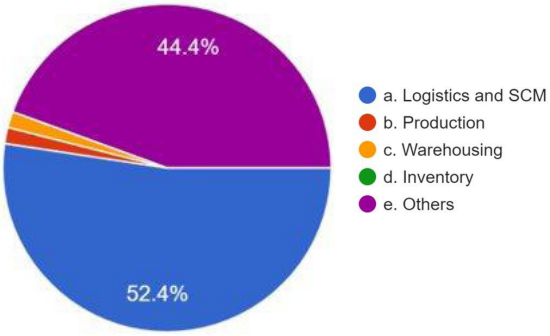

Figure 2: Departmentalization

Figure 3, explains the Digital Technologies which are currently used in your organization

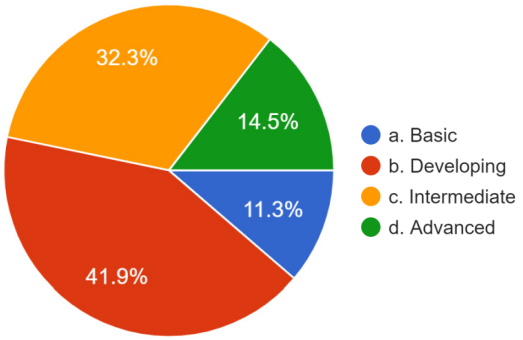

Figure 5: Organisations Digital Supply chain Maturity

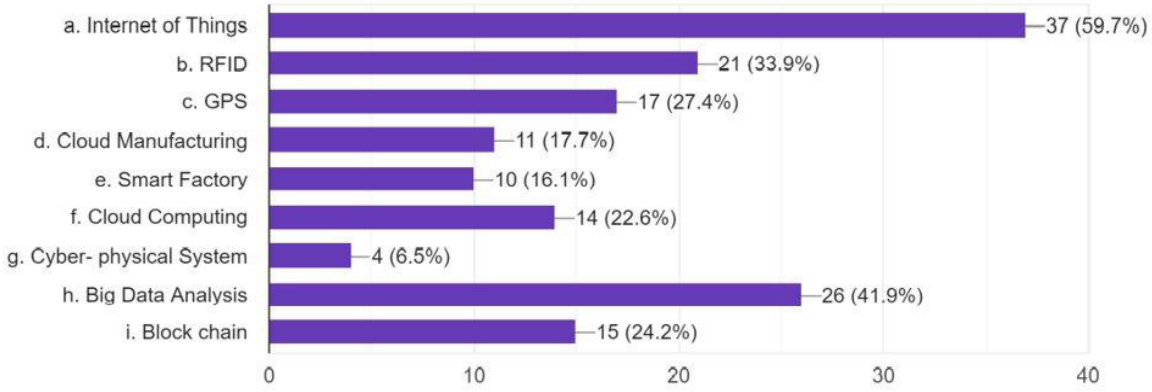

Figure 3: Type of Digital Technologies

Majority of the respondents agrees that organization have clear digital Supply Chain Vision which is explain in figure 4.

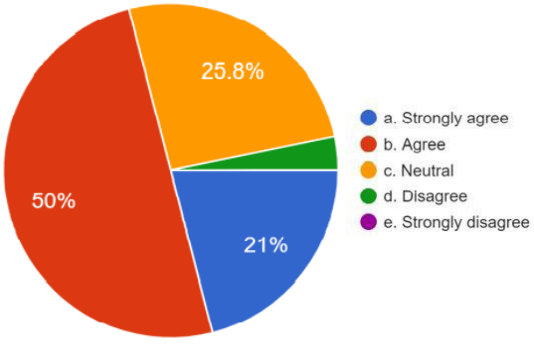

Figure 4: Vision of Digital Supply Chain

The figure 5 illustrates about organization's digital supply chain vision maturity where majority of the respondents were at the developing phase and 14.5 % are at advanced phase and 32.3 % were at intermediate phase and 14.5 % were at advanced phase.

The aim of the digital supply chain of the various organizations is explained in figure 6 where majority of the respondent's shows that the organization wants to achieve all the above mentioned factors.

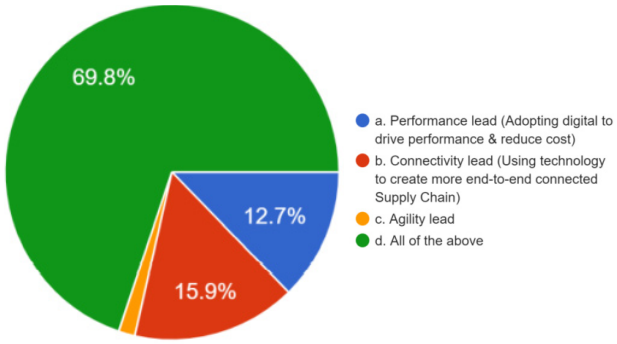

Figure 6: Aim of the digital supply chain

The majority of the respondents i.e. 62.9 % of the respondents explain that they have supply chain risk management strategy and modeling capabilities in their organizations which is shown in Figure 7.

