An Analysis of the Current Supply Chain Management: A Case of the Zimbabwean Pharmaceutical Sector

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ABSTRACT

The purpose of the study was to investigate the flaws that are within the current Supply Chain Management framework of the pharmaceutical sector in Zimbabwe. The study used a quantitative research approach and descriptive research design. Primary data was collected through a structured questionnaire. The questionnaire was distributed among a sample of 100 employees and managerial employees in the health organisations like MCAZ, NatPharm and the Ministry of Health and Child Care (MHCC). The data was analysed using SPSS a statistical tool for data analysis. The study found quite a number of problems affecting the SCM of the pharmaceutical industry are lack of a sustainable supply chain management framework, high operational costs, lack of adjustment in the market place, Lack of effective and efficient inventory management system. From the findings of this research one can conclude that the currently used supply chain management framework in the pharmaceutical sector of Zimbabwe is to a larger extent ineffective and inefficient. The research concluded that the pharmaceutical sector needs to improve on proper governance and accountability within their respective organizations in order to ensure effective management of all company processes in the acquisition and distribution of health care and pharmaceutical products or services in Zimbabwe.

Keywords: Medicines Control Authority Zimbabwe, Ministry of Health and Child Care, Supply Chain Management.

INTRODUCTION

Background of the study

Access to essential medicines is one of the key requirements for achieving equitable health systems and better population health in the east and southern Africa (ESA) region, as well as globally (Loewenson et al, 2021). One constraint to sufficient access to essential medicines is the countries weak supply chain management. The African Heads of State and Government adopted the Pharmaceutical Manufacturing Plan for Africa (PMPA) to maintain a sustainable supply of quality essential medicines to improve public health and promote industrial and economic development (EQUINET, 2014). The plan assesses the barriers and bottlenecks to medicine production in the region. Equally, the plans of the Southern African Development Community (SADC) and the East African Community (EAC) for pharmaceuticals provide information on proposed policy measures to overcome barriers to access to medicines, including measures such as pooled procurement to make medicines more affordable (Banda, 2023).

Thus, within the region an important policy goal is to create and sustain reliable, regional pharmaceutical industries whose operations are relevant to the local economies and responsive to the region's disease burdens (Balabanova, 2013).

Fitch et al (2023) noted that Zimbabwe will remain a less attractive destination for innovative drug makers over the coming years despite efforts to boost local manufacturing. Zimbabwe's weak economic environment will therefore continue to disincentives investors from entering the market despite efforts by the government to boost local production, as reflected in the newly launched Pharmaceutical Manufacturing Strategy. Fitch et al (2023) denoted aside economic challenges, other weak fundamentals in Zimbabwe include its demographic makeup

which is not conducive to patented medicine sales; the underdeveloped state of rural healthcare infrastructure which puts significant limits on access to pharmaceuticals for Zimbabwe's rural poor; a lack of government commitment to improving the healthcare service; Zimbabwe's large low-income youth population; and the country's high communicable disease burden which limits demand for innovative medicines.

The identified challenges will be useful to construct a coherent decision-making framework applicable to production decisions in the context of shortage risks, strategic positioning (Banda, 2023). This paper aims to promote a pragmatic approach to industrial policy and point to new areas for policy interventions in the pharmaceutical sector particularly the supply chain of medicines.

Objectives of the study

The main objective is to analyse the Supply Chain Management of the Pharmaceutical industry of Zimbabwe, the supporting the objective of the study is to determine the challenges facing the Supply Chain Management of the pharmaceutical industry of Zimbabwe therefore determining solutions to these different problems.

Scope of the study

This study focused on analysing the supply chain of the Zimbabwean pharmaceutical industry. The Zimbabwean pharmaceutical industry includes both the private and public sector but this study focused on the public sector. The public sector provides the framework for the private sector of the pharmaceutical industry.

Significance of the study

There is a knowledge gap concerning the Supply Chain Management of the pharmaceutical industry in Zimbabwe. Therefore this study bridges the gap between the real knowledge and the available data.

LITERATURE REVIEW

This paper focused on Zimbabwe pharmaceutical industry and below is an analysis of its supply chain structure.

