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Why Supply Chain Management is Competency Based and Business Performance Driven

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Abstract
The concept of Supply Chain Management (SCM) has been in existence for over 36 years with the aim to make firms more competitive and provide better value to end users or customers. As a result, this paper positions Supply Chain Professionals (SCP) as the new frontiers in sustaining and improving the Supply Chain business process through a set of unique managerial and technical skills and qualifications that have been critically analysed and discussed by the authors.However, most Supply Chains are dynamic and are now being faced with big problems that can be solved with recent developments in Supply Chain Management software and related technologies.
Keywords: Supply chain management; Supply Chain Professional; competencies; business performance; logistics

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I. INTRODUCTION

Ever since Keith Oliver (a British logistician and consultant) coined the terms "Supply Chains" and "Supply Chain Management" in 1982, Supply Chain Management has been crucial to the way businesses think about meeting the requirements of customers which includes a network of different stages that facilitate the production from sourcing of raw materials and delivery to the final customer.

According to Kenton (2019), "aSupply Chain is a network between a company and its suppliers to produce and distribute a specific product to the final buyer. This network includes different people, information, activities, entities, and resources". He emphasized that Supply Chain Management is an essential part of the business or commercial process and there are various links in the Supply Chain that require skill and expertise.Supply Chain Management can reduce a company's overall costs and increase profitability when it is operated effectively but if one link shuts down, the rest of the Supply Chaincould be affected and this can be costly to the business.The aim of Supply Chain Management is to increaseacompany'scompetitiveness and customer satisfaction. In this age, efficientand effectively running Supply Chains permit firms to deliver products to the end-user within agreed timing at a low cost as a result of the increasing expectations from customers for better products, faster service, and lower prices.

In SCM, the Supply ChainProfessional (SCP) coordinates the logistics of all aspects of the Supply Chain which consists of five parts (Hayes, 2019). This signifies the cordial relationship between logistics and Supply Chain.

II. SUPPLY CHAIN MANAGEMENT VS. BUSINESS LOGISTICS MANAGEMENT

The terms Business Logistics and Supply Chain Management or simply, logistics are mostly used interchangeably. Business Logistics is a part of the Supply Chain that manages the storage and movement of services and goods from point of origin to final destination. Logistics management begins with the raw materials and ends with the delivery of the final product.

Successful logistics management ensures that there is no delay in delivery at any point in the chain and that products and services are delivered in good condition. This, in turn, helps keep the company's costs down.

2.1 Two Big Areas of Supply Chain:

1. Logistics: This is a couple of activities to help transporting any raw materials, work in progress and goods. This consists of transportation, warehousing and inventory.

2. Manufacture: This is a couple of activities that add values into raw materials and convert it to finish or semi finish goods (in exchange for financial reward) that is ready to be transported to the customers. In essence, manufacturing consists of production level, assembly process, packaging and so many more.

Basically, there exists different area of specialization that have professional career path, although Supply Chain degree summarizes all the job on the surface, it is now left for the individual to build a capacity on any one of it, which most time depends on practitioner's first job.

2.2 Different Branches of Supply Chain Management

A simple and logical way to remember these branches of Supply Chain is to model it according to the Supply Chain Operation Reference Model (SCOR) which defines Supply Chain Management in 6 stages:

1. **Plan:**Planning for the entire Supply Chain process requires identification of product to be manufactured, demand management and forecasting, capacity management, network planning, source identification, material requirement planning (MRP I), manufacturing resource planning (MRP), master production (MPS), professional career path here are demand and material planning, forecasting, inventory planning, sales & operations planning, production planning, network design, distribution requirement planning (DRP) and coordination in Supply Chain.
2. **Source:**Sourcing requires searching for strategic resources like space, time, machine or equipment, raw materials, technology, man power and services for the production of the required goods or services. Professional career path here are, strategic sourcing, procurement, supplier relationship management, purchasing, spend analysis, strategic cost management etc.
3. **Make:**This is the production of services and goods which includes production planning and management, inventory management, capacity planning, plant maintenance. Professional career path here are; operations and production management, capacity and facility management, quality management, lean manufacturing, warehouse and inventory management, and process improvement.
4. **Deliver:** This is the distribution of goods to consumers either physically or otherwise.It includes activities of Supply Chain such as logistics, physical distribution management, marketing management, channel management, inventory management at different Supply Chain layers and transits. Professional career path here are transportation or distribution management, fleet management, network design and optimization, inventory management, delivery management.
5. **Return:**This relates to the return of goods either due to defective reasons, recycling and reuse, or short of customer's specification. Many e-commerce companies experiencing returns as a common part of green Supply Chain Management, with such companies like battery manufacturer, wherein the Supply Chain may include taking back waste or expired battery for recycling. Professional career path here are reverse logistics, green Supply Chain Management, returns management, quality assurance.
6. **Enable:**Enabling is also a new term which has been recently added to the SCOR model and may include different technology systems and processes that enable Supply Chain to work efficiently. Examples are Enterprise Resource Planning Software like SAP and Oracle. Professional career path here are IT Infrastructure like ERP, Contracts Management, Facilities Management.

