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Supply Chain Management Challenges Faced By Landlocked Countries – A Case Of Malawi

Abstract

Being landlocked is associated with trading disadvantage compared to coastal countries which reflects in lower development levels, inequality, vulnerability, poverty and weak economic growth as a whole. The aim of this study is to investigate the Supply Chain issues faced by healthcare and education sectors in Malawi. This has been accomplished by through a systematic review of post graduate supply chain dissertations written by students enrolled at University of Bolton. The findings indicate a wide range of issues that are contributing to poor performance of these sectors resulting in inventory stock outs, poor delivery performance and poor service delivery.

1.1 Introduction

According to Sitorus (2013) 80% of world trade involving goods are conducted by sea. As a result, being landlocked adds extra burden on trading beyond national boundaries. In general, the term 'landlocked' can essentially be referred to geographically remote areas that are associated with certain disadvantages. For example, landlocked can result in additional transportation costs and if combined with inadequate infrastructure can significantly limit the contribution of landlocked countries to the global trade. This, in turn, can lead to less exporting competitiveness, relatively fewer inflow of foreign direct investment, knowledge, technology, innovation for the country at large. These events create a negative progression of overcoming weaker economic growth and social development. This can manifest into lower level of living standards such as poor access to healthcare services, poor quality education and the inability to acquire basic living amenities. Being landlocked makes a huge impact on one country's development indicators, including, Gross national income, Human development index and so on.

Africa is the world's second fastest growing region economically but its initiative for reducing poverty lags much behind other continents UN (2015). Least developed countries (LDCs) and landlocked developing countries (LLDCs) are found in Africa (UN, 2015). Due to serious infrastructure constraints, some countries in Africa are being categorised as landlocked developing countries (LLDCs) which includes Botswana, Malawi, Zambia and so forth.

Malawi's economy relies heavily on agriculture which contributes to 80% of national export earnings Ourafrica(2016). The livelihood of many Malawians is strongly dependent on the export of tea and tobacco ourafrica (2016). Water and electricity scarcity are rampant within the country which has a significant impact on farming productivity (Trocaire,2016). Due to various constraints, farmers have no choice but to short-life cycle products and trade at low prices due to long lead time, lack of storage capacity as well as high standard requirement from buyers.

While the world is enjoying the advantages of technology revolution and advanced maritime trading, people and the economy in those landlocked countries suffer in various ways. Ranked among poorest countries in the world, Malawi has to overcome a range of obstacles in relation to supply chain management to improve socio economic development. This paper purely intends to study the challenges and the causes of inefficiencies in supply chain management in respective industry sectors that are negatively impacting the economic growth and development. This will be accomplished by a meta- analysis of Supply Chain research undertaken by master's students from University of Bolton. By uncovering the challenges and consequences of inefficient supply chain, this research will make a significant contribution to the supply chain literature. This research contributes to supply chain literature as empirical research on supply chain challenges from the context of land locked and least developed countries are sparse. Secondly the provided recommendations will be useful for policy makers and practioners which can result in overall improvement of the supply chain.

1.2 Objectives of the study

Being landlocked has become a real struggle while exporting makes up the majority of these countries' GDP.

The objectives of the study are:

- To study the causes of inefficiencies in supply chain within different industry sectors in Malawi.
- To gain better understanding on how supply chain issues are affecting economic and social development.
- To provide recommendations for improving supply chain performance of health and education sectors in Malawi.

2 Supply chain management in landlocked countries in sub-Saharan Africa

Economic growth is highly linked to the efficiency of infrastructure services (transportation, telecommunication, utilities) and human capital (income, education level and so on) (O'Fallon, 2003). Development involves education, skills labours, series of institutions, networks and capabilities. Dahlman (2006) Economic activities and development cannot take place without the foundation which requires a strong infrastructure base and effective operations. A relation between supply chain management and socio-economic development is apparent (Rodrigue and Notteboom, 1998-2016).

A number of research studies highlight the supply chain challenges faced by developing economies in Africa and they normally highlight transportation, communication, qualified workforce and adoption of technology. Climate change has contributed to water crisis in several parts of Africa which poses fresh challenges to supply chain and logistics in several industry segments such as mining and agriculture. Inconsistent weather can damage physical infrastructures (homes, roads, dams, bridges,

airport runways, rail tracks and so on), reduce productivity in agriculture, industrial manufacturing and other industry sectors. Hence it can be argued that apart from being landlocked, other factors also contribute to poor supply chain performance.

Certain common themes in supply chain management challenges that burden economic growth in sub-Saharan Africa include the following (World Economic and Financial Surveys 2015):

1. Inadequate infrastructure amenities such as road, railways, home, schools, healthcare facilities (openphilanthropyproject,2013) and cold chain facilities (fao, 2016) as well as national statistical systems (Glassman and Ezeh, 2014).

2. Environmental conditions: climate change leads to water and power scarcity that weaken the most valuable economic sectors such as agriculture industry and mining industry especially the economic growth as a whole (Botswana daily news,2015).

3. Information scarcity: e.g Poor ICT adoption and low penetration of Internet in remote areas (Jensen and Richardson, 2016).

4. Low technology adoption especially in agriculture sector one of the main industries provide income and employment opportunities in the sub-Saharan Africa region (Jack, 2013) and Muzari et al (2012).

