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New Normal in Supply Chains: Trilogy of Resilience

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Abstract:

The new normal of supply chain has evolved due to the emergencies that were created by the pandemic of COVID 19. Major disruptions were seen from local, national, regional and international businesses. As countries fought to save lives, movement restrictions were put in place which affected the supply chains in unprecedented ways. The emergencies that were created through the disrupted supply chains affected the whole world and developing countries were worst hit as their supply chains were not mature or stable. It is in this backdrop that we look at the trilogy of the new normal in supply chains especially in developing countries. The concept of risk management strategies, technology usage and adaptability and agility of organizations and supply chains will then in turn make these supply chains remain relevant and resilient to the challenges that unforeseen circumstances like the pandemic COVID 19 bring about. The trilogy will also ensure sustainability in the new supply chains. It is in this backdrop that we look at the trilogy of resilience; the new normal in supply chains.

Keywords: Technology, risk management, agility

1. Introduction

In December 2019, the world was shaken with a new virus in Wuhan, China that later spread to all areas of the world and became a pandemic. In order to contain the virus, most countries declared lockdowns and restricted both local and international travel, Kenya being no exception. This led to a disruption to the supply chains as all industries were affected especially the travel and hospitality sector which almost came to a halt. The spiral effect was that all service providers to the industry were affected. The manufacturing sectors were also affected and most work was being done from home. The education sector was also affected with all schools and institutions of higher learning being shut down indefinitely. Most Micro, Small and medium enterprises closed down due to lack of business and raw materials.

A report by United Nations Development Plan (UNDP) released in May 2021, stated that the economic growth of Kenya contracted by 5-7% in 2020. This was articulated in a report by World Bank, (2021) in Kenya's Economic Update said that the poverty levels increased by over 2million Kenyans which was due to job losses. These disruptions definitely exposed that the Kenyan supply chains were not prepared to handle any pandemic and also the risks that are associated with pandemics. No one anticipated the risks that came with the pandemic and shutdown in the whole world. Most of the risks associated were loss of labour, loss of manufacturing, loss of raw materials, changes in emergency requirements, disruptions in foods supply chains, hospitality supply chains and education sector supply chains.

The previous supply chains were not agile and had stabilized over some times and as such the major disruptions caused many of them to shut down and major changes were seen. The risks and challenges seen were unprecedented and no one was prepared for the changes that came and thus the question that comes in mind Is 'What is the new normal and how do we ensure continuity of supply chains amid disruptions?'

2. Theoretical Underpinning

The theoretical framework for the paper will be based on three theories. These are the enterprise risk management theory, technology innovation theory and organizational agility theory. These theories are directly related to the study and give an understanding of how the paper shall have a scholarly backing.

The past two decades have witnessed a large increase in the demand for Enterprise Risks Management (ERM) and improved governance of firms' risks more generally. Pressure from outside stakeholders has been an important influence on this development reflecting corporate scandals involving excessive risk-taking. (Jankensgård, 2018). ERM consists of risk identification, risk governance and risk aggregation. The principles of holistic risk management that underpin ERM were first developed in the mid-1990s by the people behind the Australian risk management standard (RM 4360) with later additions by their Canadian counterparts. Against the backdrop of corporate scandals involving unethical conduct, the Committee of Sponsoring Organizations of the Tread way Commission (COSO).(Jankensgård, 2018). Thus this theory will handle the risk management aspect of the trilogy.

The technology diffusion of innovation theory was first postulated by Rodger. E. M in 1962 has undergone several changes with various authors adding to the original discussion. Most studies show that there is a correlation between technology adoption and skill level. (Mukoyama, 2003). Highly skilled workers adopt technology faster than lower skilled

workers and as such with the changes in the industrial revolution, skill becomes a necessity in ensuring the goals and objectives of organizations and nations are fulfilled. The other concept of technology is that it is not static and changes over time. And this diffusion is imminent. (Mukoyama, 2003).