Figure 1: Supply Chain Management through the SCOR Model

III. SUPPLY CHAIN PROFESSIONALS

All industries require Supply Chain Professionals to properly manage the flow (input, transformation and output) of physical goods both within the organisation and relationships with other collaborators.

Consequently, Supply Chain Professionals are considered as a critical element in SCM (Van Hoek et al., 2002; Mangan; Christopher, 2005; Lorentz et al., 2013). The function of Supply Chain Professionals have significantly changed over the years. Previously concentrating on logistics functions (Gammelgard; Larson, 2001; Murphy; Poist, 2007), and now moving to an extensive function of performance (Harvey; Richey, 2001; Kovács et al., 2012; Harvey et al., 2013; Sohal, 2013), bringing the skills summary for Supply Chain Professionals to a wider and varied perspective than for many other management categories (Andréia&Rosane, 2015).

3.1 Skill-sets for Supply Chain Professionals

Supply Chain skill-sets are hugely relevant today. All successful business entrepreneurs will always study and implement a Supply Chain strategy at one point or the order. A very good example is Michael dell using pull strategy as a competitive edge over competitors with pure IT skills. (it helps the organization to lower its cost by holding minimum inventory, reducing number of mediators in distribution channel, helps the customer to customize personal computers according to their choice),or Tim Cook (an industrial engineer by training) who was brought to reduce inventory and make Apples' Supply Chain more agile and well leaner. Principles and concepts relating to Supply Chains are hardly presented as a core subject or unit in business programs, and how Supply Chains and networks should effectively operate is usually not understood across management profiles. Recent trending terms can be flaunted in meetings with the speakers being unable to convert the terms into useful plans and actions for their organisation's Supply Chain targets. This is why Supply Chain Professionals are essential (Oakden 2019).

3.1.1 Supply Chain Jobs

Rossetti and Dooley (2010) (qtd. in Andréia&Rosane, 2015)discovered there is a lack of clarity in defining the professional practices and types of jobs associated with SCP. They suggested eight possible positions of management that are linked with SCP:

- Supply Manager – develops and manages activities aimed at the improvement of the supply network right from the origin (supplier or plant) to required point.
- Operations Manager – develops and manages activities directed at process improvement incomprehensive operations,
- Service Operations Manager – monitors outsourced companies and service providers
- Purchasing Manager – develops and manages activities directed at replenishing or controlling inventory and supplies usage,
- Information Manager - develops activities directed at the global information management in the Supply Chain,
- Integration Logistics Manager - develops activities aimed the internal and external monitoring of product flow,
- External Logistics Manager - manages the link between company and consumer,
- Manufacturing Manager - develops activities directed at the production management as well as quality management and processes improvement.

3.1.2 Key Capabilities or Competences of Supply Chain Professionals

Oakden (2019) describes what he conceptualized as the "key" capabilities of a Supply Chain Professional in figure 2.

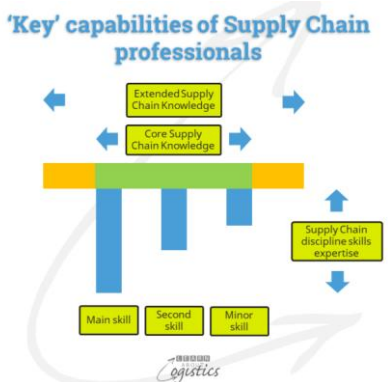

Figure 2: Key Capabilities of Supply Chain Professionals, (Roger Oakden, 2019).