5. Lack of capacity/Humanitarian factors/Talents: e.g logistics expertise, qualified/trained procurement staff (Steele, 2015) and engineers (Royal academy of engineering, 2012).

6. Lack of effective Government procurement policy: e.g lack of procurement performance metrics and evaluation (Government Procurement Procedures in sub-Saharan Africa, 2015).

7. Weak management practices: e.g poor procurement and distribution processes, weak managerial overview (Bryan et al 2010).

8. Dependence on neighbour/transit countries in term of infrastructure, politics, administrative processes in transit and peace and stability. (Faye et al 2004)

3. Methodology

Since the objective of this research is to identify the supply chain challenges faced by various supply chains and in different countries, it was felt that document review was the most appropriate one.

Documents are useful due to several reasons according to Ross and Matthews (2010):

1. readily available with a large amount of information
2. are static and present a snapshot of a particular period of time
3. are “more than just a source of data” providing various context to the research
4. are being constructed in a way that can provide readers more than information and data

5. the document data can be useful to triangulate data collected from other sources.
6. are long lasting

The world bank (2007) adds that using document review method puts researcher into systematic procedure from identifying to analysing and deriving valuable information from existing/previously published documents. Ross and Matthews (2010) however raise a concern about the validity, credibility and reliability of the data collection and analysis in the findings of others. Thus triangulation occurred in order to improving the accuracy of different types of data collected regards to the same topic (Jick, 1979).

3.1 General Procedures and limitations

- University of Bolton in collaboration with local educational institutions deliver MSc Supply Chain Programmes in Malawi. It has been running successfully and has attracted attention from local government officials, procurement professionals and people working for NGOs. As a part of the master's requirement, they have to complete in-depth research on a supply chain issue faced by their organisation. The research was supervised by two academics one based in UK and the other in Malawi. This process ensured rigor in the research and more importantly it was undertaken with the objective of finding solutions to the problems faced by those organisations. 120 supply chain reports from Malawi spanning over a period of three years (2012 to 2015) formed the basis of this research. Of the 120 reports, 8 research studies were shortlisted for further analysis. They were shortlisted based on the relevant research topics, the sample size of the data collections, the characteristics of the population and the response rate. The data was transformed into findings by tabulating each study along with key findings (Please refer to Appendix 1). A systematic approach was used while recording and interpreting the findings and triangulation method was used to validate the reliability of the data.

4 Findings

4.1 Overview about Malawi

Agriculture sector is being seen as the main contributor to the real GDP growth of 5.7% in 2014 (African economic outlook, 2014) in which tobacco or 'green gold' accounted for 51.2% of the total export followed by tea with 6.17% (The Observatory of Economic Complexity 2014). Agriculture sector provides the largest number of employment opportunities up to 64.1% followed by services and other with 28.5% in 2013 (UNdata,2014). Tobacco industry contributes greatly to the economy and deforestation at the same time. There are many negative impacts associated with deforestation such as floods, planting and growing crops, changing of rainfall pattern, food security, illness/diseases and so

forth. These issues seriously affect the livelihoods/quality of life of Malawians and more importantly the socio-economic development as a whole. Malawi is now ranked as the world's poorest country, depends heavily on tobacco export and currently face the decline in cigarettes demand due to health concerns as well as higher tax policies (Vidal,2015). The country health's system is currently facing a high rate of HIV/AIDS, malaria and premature deaths among the population. Illness and illiteracy often links to imbalance and inequality widening the gap between rich and poor people making women and children vulnerable. From a socio-economic perspective, providing healthcare needs and education in a cost effective and efficient way will support the development of a nation with one of the most important contributors to the economy: human resource. In Malawi, the healthcare and education sectors are treated with a priority investment, 11.4% of total country's GDP and 6.9% of Government's expenditure in 2014 (UNdata,2014).

4.2 Healthcare

Healthcare needs supply chain management due to the matter of cost and risk (Chandra and Kachhal 2004). Supply chain inefficiencies can have negative impact on total cost and quality of the healthcare delivery system as well as the national economic output.

Speaking of supply chain management, Malawi has inadequate resources and inadequate capacity especially at central level to be able to provide healthcare products and services effectively to all Malawians, Government of Malawi (2010) states. The pharmaceuticals products must be distributed through the supply chain system effectively to ensure the quality of medication and a high standard of care for patients. Many recent studies have focussed on healthcare industry in Malawi and have reported a number of supply chain problems. In Malawi, the Central Medical Stores (CMS) are in charge of medicines and medical supplies for all healthcare facilities located in Central, North, Southern regions within the country. This means CMS are responsible for all activities within a supply chain network including forecasting, procurement, warehousing and inventory management. The traditional CMS system is whereby drugs are financed, procure and distributed by the Government, the owner, funder and controller of the whole medial supply chain (WHO, 1998). When in short of medical supplies, public healthcare facilities are allowed to buy from private suppliers whereby longer lead time incurs and higher costs associated. Funds are usually from central Government's allocation and/or donors.

The primary objective of the public healthcare supply chain is to ensure a continuous supply of essential drugs by having a tight control over product selection, procurement and distribution processes. Factors such as long procurement process, poor specification, weak logistical system, unpredictable funding are reported as determinants of shortage of drugs in Malawi (Government of Malawi,2010). Moreover, a considerable quantity of drugs consumed in Malawi are imported from other countries (nyasa times,2013) meaning a shortage of local manufactured medical supplies (which

is more likely more affordable) and long lead time of transit. Another challenge is related to medical equipment which are largely donated and used without following health and safety and necessary training putting risk to patient's health and the environment.