Agility refers to two fundamentally different things. In everyday English, agile means able to move quickly and easily (nimble) and able to change or be changed rapidly (responsive). (Wufka & Ralph, 2015). A contingency approach to management is based on the theory that management effectiveness is contingent, or dependent, upon the interplay between the application of management behaviors and specific situations. In other words, the way you manage should change depending on the circumstances. One size does not fit all. (Grimsley, 2021).

Contingency theory builds upon accepted elements of System Theory. It recognized that an organization is an open system made up of interrelated sub-units. It adds, however, that the behavior of individual sub-units is contingent upon internal and external environmental contingencies. These might include the relationship between two other sub-units or external systems. This is particularly true when these internal or external units/systems have an effect on the desired outcome of a sub-unit. Contingency theory also proposes structural changes or designs, leadership styles, and control systems in an organization that allow it to react to environmental contingencies.

3. The Trilogy of the New Normal

The new normal is the unprecedented disruptions in supply chains. As the Covid-19 pandemic continues to wreak havoc and mutating, with new variants there is closure and opening of borders at random times. This means that the supply chains stability is not seen in the near future. Even mature supply chains have been disrupted with major changes in the way they do their things. Then what shall the new emerging supply chains do to remain relevant, ensure stability and also gain competitive advantage and reduce risk while improving quality and sustainability. The new normal supply chains have to embrace risk management practices, technology and agility as the trilogy of survival.

4. Risk Management

Most risk management had been done but none was for unprecedented major disruptions like the one caused by Covid 19. Risk management is a concept where we identify risks and manage them to reduce the impact to the organizations. The ISO 39000 describes risk as the uncertainty to objectives. The practice has been risks associated with financial loss are the ones that are identified but then the risks associated with COid-19 Disruptions were not made. The Public Procurement and Asset Disposa Act 2015 catered for 'emergency procurement' under sec 103(2)(c) but then again could the disasters be avoided and emergency procurement avoided. THE employment act of 2010 sec 32 requires organizations to ensure adequate and clean supply of water to staff. The most easily available prevention for covid was provision of hand washing stations which if the law was implemented then it would have not been an emergency.

The Health and Occupation Safety Act of 2007 sec 47 talks about basic cleanliness while sec 48 talks about overcrowding in organizations and places of work. These are all Ministry of Health Covid-19 containment measures that had been described in law but not enforced. We now saw organizations rushing to buy hand washing stations, and where is the emergency there? In public sector organisations, having an internal control system and risk management framework in place is essential for any public integrity strategy.

The Organization for Economic Cooperation and Development (OECD), (2020), in its report on risk management in public institutions recommended risk management in public entities to ensure Public Integrity and calls on adherents to 'apply an internal control and risk management framework to safeguard integrity in public sector organisations. The CMR Mechelsen Institute, (2007) in its report to the anticorruption resource center emphasized that emergency procurement is a bedrock for corruption as it closes out fair tendering and encourages hoarding which then affects prices. The fact that Covid-19 was a humanitarian natural disaster that was unprecedented hence no contingency plans were made ensured that to save lives, some emergency procurement had to be done and this meant that procurement plans and budgets were varied which was against the law as the law does not take into consideration the variations. Opportunities to engage in corruption are particularly high in emergency contexts, where controls are weak, funding levels and media pressure are high, and staff turnover is rapid. Despite the obvious risks, the humanitarian community rarely discusses corruption directly or openly. In post-crisis evaluation reports, for example, corruption concerns are typically raised in careful, imprecise terms (CMI, 2007).

From this backdrop where the emergency led to changes in procurement, the questions then are:

- Did we manage our risks well?
- Are our contingency plans ok?
- How will the procurement law support such kind of emergencies in future?
- Shall we always resort to emergency procurement?
- Do we review our organizational and national risk plans to encompass pandemics?
- If we manage the risks within the supply chains, how will lean supply chain be affected?
- Was quality affected by the types of procurement that was used?
- How was budget affected by the risks?
- What are national policies related to risks in pandemics and management of pandemics
- Can there be a section of the law to handle emergency procurement and direct procurement during pandemics?