The main concept in figure 2 is to modify the capabilities of a Supply Chain Professional from a "T" perspective into a shape similar to a "key".
The "key" shape recognizes that Supply Chain Professionals should have many skills with different degrees of depth in his area of discipline. These areas form the 'teeth' of the key. The trunk of the key recognises the knowledge required at two major levels:
a) Within the organisation's core or central Supply Chain (i.e. between tier 1 suppliers and tier 2 customers)
b) From beyond the organisation's central Supply Chain (the stretched Supply Chains).
Oakden (2019) further expatiates that the 'key' shape covers the variety or collection of skills and knowledge required for Supply Chain Professionals to be problem solvers in their Supply Chain discipline or domain. It also enables them with confidence and knowledge to collaborate more easily with others from various disciplines and backgrounds, to solve problems.
According to the authors, the competences of Supply Chain Professionals revolve around three key areas of management; planning and analysing, implementation and supervision, and control.
1. **Planning and Analysing:** requiresevaluating the performance of certain objects and plan to develop or improve the object to raise performance in future. The red colour in figure 3 signifies it is a very important phase that must be well thought out with great insight. Planning is difficult and time consuming but it is also needed in every business. For example: in the field of inventory, raw materials need to be sourced, procurement plans and analyse purchase, price, quality and delivery options so it can timely support production process. Production process would be a mess, if there is no raw material provided in the middle of production process. The planning must be comprehensive and accurately analysedto avoid waste from overstocking or loss from understocking.
2. **Implementation and Supervision:** This is easier than planning because practically, this job will be done by supervisorswho monitor and manage operators that follow the planned process or standard operating procedure (SOP)of the planned system. The yellow colour in figure 3indicates the system is in the test phase or early implementation stage. People managementis very crucial at this stage because Supply Chain Professionals must be able to managethe strengths and weaknesses of both their direct staff and colleaguescross functionally.
3. **Control:** Monitoring the running process is another important stage because if we cannot monitor performance, we would not be able to identify performance efficiency that will guarantee customer satisfaction. A control system is critical to sustaining the system; for instanceto allow us know when the raw materials run out and when we should order for replacement.At the control stage, the green colour in figure 3 signifies the system is stable to a great extent and can be sustained with corrective measures if there are outliers.

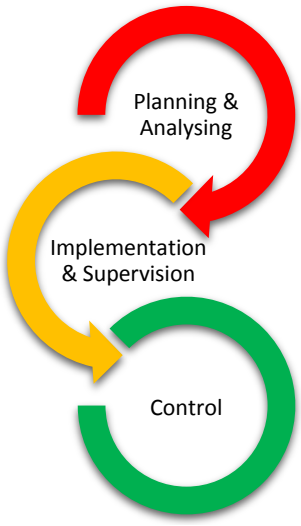

Figure 3: Key management areas of Supply Chain Management

Understanding these three key areas of management will create a foundation forSupply Chain Professionals to effectively build on managing Supply Chains and what impacts them through a wide set of skills and knowledge.Some of the technical skill-set required by Supply Chain Professionals to enable them implement the earlier mentioned job summary are;
a) Logical Thinking - the ability to break problems down into logical components, recognize edge cases, boundary conditions, and then solve each issue is something professionals use every day. This could be achieved either with common sense (a pragmatic approach to see the consequence and importance of your

actions),experience and exposure, or brainstorming with others,to make sure the solution is doable and sellable to the management.

b) Forecasting techniques, statistics and data analysis. This will depend on the nature of the job.
c) Six Sigma. It depends on the organisation, but some of the tools can be excellent and they are based on statistics or problem analysis. One needs to be careful about creating a monster that is hard to maintain and manual or time taking process.
d) Operations research - depends on the role. Professionals can use linear programming, queues, and lots of optimization techniques as well as rules of thumb. For example;
* 80 % of demand in a distributed network can be delivered by external vendors to a local warehouse or via direct delivery, if you have a medium lead time, with 20 % being kept in regional warehouses. or
* variations in lead time and delivery quantity can be much larger than variations in demand which are far worse a problem for labour and machinery loading in a DC.In this case operation research procedures will help to favour a trade-off decision to be taken. Operations management covers topics relating to industrial engineering and Supply Chain Management, such as:

- Process design, flow and simulation
- Value stream mapping
- Critical path analysis
- Lean and six sigma
- Inventory reorder point, safety stock and service level
- Supply Chain network optimization
- Service operations management etc.