Given this environment, the supply chain challenge is down to how healthcare providers ensure medicines and services are continuously available/supplied at the right quantity, with a high quality, at the right price and at the right time to help saving patients' lives. Improving public healthcare services is essential and has never been greater especially in developing countries like Malawi due to a high rate of diseases and illnesses among ordinary citizens, the national workforce. Lapukeni (2012) undertook research on the role of third party logistics provider in improving the availability of health products using the Malawi's Central Medical Stores as the case study, Lapukeni (2012) conducted interviews with managers, staff at CMS, District Health officers and other relevant stakeholders together with National Health Management Information System analysis. The author has identified that CMS are unable to manage all acts within supply chain system. As a result, *essential health products* are seriously *low in stock* and unable to meet the demand from -to distribute to all regional healthcare facilities. Overall, an unreliable supply chain system was identified which mainly involved technical uses, inadequate capacity and human resource capacity to according to the author.

The SCM challenges are specified as below:

- In term of *Logistics management*, based on a high rate of response (93%) from central hospitals and district hospitals, the *logistics efficiency of CMS was described as average*. Similarly, 70% of respondents from Ministry of Health of Malawi and staff members of CMS agreed that logistics management at CMS is on an average level in regard to effectiveness. This leads to the uncertainty in ensuring health products are available in public health facilities across the country.
- Concerning *warehousing and distribution facilities*, 89% of respondent from stakeholders indicated that warehousing and distribution facilities for CMS need much more attention to be able to ensure health products availability. Based on data analysis, the author also found out that *storage space in all regional warehouses has inadequate capacity* associated with *poor management*. In particular, pallets and racks are piled up too high in the warehouse. This makes it difficult to undertake stock control/inventory management effectively. This has led to due to consumption health products stay on shelves taking up warehouse space increasing overstocking costs. Furthermore, based on focus group discussion using questionnaires with procurement officers from five central hospitals, the author observed that factors cause inefficiency of existing supply chain system at CMS including: *inadequate delivery facilities, long lead time, poor security* during transit and *lack of assistance* from CMS in handling and

loss claims as well as *lack of consistency in communication* to provide advance notice of transit delays.

Kanyoma (2012) went further into investigate the frequency of stock outs at five selective public facilities in Malawi. The author indicates that frequency of stock out of drugs in Malawi's public hospitals results in critical consequences on patients' health (death). It is one of the major causes of disruption of public healthcare delivery. In this study, the author intended to identify the causes for shortage of medicines availability within supply chain pipeline. The researcher also looked into the impact of having a single supplier of medicines supply at public hospitals from which the author reviewed the relationship of a single sourcing strategy and supply risk management. Using questionnaires to ask staff including nurses, clinicians, doctors, senior managers and procurement staff who are directly involved in procurement processes regarding to the causes of stock out of drugs, the study has discovered that stock outs do occur on a regular basis. 40% of respondents agreed that it happens once a month whereas 30% quoted on a weekly basis. The author noted that staff working in different departments along the procurement system experience stock-outs differently. This particular research has shown that stock-outs could seriously affect patients' health. Stock-outs in fact cause death of patients. This statement has received a strong agreement from respondents at a rate of more than 80%. Death is the worst but is not the only consequence of stock-outs. The interviews with respondents who work at respective hospitals and are directly involved in giving patients care (95%) and hospital managers (80%) indicated that worsening of medical conditions of patients, overcrowding and delays in medical surgery do occur due to out-of-stock drugs. This is not simply a failure of healthcare delivery but more importantly it could have a huge impact on the downstream ultimate customers, the patients. Interestingly, through the data analysis, 100% of procurement staff did not accept responsibility for their role in stock outs. The majority of patients care providers (Doctors, Nurses, Medical technicians) agreed on statement that stock-outs were caused by *procurement delays*. Given the data of three-week long procurement cycle, the author concluded that procurement delays partially contribute to the issue of stock-outs. *Withholding funds* from donors was one of the reasons that causes stock-outs as per the author's interpretation. The majority of interviewees in this research agreed that *wrong forecasting* demand of drugs is an important cause of stock-outs. However, one of the procurement staff mentioned that there are large orders are placed with suppliers but there is always a small quantity are received from CMS. CMS might be under pressure of distributing too many essential drugs to all regional health facilities. Hence, it can be concluded that wrong decision making on forecasting demand at hospitals might not be the main cause of stock-outs. Following up this situation, the author then went further and gained a better perception from procurement staff and hospital managers who indicated that CMS is the root cause of stock-outs. *CMS* in fact *fails to communicate with respective hospitals* about their ability of meeting specific orders. The author then pointed out that *CMS failed to give clearance notices that allow*

respective hospitals to place the orders with private supplier(s). This could mean *single sourcing strategy* represent such a high supply risk. This is mainly because hospitals are not allowed to procure from private suppliers unless they receive clearance note (authority) from CMS which is really not effectively managed. It is clear that CMS is the main responsible body for the stock-outs situation at respective hospitals in Malawi.

Chirwa (2012) did a research on improving health commodities supply chain efficiencies in Malawi. With the one main challenge of inefficient medical supply chain, the study seeks to provide a clear picture of how outlined supply chain components such as (product selection, forecasting and quantification, procurement, warehouse and distribution and finance) can affect the availability of medicines and medical supplies.