The thought-provoking questions then come to remind that supply chain risks cut across organizations as they focus on the chain from upstream suppliers, through value addition to downstream suppliers. The risks are not limited to but constitute delivery risks, production, risks, reputational risks, quality risks, loss of production risks, institutional risks,

legal compliance risks, financial risks, risks associated with changes in dollar prices among other risks. As institutions, a review of risks and risks mitigating strategies need to be identified so that the whole system is not repeated in history. At the outset of COVID-19, the coronavirus was primarily viewed as a local issue affecting China. However, the SCM impacts were already occurring at the global level, with industry reports suggesting that roughly 95% of Fortune 1000 companies had global supply chain operations in China and were experiencing direct product and inventory flow interruptions. Scholars have long studied such risks of global SCM networks, yet pandemic-related work stoppages brought new SCM risk conversations to the forefront. The SCM risk research focuses primarily on operational risks that threaten inventory investments and supply chain costs. (Esper, 2021).

Some of the risks and disruptions witnessed can be summarized as follows;-

4.1. Manufacturing

Some areas that manufacturers found problems include;-

- No distribution capacity for products and services
- Inventory buildup leading to higher cost of stock management
- Lack of constant supply of raw materials leading to increased stockouts of finished products and work in progress.
- Increased losses in perishable goods due to distribution challenges
- High transport and distribution costs due to travel restrictions.

4.2. Export and Import

- Due to cross border restriction and limitations there is reduced export and imports.
- Delayed clearance at ports due to the restrictions and work capital capacity.
- Warehouses at ports are full due to the restrictions imposed and delays in shipping.

4.3. Retail Trade

- Retailers have problems selling products through cross border trade and also adapting to online trade with transportation restrictions.
- Increased inventories due to stock pile up leading to higher inventory carrying costs.
- Retailers cut down prices reducing profits so as to push inventory through to consumers.

4.4. Hospitality

- Food, travel and hotel services were really hit.
- Airlines, hotels and airports laid off workers in their hundreds of thousands.
- Online deliveries for restaurants cut their business by over three quarters.
- Losses from farmers, transporters, hotels from reduced consumption.
- Working from home also reduced the need to eat outside, travel or stay at hotels.

4.5. Transport and Logistics

- Increased distribution charges to cover for drop in cargo and also extra length of stay on the roads and ports.
- New partnerships in the distribution channels both upstream and downstream are being developed.
- There is high operating costs and low turnover leading to losses and job cuts.
- Increased travel restrictions also increasing operating costs especially passenger travel both local and international

4.6. Education

- Education institutions closed down with some countries like Uganda for upto two years.
- The food supply chains in schools majorly affected.
- Private schools closed down due to high operating costs with no turnover due to the shutdown.
- Higher education has had to go online and in developing countries where over 50% are living below the poverty line, access to online services is a dream making online learning a mirage.
- Use of modular learning to be developed.
- Institutions to embed technology in learning.

4.7. Government Services

- Most government offices were closed down.
- Most services offered were online.
- More investment in online services to be done to reduce congestion at the point of service delivery.
- Hospitals were overwhelmed and costs of treating covid, covid complications, post covid and long haul covid were quite high.
- There was major loses in human capital as casualties to covid especially the medical fraternity.
- Interventions in tax rebates were done as an emergency to cushion people affected by the pandemic.
- Quick guidelines were given on covid management but there were no guidelines to emergency procurement.
- Costs of basic goods and services shot up and the auditors generals report should reveal this.

- There was encouragement of preference and reservations scheme procurement.
- Supplier development was not done to empower the cottage industries.

From the above we see that the markets in different sectors and the government had some risk management strategies but not on a pandemic level and everyone was affected. This meant that the industries that rebound faster has some strategies in place which included risk management and agility strategies that made them rebound faster. Most of these were private sector companies which were not as rigid as public sector companies. Another aspect that also caught people unawares was lack of succession planning but this is a HR issue though the impact was also felt in the supply chains.

Thus we can say that the whole risk management strategies need to be relooked from all angles, international, regional, national, local, industry-wise and supply chain wise. New supply chains will emerge and this will offer both opportunities and risks and they need to be looked into. Laws, regulations and policies need to be also looked into to ensure that there is room to address such pandemics in future.

