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Digital Supply Chain Management and Smart Operations
Industry of Choice: Retail Industry

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1. Introduction

The Retail industry can be defined as the engine that drives consumer spending, a massive sector that encompasses all the businesses that sell products and services directly to individual customers. This includes everything from the corner bodega to the largest online retailers, and it plays a vital role in the global economy. Some examples are Amazon, Walmart, Zara, Sephora, Rewe, Edeka etc. With the advancement of technology, the era of Industry 4.0 was ushered in where businesses began to adapt automation and traditional manufacturing and industrial practices were replaced by modern smart technologies (Har et al., 2022). The retail industry isn't immune to the wave of technological advancements. While Industry 4.0, introduced in 2010, ushered in a new era for manufacturing, it also laid the groundwork for Retail 4.0. This term emerged as retailers began implementing Industry 4.0 technologies like AI, IoT, cloud computing, big data analytics, and augmented reality into their operations, fundamentally transforming the retail landscape (Har et al., 2022). The arrival of steam engines and mass-produced goods in Retail 1.0 (Late 18th - Early 20th Century) led to the rise of department stores. Retail 2.0 (Early 20th - Late 20th Century) saw a shift towards lower-cost products and the proliferation of shopping malls. The internet revolutionized shopping entirely in Retail 3.0 (Late 20th Century - Present), allowing consumers to shop globally from the comfort of their homes. Now, Retail 4.0 (Present - Onwards) promises to further simplify and improve our lives by leveraging technologies like artificial intelligence, the internet of things, cloud computing, big data analytics, and augmented reality (Har et al., 2022).

2. SCOM Trends and Challenges in the Retail Industry

The trends and challenges in SCOM can be succinctly explained by preparing a CORRIDOR model. This model serves as a guiding framework for influence assessment and development of proactive or corrective actions (Ivanov *et al.*, 2019).

2.1. CORRIDOR MODEL

There are several factors that are regarded as Challenges and Turbulence Drivers in SCM. Here we look at these factors in detail.

Complexity - The ever-expanding number of products, variants, markets, information channels, and communication methods have added to the complexity of the Supply Chain. In Retail, these include multichannel retailing, large number of stores, stock keeping units (SKUs) vendors, sourcing through the warehouses or directly to stores. This complexity can be managed by Enhancing Visibility and Data Management by Implementing real-time tracking systems, Logistics Partner Integration etc (Ekinci and Baykasoğlu, 2019).

Overview - Supply chain transparency is lacking. It is not possible to get a complete picture of everything happening across the entire chain, including the processes and goals of all partners. Different players use incompatible data systems or have limited data sharing practices, this lack of a universally adopted system makes it harder for tracking products throughout the supply chain. Blockchain Integration and utilizing existing data sharing platforms can improve supply chain transparency (Sunny, Undralla and Madhusudanan Pillai, 2020).

Risk and Vulnerability - Supply chains face a variety of risks, both predictable and unpredictable, with varying degrees of potential disruption. These risks include Natural Disasters, Demand Fluctuations, Product Obsolescence, Unethical Labor Practices, Product recalls. Supplier Diversification, Demand Forecasting and Inventory Management, Scenario Planning and Risk Assessment can be adapted to mitigate these risks (Tang and Tomlin, 2008).

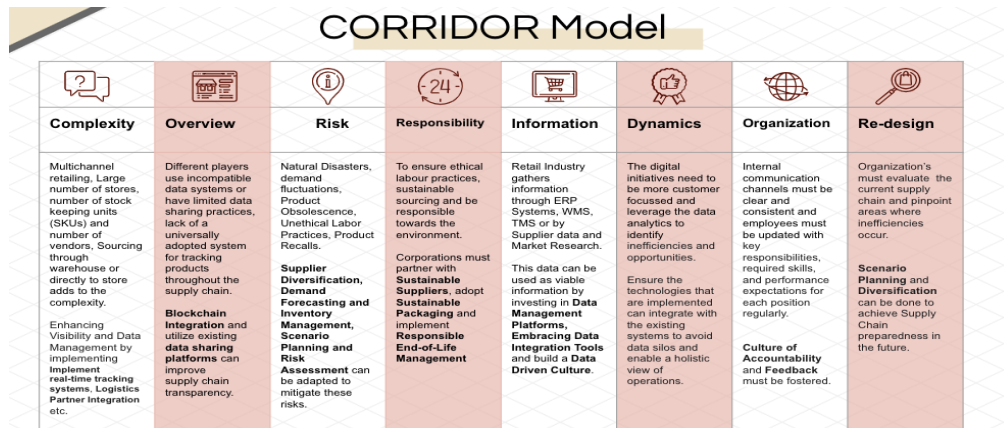


Fig 1: CORRIDOR MODEL, (Own representation)

Responsibility - Sustainability and ethical practices are crucial for all participants in the supply chain. Corporations have a responsibility to ensure ethical labor practices, sustainable sourcing and be responsible towards the environment. Corporations must partner with Sustainable Suppliers, adopt Sustainable Packaging and implement Responsible End-of-Life Management (Singhry, 2015).