With a 75% of response rate (150 respondents out of 200 targeted respondents) using questionnaires targeting various key people (district health officers, Pharmacy personnel, procurement staff and clinical officers) within the national healthcare supply chain, this particular study pointed out that the major challenges of the healthcare system *involve procurement processes, forecasting and quantification, warehousing and distribution* as well as *lack of collaborative network*.

The author specified that *collaboration between supply chain members* must be improved because without collaboration the information will not be shared in a way that is helpful for procurement and distribution. As a result, it is difficult to allocate resources accordingly. This is the greatest challenge of procurement in the case of Malawi's public healthcare Chirwa(2012). Lead-time needs to be reduced by ease the *bureaucracies in public sector* to promote the healthcare sector. Forecasting and quantification can be effectively performed by having a reliable electronic system for warehousing and distribution in health centres to store quality data. This means there is a lack of physical infrastructure for a better performance. drugs budget was mentioned by respondents as one of the problems that cause stock-outs.

Mlendo (2012) undertook investigation of procurement practices that have been affecting the medical availability at public and private hospital. At first, the study notes that, CMS is responsible for medial sourcing. Furthermore, according Mlendo(2012) analysis, 80% of medicines is imported from outside rather than from local manufactured in Malawi. These two facts mean in the case CMS runs out of medicines, CMS will source medicines from private suppliers as emergency buying. The same problems have been pointed out by other researchers that long lead time and high costs incurred due to this *sourcing strategy* and *imported buying*. Interestingly, in this research the author found out that the lead-time of medical supplies of public hospital is different from private hospitals. The delivery of medicines takes from 7 to 14 days maximum to arrive to private hospitals whereas it takes 60 days maximum to arrive to public hospital. The big gap of lead-time between public and private hospitals is mainly due to the *frequency of communication*. Private hospitals often communicate with their

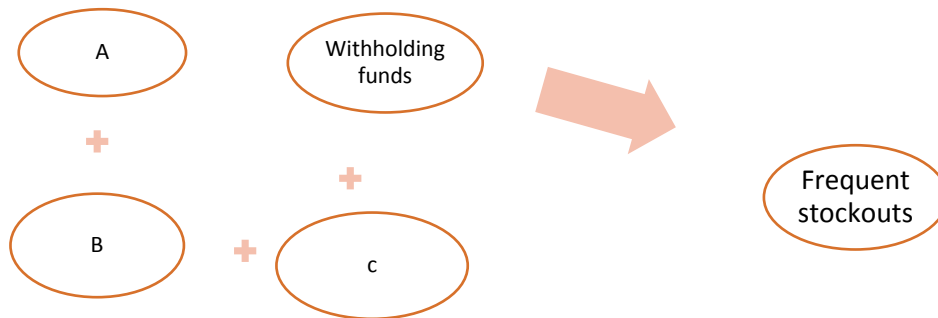
suppliers on a monthly basis while public hospitals only do it every three months. This means suppliers are likely to commit to supply to regular buyers (private hospitals in this case) who are keen on information sharing for mutual benefits. The frequency of communication between buyers (hospitals) and suppliers in fact make a difference in terms of operating an efficient medical supply chain. It is logically argued that better/close knit relationship between buyers and suppliers is the result of regular communication. This study looks at supply chain issues from a communication perspective. The study successfully indicated that frequency of communication does make an impact on supply commitment from suppliers which in turn affects the availability of medicals at public and private hospitals in Malawi. Managing communication can have a direct impact on controlling the uncertainties in supply and demand (Apte, 2010). Hence, communication clearly helps in building trust between buyers and suppliers and helps in managing the fluctuations of demand.

Based on those research studies in 2012, the unavailability of medicines and medical supplies in public healthcare facilities in Malawi reflects the inefficiency of inventory management due to a number of reasons including:

- 1. The procurement rules/ single sourcing strategy (public facilities procure from private suppliers only when received authority from CMS)**
- 2. Long lead-time due to buying from suppliers outside the country**
- 3. Lack of frequent communication between buyers (hospitals) and suppliers**
- 4. Inadequate logistics management**
- 5. Inadequate warehousing and distribution facilities**
- 6. Poor security and assistance during transits**
- 7. Lack of information system for data storage which contributes to difficulties in communication between stakeholders impacting forecasting and quantification**
- 8. Short/unpredictable of finance support**
- 9. Wrong forecasting and quantification**
- 10. Delays of task of procurement staff.**
- 11. Lack of clarification of roles and responsibilities of staff**

These problems found in studies in 2012 can be categorized into main themes related to theoretical frameworks as follows:

A. Government policy and management practice	B. Infrastructure, Technology	C. Human issues
<ul style="list-style-type: none"> • restrict procurement rules • long lead-time due to importing strategy • inadequate logistics management • Lack of clarification of roles and responsibilities of staff • Lack of frequent communication between buyers (hospitals) and suppliers • Poor security and assistance during transits 	<ul style="list-style-type: none"> • lack of information system leading to wrong forecasting and quantification • Inadequate warehousing and distribution facilities • Poor security and assistance during transits 	<ul style="list-style-type: none"> • Delays of task of procurement staff • Poor security and assistance during transits • Lack of frequent communication between buyers (hospitals) and suppliers