e) Financial calculations (management and financial accounting):This includes costing and activity based costing, overheads, reading financial reports, ROIs, KepnerTregoe for business justifications and predictions of costs. Math skills combined with strong analytical and statistical capabilities to understand supply and demand issues and also ability to use data to track orders and shipments, sales trends, demand and any weaknesses and inefficiencies.
f) Excel or data cubes and reporting systems or Structured Query Language(SQL) – this is important to able to make difficult issues clearer without distorting the numbers. This will also help create a structured answer in a spreadsheet for prompt decision making.
g) Safety stock and re-order levels: Drum Buffer Rope (DBR)- planning and scheduling solution, advanced planning systems , constrained ordering systems and ABC inventory/ Almyta Control System (ACS)
h) Matrices: used for making seismic surveys. They are used for plotting graphs, statistics and also to do scientific studies and research in almost different fields. Matrices are also used in representing the real world data's like the population of people, infant mortality rate e.t.c
i) Graph Theory - This is the source code of understanding the micro and macro relationships in Supply Chain. You'll be faced with problems like the vehicle routing and bin packing problem.
j) Linear Programming
k) Probability and Statistics
l) Statistical Process Control
m) Precise Question - Precise Answer Communications Skills
n) Statistics & Probability - Having an understanding of probability and statistics cannot be overstated here. Being able to read statistical process control charts put professionals at an edge.
o) Learning How the Sales Process Works - Knowing how to sell to all layers of the Supply Chain increases professional utility to the Supply Chain. It allows professional to think about "dynamic marketing" based on the location of a supply node and much more.
p) Programming skills –SPSS, MATLAB, SIMIO. Knowing exactly how to use these to simulate manufacturing protocols.
q) Problem Exploration - This is the single greatest area where people fail. The ability to pseudo randomly explore the Supply Chain environment and listen to those in it, till the problem emerges, is of key importance.
r) Data Schlepping - Listening and talking to people on the ground in the Supply Chain as well as interpreting data is a valuable skill you can have. Furthermore, the ability through experience, to identify what types of data generated will be of high quality for optimization later is a massive skill.
s) Scientific Competency - The more of it you have, the more valuable you are to the Supply Chain and the market at large. Semiconductors and Pharmaceuticals are no small matter and they require sophisticated Supply Chain managers. They have all the tough elements of things to deal with.

- Difficult shipping lead times.
- Moore's Law

- Eroom's Law
- Scaling Synthetic Chemistry
- Inelastic Demand
- Commodity Price Fluctuation
- Quality Control
- Supply Chain Benchmarking
- Expiration
- Regulations(For instance, CGMP- Certified Good Manufacturing Practices)

3.1.3 Level of Education for Supply Chain Professionals

On the level of education required for Supply Chain Professionals, FrissandSzóljon(2020) discovered that University education is now more relevant for Supply Chain Professionals than ever. From their studies, they were not surprised that the average level of education of Supply Chain Professionals is high which is evident in Figure4showing the percentage of Supply Chain Professionals with graduate university degrees (71 percent) to be significantly higher than their peers in sourcing (50 percent) and logistics (23 percent) respectively. This was also similar with the percentages for Supply Chain Professionals without staff responsibilities.

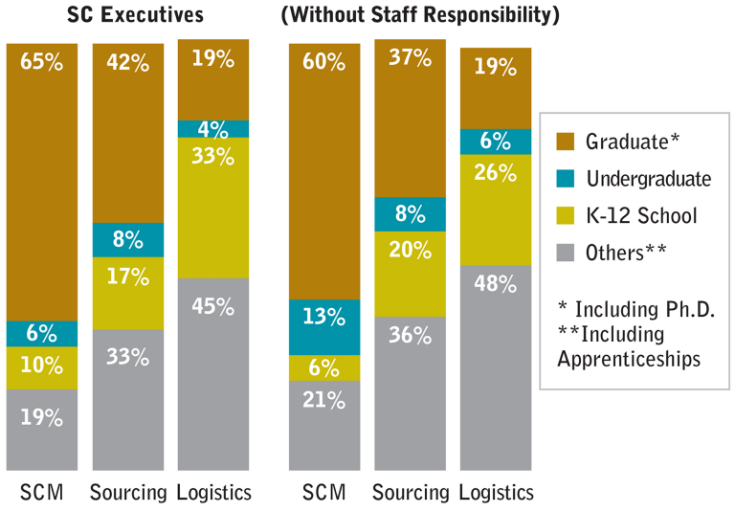

Figure 4: Level of education for Supply Chain Professionals (Friss and Szóljon, 2020)

Friss and Szóljon (2020) also learnt that the level of education for young Supply Chain Professionals have increased and a university degree is important for these professionals in SCM. In figure 5, the results also show that 84 percent of the age bracket 25 to 29 years have obtained a university degree while 40 percent of professionals from 60 years and above possess a graduate certificate. A similar but lower trend exists in the professionals of sourcing and logistics.