Distribution network and drug transportation requirements in Zimbabwe

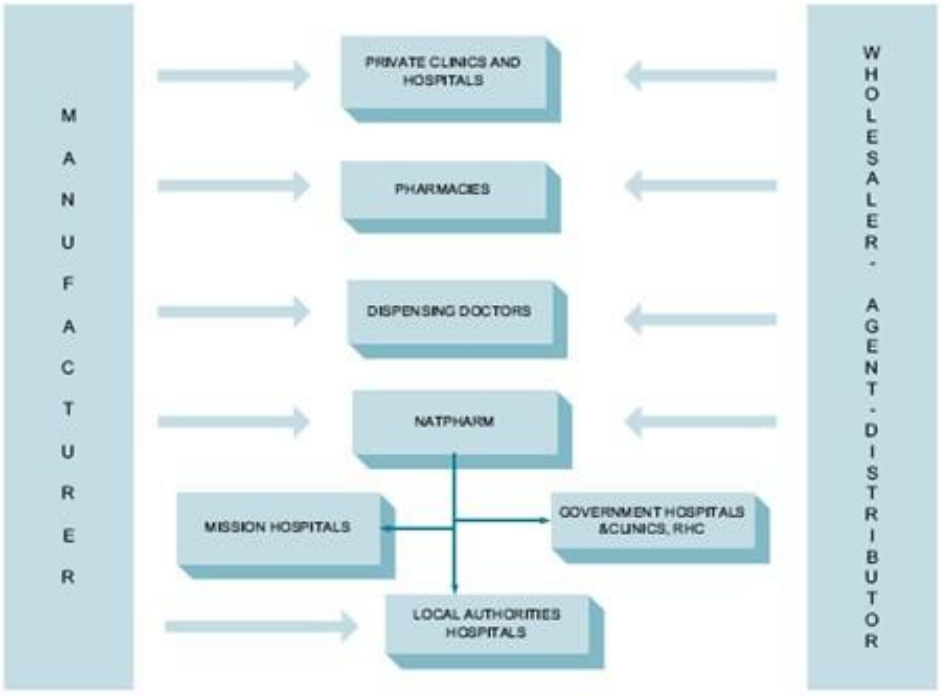


Figure 1: Pharmaceutical Procurement and Distribution Channels in Zimbabwe

Source UNIDO (2011)

The National Pharmaceutical Company of Zimbabwe (NatPharm) is the national drug and medical commodities and equipment procurement and distribution body for all government hospitals and clinics. Private procurement and distribution is carried out through private wholesalers/agents/distributors and retail pharmacies (MCAZ, 2022). NatPharm sources medicines and health commodities through open and closed tenders.

NatPharm is funded by the Government of Zimbabwe through budgetary allocations (World Bank, 2016). However, the current economic difficulties have made this type of funding non-functional. Consequently, over the past three decades, NatPharm procurement of pharmaceuticals has been funded by external bodies, including the World Bank, the European Union, the UK's Department for International Development (DFID) and many others World Bank (2022). This lack of funding at NatPharm has had a substantial negative impact on the sustainability and viability of the local pharmaceutical manufacturing industry since the public sector is by far the largest consumer of pharmaceuticals. In addition, donor organizations have been channelling finished pharmaceutical products into the country through NatPharm and this has further worsened the precarious position of local industry (UNIDO, 2011).

In the private sector distribution system, manufacturers give discounts to wholesalers and pharmacies based on de facto industry levels (MHCC, 2018). During the medicines prices survey carried out, it was concluded that there was no transparency in the pricing of pharmaceuticals with the problem being more acute in the private and dispensing doctors sectors, MHCC (2018).