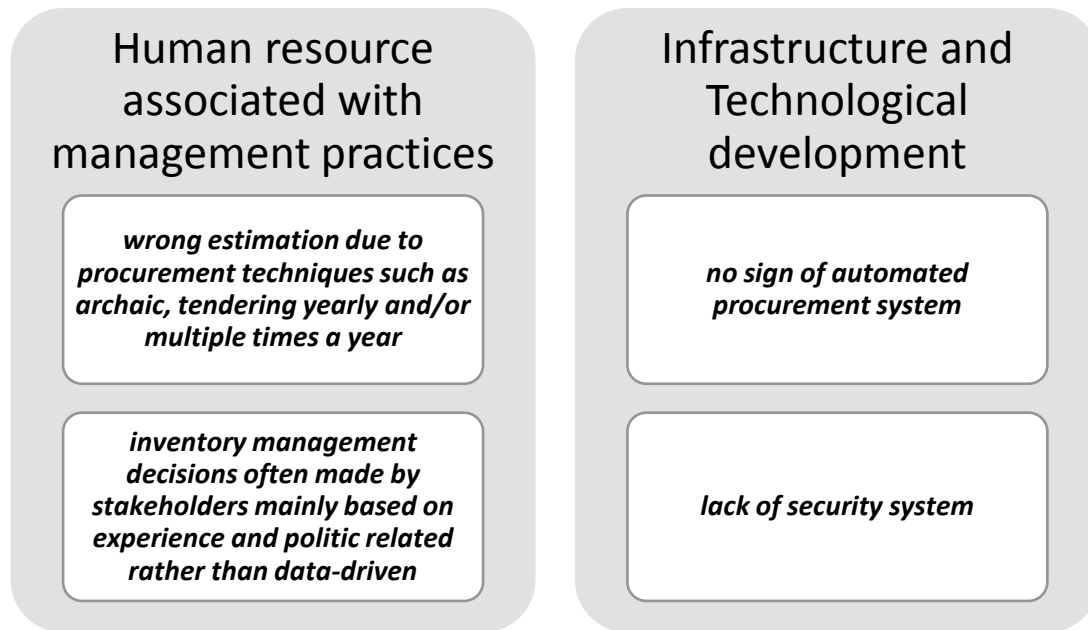
Frequent stock-outs of medicines leads to failure in public healthcare delivery in general and results in illegal selling of drugs in Malawi (Chikumbe 2013). Illegal drugs selling puts Malawians at risk as they are poor quality and wrong medication which is too dangerous. Chikumbe (2013) studied five districts in Malawi collecting data from various method such as questionnaires with pharmacists, clinicians, nurses and other hospitals personnel, face to face interviews with drugs selling vendors, patients and their guardians and pre-designed interview schedules with procurement officers at Ministry of Health and CMS Trust. Data collection illustrated that there was only 25% of medicines available at CMS Trust, 15%-20% of allocated medicines were missing. Through this study, it was also revealed that there was *no proper procurement system within CMS Trust* to be able to deliver approved quality medicines at affordable prices. This means all the medicines were distributed to all regions across the country based on population size and disease rate across regions. The author reported that the *manual distribution technique* has been in use for more than 10 years at the time of the study. This

according to the author leading to 10%-15% of medicines shortage due to *wrong estimation done by staff*. There was *no sign of automated procurement system, lack of security system* in the warehouse of the CMS Trust. This makes it difficult to track the medicines once they left the warehouse or during transits. Drugs stealing most likely to occur due to those reasons combined.

Having sufficient inventory of medicines evidently continues to exist in public healthcare facilities in Malawi. Indeed, Mtama (2015) did a research on impact of procurement processes on medicines availability at CMS Trust. The author investigated that there was a fall of 23% of medicines availability within 6 months' period in 2012 in CMS Trust (from 46% down to 23%). While carrying out the research, the author also discovered that CMS Trust experimented the instability of stock levels. It further revealed that sometimes drugs were delivered near the expiry date. This reflects the problem of stock control/inventory and distribution management at CMS Trust.

Shortage of procurement skills (planning, quantification and forecasting) were identified which affects the stock availability and the efficiency of the healthcare delivery, more importantly the health of patient. Mtama (2015) managed to find out *the procurement techniques such as archaic, tendering yearly and/or multiple times a year were used at CMS Trust* which resulting in long-lead-time, stock imbalance, high commodity cost, and commodity insecurity. More interestingly, Mtama(2015) discovered that *inventory management decisions often made by stakeholders mainly based on experience and politic related rather than data-driven* which directly impacting on medicines availability.

As can be seen from studies in 2013 and 2015, stock-outs issue highly related to human resource and infrastructure available coupled with a serious shortage of technology use which were mentioned in the literature review relating to the SCOR model, the Porter value chain and highly related to the five main themes of challenges in sub-Saharan Africa (Inadequate infrastructure, Environmental conditions, Information scarcity, Humanitarian factors, Lack of effective Government procurement policy and Weak management practices).



Stock-outs level increase meaning there are more emergency orders going to be placed. This activity will be expensive compared with bulk purchases from manufacturers or suppliers. Frequent stock-outs will also leave patients with no choice but buying medicines from private suppliers/vendors at a very high cost or from vendors who could be unauthorised to sell drugs and have no knowledge to prescribe people putting people health at risk.