Information Flow / Information (Data) Availability - Efficient information flow, powered by strong IT systems, is crucial for suppliers, producers, and logistics providers to analyze data proactively and ensure they can meet evolving customer needs. Retail Industry gathers information through ERP Systems, WMS, TMS or by Supplier data and Market Research. This data can be used as viable information by investing in Data Management Platforms, Embracing Data Integration Tools and building a Data Driven Culture (Haulder, Kumar and Shiwakoti, 2019).

Dynamics - The dynamic nature of digital transformation must address rapidly evolving customer demands, including changing product specifications, components, sourcing strategies, locations, technologies, communication channels, and distribution methods. The digital initiatives need to be more customer focussed and leverage the data analytics to identify inefficiencies and opportunities. Organizations must ensure that the technologies that are implemented can integrate with the existing systems to avoid data silos and enable a holistic view of operations (Kache and Seuring, 2017).

Organization - The evolving business landscape necessitates a clear definition of roles and responsibilities within the supply chain organization. Internal communication channels must be clear and consistent and employees must be updated with key responsibilities, required skills, and performance expectations for each position regularly. Culture of Accountability and Feedback within an organization must be fostered (Proctor and Doukakis, 2003).

Re-design - Organization's must evaluate the current supply chain and pinpoint areas where inefficiencies occur. Scenario Planning and Diversification can be done to achieve Supply Chain preparedness in the future.

3. SCOR MODEL

3.1. Traditional Supply Chain with the SCOR Model

The Supply Chain Operations Reference (SCOR) model was developed by the Supply Chain Council in 1996. The SCOR model focuses on the supply chain management function from an operational process perspective and includes customer interactions, physical transactions, and market interactions (Zhou et al., 2011). The benefits of implementing the SCOR model included faster cycle times, less inventories, improved visibility of the supply chain, and access to important customer information in a timely fashion. The SCOR model is used not only in manufacturing operations but also in service operations (Delipinar and Kocaoglu, 2016). This paper explains the 5 steps of the SCOR model **Plan**: This step is concerned with data analysis and market forecasting and involves searching and evaluating

suppliers for selection. **Source:** Sourcing practice connects manufacturers with suppliers and is critical for manufacturing firms. **Make:** The Make process includes the practices that efficiently transform raw materials into finished goods to meet supply chain demand in a timely manner. **Deliver:** This step refers to a process used to provide goods and services to meet customer demand (Delipinar & Kocaoglu, 2016). **Return:** This process involves managing the return of defective or excess products and includes activities such as returns processing and reverse logistics (Mañay, Guaita-Pradas & Marques-Perez, 2022).

3.2. Digital solutions facilitating the fundamental SCOR Processes and the Case examples

The Digital SCOR model builds upon the core processes of the Traditional SCOR model by integrating digital technologies for enhanced visibility, agility, and collaboration. Robust, lean, and proactive SCOR processes in a digital age are the backbone for retailers to achieve core marketing objectives and create value exchange for all stakeholders (Tsipoulaidis and Nanos, 2022). In a digital landscape, the SCOR model has the following features.

Plan: Demand forecasting can be improved with machine learning and customer data analysis, leading to more accurate inventory planning. Digitalization allows for better collaboration between retailers and suppliers, optimizing sourcing and procurement (Carbonneau *et al.*, 2008). Machine Learning and Advanced Data Analytic Tools like ARIMA/SARIMA - (Autoregressive Integrated Moving Average) are used by large retailers like Walmart, Amazon (Gupta, 2018) and Long Short-Term Memory (LSTM) Networks are used by giants like Sephora, Walmart and Amazon (Onyijen, Oyelola & Ogieriakhi, 2024).