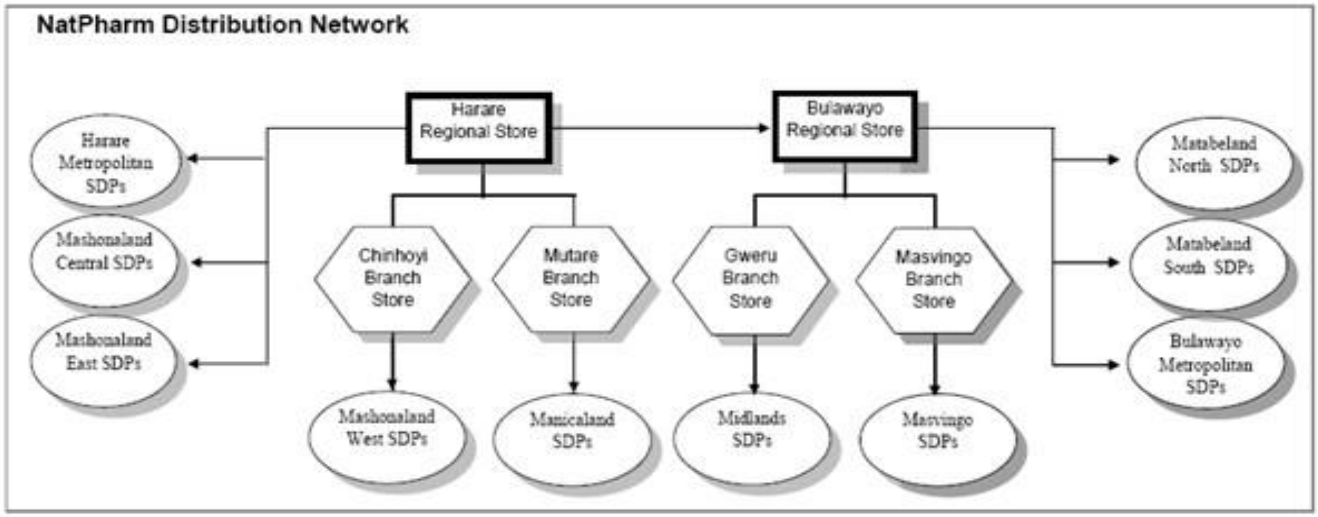


Figure 2: NatPharm Distribution Network

Source: UNIDO (2011)

Historically NatPharm has operated a pull order system for essential drugs. Health facilities issue requisition orders for the products needed, which are then sent by post or delivered in person to their district pharmacy manager, which is located at the district hospital. The orders are then processed, checked, and consolidated at the district before being transmitted to the local NatPharm branch store for fulfilment. The four branch stores then obtain their products from one of the two regional stores. Figure 2.1 summarizes the NatPharm supply chain network.

Challenges facing pharmaceutical supply chain from a global perspective

The table 2.1 below outlines problems facing the pharmaceutical industry in supply chain management.

Table 2.1 Challenges Facing Pharmaceutical Supply Chain

Author	**Challenges in the Pharmaceutical Industry**
Adebisi et al (2023)	. High burden of infectious diseases and non-infectious disease, limited pharmaceutical industries and high cost of raw materials, overdependence on countries abroad for

	medicines, poor supply chains, lack of government investment in pharmaceutical sector, limited healthcare workforce, unfavourable manufacturing conditions, Lack of sustainable health financing mechanism, Lack of Infrastructure and technical know-how, Circulation of fake and counterfeit medicines, Patent issues and limited investment on research and development
Schöpperle (2014)	Inventory Management • Inventory management/warehouse infrastructure • Challenges for order fulfilment • Inventory management systems and forms Transport and Distribution • Supply Chain and Transportation strategies • Last mile distribution challenges Monitoring and Training • Lack of Necessary Knowledge Transfer and Training • selection and quantification such as unknown demand; • Lack of transparent procurement procedures • distribution such as a lack of appropriate planning, monitoring and evaluation and inadequate budget allocation;
Yadav (2015)	Diffuse Accountability, Uncertainties in Financing, Unnecessary Level of Complexity, Long Resupply Intervals, Lack of Supply Chain Planning Data, Mismatch Between Skill and System Design, Lack of Interest in Funding, Operating Costs, Poor Reach in Rural Areas, High Prices in the Private Sector, Poor Quality and Sub-Optimal Assortment, Shortage of Pharmacists and Proliferation of Informal Drug Sellers
KAUPA (2021)	· Lack of knowledge of the pharmaceutical market, High cost of medicines and treatment, Narrow range of registered products, Poor quality of consumption data, Insufficient financial resources • Lack of a robust procurement system • Lack of financial resources • Lack of human resources and skills • Poor specifications and quantification • Weak governance and accountability mechanisms • Inadequate capacity of suppliers/manufacturers • Inadequate storage • Lack of inventory management system • Lack of collaboration
Bates and Awwad (2020)	• Drug Shortages • Lack of transparency

	• Logistic challenges • Lack of Compliance to FDA Regulations
McCabe (2011)	• Poor access to foreign exchange. • Fluctuation of API prices and supply of raw materials. • Taxes and tariffs on medicines. • Unreliable and expensive utilities. • Poor transport infrastructure. • Poor forecasting. • Limited access to credit • High cost of meeting quality standards.