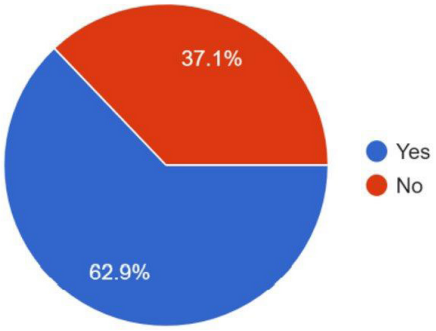

Figure 7: Supply chain risk management strategy and modeling capabilities in your organization

Majority of the companies 37.1% of the respondents explains that 1-2 % of revenue is the expected as the level of investment in digital supply chain project which is explained in Fig 8.

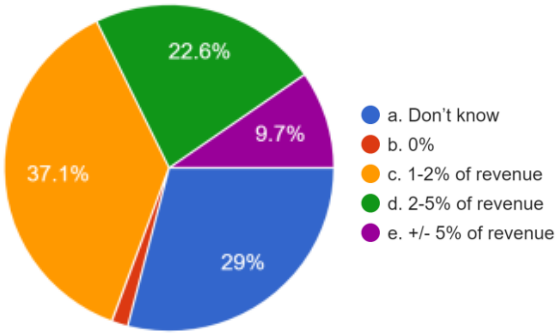

Figure 8: Level of investment in digital supply chain project

The organisation shows that there is the Driving shift towards Digital Supply Chain which is explained in Figure 9.

Figure 10 explains that the majority of the organizations, 82.5% of the companies track the customer satisfaction regarding Supply chain performance.

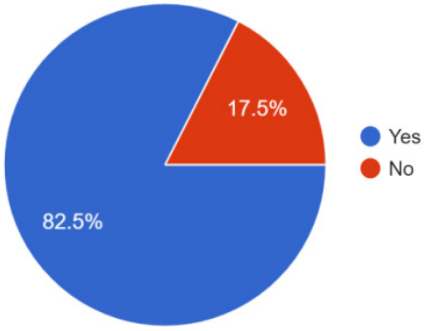

Figure 10: Customer satisfaction regarding Supply chain performance

Figure 11 shows that majority of the companies i.e. 67.7 % have E2E supply Chain Visibility

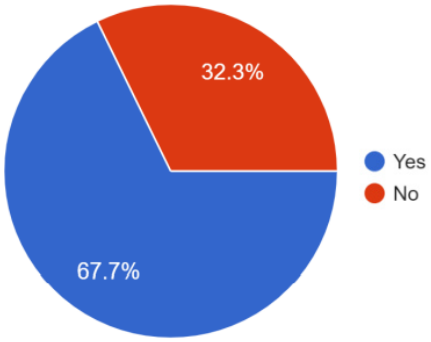

Figure 11: Company has E2E supply Chain Visibility

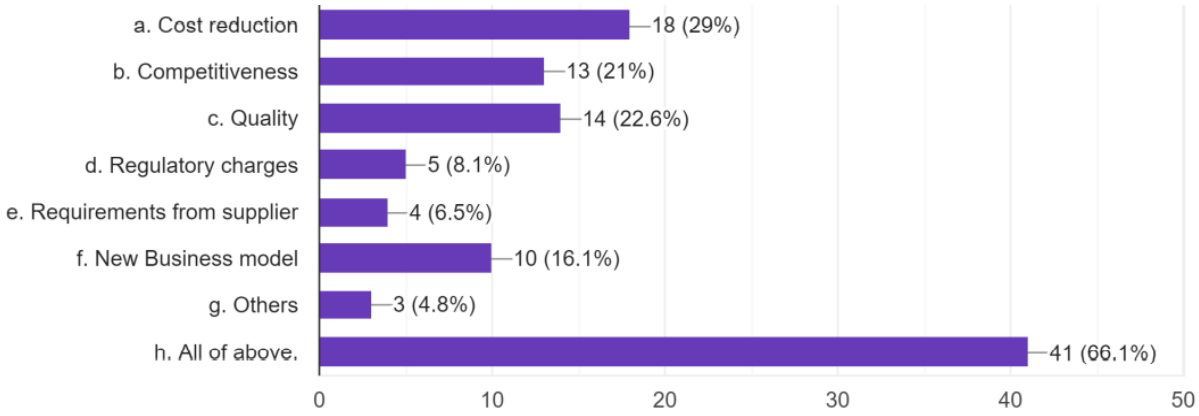

Figure 9: The Driving shift towards Digital Supply Chain

Figure 12 depicts that 83.9 % of the companies are able to access the impact of technology on performance and costs.