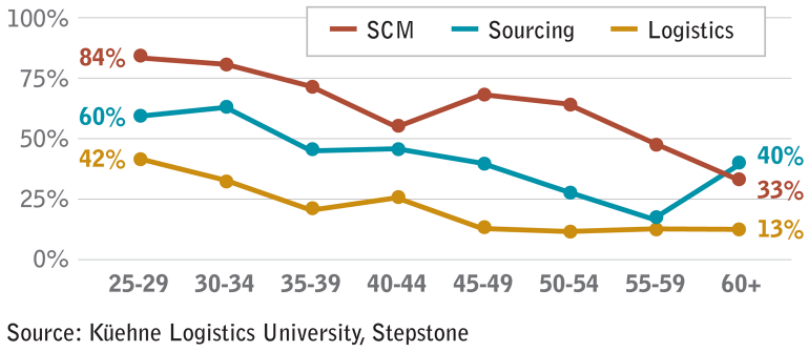

Figure 4: Level of education for Supply Chain Professionals by age group, (Friss and Szóljon, 2020)

3.2 Challenges of Supply Chain Professionals

Knowing that Supply Chain Professionals are crucial to the coordination and success of Supply Chain activities, this does not exempt them from the following challenges that are prominent with managing Supply Chains;

- **Uncertainty**

Where there is an existing production and future trade agreements, Supply Chain Professionals must expect volatility and prepare for it. Uncertainty is inevitable most especially, in industries where business trade majorly on irregular or unpredictable demand and or supply. Irregular demand and supply defile all Supply Chain strategies. Different solution exists depending on the uncertainty of the problem such as;

- What is the effect of external policy on my business?
- Which of the supplier is likely not delivering raw material to us?
- How much will my new products sell?
- What kind of quality problems will my customers experience?
- How much will my customer return back?
- What am I going to sell in the future?

Historical data, independent variables (demand or supply driver) and predictive analysis might be a proactive solution for the uncertainty problems.Also Companies need to establish structures which allow for fast analysis, decision-making and execution.

- **Disruptions**

Events like the tsunami in Japan, the hurricanes in the USA, the floods in Thailand and the eruption of the volcano in Iceland have unveiled the vulnerability of many of today's Supply Chains. Most recently is the COVID-19 pandemic that is now changing the usual Supply Chain practice of centralization to adopting more concepts that supports decentralization of operations and distribution.

Visibility is fundamental, which requires identifying the major players and their abilities, agreed conditions and prices, etc. and the transparency of relationships between parties which requires the mapping of the Supply Chain end-to-end. This in itself is a challenge, as suppliers need to be asked to provide information, which need to be checked, completed and constantly updated.

- **Demand Forecasting and Life-cycle Management**

Walgreens in 2014 had a $1 Billion forecasting mistake that led to the exit of two executives. Nike also encountered a demand planning software failure in 2001 that led to lost sales running into a $100 million. These examples imply that Supply Chain is a complete system in which a defective part will affect the whole Supply Chain.Although some industries are more volatile to this failure than the others, but there are no industries immune from these error if wrong strategies areutilised. It might be difficult managing demand and forecast of products with short life cycle like fashion, electronic gadgets, food & beverages etc. due to its short phase.

- **Cost and Performance Management**

Michael and Much (2010) identified another traditional field of a vast range of challenge which is cost and performance measure. Performance management is not just about collecting, analysing, and reporting data; it is about improving results, improving efficiency, and providing better services to customers by giving policymakers, managers, and others the necessary information to make educated decisions. Governments are facing increasing pressure from all sides, and the current situation will not work. Private firms face the same challenge in the form of competition, and in response, they have to innovate and improve to remain effective.

Questionssimilar to what is presented below will provide insights for cost and performance management;

- Do I have detailed understanding of the costs associated with my current processes?
- Do I have growing indirect costs and issues with appropriate allocation of costs?
- Do my operations fully match current business strategy?

Organisation need to clearly define Balanced Scorecards and dashboards. Strategic, operational and individual KPIs might help to align cost and performance management to initial business objective.

- **Inventory and Cash Flow Management**

No doubt inventory control has a relationship with cash flow management. Effective inventory control can boost your cash flow, in the same way that bad stock management will lead to additional costs and even cause cash flow problems.Although, holding inventory might be unavoidable. However, holding too much inventory stock ties up cash that could be invested in other areas of the business.An effective way to improve profitability and cash flow is through proper inventory control. Inventory helps to generate cash flow but purchasing inventory needs a cash expenditure that will affect the organisation's cash balance.

- **Peak Management**

Singles Day, Black Friday, Thanksgiving, Christmas, and Chinese New Year are the most prominent examples of events which create massive peaks in the Supply Chain. Retailers, delivery companies etc. hire hundreds of thousands extra temporary staff to cope with the volumes - sometimes more, sometimes less successful.Designing for peak is a combination of flexibility and scalability (Khodl,2019). "From a strategy standpoint, we have to build flexible designs that can meet today's operational needs",Khodlalsoopined that "process must also be scalable to accommodate future growth".