Author: Challenges in the Pharmaceutical Industry

From the table 2.1 above it can be detected that the supply chain of pharmaceutical industry is facing serious challenges which are from within and without the industry. Some of the noted challenges are really affecting supply chain in the country of Zimbabwe.

The following section of the research paper describes the research methods which this study undertook to carry out the research and the nature of the research design chosen.

METHODOLOGY

Research Approach

The epistemological basis of pragmatics is the idea that by focusing on "practical understandings" of concrete, real-world issues, research might steer clear of metaphysical debates about the nature of reality and truth (Patton, 2005).The objectives of the study is to analyse the Supply Chain Management (SCM) of the pharmaceutical industry and to determine the challenges facing the pharmaceutical SCM. To achieve this goals the study adopted a quantitative research approach; structured questionnaire . A quantitative research enables the researcher to collect objective and numerical data to apply statistical tools. Research design is a map that is usually developed to guide the research (Prabhat et al, 2016). Descriptive research design was used for this study.

The source of this study was primary data source. As the research was intended to study the challenges of pharmaceutical supply chain management in public health facilities. Target Population of the study Nat Pharm, MCAZ and the Ministry of Health and Child Welfare. The researcher used a sampling technique which is a mixture of deliberate (purposive) and simple and random sampling technique. The purposive sampling technique was used in order to select the target population which. Whereas, the simple random sampling technique was used to take the respondents from the target population. This techniques are used to increase convenience of the study. The study used the Krujce and Morgan table to choose the sample size.

Organisation	**Target Population**	**Sample**
Nat Pharm	128	60
MCAZ	80	30
Ministry of Health and Child Welfare	10	10
Total	**228**	**100**

Data Analysis

An array of descriptive analysis was conducted to address the two research questions presented in the introduction. Once data was collected, it was necessary to employ statistical techniques to analyse the information. Data was analysed by using SPSS 20 software and excel spreadsheet.

Validity and reliability test

Reliability Test

Statistical investigations (Cronbach's alpha) in order to check the reliability of an instrument to capture intended objective of the study. Cronbach's alpha was calculated by application of SPSS20 for reliability analysis. The Cronbach's alpha value for all constructs SCM activities and challenges should be greater than 0.7 that is considered to be acceptable.

Ethical research considerations

The researcher tried to avoid misleading or deceptive statements in the research. The researcher had to apply for permission at the Ministry of Health and Child Care, Nat Pharm and MCAZ. Lastly, the questionnaires were distributed only to voluntary participants.

RESULTS OF THE STUDY

Reliability test results

The reliability test results showed that the responses obtained from this research were reliable and could be used for further analysis (figure 4.1.1 and figure 4.1.2). According to Haan (2018) the closer the value is to 1 the better, with values greater than 0.9 being excellent, those above 0.8 being very good and those above 0.7 being good and those from 0.6 and 0.5 being acceptable and poor respectively.