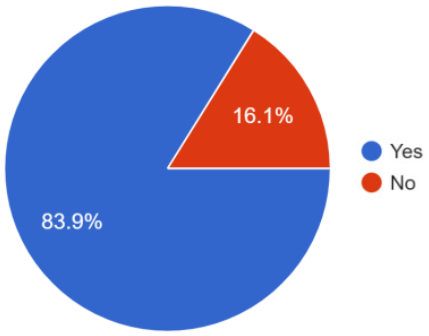

Figure 12: Is the company able to access the impact of technology on performance and costs

The various factors that affect the implementation of digitalization in Supply Chain are as shown in figure 13.

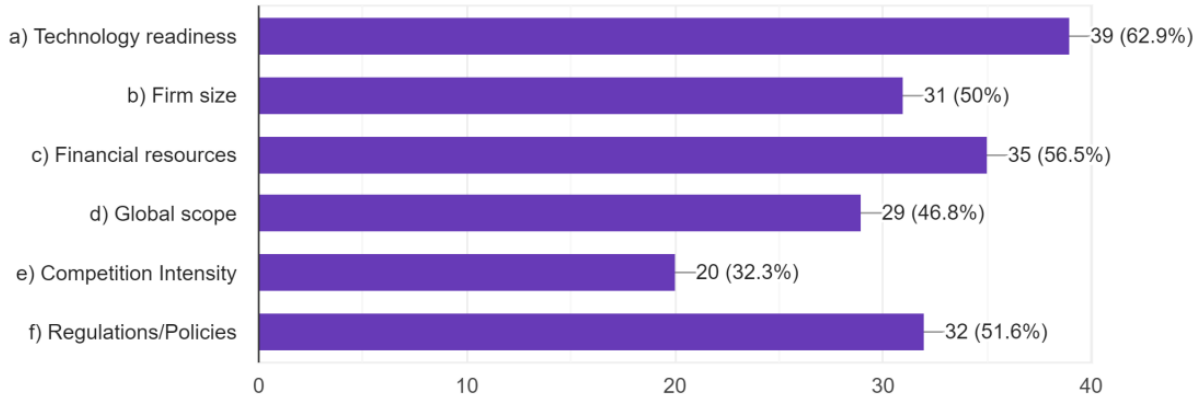

Figure 13: Various factors that affect the implementation of digitalization in Supply Chain

The improvement areas after the digitalization of Supply Chain are explained with the help of the figure 14.

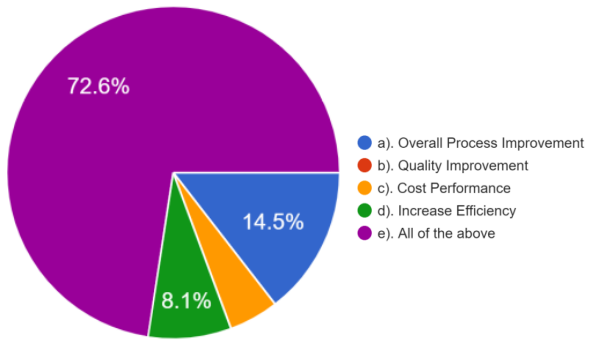

Figure 14: The improvement areas after the digitalization of Supply Chain

Findings

Based on the analysis it was found that the respondents were from all the levels of management and they have clear digital Supply Chain Vision. The digital Supply Chain vision of the companies is at the developing phase. There are number of digital technologies which are currently used in the organization and there are various factors that affect the implementation of digitalization in Supply Chain like agility, Performance and visibility in real time and also the ability to connect to the internet from anywhere in the world. There also exist the various challenges and the improvement areas which are up-coming in digitalization process.