Source: Digital marketplaces and e-procurement platforms streamline supplier selection and negotiation. Real-time data sharing improves visibility into supplier inventory and production, enabling just-in-time deliveries. Coupa is one E-Procurement Platform that is used by Nestle, Esprit and Zalando, SAP Ariba is used by retailers like Nestle, Coop and MACY's uses Basware SRM system (coupa.com, 2024, SAP, 2024).

Make: Automation in warehouses and stores can improve efficiency and reduce costs. Inventory management systems with real-time data can optimize stock levels and reduce stockouts. Cloud-based IMS offer real-time data on stock levels across warehouses and stores. This allows retailers to dynamically adjust inventory allocation based on demand fluctuations and optimize stock levels. Retailers like Target, Home Depot use Warehouse Management Systems (WMS) (Min, 2006) and RFID systems. RFID tags attached to products provide greater visibility into inventory movement throughout the supply chain. This allows for more accurate stock tracking, reduces shrinkage, and facilitates cycle counting (Kumar, Anselmo & Berndt, 2009).

Deliver: Omnichannel fulfillment allows customers to choose their preferred delivery method (in-store pickup, home delivery, etc.). Last-mile delivery options are becoming more efficient with route optimization software and autonomous vehicles. This automation is under further development (Sonneberg et al., 2019)

Return: Digital platforms facilitate easier returns and exchanges, improving customer satisfaction. Data from returns can be used to improve product quality and assortment planning.

4. Case examples for fundamental SCOR Processes

Several Digital solutions facilitate the fundamental SCOR processes. Here we look at case examples of different corporations and how they have adapted the digital solutions on different Supply Chain processes.

Plan: For Planning, Sephora uses machine learning algorithms like LSTM that analyze historical sales data to identify trends and predict future demand for specific products and for identifying users'

personality traits based on social network data (Onyijen, Oyelola and Ogieriakhi, 2024). When we interviewed a Procurement manager at Wella, a beauty retailer, we were informed that their procurement system is on the verge of digitalization and that most of their forecasting is still manual and Excel based (Chabbra, H. 2024).

Source: Nestlé emphasizes efficient spend management. It uses Coupa to Streamline supplier discovery, qualification, and negotiation processes. And also, to gain insights into spending patterns across various categories and identify cost-saving opportunities. Coupa also electronically manages contracts, tracks performance against agreed-upon terms, and automates contract renewals (coupa.com, 2024).

Make: Zara uses C-design PLM Software that centralizes product data (designs, specifications, materials) and streamlines collaboration between design teams, suppliers, and manufacturers. This allows for faster design iterations and efficient communication throughout the product development cycle (Abbou, 2007).

Deliver: Amazon uses its own Amazon Warehousing and Distribution (AWD) software to manage inventory levels across a vast network of fulfillment centers where they optimize picking and packing processes to ensure fast order fulfillment. When inventory dips below a certain level, Amazon is notified and can move bulk stock from AWD warehouses to fulfillment centers closer to customers (sell.amazon.com, n.d.). In one of our interviews, we found out that the Amazon warehouse in Munich saw a staggering increase in automation as they now use robots for Inbound, Sorting and Outbound processing (Jagtap, 2024).

Return: Zalando uses their own Returns Solution software called ZRS through which customers can initiate returns electronically. These captures return data upfront, including the reason for return, which helps with processing and can provide valuable customer insights. E-commerce industry also uses Process mining, which can enable and accelerate reverse logistics optimization (Zalando Corporate Website, 2023).

5. Forging Competitive Advantage in the Digital Age: Using Lean Philosophy

5.1 Digital Technologies in Supply Chain

The concept of “digital supply chain” refers to the exchange of information between supply chain stakeholders to enhance communication (Eljazzar et al., 2018) and to integrate various manufacturing processes to create a transparent system (Chaudhary et al., 2018). Digital supply chain management is a process of providing cost-effective solutions and creating value chain to many industries in the ecosystem including firms, their suppliers, employees and customers (Korpela et al., 2017).

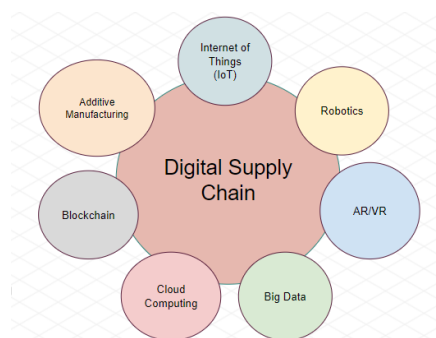


Fig 2: Key technologies powering digital supply chain, (Own Presentation)

Digitalizing supply chains is one of the most important extensions in the industry as it directly impacts the retailers, manufacturers, distributors and logistics providers to manage their operations particularly the inventory across all of their sales channels. The digitalization helps in building a technological roadmap for implementation of industry 4.0 or 5.0 in the manufacturing industry (Haddud and Khare, 2020). Figure 2, shows several digital technology trends which are considered as the pillars of digital supply chain management that includes Internet of Things (IoT), Robotics, Augmented Reality (AR) / Virtual Reality (VR), Big Data, Cloud Computing, Blockchain, Additive Manufacturing.

