



Optimization of Supply  
Chain Design Based on the  
Lean Manufacturing  
Concept: Application in  
Health Care System

**MYTHESIS**

**Govindan, K., Mina, H. and Alavi, B., 2020. A decision support system for demand management in healthcare supply chains considering the epidemic outbreaks: A case study of coronavirus disease 2019 (COVID-19). Transportation Research Part E: Logistics and Transportation Review, 138, p.101967.**

### **Motivation of the Research**

Compared with the 2003 SARS outbreak, COVID-19 has caused many challenges to the highly integrated economy. This effect is expected to hit the healthcare industry as well and has already started to be visible. The shortage in supplies has affected the healthcare industry largely, as the need for sanitizers, protective masks, and gear and oxygen machines is great and the demand keeps increasing due to the spread of this infectious disease. This has resulted in both the problem of high demand and low supply and also the problem of the movement of the products between countries.

This has created an imbalance in the economy. Sweden has developed a growth in bankruptcies after the coronavirus outbreak. For instance, restaurants and hotels in Sweden have an increase of 18% of bankruptcy from March to April. In addition, the coronavirus lockdown is doing “unprecedented damage” to European business activities. Also, this has created deterioration and warns of a substantial fall in employment. Most of the world has been in lockdown since March but some countries had partially relaxed restrictions. According to the International Monetary Fund (IMF), it expected the world economy to suffer a record postwar contraction of 7.5% this year.

Unlike other countries, the Swedish government has imposed relatively light restrictions. The measures taken include cancellation of public events, recording presence of public information campaigns and international travel controls. In response, manufacturing companies, research laboratories, and universities are sharing resources and retooling their systems to support the effort.

Manufacturing and supply networks across most industries are impacted by COVID-19 and/or the mitigation measures enacted by governments, companies, or health systems. At the same time, the manufacturers are faced with challenges, including complying with the directive for workers to remain 6-ft apart and also sick or quarantined workers, as well as supply interruptions of critical components and materials pose even greater challenges. This implies that the healthcare industry supply chain in the area needs to be intensified as more equipment to manage the issue arises.

## **Objectives of the Research**

This research aimed at investigating the effects of the COVID-19 outbreak on the healthcare industry supply chain in Stockholm, Sweden. The research expanded to investigate how every aspect of the supply chain in the healthcare industry is being impacted in the area of focus. COVID-19 comes from various families of coronavirus, which has existed for years that cause illness ranging from the common cold to more severe diseases. Based on its nature and advances, this study shows how this pandemic has an impact on the supply chain in general and more specifically how it has an effect on the manufacturers, imports and exports, labor, and the global economy in Stockholm. The research is specific to healthcare industry supply chain management in Stockholm, Sweden.

## **Recommendation of the Study**

Coronavirus outbreak has a long-term effect on the healthcare industry supply chain in Stockholm. The most common long-term impact is that supply in the healthcare industry will take a long time before it comes to normalcy. Currently, it is still challenging and uncertain to discern how the supply will be restored based on the fact that there has been a noticeable shortage in medical supplies, to be specific. The impact of new epidemics is associated with long-term economic effects. According to the findings of the study, more than 40 types of infectious diseases have been detected. Moreover, epidemics of new occurrences are increasingly spreading throughout the world. As the pandemics increase in spread, countries are taking measures including transport restrictions. Medical supply then becomes challenged in the course of these restrictions. Therefore, it will take a long time before an efficient supply of medical products is restored to normal.

## **Scope of research for current study**

This study can comparatively investigate the impact of COVID-19 and other pandemics that have occurred before and their impact on the healthcare supply chain management in a more thorough way. This is because in the future, there will be more information about this novel disease which could further improve the current research of this paper. As it was proven through both the secondary and primary data in this study that this novel disease will have an effect on the healthcare industry supply chain, It could be further developed by looking at the post-events which will come after the spread of the disease is over.

**Sazvar, Z., Rahmani, M. and Govindan, K., 2018. A sustainable supply chain for organic, conventional agro-food products: The role of demand substitution, climate change and public health. Journal of cleaner production, 194, pp.564-583.**

### **Motivation of the Research**

The health situation in the West Africa sub-region and the weakness of national health care systems health has been a concern for decades. According to the West African Organization of Health (WAHO), health problems such as malaria, malnutrition, HIV / AIDS, maternal and infant mortality, as well as access to medicines and vaccines, remain great acuity in the sub region.