- **E-commerce**

E-commerce has boosted the number of home deliveries. Individuals do not behave like businesses: they might do what they said or not, might be at home or decide to leave to go somewhere else. New delivery models are required and need to be constantly developed further to adjust to changing customer expectations.The home deliveries are significantly increasing urban traffic. Supply Chain managers need to monitor developments in the cities to be able to quickly react to regulatory or other changes.

- **Omni-channel**

Omni-channel is a cross-channel content strategy that organizations use to improve their user experience. Today's consumer wants everything, every-time and anywhere. They shop digital, mobile - day and night. In large cities deliveries are expected within minutes. Traditional shops will be gradually replaced by the show room model.Customer's demand for flexibility and speed require highly agile Supply Chains.

- **ICT implementation**

Modern Supply Chains cannot be managed without powerful ICT tools and collaboration platforms. These can be designed like social media platforms, where orders are taken and offers are placed.Advanced trans-organizational control structures are required and possible in the era of internet and cloud solution or computing.However, the implementation of advanced solutions and the integration with other IT architectures is complex, time consuming and capital intensive as well as high risks are involved.Partnerships with advanced software players might be a possible solution to this challenge.

- **Cyber-security**

The digital is overlaying our physical world. Digital is increasingly steering and controlling all parts of life and business. We have to ensure that these overarching systems are not hacked by criminals or even terrorists.Supply Chain managers need to contribute to the company-wide effort to protect brand value, revenues and profits but even more so suppliers, customers and the general public.Cyber-risk awareness and management revolution is required to sensitize general public.

3.3 Biggest Problem in Supply Chain

If we try to generalise, the most common issues could be;

- **Supply Chain risks:** A major challenge in Supply Chain is the exposure to risks associated with sourcing from suppliers that get their materials from the same source. This also extends to other parts of the Supply Chain that will be affected by a disruption from suppliers' major source, putting the whole Supply Chainprocess at a major risk.Otherrisks peculiar to manufacturing, warehousing and distribution can jeopardize the Supply Chain effort if standard operating procedures and risk evaluation are not implemented at various critical points.
- **Transparency and visibility throughout the Supply Chain:** many companies do not have systems that provide transparency, making planning and follow up difficult.
- **Silos approach:** this is a cultural thing, where every department works for itself and reluctantly shares information and collaborates.
- **Data:** we have now big data collected in almost every organisation; however, the analytics and reporting are still not able to satisfy the needs of every department. The authors anticipate a fully integrated world where all data transfer is done by machines thus eliminating the currently often occurring problem of wrong/late/missing data.

3.4 Supply Chain Management Software

Supply Chain Management (SCM) software is an intelligent solution that allows managing the flow of products from the company to customers. It gives the Supply Chain Professional a bird's eye view on the position and function of products in the Supply Chain.Forinstance,some companies manage their Supply Chain operations using only emails for communication, notification and alerts, as well as common spreadsheetapplicationswhich makes their operations ineffective and non-responsive to real time decision making. Intelligent software solution can make it simple and efficient by providingfreight or product visibility throughout the Supply Chain with features such as material requirement planning,purchase order management, track and trace, and inventory stock levels and locations. Getting real time information on stock levels across functional levels can help improve and make the purchase planning more accurate to avoid unnecessary and

costly inventory stock outs or overstocking. If a shipment of productsexperience delay on its way to a client's warehouse or place of delivery, the software will give you visibility on whereand how you can get alternatives from your supply network and complete the delivery. SCM software can work as a stand-alone app or an integrated module for a comprehensive ERP system. Most of the world's leadingorganisations run a computerizedSupply Chain and enterprise resource planning software. Supply Chain Management software allows companies to:

- Automate the product flow and streamline business operations
- Speed up cargo processing
- Reduce the amount of paperwork
- Work with real-time data
- Improve forecasting
- Predict future demand using predictive analysis features

Custom-made SCM can provide company management with relevant and accurate information about warehouse activities, inventory management, and logistics processes. You can achieve improved performance and productivity thanks to business processes automation and end-to-end visibility of your Supply Chain. Clients' loyalty can be increased by reducing the distribution or delivery process and to achieve fast and timely response. That's why SCM helps to ensure better cooperation and communication with vendors and dealers through real time exchange of data.

In any case, technology cannot solve a flawed process but rather should be used to improve processing of information across the internal and external Supply Chain enterprise. It is the key to Supply Chain visibility which is needed for multi-level inbound and outbound supply networks.Managing global suppliers and transport providers by email is not sustainable over the long term but with technology.

For effective control, Supply Chainscope and complexity mightneed more than one software.Portalscan provide useful tracking information and visibility of shipments. However, they are characterized as after-the-fact instrument.

Tracking and managing orders and products of an inbound container has tremendous value compared to tracking a container number. The real problem is the purchase Order and howit moves. Supply Chain technology might just be the most valuable of the several technology applications which is important to collaboration and integration.