5.2 Competitive Advantages of Digital Supply Chain

Digitalizing supply chains involves the adoption of sophisticated and smart technological capabilities to make supply chains more connected, collaborative and efficient to gain competitive advantage using lean principles. Lean manufacturing is a management approach aimed at enhancing organizational competitiveness by maximizing value and eradicating inefficiencies in business processes. This method focuses on boosting operational efficiency and cutting costs (Garza-Reyes et al., 2012).

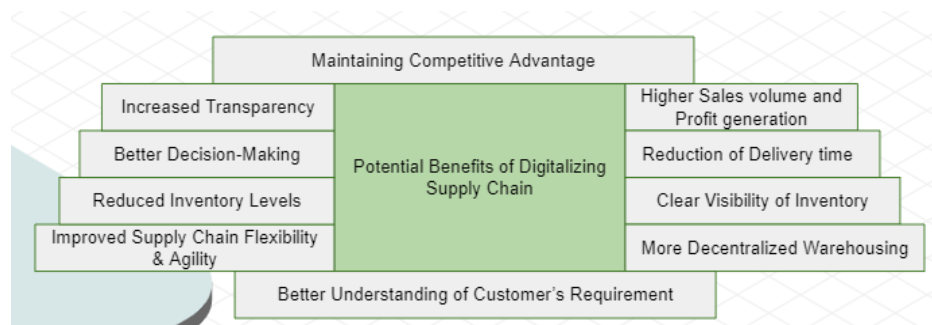


Fig 3: Potential Benefits from Digitalizing Supply Chain, (Own Presentation)

Figure 3, shows the competitive advantages that can be gained during the digital era, importance of shifting towards digitized supply chain, and its impact in lean practices which includes, greater transparency, reduced inventory levels, clear visibility of inventory, more decentralized warehousing, delivery times reduction, better understanding of customer's requirements, higher sales and profit margins, improved supply chain flexibility, better decision-making processes and maintaining competitive advantages.

5.3 Competitive Advantage using 7+x wastes in the Digital Era

Lean thinking is one of the most effective methodologies to gain competitive advantage and improve business process. Just in time (JIT) contribution as a manufacturing strategy to lean helps in building competitive advantage. Lean principles with the use of technology focuses on operations improvement strategies that helps in minimizing the unnecessary stocks, addresses inefficiency, minimizes transportation and inventory costs while delivering parts frequently. All the 7+x wastes use digitalization in various ways to increase the efficiency.

Reduction of unnecessary movement and optimizing delivery routes during the **transportation** can be easily handled by using **IoT sensors** which collects real-time data that may be used for identifying, locating, and assessing orders using sensors like Global Positioning System (GPS), Geographic Information Systems (GIS), Radio Frequency Identification (RFID) (Paul, Chatterjee, & Guha, 2019, Fenik et al., 2020). Secondly, **big data analytics** also play a crucial role to improve traceability for better tracking and flow of goods from production to deliver (Awwad, Marathe & Kulkarni, 2018).

To avoid excess of **inventory**, the retail industry is gradually shifting towards smart inventory. **Big data** helps in data-driven decision-making, demand forecasting while maintaining a stable inventory, **blockchain** establishes improved documentation and communication between distribution centres and retail stores and provide up-to-date inventory record and transactions (Awwad et al., 2018, Mondol, 2021). **RFID and barcoding** help to link the set of inventory data from store shelf to the back stockroom, central warehouses and other stores for full visibility and tracking (Fenik et al., 2020). A notable example of an effective smart inventory management system is Amazon, which has automated nearly 85% of its inventory. Mula is right now at 80 percent of automation in inventory management (Jagtap, 2024).

To eliminate unnecessary **motion and movement** of employees inside the warehouse organizations leverage smart robots which helps in locating a product, pick them and place them in designated place or conveyor belt, IoT sensors are used on these robots for collecting data to optimize workflow (Xu et al., 2020). **Automated Guided Vehicles (AGVs), Automated Mobile Robots (AMRs)** are used to transport goods within the warehouse (Zhang et al., 2023).