5. Technology

As we work remotely from home due to the pandemic, technology had to come into play. This was the norm for service sectors and education sectors but also in the manufacturing sectors services departments. By definition, technology means use of any digital equipment that is used to simplify all supply chain activities from point of supply through value addition to point of consumption including storage and logistics.

This includes hardware, software, people ware and processes to govern the use of technology from upstream suppliers to downstream suppliers. Technology can be used in many areas in supply chain to drive the 4th industrial revolution that is evident.

5.1. 4th Industrial Revolution and Supply Chain Management

Currently, we are on the precipice of what is now called the Fourth Industrial Revolution. A greater form of automation builds, and artificial intelligence enhances capabilities in the supply chain. Software now touches nearly everything in the manufacturing, warehousing and logistics processes, all the way out to consumer purchasing. (Jaekel, 2020).

The Fourth Industrial Revolution is characterized by the convergence of breakthrough technologies – such as advanced robotics, artificial intelligence, the internet of things, virtual and augmented reality, wearables and additive manufacturing – that are transforming productions processes and business models across different industries. Business leaders can no longer focus on developments and trends in their own sectors alone, but need to understand potential transformations and disruptions in the entire world of suppliers, customers and adjacent markets. (World Economic Forum, 2017).

The McKinsey model of Supply chain with 4th Industrial revolution depicts the nodes that can be used in the 4th industrial revolution and supply chain. Several technologies have emerged that are altering traditional ways of working. On top of this, mega trends and customer expectations change the game. Besides the need to adapt, supply chains also have the opportunity to reach the next horizon of operational effectiveness, to leverage emerging digital supply chain business models, and to transform the company into a digital supply chain. (McKinsey, 2016)

Several mega trends have a heavy influence on supply chain management: there is a continuing growth of the rural areas worldwide, with wealth shifting into regions that have not been served before. Pressure to reduce carbon emissions as well as regulations of traffic for socioeconomic reasons add to the challenges that logistics are facing. But changing demographics also lead to reduced labor availability as well as increasing ergonomic requirements that arise as the workforce age increases. (McKinsey, 2016).

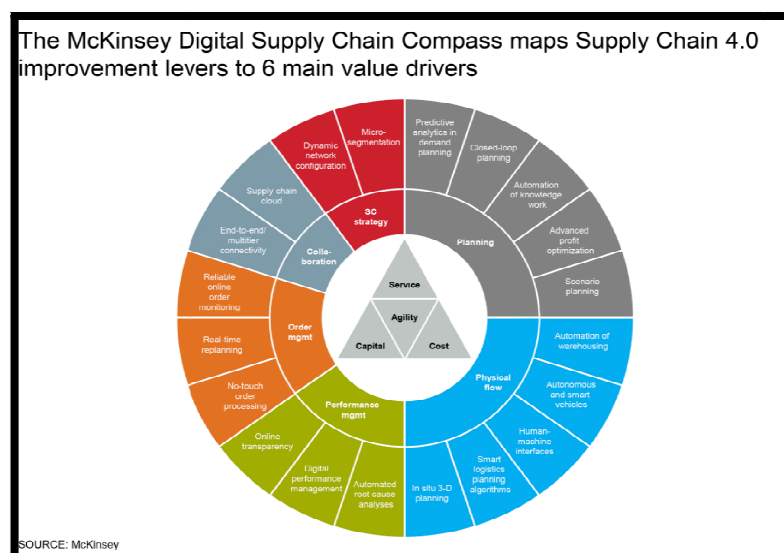


Figure 1

Some areas to look at through the 4th industrial revolution include:-

5.2. Internet of Things

Internet of Things (IoT) is a worldwide platform that creates a connected network between physical objects and devices through internet to be located, identified, and controlled. (Morssi, Elhousseiny, & Hamad, 2020). In the supply chain, Internet of Things devices are an effective way to track and authenticate products and shipments using GPS and other technologies. They can also monitor the storage conditions of products which enhances quality management throughout the supply chain. According to World Economic Forum (WEF), there are be over 20.4 billion interconnected devices worldwide by 2020.