Thus, the performance of health product supply chain management appears nowadays as a crucial point for strengthening public health systems. Chain efficient procurement translates into the availability of the right products, in the right quantities, in good conditions, at the right times and at the right costs. As summarized by Dr Orin Levine (Associate Professor, Johns Hopkins Bloomberg School of Public Health), “The Ideal Supply Chain is that which ensures that the limits of science are not restricted by the limits of the system.”

To operate most efficiently, public health supply systems need staff who are trained, competent and experienced in operational procedures standards required for each logistics function, but also able to make decisions or participate in decision-making and policy-making processes that have an impact on chains supply. Lack of staff with the right skills is often a problem. the origin of dysfunctions in the management of the supply chain, affecting the entire health system, and therefore the health situation of a country.

Recognition of the importance of the supply chain was expressed by the World Health Organization (WHO) in 2006 and is today notably supported by the People that Deliver Global Initiative resulting from a working group within the Coalition for reproductive health products.

In order to determine the relevant actions to be taken to improve the performance of the chains supply chain, Bioforce proposed to conduct a survey. The This study thus aims to take stock of the performance of the staff who manage this supply chain in the West Africa sub-region, and to consider the axes improvement.

### **Objectives of the Research**

The general objective of this study is to establish a mapping of the resource capacity human involved in the public health supply chain in the sub-region West Africa and Madagascar.

The specific objectives of the study are as follows:

- Describe the context of the public health supply system in each country studied.
- Describe the organization of the public health supply system in each country studied.
- Describe the human resources in the supply chain of each country studied.
- Set priorities for better supply chain efficiency of each country studied.
- Establish the issues common to the countries studied and general recommendations for better supply chain management.

### **Recommendation of the Study**

The general objective of this study was to establish a mapping of the resource capacity human involved in the public health supply chain in the sub-region West Africa. In view of the issues mentioned above, several avenues improvement can be envisaged and implemented through collaboration between Ministries of Health, the Ministries in charge of vocational training and higher education, PTFs and civil society.

Overall structure of the health system and supply chain:

- An approach tending towards the gradual integration of the supply chains of various programs and PTFs to the public system. Although this raises issues in terms efficiency initially, and corruption, integration would in the long run increase human capacity (through a systemic approach to human resources, the skills development) and finance of the public supply chain, and therefore to have a less fragmented and more efficient system.
- Reinforced coordination at the central level and exchanges of practice formalized in periphery between actors in the public sector and those in the private sector (including medical traditional) to move towards an integrated health system based on complementarities between the public and private sectors.
- Stricter control of illicit networks, through the training and recruitment of control.
- Continuous training of human resources in the supply chain at the level central to support the development of national procurement policies and their implementation plans;

continuous training of agents at intermediate levels and peripheral to facilitate the implementation of the plans developed.

- Continuous training of human resources within the departments in charge of infrastructure, equipment and maintenance to support development systematic equipment maintenance and monitoring plans; continuing education for maintenance agents at the intermediate and peripheral levels to facilitate the implementation elaborate procedures.

### **Scope of research for current study**

This study highlights a very important factor of professionalization of healthcare supply chain in Africa. These findings can directly be implemented to developing countries in other continents after making relevant changes which can be done in our study.

**Bvuchete, M., 2020. A Demand Driven Supply Chain Management Maturity Model for the Public Healthcare Sector.**

### **Motivation of the Research**

Despite their importance for hospital operations, discussions of healthcare industry logistics and supply chain management practices are notably lacking in developing countries. This paper describes a methodology for organizing the supply chain of medical materials in the healthcare industry, based on an action-research approach. Interventions were based on the assumption that a significant portion of problems in several of the National Health Systems of developing countries facilities derive from the fact that their clinical and administrative departments do not see themselves as belonging to the same production chain - neither the hospital nor the supply department is aware of what the other produces. The development of the methodology and its main steps are presented and discussed, against a background of recent literature and total quality and supply chain management concepts.

### **Objectives of the Research**

This study is aimed at developing a procurement model which will have the following function:

- To understand the concept of DDSCM
- To investigate the key success factors for DDSCM

- To investigate the benefits of transforming healthcare supply chains through DDSCM

### **Recommendation of the Study**

In this perspective, the DDSCM methodology presented important findings in the direction of accompanying other developments. These developments include both improving processes that involve external partners - in the formation of buyer groups and in the forms of relationships and contract with suppliers - as in the persistence of the commitment with the improvement continuity of the internal processes of the organization and with a growing incorporation of perspectives the patient.

### **Scope of research for current study**

This study has provided a well worked upon methodology of DDSCM. Our study could take up the idea from this and develop a more effective version of this methodology which can be applied universally and not just the developing countries.