Reduction in processing **wait time**, inventory pick up or order fulfillment by real-time tracking can be done efficiently by using Cloud based Order Management Systems (OMS) offers real-time visibility into order fulfillment process irrespective of location and allows integration of Warehouse Management Systems (WMS) thereby enabling scalability and accessibility. **Big data** helps to analyze historical order fulfillment data to predict delays of reason. As per one of our interviewees, around 60 to 70 percent of time has been reduced through these automations in mula, a Berlin based retailer (Jagtap, 2024).

Production planning consider material requirements planning (MRP), enterprise resource planning (ERP), just-in-time manufacturing, and collaborative planning, forecasting, and replenishment to reduce overproduction ahead of demand. **Overproduction** is management by using AI to analyse trends and predict future data, big data collect and analyze data from various sources and could-based collaboration which provides a platform to facilitate communication and data sharing (Bueno, Filho & Frank, 2020).

Reduce processing error and increase accuracy by automating data entry and streamlining workflows. **AI** helps in automating the data entry and order verification, **smart robots** help in picking and packing of orders during the processing, and **cloud-based management system** acts as a command center to optimize the entire order fulfillment process and increases collaboration within teams (Andiyappillai, 2021).

Retail industry faces the most challenges with respect to **defects**. Reduction of with improved quality control, trainings and innovation in manufacturing techniques. Use of **IoT** sensors to monitor and track factors like temperature, humidity, and vibration during storage and transportation (Salah et al., 2020). **Blockchain** helps to maintain a tamper-proof record by tracking and tracing the products from raw materials to retail shelf (Sunny et al., 2020). **3D Printing** helps in customized product design and production while reducing the risk of defects with traditional methods eg: NewBalance, **AR/VR** is widely used for trainings, virtual testing and visualizations of product, conduct supplier audits with AR (Ali & Xie, 2021). Digitalization helps to **reduce the waste** in supply chain by optimized inventory management, demand forecasting, improved transportation efficiency and reduced paperwork.

Use of various digital technologies to **meet consumer demands** and obtain satisfaction. **Big Data** analyzes customer data with reviews and comments to understand and predict real-time customer needs and pricing strategy, **cloud-based Product Management Systems** ensures the real-time updates on products to various teams, thereby resulting in quick corrections and streamlined processes. **AI powered chatbots** provides personalized suggestions based on past purchase and browse history (eg:

Myntra chatbot Maya, mystylist) and **AR** helps in virtual try on for clothes, makeup, furniture etc. eg: Ikea. The increase in digitalization is creating a major skill gap in supply chain. To increase **resource utilization** big data is used for human machine collaboration by leveraging human judgements to increase efficiency in decision-making and **AR/VR** is used for knowledge sharing and trainings to handle and operate new emerging technologies (Awwad et al., 2018, Pitt, 2020).

A prime example of the lean management system is Walmart's digitalized supply chain where with the use of Alphabots 95% of the orders can be picked under 12 minutes, they have also started drone delivery system which enhances cost efficacy and save time. They have automated fulfilment centers in various locations which reduces the steps in the entire supply chain resulting in faster shipment. As per reports by the end of 2026 almost 65% of stores will be serviced automation, approximately 55% of fulfilment centers volume will move through automated facilities (Wahab, 2017, Walmart, 2023).

6. Transition towards Industry 5.0

During the era of Industry 4.0, manufacturing and production systems has undergone a significant transformation by enhancing operational efficiency and creating new business models, services, and products. Specifically, the primary objective of Industry 4.0 was to boost automation and efficiency by using various digital platforms or digitalization methods such as Internet of Things (IoT), Cyber Physical Systems (CPS), Platform Service Systems (PSS), Networks, Smart Manufacturing Systems (SMS), and, Cloud Manufacturing (Mouritzis, 2020).

Although Industry 4.0 has not yet been fully implemented globally, numerous business innovators and technological pioneers are already anticipating the Fifth Industrial Revolution, or Industry 5.0. This next phase will feature autonomous manufacturing, with human intelligence and technology serving as a foundational base, both integrated into and overseeing the processes. The main focus of Industry 5.0 relies on mass customization, man and machine collaboration, cyber-physical cognitive systems, human centric systems, resilient systems, adaptive cognitive manufacturing systems, value driven and focus on sustainability (Mouritzis, 2020). As per one of the interviewees, mula has been using human machine collaboration so as to predict demand i.e. 20% of AI and 80% of human intervention. Additionally, mula follows sustainable practices by reducing plastic consumption by 70 to 80% (Jagtap, 2024).