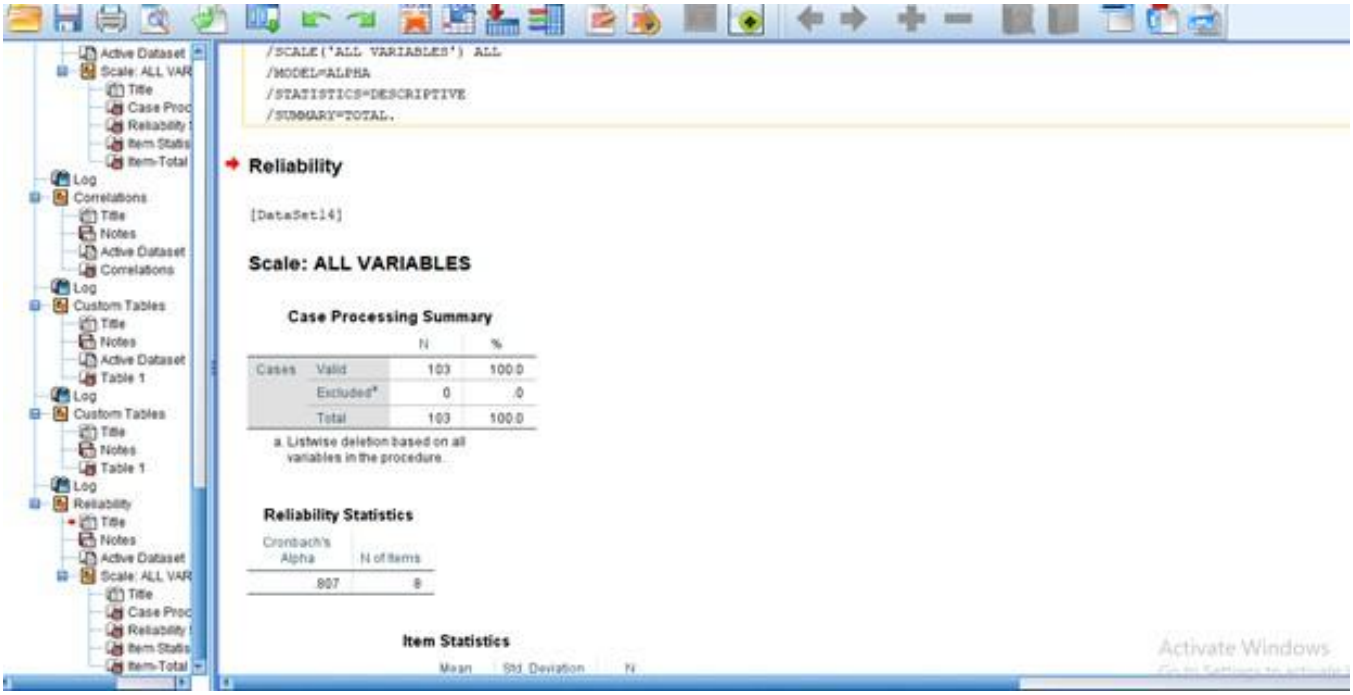


Figure 4.1.1: Picture showing the Cronbach`s alpha value for responses on the key performance indicators of supply chain management for the pharmaceutical sector of Zimbabwe.

Figure 4.1.1 above shows that the Cronbach`s alpha value for responses on the key performance indicators of supply chain management for the pharmaceutical and health sector of Zimbabwe was 0.807. This was a very good value representing good consistency in the responses obtained by the research.

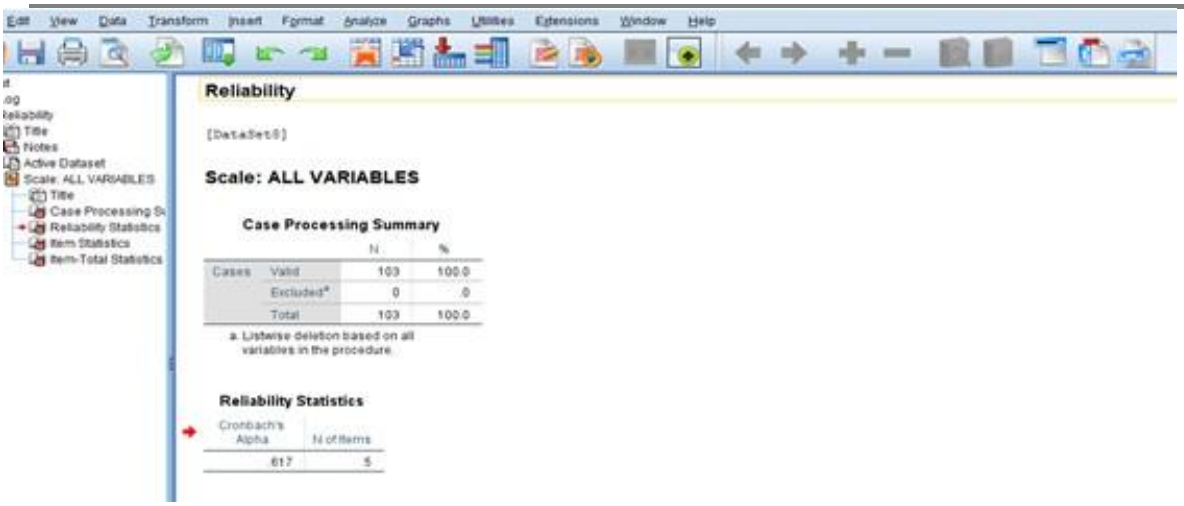


Figure 4.1.2: The Cronbach`s alpha value for responses on the main challenges faced in the supply chain management framework for the pharmaceutical in Zimbabwe