Challenges during the implementation of Digitalization

There are numerous challenges which are faced by the organisation in the implementation of Digitalization, as supported by the primary data collection from the 62 respondents, which clearly explains that:

- At all the three levels of traditional Supply Chain , upstream, down- stream and inside the organisations digitization is required in order to the integration of solutions and systems which will give the real time information for various methods of collecting, sorting, and evaluating data to help planners and managers create more accurate forecasts of demand for more effective planning strategies.
- There are various technologies used but many of the technologies from Industry 4.0 is still to be implemented for the integration and smooth flow of information technology.
- The organizations agrees that they have clear vision of Digital Supply Chain , but majority of them are still in developing phase , as supported by the responses from Q 7 as 41.9 % are still in developing phase and 11.3 %

are in basic stage and only 14.5% are in the advanced stage. So Organisations have to take to initiative to adopt digitization to survive in this competitive environment.

- For Maintaining communication and collaboration within the supply stream access data and communicate its importance in real-time, which is a core driver of end-to-end (E2E) visibility. The E2 E implementation in the organisation stills needs to be implemented as indicated in Q13.
- There are several technological, organisational and strategic challenges remain to overcome to foster the success of the DSC implementation.
- Further there are lot of challenges organisations are facing in the deployment of digitization as supported by Q15 – explains that most of the companies are focusing on , are the following :
  - Technology Readiness in terms of adoption and Implementation of innovative technological processes.
  - It is also affected by the firm size.
  - The major concern is the financial resources; the overall implementation cost is too high which is again a major challenge.
  - Another factors like Global Scope, Competitive Intensity and also various Regulatory Rules and Policies and Practices also impacts the implementation of Digitization in Supply chain management.

Advantages / Benefits of Adopting the Supply Chain Management

- Today's digitized supply chain is truly in an information age.
- Manufacturers rely on the accuracy and availability of data and reporting to create better planning platforms and production programs, but also to more effectively manage inventory, ship and track the movement of parts, and even manage personnel.
- To summarize, the complete digitization of the supply chain is quickly becoming less of a dream and more of a necessity for companies to remain viable and competitive.
- And to be in streamlined manner to compete on a global stage.
- The digital supply "network" will bring a new level of robustness and reactivity, allowing organisations that are first to market to outperform the competition in providing clients with the most efficient and transparent service delivery possible.
- Digitization helps in Improving in the overall processes in the organization, also helps in overall Quality Improvement, Cost performances and overall increased efficiency
- The responses as indicated by Q 8 also indicates that 69.8 % indicates that the implementation of digitization leads to overall performance lead, connectivity lead and Agility lead.
- DSC helps by making real-time information available for making accurate and timely decisions that support organisational performance objectives such as revenue, profit, market share, quality, responsiveness, cost, dependability, and sustainability, the DSC increases visibility of material flows along the value chain and reduces any bullwhip effects.
- There is increased communication and interaction among supply chain partnering organisations in DSN, which leads to timely product delivery to clients. DSC/DSN offers the following benefits:
  - agility
  - supply chain integration
  - effective intelligent optimization, transparency,
  - holistic decision-making
- Technologies like the Internet of Things (IoT), artificial intelligence (AI), expert systems, machine learning, robots, block chain, and big data analytics help organisations achieve strategic goals including agility, cost, quality, flexibility, and dependability.
- Through design process optimization, product optimization, planning & inventory efficiency, risk management, supplier collaboration, operational efficiency, logistics optimization, sales optimization, and after-sales support, the DSC enables strategic supply chain reforms.
- Furthermore, the DSC/DSN promotes long-term supply chain operations that consider economic, social, and environmental aspects.

Practical Implications

To summarize, the complete digitalization of the supply chain is quickly becoming less of a dream and more of a necessity for companies to remain viable and competitive and to be in streamlined manner to compete on a global stage. The key to become a digital master and reaping the full benefits of digital supply chain is to build a systematic strategy for installing and integrating the technologies and skills needed. It will help to make the processes more effective and efficient.

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The Editorial Board had used the Ouriginal – a Swedish anti-plagiarism software tool which is a fully-automatic machine learning text-recognition system made for detecting, preventing and handling plagiarism and trusted by thousands of institutions across worldwide. Ouriginal by Turnitin is an award-winning software that helps detect and prevent plagiarism regardless of language. Combining text-matching with writing-style analysis to promote academic integrity and prevent plagiarism, Ouriginal is simple, reliable and easy to use. Ouriginal was acquired by Turnitin in 2021. As part of a larger global organization GJEIS and Turnitin better equipped to anticipate the foster an environment of academic integrity for educators and students around the globe. Ouriginal is GDPR compliant with privacy by design and an uptime of 99.9% and have trust to be the partner in academic integrity (https://www.ouriginal.com/) tool to check the originality and further affixed the similarity index which is {5%} in this case (See below Annexure-I). Thus, the reviewers and editors are of view to find it suitable to publish in this Volume-14, Issue-3, Jul-Sep 2022.