7. Success and Failure Factors

7.1 Success factors

Digitalizing supply chains entails the implementation of advanced and intelligent technologies to enhance connectivity, collaboration, and efficiency within supply chains. Digital Supply Chain is defined as an intelligent process that leverages innovative solutions with emerging technological means to generate new forms of revenue and business value for organizations." Industry 4.0 and 5.0 involves transforming businesses through digitalization and internet integration by adopting technological applications that significantly improve the design and manufacturing processes, operations, and services of manufacturing products and systems (Haddud and Khare, 2020).

Firstly, **demand forecasting** becomes easier and more accurate for companies with the use of Machine learning algorithms and advanced analytics to predict the sales volume. Secondly, **digital marketplaces and e-procurement platforms** help in streamlining supplier discovery, negotiations, and real-time data sharing for just-in-time deliveries. Moreover, **cloud-based inventory management systems, RFID technology, and warehouse management systems** provide real-time stock visibility

and enable dynamic inventory allocation which helps the companies to manage inventory efficiently. Furthermore, **automation in warehouses and stores, smart robots** are used for picking and packing, and route optimization software to improve efficiency and reduce human labor, in turn reducing the cost. Finally, **integrated supply chain management software and data sharing platforms** fosters collaboration, and proactive decision-making to maintain transparency across the entire supply chain.

7.2 Failure Factors

While digitization in the supply chain has numerous benefits, there are many factors which are still untouched and need to be streamlined to implement the transformation of the entire ecosystem. These challenges are expected to vary from one business to another depending on the level of understanding and awareness among the companies about the impact of digitalization in the supply chain industry, and its existing technical infrastructure. Companies are still in a transition phase where some of the major failure factors or challenges per the current scenario are:

Firstly, **data silos** such as incompatible data systems or limited data sharing practices among supply chain partners such as the suppliers or the companies can hinder transparency and collaboration. Secondly, **the skill gap** is one of the major issues in a fast-paced environment with the increase in digitalization, which has generated a considerable requirement for investments in training and knowledge sharing for new technologies. Moreover, **integration challenge** is another major challenge in today's supply chain ecosystem to avoid data silos and enable a holistic view of operation, the smooth and seamless integration of new digital solutions with existing systems. Furthermore, with the advent of magnificent increase in digitalization, the higher management in companies are facing challenges in fostering a data-driven culture, clear communication channels, and a culture of accountability and feedback within the organization to promote **change management**. Additionally, as the supply chain industry is facing a significant change towards the digital world, the reliance on digital technologies and data sharing has heightened the **cybersecurity risk** and has increased the need for robust cybersecurity measures to protect against potential threats.

8. SCOM 5.0 Excellence Checklist

To conclude, as per the research in this paper, to achieve Supply Chain Operations Management (SCOR) excellence in the era of Industry 5.0 the supply chain industry will go through a major transition of transforming into an ecosystem where human and machine unitedly work together. Hence, organizations must focus on the following key areas such as human-centric approach, sustainability, customer-centricity, digital transformation, agility and resilience, collaboration and integration, data-driven decision-making and cybersecurity and data privacy.

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Appendix

Interview 1:

Location: Online meeting via Teams, HWR campus, Berlin.

Date: 24th Apr. 2024

Interviewers: Panda. S, Bhamidi. R

Interviewee: Chabbra. H, (Supply Planning Manager, Wella Company)

Q1. Could you share some of your experience till now in supply chain?

A1. Okay, so let me also open. Because I just before you joined me, I was just mentioning to Sneha that I'm not sure I will be like a lot of help to you guys because firstly the company I'm currently working with, it is retail company, but we are not at the side of like using a lot of automation. So, it's too much manual work because I was working in P&G earlier.

I had a lot of tools, but to be honest, I've forgotten about it because so it's been two, three years. And currently in my company, we are using too much of Excel. So, a lot of manual work. Secondly, I don't have my background in education and supply chain. I just like stumbled into it. So, I'm not like a very technical person.

Q2: How does a regular day in inventory management look like?