The existing situation of frequent stock-outs of medicines and medical supplies continues to be a question in public healthcare delivery. In public healthcare sector, despite supports and encouragement from Governments, it seems that SCM should be focusing on logistics and effective movement of medicines and medical supplies via a better implementation of ‘strategic sourcing, planning, implementing, monitoring and evaluating’ of resources use and allocation of human, capital, technology and finance.

4.2 Public education

Education has a serious impact on poverty reduction and the national economy outlook. Education in Malawi is seen as important sector that impacts on socio-economic development according to the World Bank (2010). A strong educational development is highly associated with high employment rate and high income which benefit the overall economic performance of the country. It is even more important in Malawi because of its HIV/AIDS prevalence. In Malawi, educational system has such a significant role to play in term of equipping knowledge, value and skills for citizens to be aware of and to be able to avoid the spread of the infection thus being able to perform effectively as valuable workforce (Nyondo,2015). Nyondo (2015) did a research on the effectiveness of Life Skills Education

program introduced by Government in order to help developing skills set for young people to cope with everyday life challenges. The programme was found not being effective carried out as it supposed to be. The reason for that involved the problems from programme deliverers (teachers). It was reported that teachers were interviewed who admitted that they are *not interested in teaching the subject* associated with the Life Skills Education programme and have *no motivation* to participate fully in this program. In fact, interviewees stated that they were not *well-trained to have the confidence to deliver the accurate information*. This addresses that human resource constraint is the obstacle of the project delivery in this case. *Poor or non-availability of teaching and learning materials* were identified as the reason for the failure of the programme. It is clear that, teaching and learning materials contribute significantly to students' learning aptitude and teachers' effective instruction (Gama,2013). One interesting fact that affects the expected outcome of the program was due to *culture and religion beliefs*, teachers sometime avoid talking about sexual transmitted infections can spread the prevalence of HIV (Nyondo,2015). The research has shown some of the difficulties in delivering quality education to empower the poor, to enhance the national workforce capability and to stimulate the economic development as a whole.

The world bank (2010) illustrated that the fragility of school demand in Malawi is mainly driven by poverty. Early marriage and pregnancy rate is high. Children drop out of school and go to work for supporting the family. World bank (2010) also indicated that the lack of supply of physical infrastructure (schools and suitable classrooms) has a negative impact on retention rate in primary education in Malawi. Infrastructure is an important component that enable the creation of environment for the organisational performance.

Office of Government Commerce (2006) defines Supply chain management as a collaboration of all parties including external suppliers, partners, internal business/organisation units that involved in delivering inputs, outputs and outcomes aim at meeting specific objective(s). In public sector, some challenges currently exist which affects SCM performance resulting in 65% wastage of public resources and school dropouts (the World Bank, 2010).

A research study by Uledi (2012) evidently indicated that there are certain supply chain challenges faced by the Education Sector Support Project (managed by the Education Development Management Unit) in order to improve the quality and the efficiency of public education delivery in Malawi. Particularly, the author did breakdown challenges in categories as below:

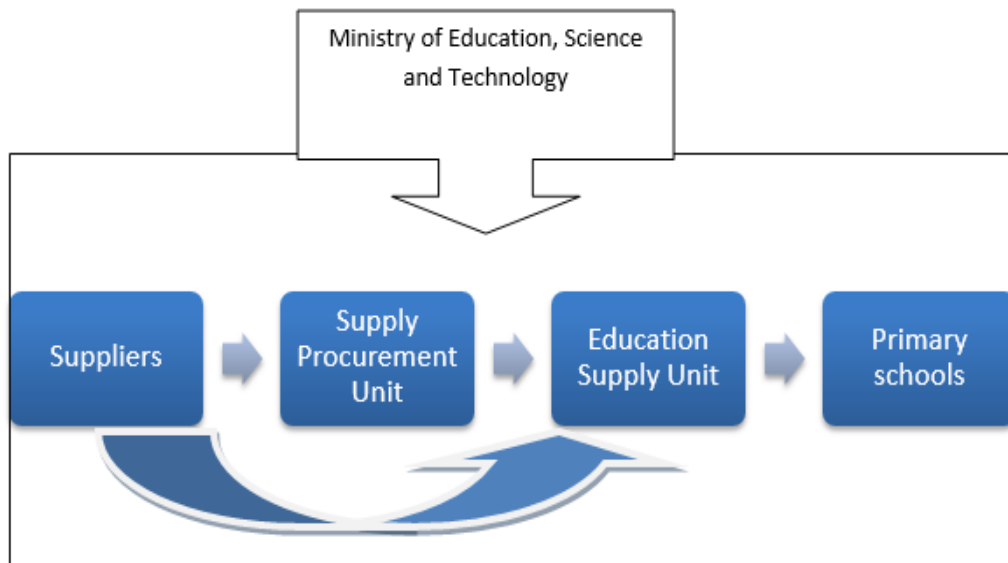
- 1. Strategic leadership** Based on data analysis, (with 84% of responds from employees in the Education Development Management Unit that acts as implementing agency of improving public education efficiency project) the author concluded that despite the well-defined expectations and goals, the standard of work and targets have not been met. This is because according to the author, 58% of the committee did not have a clear understanding of their

roles and responsibilities in implementing the project. Moreover, it was found out that, members of the committee did not meet up regularly to address the issues of implementation or to provide supports to Education Sector Support Project. These reflect the lack of strategic leadership.