- Ease of web enabled connectivity, mobile access and interfaces are important.
- Overall Supply Chain process handling; ordering, transportation, warehousing, distribution, finance, vendor, and more importantly to manage and direct the process and reduce time and inventory.
- Event management and exception management capabilities should be part of the technology used; they empower control of the process.

3.4.1 Some of the IT that have improved Supply Chain performance significantly;

✓ **Business Intelligence powered by Artificial Intelligence-(AI),AdvancedAnalytics,machine learning-(ML) and Deep Learning.**

Within 2018, Artificial Intelligence (AI) and Advanced Analytics have evolved into the kind of "indispensable" technology. Moreover, SME to large enterprises are applying this technology to improve the efficiency of business process, most especially in the Supply Chain. AI and Advanced Analytics are powered by Business Intelligence-(BI) system, convert Supply Chain data into simple, accurate, real-time reports. AI will improve Automation, inventory management, timely delivery, improve customer service, reduce operational cost, improve safety at work, not forgetting that AI can also create skill gap, create security issues and difficult to spot mistakes

✓ **The Migration to the Software as a Service (SaaS)or Cloud Computing in Supply Chain Management**

In recent years, Supply Chains have been moving to the cloud and not until now that it's reaching mass-scale adoption. A recent report from International Data Corporation (IDC) 2020 discovered thatabout 80% of Supply Chaindealings will happen across cloud-based business networks. Some of its benefits is affordability, competitive environment, efficiency through automation and analysis, easy scale up of Supply Chain like inputting additional data and new location etc. Known demerits of this software are fear of downtime or accidental data loss resulting in lost profits and catastrophic interruptions.

✓ **Technology Enables Green and Sustainable Supply Chains**

In 2019, there wassubstantial evidence showing the green initiative of the Supply Chain driven by technology. Cleaner planes, ships, trucks and trainsjoined with clean technology and automation in warehousing and cargo handling, bio-degradable packaging materials are accelerating. Moreover, many countries are driving investment into green initiatives, as well as enacting environmental business policies.

✓ **Increasing Application of Robots**

As technology advances, companies are applying more robots in manufacturing, warehousing,transportation and more automation in some ports. In 2019, robots execution was 50% in use in fulfilment centres, according to IDC. This resulted in productivity gains of up to 30%, help drive down the cost of operations and off set an increasing shortage of labour in some continents.

✓ **Blockchain**

Blockchainis an integrative technology that forces data or information to be synchronized through its logical system and processes with data privacy. It produces an immutable append-only ledger, storing the history of every step of a product's lifecycle or process.Centralized repositories can be easily altered, with data vulnerabilities to bad actors wanting to move cannabis in or out of a geo-fenced sales area. It is hard enough to track the flow of old market goods in or out of a regulated market; even harder if the data entries established to track these goods can be altered at a majorlevel.When it comes to how blockchain will revolutionize the Supply Chain industry, there are several areas where we can see the potential for use:

- Transparency in logistics: blockchain allows any stakeholder to see the current status of his shipment
- Traceability: blockchain enables full traceability of the product. For example, from the farm, over meat producer up to the restaurant and this information is stored as updates come in, without the possibility of any third party alteration.
- Administrative processes (invoicing, customs) can be streamlined using blockchain
- Smart contracts that are signed online

Companies such as Mearsk and IBM are currently executing blockchainprograms like TradeLens which is a blockchainenabled shipping solution that converge port and terminal operators, global container carriers, customs authorities, and logistics and transport organisations.Others are putting in place pilots programs and it will take time until we see some standardization being put in place, which is the prerequisite to really have a Supply Chain revolution.

IV. CONCLUSION

Recent trends shows that Supply Chain Managementhas become an important part of the success factor for most businesses. Thisis due to the fact that it encompasses all activities involved from the planning and sourcing process straight through manufacturing, assembling, warehousing, physical distribution, marketing and reverse logistics (returns management). Unlike the logistics concept that focuses within the organisation, Supply Chain has a broader view of the business process and the relationships between external collaborators that provides value to the customer and competitive advantage to the business.

Consequently, Supply Chain Professionals are the new frontiers in sustaining and improving the Supply Chain process through a set of unique skills that fortify them for current and future challenges. Some of these skill which are not exhaustive have been identified and discussed by the authors under two major categories; managerial and technical skills.