A2: I work a lot with inventory. So, I work with inventory management, excess management and something related to safety stocks. So, most of my life I was working with end-to-end supply planning. So, I was never involved in when it comes to like distribution. Let's say like I was not aware about I was working with strategies basically. So, I was never into distribution. I'm always doing something related to the launching some strategies to mostly optimizing inventory. So that's kind of my specialization right now.

Q3: What is your current profile and what are you working on right now?

A3: So currently I am working with a company called Bella who was into hair products and nail paints, which is OPI nail paints. I'm working as an ESP planning manager, which is end-to-end supply planning in my current profile. I'm more like a project manager because I have like different kind of projects. I don't have any fixed work. So, most of my work revolves around inventory. So, for example, I reported also globally because this office in Warsaw is a global office for Bella supply chain. So, it's the hub for supply chain for the world. I'm managing the inventory in the sense that what do we have currently in everywhere like all the distribution centers and all our factories including finished goods and non-finished goods.

Q4: How do you manage or predict demand forecasting?

A4: I have to make sure that whatever target was there to achieve for the end of fiscal year, which is June is achieved. And then what are going to be the next target if we are off target where we are off target and then how we are going to reduce it. What do you have as plans to optimize your inventory and reduce your inventory? Anything related to any location of Wella inventory is on me. Any distribution center any factory so that's one part second is I am responsible for production volumes overall for Bella. Like, what are we going to produce overall everywhere throughout the year and versus what do you have in demand?

Q5: Do you use any digital tools for demand planning?

A5: I'm not in demand planning completely, but I take inputs from them because I am like a middle coordinator. I know that there are value streams who are maintaining all the factories production. And then I know there is a demand planning team who are maintaining their demand putting the forecast into the system. I take inputs from both of them and then very regularly. I have to sit with finance where I need to tell them that okay for current fiscal year. This is I'm this is how much I'm going to produce. This is how much I'm going to sell by product. Not by products by division.

We do not use any tools yet but we are at the edge of turning a lot of things, a lot of these processes into automation tools. We are in the verge of converting a lot of things to, handing it over to Blue Yonder, which is I think previously JDA. So, I think with that we'll have a lot of tools in future, but currently it's purely manual.

Q6: Does Wella take any sustainability measures during the entire supply chain process?

A6: I have a little bit in sustainability part as well where I'm handling overall well as air freights. Of course air freights is something which is not good for the environment cost wise is not good. We should not use it as much as possible. But there are a lot of times something goes wrong in your supply chain and then you need to send something urgently for whatever reasons. This is something I've been doing for the last two years and we were able to actually reduce it a lot as well. We were spending 4 million in 2022 and now we are spending 1 million.

Q7: How do you deal with waste as your company is still following the manual methods?

A7: There are a lot of products like slow movers, a lot of fast movers as well. And then you have these products which are just there to fulfill your portfolio and not really help in sales and just are so slow moving that either it creates excess, increase our inventory, and then we end up destroying them. If you had a lot of excess with a similar kind of initiative in the past, we had to destroy a lot of products and it didn't do very much on the net revenue. So now this time we want to challenge them that not to launch because the list of SKUs sometimes is so huge in retail that 20% is giving you like 60, 70% of revenue and 80% is just like sitting there. So, it happens all the time.

Q8: How do you manage your inventory and predict the sales?

A8: So, from our inventory perspective, we have this model where we take all the past data of a similar initiative. And we try to predict with that historical data that how this initiative is going to do in future for us. There will be a lot of outcomes with the historical data. This new initiative, I'm saying that, okay, this is the net revenue. I'm going to have this much of excess inventory. I might have because we've had in future and we didn't, you know, we didn't succeed with the initiative. Like what does it make you think that this time you're going to succeed? We want to really reduce the portfolio and we've been working on reducing the portfolio in the last two years and it's actually working in our favor because it's reduced waste, reduced destruction, better to manage, and really helps us overall in supply chain to handle a smaller number of SKUs. This is like, for example, these kind of, I don't know if it's, I can call it prediction, but yeah, this is something which we want to proactively do to maintain inventory because for me, everything is related to how inventory is going to look like. We're not really into like how is the service, so like fill rates and all.

Interview 2:

Location: Online meeting via Teams, HWR campus, Berlin.

Date: 30th Apr. 2024

Interviewers: Panda. S, Bhamidi. R

Interviewee: Jagtap, J. (Senior Manager Supply Chain Management, mula)

Q1: Do you use any specific digital tools?

A1: We used to use SAP earlier but since last two years we have entirely cut off this software and we have been using our own in-house ERP software since then.