Along with many positive sides the machines have some disadvantages like cyber risk, security issues (World Economic Forum, 2017).

5.3. Artificial Intelligence (AI)

Through AI the cognitive abilities of human beings have been incorporated in to the machines.

5.4. Big Data Analytics

Nowadays, many companies are planning to extend the existing IT-Infrastructure with Big Data solutions. New suppliers and distributors have to be integrated into the supply chain. Additionally, the supply chain operations and processes have to be constructed for global application by considering new product variants (Leveling, Edelbrock, & Otto, 2014).

Big Data revolutionizes SC business models. On the one hand, it shortens the SC layers.

5.5. Block Chain Technology

Blockchain technology, as a source of total supply chain efficiency is important in eliminating the dependance on trust-based business transactions (Wangui, 2017). Nakamoto, (2008), defined Block chain as a decentralized shared network of ledgers that have many other uses also. Reijers, O'Brolchain, & Haynes, (2016), stated that first applied in the design of Bitcoin in 2008, emerged from a movement of anarchists, computer scientists and crypto-enthusiasts who saw the potential of the technology as a breakthrough in the long-awaited realization of an old 'cypherpunk' dream of money that is free from the control of the state and other third parties, such as commercial banks; however, blockchains offer technological possibilities far beyond new ways of issuing money. A report by Kukelhaus, (2019), analyzed the trends of how supply chains will have to adapt in both the short term and the long term through various scenarios.



Figure 2

Thus, we can say that the fundamental concepts of block chains are; -

Node. It is a computer with special provision of software that helps to preserve blockchains. All the nodes are further connected with Blockchain network. This is because these can accept and acquiesce transactions. After the submission of a transaction, all of these can be sent to the nodes. From one node it can be transmitted to other nodes. Through the help of the nodes, all the transactions are cryptographically validated. To allow distributed system, agreement of all the nodes create consensus. It stops the transmission of faults to other nodes (Boschi, Regero, Raimundo, & Battochio, 2018).

There are basically three types of block chains as stated by Dujak&Sajter, (2019). These are:-

- Permission-less Block chain – these include bitcoins and Ethereum, that are decentralized and institution-less, fully public peer to peer networks where any members can join.
- Permissioned block chains – this is almost like a federation where members form a group and new members have to be referred to by old members – almost like a members club
- Private block chain – where permissions are centralized with one organization which manages all the chains.

5.6. Opportunities of Block Chains in Supply Chain

Since supply chains deal with ensuring the 12 rights of supply chain are adhered to which are the right price, right quality, right time, right place, right source, right quantity, right attitude, right contracts, right materials, right transportation, right condition and right customer.

- Track product flow visibility
- Demand Forecasting
- Open Access to Information
- Decrease in fraud and counterfeit risks
- Transaction automation
- Environment conservation
- Smart Contracts
- Smart containerization Financial Transactions.(Zhu & Wang, 2019).
- Inventory management(Boschi, Regero, Raimundo, &Battochio, 2018)

6. Agility

The third aspect of the trilogy is agility. Agility refers to two fundamentally different things. In everyday English, agile means able to move quickly and easily (nimble) and able to change or be changed rapidly (responsive) (Wufka& Ralph, 2015). A contingency approach to management is based on the theory that management effectiveness is contingent, or dependent, upon the interplay between the application of management behaviors and specific situations. In other words, the way you manage should change depending on the circumstances. One size does not fit all (Grimsley, 2021). Today's business environment is quite unpredictable and the supply chain are affected especially with the Covid pandemic still mutating we don't know what the future holds.

Customers needs, wants and demands have changed and they want quality products at lower prices in a faster way. (Meyer, Niemann, & PEckover, 2019). These external factors have pressured organisations to shorten product life cycles, adapt new technologies and increase product variety. Supply chain agility is critical for the survivability of an enterprise within these dynamic markets. Agility is all about customer responsiveness, people and information, cooperation within and between firms and fitting a company for change. To be truly agile, a supply chain must possess a number of distinguishing characteristics which include: market sensitivity, virtuality, process integration, and networking. (Ambe, 2010).