Managerial skills are the foundation or the building blocks for Supply Chain professions. *Planning and analysing* requires Supply Chain Professionals to forecast or plan for people, raw materials and equipment, manufacturing, distribution andmaterial returns management in good time ahead of major activities that require the smooth running of the Supply Chain process. Planning alsohelps identify potential Supply Chainrisks or disruptions that could be promptly mitigated especially when they become unavoidable. The second phase of managerial skill require Supply Chain Professionals to*implement and supervise*planned and agreed service levels within budgeted or allocated costs and time. This is then monitored by the last phase referred to as the *control* that makes sure that operations and service levels are continuously working according to implementation standard and timely identification of defects or shortfalls in the system. These shortfalls are corrected and a corrective approach (control system) is implemented to prevent a reoccurrence.

Technical skills are the second category of skill-sets identified by the authors as being crucial to the professional requirements of various branches or disciplines of Supply Chain. These skills give Supply Chain Professionals the nitty-gritty knowledge of how they can add value to the area of Supply Chain they find themselves or have interest. Some of these skills include; logical thinking, forecasting techniques, statistics and data analysis, Operations research , process design, flow and simulation, value stream mapping, critical path, lean and six sigma, materials requirement planning, manufacturing requirement planning, distribution requirement planning, inventory, reorder point, and safety stock, Supply Chain network optimization, costing, overheads, reading financial reports, Excel or data cubes and reporting systems, graph theory, statistics & probability, the sales process, commodity price fluctuation, quality control and Supply Chain benchmarking, import and export process, documentation and control, supplier relationship management, vendor management, and ERP solutions.

Even though Supply Chainexpertsare equipped with earlier mentioned managerial and technical skills, most Supply Chains are dynamic and are faced with some challenges such as integration with IT systems,

Omni-channel, peak management, inventory and cashflow management, cost and performance management, demand forecasting and life cycle management, disruptions and uncertainty. The authors identified Supply Chain risks, transparency and visibility, silos approach to information sharing and data analytics as big problems in Supply Chain Management that must be addressed to meet up with the requirements of modern day Supply Chainbestpractices.

However, with the increasein the internet of things-(IOT), application of robotics and autonomous operations,business intelligence powered by artificial intelligence-(AI), advanced predictive analytics-(APA), machine learning-(ML), deep Learning, the migration to the Software as a Service-(SaaS) or cloud computing in Supply Chain Management, Blockchain, and the adoption of greenSupply Chain practices are recent developments that have improved Supply Chain and business performance.

V. RECOMMENDATIONS

✓ Intensifying understanding of technology—artificial intelligence, machine learning, Internet of Things, analytics software and apps.

✓ Improvement in Soft skills knowledge to negotiate and build relationships with suppliers, customers and team members.

✓ Attention to detail in order to understand the business and the environment in which it operates.

✓ Managing vendor performance as a critical requirement for reducing supply chain cycle time.

✓ Mandatory integration and collaboration along all facet of supply chain, both external and internalsupplier's and service providers, as Non-integration adds to supply chain time and the lack of responsiveness and dead spots in the cycle time.

✓ Improvement in the transfer of data along the chain in order to collect, analyse, and forward data.

✓ Multi-tier inbound logistics knowledge. What modes, carriers, service and ports are used can reduce transit time and increase inventory and cash conversion velocities.

✓ Have the ability to make decisions.

✓ Have a sense of accountability.

✓ Understand the power of networking for quick solution to issues.

✓ Have ethical standards to credibility and encourage trust.

REFERENCES

[1] Friss H. and Szóljon H., (2020). The DNA of Supply Chain Executives. https://logisztika.hu/2020/06/18/the-dna-of-supply-chain-executives/

[2] Hayes A., 2019). https://www.investopedia.com/terms/s/scm.asp

[3] Kenton W. (2019), https://www.investopedia.com/terms/s/supplychain.asp

[4] Khodl M., (2019). "Dematic Selected as World Trader of the Year" https://www.dematic.com/en-us/news-and-events/press-releases/2019/2019/05/06/17/09/2019-05-07-dematic-world-trader-of-the-year/

[5] Mucha M. J. (2010). Rethinking the Costs and Benefits of Performance Management. https://m.gfoa.org/rethinking-costs-and-benefits-performance-management.

[6] Rossetti C. L.; Dooley, K. J. (2010) Job types in the supply chain management profession. Journal of Supply Chain Management, v. 46, n. 3, p. 40-56.

[7] Siqueira A. &Alcantara R. (2015). Supply Chain Managers: Professional Profile and the Role in the Cross-Functional Integration of Supply Chain Management. Independent Journal of Management & Production. 6. 10. 14807/ijmp.v6i1.246.

[8] Supply Chain Professionals and their 'key shape' style, Roger Oakden October 30, 2019. https://www.learnaboutlogistics.com/supply-chain-professionals-and-their-key-shape-style/