Q2: You have seen the transition from manual to the digitalized supply chain system, so do you notice any difference back then and now? How does digitalization impact the supply chain?

Yeah, for sure, like as I said, like before, like two, three years we only had this central ERP system where we only used to do inventory management over there, but we had all entire purchase order, like purchasing activities on Excel and through Google Drives and that's the main, I would say, transition that we had in last two, three years that we have now entire digitalized this whole purchasing process over our platform. All the orders that we are getting is over our platform and then we can see all the purchase orders within them and also work on them directly on our platform.

So, this was one of the tasks, I would say, we used to do more in a digital way and now we are doing more in a digital way and other than that, I would say, like the inbound and outbound logistics was also one of the activities that we used to do more on the paper, more on the paperwork. And yeah, this also right now, we have optimized it over our platform digitally and now we can filter out all the inbound and outbound logistics deliveries that are coming and leaving our warehouse.

Q3: Do you also see any reduction in the number of errors that would happen?

A3: Yeah, for sure, like what we have noticed since using those is like, of course, the errors are reduced, but also the manpower and the work which is required has been reduced along with the time. And the more important thing is everything is standardized now and the processes are standardized, the scope for the error is minimized a lot. And also, like I would say, that right now we are in a position where we can retrieve the data from past two, three years before we did not have any data as well, because everything was manually done and also done over the paper and it's very hard to gather the data from that from that perspective. But right now, we also have those data and we can use them for forecasting and also for negotiations when we are meeting our suppliers and customers. So that's one of the other things.

Q4: How much time is expected to be reduced right now? For example, like if something is to take one week of time right now, is it only one or two days or even like?

A4: I mean, like right now, what I could say is like around 60 to 70 percent of time has been reduced through these automations. I mean, like 67, I can't tell you exactly how much, but I would say like 60 to 70 percent is what I feel has been reduced.

Q5: Can you please tell us a bit about your inventories right now? How much they are automated and how many percentages of manpower they are using right now?

A5: So right now, like we have almost 80 percent of automation in inventory management. That means within our platform, we have our warehouse management system where we store all the inventories and we also pick them from warehouse through this warehouse management system. The only thing

what we don't have right now is the stock checks that we are currently doing manually, but that is something I would say like is always done manually in a more traditional way rather than living directly from the platform. So yeah, something that is really struggling to do it over the platform. Other than that, I would say like 80 percent of the activities are done over our digital platform.

Q6: Do you see a drop in hiring because of automation? Because we've gotten like very mixed information regarding this like some say automation is not going to reduce jobs, some say they do. Do you have any thoughts about this?

A6: So yeah, I mean like what I have felt is like automation has definitely reduced the manpower within our team. Earlier we had to, we had like around four to five people within our team for handling all the purchase orders and right now that has been reduced because of the automation like a single person can handle more order purchase orders. That is in a way it's good for company, I would say, but it reduces the manpower as soon as the automation has been increased.

Q7: For demand forecasting sort of things, even though AI is used, is there still some kind of human intervention where they double check what's going on, if it's going fine or not, or is it like completely you rely on the AI?

A7: Yeah, like we do the forecasting based on the current situation. We take the help of the AI but we don't rely on AI a lot because the current situation in the current market is really volatile and I would say like AI just using the past information and which can't predict the future. So it's really like our forecasting really depends upon the sales numbers and sales speech and based on that we do the calculations and yeah, I mean like I would say like 20% is based on AI but 80% is again on the human interventions.

Q8: In your entire career in this current company right now, would you like to share something that like has stood out completely in terms of digitalizing the entire supply chain process where either you reduced a lot of time or something else?

A8: So, like from my perspective, like automation and digitalization has really helped us within our company to grow in a very organic way I would say with all the fulfillment rates getting higher because of the automation and also the errors that we used to make when we used to have non-automated processes that has been significantly reduced and also the human aspect also has been reduced with the use of digitalization. I'm personally a big fan of digitalizing all the supply chain processes but, in the end, you need someone like someone who has really knowledge of supply chain processes in depth because in the end everything that you are doing is related to passing all the information and that information really needs to be passed in a more correct way. So that's what I'm thinking right now is the main problem of digitalization that needs to be breached out very accurately using the more talented people that are working

Q9: Where do you see your current company with respect to sustainability?

A9: Yeah, initiating the sustainable practices but what we have done over the last few years significantly is reducing the waste which we are producing in terms of plastics and all these things we have like 70 to 80 percent. We are using it to reduce the plastic waste as well.