Thus, the organization's ability to quickly adapt to environmental changes and market conditions is a critical subject. In such circumstances, agile supply chain becomes more important because such a chain can respond quickly and effectively to market changes.

An agile supply chain is composed of a set of companies which are separate from each other and yet have business interdependence. These companies are linked by the forward flow of materials and information feedback flow. No company has all the necessary resources to use opportunities in market, so, in order to gain competitive advantage in the global market, companies must cooperate with suppliers and customers to integrate operations and achieve a level of agility beyond exclusive companies. In this way, promoting agility in the supply chain is one of the most important factors to win the competition (Bidhandi & Valmohhamadi, 2017).

Factors affecting supply chain agility and profitability are listed below:-

6.1. Speed

- Quick access to demand information.
- Preference to keep this information on file.
- Access to information throughout the chain.
- Virtual Communication.
- Speed of exploring new markets.
- Emphasis on outsourcing.
- The use of web-based applications.
- Implementation of activities at the same time.
- Speed of new product introductions.
- Multitasking teams.
- Speed in deployment of new techniques in manufacturing.

6.2. Competency

- Commitment of senior management to agility.
- Decentralized decision making.
- Adoption of new production techniques.
- Vertical integration.
- Initial design of products by adding value to the customer.
- Team-oriented goals and measures.
- Creation of infrastructure to encourage innovation.
- Quality beyond the product lifecycle.

- Relationships based on trust with partners.
- Appropriate Technology.

6.3. Flexibility

- Ability to change delivery policies.
- The number of technologies used in manufacturing.
- Ability to purchase from different sources (different providers).
- Ability of production lines to manufacture different products.
- Ability of being responsive to diverse demands of customers.
- Ability of supply chain staff to deal with sudden changes.
- Ability to change storage capacity.
- Ability of chain products to consequent responsiveness.

6.4. Responsiveness

- The ability of IT systems to support the changing needs of market.
- Ability of IT system to meet the expectations of users.
- IT-support methods for the analysis of competitive environment.
- Pre- and post-sales services.
- Producing customer-centric products (customization).
- Maintaining and enhancing relationships with customers.
- Responsiveness to customer demand upon receipt of order.
- Increasing the level of product quality.
- The ability to predict market demand.
- The ability to deliver products for special customers.
- The ability of IT systems to adapt to changes.

Achieving an agile SC is challenging because of the complexity involved in SC. Clearly, complexity is a major factor influencing supply chain exposure and agility. Agility has become a major topic of research for academics. Two concepts inherent in most of the 12 attributes specifying an agile firm are speed and flexibility. Although the speed and flexibility of the supply chain affect a firm's agility, the agile manufacturing literature has overlooked the issue of supply chain management. In many cases, a firm's international supply chain may not be able to respond as quickly and reliably as the rest of the organization. While, in the ideal definition of an agile firm, all logistics problems could be dealt with directly, management must sometimes accept tradeoffs between external supply chain vulnerability (a result complex supply chains and uncertainty) and supply chain agility. Clearly, as the exposure of the supply chain increases, agility should decrease. This is because uncertainty and complexity increase and, consequently, also the probability that the supply chain will have a negative impact on overall operations. From a practitioner's point of view this means that, in an international environment, businesses cannot be "all things to all people". (Prater, Biehl, & Smith, 2019).

7. Conclusion

The dynamic environment and short product shelf life means that organizations have to adapt to the new normal of disruptions in supply chains. As supply chains compete to gain competitive advantage, organizations have to work extremely hard to ensure that the collaborations they have with the supply chains are as agile and responsive as the environment they thrive in themselves. The universe is not remaining static and these disruptions are the norm. So we now need to see how then do we create supply chains that withstand the test of time during abnormal times and still achieve organizations objectives of maximum profits at lower costs while the chains remain with a competitive advantage. Laws policies and regulations have to be reviewed to capture the changing trends and take into consideration future pandemics so as not to be gotten unprepared as with the covid 19 pandemic.

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