2. **Human resource management:** it was discovered that, due to lack of 67% of human resource for key positions such as project director, financial management specialists were recruited late resulting in project delays. Human resource management certainly proposed challenge in term of project implementation.
3. **Financial management:** Based on various research methods, the author managed to find out that, the implementing agency has inappropriate financial system for budgeting and overall recording and reporting. On top of that, the current staff at the time were not be able to deal with some financial management systems which directly affect overall project delivery and the information flow of public funds spending.
4. **Programme/process management:** it was revealed that the allocated budgets for individual programs was not adequate within the schedules and timeframe given. 62% of respondents within Education Development Management Unit agreed that there was a lack of appropriate monitoring and evaluation systems to keep track of the work flow.
5. **Infrastructure:** Surprisingly, the majority of respondents either agree or strongly agree on the opinion that they were provided adequate office accommodation and internal services, transport system and functionality vehicles/equipment to carry out their daily work tasks. A high level of satisfaction in term of technology was recorded.

It comes to realise that supply chain effectiveness and efficiency can be disrupted due to any disruption within the supply chain.

Gama (2013) conducted a research about distribution of learning materials in public primary schools in Malawi suggesting outsourcing method in order to improve the distribution situation at the time of the study. The research was keen on addressing the need of timely delivery of teaching and learning materials to public primary schools. Again, the sense of an effectively managed of a supply chain is recognised. In this study, Gama (2013) identified that 87% of interviewed public primary school did *not have sufficient supplies of teaching and learning materials, physical infrastructure like storage space to stock materials was lacking and short of funds to purchase needed teaching and learning materials* was reported. Ministry of Education, Science and Technology is responsible for Education Supplies Unit which provide materials for public primary schools in Malawi. The interviews with a total sample size of 130 gave the author a respond rate of 86% which significantly represent the accurate of distribution situation of teaching and learning materials in pubic primary schools in Malawi. The supply chain distribution map of teaching and learning material of public primary schools in Malawi according to Gama (2013):



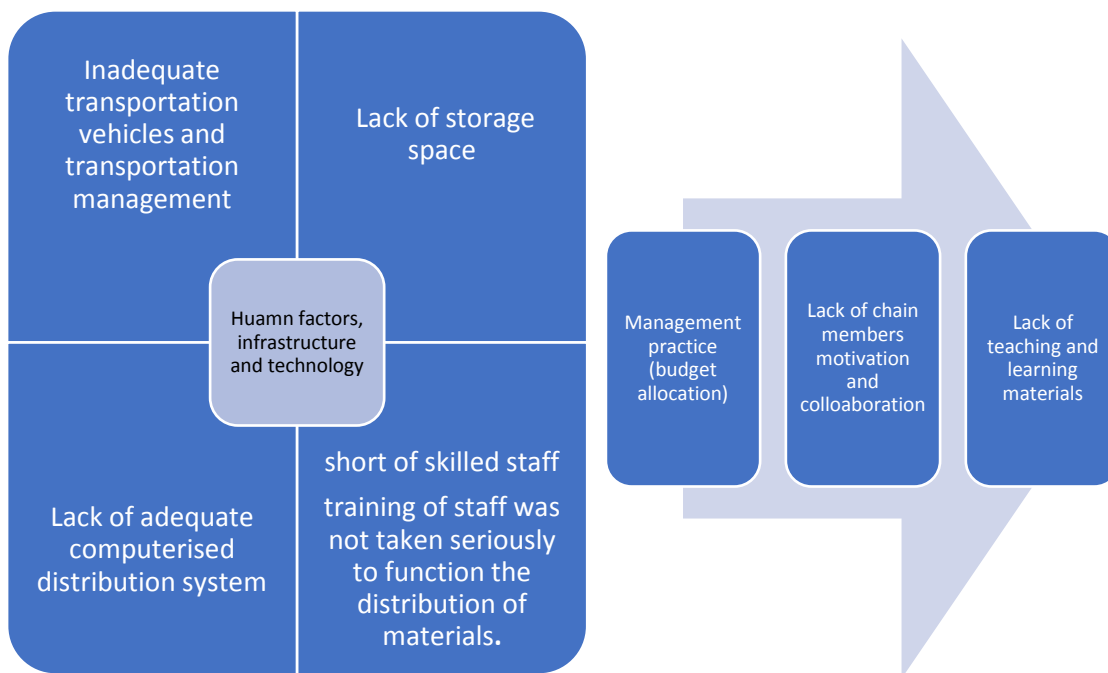
The majority of interviewee (75%) stated that *the Ministry did not formulate the budget for the materials based on requests* from respective public primary schools. Due to the fact of *late delivery of teaching and learning materials to schools*, the author went to investigate the reason causing this issue.

1. Within Procurement Unit, it was found that there was a **lack of coordinated procurement plan**.
2. Within Education Supply Unit, there was **short of skilled staff (technical and administration staff) and lack of adequate computerised distribution system** in order to generate the distribution management effectively to meet the requirements of public primary schools in a cost effective and timely manner. This is because **training of staff was not taken seriously to function the distribution of materials**.
3. According to distribution service providers, **the road accessibility is poor** making delivery of materials to delivery points more challenging.
4. **Inadequate transportation vehicles and transportation management**
5. **Inadequate storage capability to stock large quantities of materials**.
6. **Funding constraint: budget for teaching and learning materials were budgeted not based on requirements from schools**.
7. **There was none of the participation from lower levels of the supply chain which including people who can directly influence the distribution efficiency of materials in public schools such as: teachers, head teachers, district education managers, primary education advisors**.