Annexure 14.13

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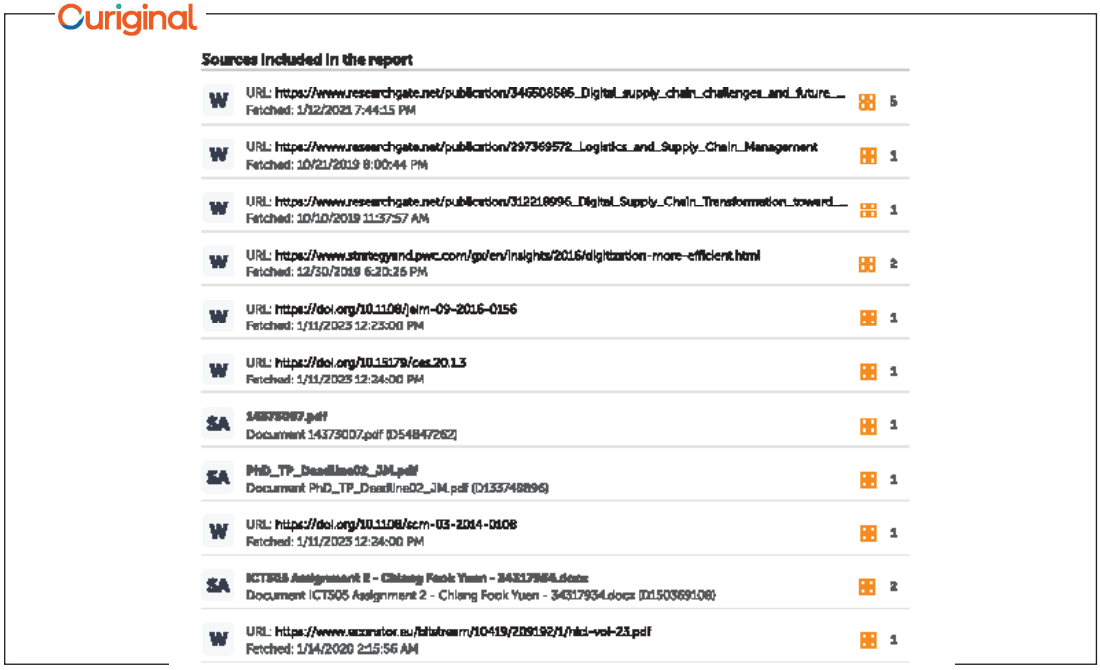

Reviewers Memorandum

Reviewer's Comment 1: Digital supply chain management is a necessity for every company in today's era. Since technology is continuously changing this topic has many unexplored area. Technologies like the Internet of Things (IoT), artificial intelligence (AI), expert systems, machine learning are increasingly used in SCM. Apart from advantages of DSCM, this paper also highlights the challenges faced by company in digitalising supply chain management.

Reviewer's Comment 2: The study is empirical in nature based on descriptive research design. Both primary data as well as the secondary data was used. Secondary data is collected through questionnaires filled from the 62 respondents working in the logistics and Supply chain Industry.

Reviewer's Comment 3: Since this topic is a little bit technical but it is presented very strategically so that it can be understood by everyone. Number of respondents in primary data could have been increased

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Conflict of Interest: Author of a Paper had no conflict neither financially nor academically.

Editorial Excerpt

The article has 5% of plagiarism which is the accepted percentage as per the norms and standards of the journal for publication. As per the editorial board's observations and blind reviewers' remarks the paper had some minor revisions which were communicated on a timely basis to the authors (Tanu and Vinita), and accordingly, all the corrections had been incorporated as and when directed and required to do so. The comments related to this manuscript are noticeably related to the theme "**Digitalization in Supply Chain Management**" both subject-wise and research-wise. Digital supply chain management is an intelligent supply chain because it takes advantage of technological improvements to integrate various supply chain factors. The finding revealed that digital Supply Chain vision of the companies is at the developing phase. Yet there exist various challenges which need to be tackled in up-coming digitalisation process. The study provides ample scope for further research in this area. After comprehensive reviews and the editorial board's remarks, the manuscript has been categorized and decided to publish under "**Empirical Research Paper**" category.

Acknowledgement

The acknowledgment section is an essential part of all academic research papers. It provides appropriate recognition to all contributors for their hard work and effort taken while writing a paper. The data presented and analyzed in this paper by (Tanu and Vinita) were collected first handily and wherever it has been taken the proper acknowledgment and endorsement depicts. The authors are highly indebted to others who facilitated accomplishing the research. Last but not least endorse all reviewers and editors of GJEIS in publishing in the present issue.

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