**Göleç, A. and Karadeniz, G., 2020. Performance Analysis of Healthcare Supply Chain Management with Competency-Based Operation Evaluation. Computers & Industrial Engineering, p.106546.**

### **Motivation of the Research**

The hospital supply chain represents an important context of research due to the criticality of the services provided and has become one of the area's most important for hospital managers and executives. In the context of supply chain, performance evaluation emerges as an important topic given the current scenario of inefficiencies in health services. In this way, the present work involves a bibliographic research on the existing models performance evaluation of the hospital supply chain. The study seeks to propose an approach to classify and choose the indicators to be used performance evaluation. The work begins with the general definition of the chain hospital supplies and aspects related to performance evaluation.

### **Objectives of the Research**

The aim of the study was to conduct a performance analysis of healthcare supply chain management with competency based operation evaluation.

## **Recommendation of the Study**

The present work proposed an approach of evaluation of performance comprising three dimensions: organizational, suppliers and operational. Each dimension is described, as well as exemplified with possible indicators. Analyzing the logistical performance of the hospital is essential to control activities and services provided, in order to offer better control of management and support the decision-making process of managers, identifying the processes need improvement, reducing failures and aiming at the fulfillment of the qualitative and quantitative goals that meet the needs of the health area.

## **Scope of research for current study**

Our study can work upon the financial and business indicators as the operational information can be used from this study as this study has worked upon so rigorously on the operational indicators.

**Hussain, M., Ajmal, M.M., Gunasekaran, A. and Khan, M., 2018. Exploration of social sustainability in healthcare supply chain. *Journal of Cleaner Production*, 203, pp.977-989.**

## **Motivation of the Research**

Health establishments consume a large number of products and services. Doctors and nurses use principally mainly medications at work, but many other products -food, printed matter, stationery, material laboratory, etc. - are also necessary rivers for the perfect operation of a health facility. Aiming declared to manage the replacement of products, hospitals have created units administrative decisions for your purchase, your reception, storage and distribution to points of consumption. The costs of this structure represent less than 1% of the total budget, having their employees two a direct responsibility for the send a bill in dollars detailing the health care received, which does not generate the need among the hospital administration to precede with individual follow-up zed consumption. There is usually have USP in each medical service, or nursing unit in addition to those located in laboratories and administrative departments.

These USPs receive visits to control inventories, with frequencies ranging from daily to monthly. If the personal discovers that the available quantity of a product is below its order point a is issued Order Rhea - provisioning (PR). Sometimes these PR have been automated and are generated at

constant frequencies although not has produced the visit, this being the strategy used for strength products I consume you and low price.

There are two methods of replenishment the USP depending on the type of requested product. Products in the inventory are kept in the central warehouse and are sent directly to the USP in response to ta to your needs. Products on the contrary, are requested supplier each time an order is processed do, since a stock is not kept in the warehouse.

Due to this continual departure from existing inventory, the level of a product in the warehouse ends up being less than your point of order. At this time, the responses Warehouse managers generate an order restocking and send it to the staff shopping. These stock controls are normally carried out with regular visits the inventory centers, although they start information management systems are being used inventories in real time.

### **Objectives of the Research**

The objective of study was to Control and know the expenses of the products and services consumed by the establishment sanitary. Measuring the volume of activity in the supply chain.

### **Recommendation of the Study**

Although this system of measurement of performance has been developed and implemented with the reality of the states in mind. Canadian establishments, the result may be also in other structures equivalent sanitary facilities, as in the case storeroom. Thus, in Spain, supply chains Hospital records carry out the same activities and are managed by the same way that in Canada, with Pharmaceutical Services for medicines, supplies for the rest of the families of products and with regional authorities —Call Insalud or different agencies public of the autonomous communities— that coordinate the centralized purchase of =some products. Furthermore, the fact of belonging to newer in both cases to public entities forces them to develop and administer techniques more limited and demanding activities, perfect compatible with the medical system of the performance presented here.

A system of performance measurement allows increasing gain knowledge about a process and thus improving the quality of decisions. For him On the contrary, the performance defined according

to measurement system - with their hypotheses priority— and excellence are not necessary synonymously, like a multitude of companies have been showing us for years. Within the qualifier of excellence is included they include a multitude of variables hardly quantifiable and even indefinable. So, the managers, according to what Mintzberg, are obliged to combine the systems measurement topics with other information informal character or even with their pious subjective perceptions for making the best decisions.

### **Scope of research for current study**

This paper effectively identified various factors which impacts the performance of healthcare supply chains and also the complete performance assessment of it. For our study this could provide a list of factors or variables which we need to investigate to get the current scenario of the healthcare supply chains.



**MYTHESIS**