The findings from Gama’s study demonstrates that teaching and learning materials should be delivered just in time (JIT) in a cost effective way, in the right quantities and timely manner to be able to enhance the education quality which is believed to empower Malawi’s socio-economic development. This means the effective planning and implementation are required in the case of improving teaching and learning materials distribution in public primary schools in Malawi.

Speaking of teaching and learning materials, Dziko (2013) in her study attempted to investigate the shortage of materials in ten specific schools from five districts in central region of Malawi. The author discovered that almost ten selective schools did *not have enough teaching and learning materials especially text books* at the time of the study. More than half of the selected schools for the interview indicated that the shortage of materials occurred due to the Ministry of Education, Science and Technology’s procurement system and financial shortage. Again, *lack of storage space* more specifically libraries in schools led to difficulties to handle materials. As a result, materials were not being taken care and were being stolen to sell to private schools within the region.

Throughout the years (2012, 2013 and 2015) in the public education delivery, the common supply chain problem is shortage of teaching and learning materials at public primary schools. This is due to:



6. Conclusion

This paper has identified a number of supply chain management issues faced by Malawi in respective industry sectors which has significant impacts on the socio-economic development. The paper successfully represents the relationship of some economic sectors to the country’s development. The

findings discuss a wide variety of issues of supply chain management in specific industry sectors raised by relevant target population in a range of researches within the same industry. The findings identify that includes human, technology and process inefficiencies. The research proves the importance of management capability and humanitarian skills in term of improving overall performance and productivity of respective industry sectors. In sub-Saharan Africa, Government policies and regulations should be restructured to play a proactive developmental role.

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Appendix 1

ID	Author	Year	Project's name	Industry	Key problems identified
004	Lapukeni,I, W	2012	Adoption of third party logistics (3L) to achieve health products availability in public health facilities- the case of Malawi's Central Medical stores	Public healthcare	<ul style="list-style-type: none"> • Human resources management (regard to procurement strategy) • Inadequate distribution capacity (warehousing and facilities, delivery vehicle, inappropriate technology)
005	Kanyoma.E, K	2012	The Impact of Procurement Functions on Healthcare Delivery in Malawi's Public Hospitals	Healthcare	<ul style="list-style-type: none"> • Stock out of drugs caused by delays in procurement • Wrong demand forecasting • Withholding of funds by donors. • Excessive drug donation lead to expiry of drugs some are not even boarded to be used
006	Mlendo.J, H	2012	Benchmarking Procurement Practices of Private Hospitals to help improve availability of medical supplies in Malawi Public Hospitals: a case study of South-East Zone Hospitals	Public and private healthcare	<ul style="list-style-type: none"> • Communication with suppliers
007	Chirwa.J, S	2012	Improving Health Commodities	Healthcare	<ul style="list-style-type: none"> • Long lead time • Lack of funding

			Supply chain Efficiencies in Malawi		<ul style="list-style-type: none"> • Stock-outs at CMS • High costs to procure from private suppliers • Lack of collaboration between CMS and partners
008	Chikumbe.M .M, R	2013	A study of factors contributing to illegal selling of medicines by vendors in Malawi	Healthcare	<ul style="list-style-type: none"> • Lack of availability of medicines at public health centres • Unemployment rate is high • Poverty • Low paid for healthcare workers • Minimal fines/penalties applied to illegal sellers
009	Mtama, T	2015	Assessing the impact of procurement processes on availability of medicines and medical supplies in Malawi: A case of Central Medical Stores Trust (CMST)	Healthcare	<ul style="list-style-type: none"> • Low supply of medicines and medical supplies • Requested items are not provided in full. • Overstocked expiry products
010	Uledi.D.A, G	2012	An exploration of the role of supply chain activities in the delivery of public education projects: the case of a public sector project implementation unit in Malawi	Education	<ul style="list-style-type: none"> • Strategic leadership • Human resource • Financial management • Program/process management
011	Gama, R	2013	Improving distribution of primary school teaching and learning materials in Malawi: Can Outsourcing Work? A Case of	Education	<ul style="list-style-type: none"> • Inappropriate budget allocation • Delays in procurement • Lack of human resources • Lack of transportation

			Education Supplies Unit		<p>vehicles and management</p> <ul style="list-style-type: none"> • Inadequate distribution system • Poor road accessibility • Non-participation of chain members • Late deliveries
012	Dziko, M. M	2013	Effects of the shortage of teaching and learning materials on learners in public primary schools: the case of Central West & East education divisions- Malawi	Education	<p>Shortage of teaching and learning materials because of:</p> <ul style="list-style-type: none"> • Lack of funds • Centralised procurement system • Inadequate storage capacity • Lack of proper care of material <p>Leading to material being stolen</p>
013	Nyondo.A, A	2015	The impact of the educational system alongside the media in creating awareness on HIV/AIDS among the youths : a case study of Lilongwe city Central Youths	Education	<ul style="list-style-type: none"> • Lack of skilled staff due to lack of training and lack of staff motivation • Cultural beliefs act as barrier to deliver knowledge • Lack of teaching and learning materials