Figure 4.1.2 above shows that the Cronbach`s alpha value for responses on the main challenges faced in the supply chain management framework for the pharmaceutical and health sector in Zimbabwe was 0.617. This value represented an acceptable consistency in the responses obtained by the research and thus the data could be used in further analysis.

Responses on the key performance indicators of supply chain management for the pharmaceutical sector of Zimbabwe

The merged results from the questionnaire on the flaws within the supply chain management framework showed that 59.2% of the respondents supported the idea that the current supply chain management framework ensures a return on the investment as opposed to 33% that disagreed and 7.8% that were not sure. In terms of reducing the operational costs 84.4% disagreed that the current supply chain management framework ensured reduction in operation costs with 7.8% of the respondents being unsure and the other 7.8% agreeing on that idea (figure 4.2.1 below).

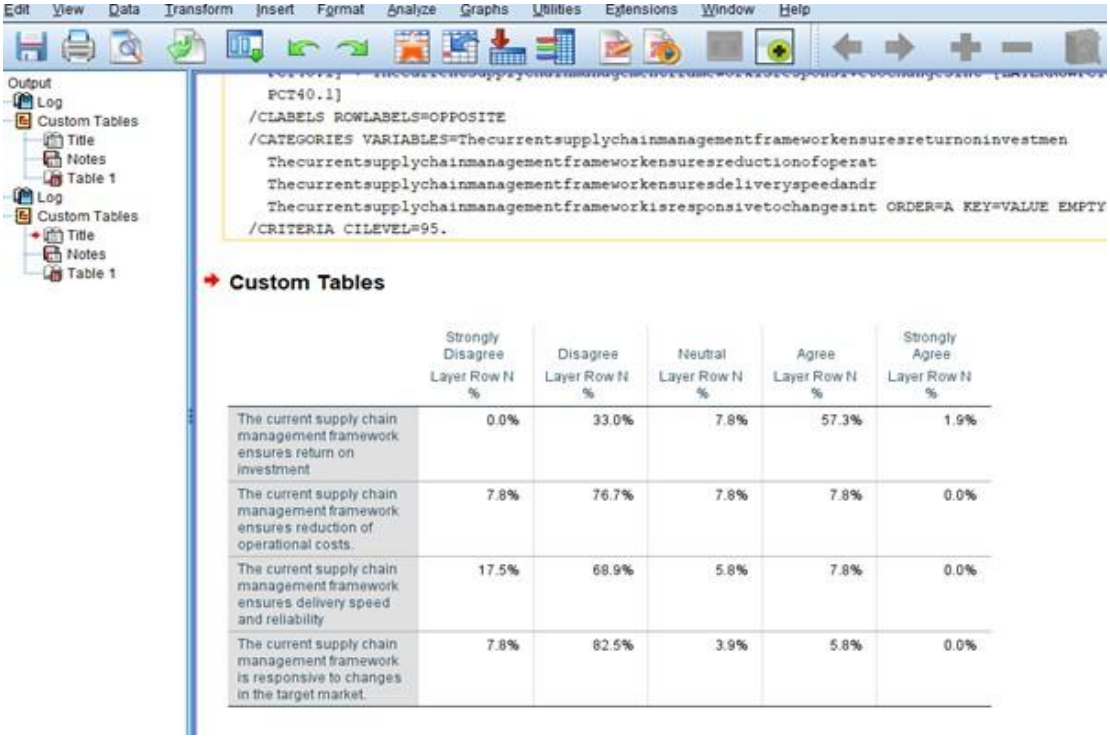
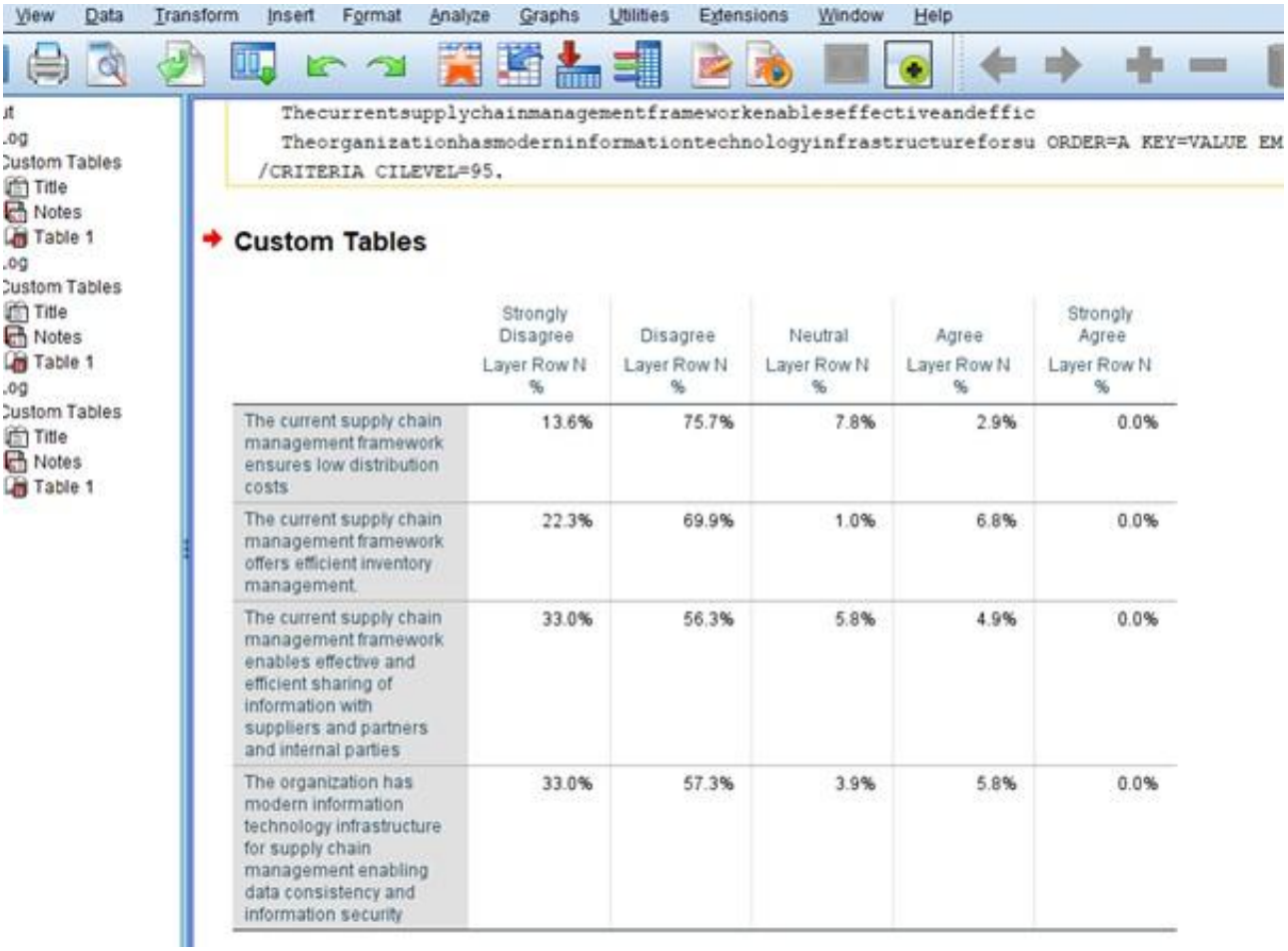


Figure 4.2.1: The distribution of responses of the first four aspects on the key performance indicators of supply chain management for the pharmaceutical and health sector of Zimbabwe.

From figure 4.2.1 above, when it came to the current supply chain management framework ensuring high delivery speed and reliability the merged results showed that 86.4% of the respondents disagreed with 5.8% of the respondents being unsure 7.8% of the respondents agreeing. The statistics were also not in favor of the current supply chain management framework being able to respond to changes in the market place with 90.3% disagreeing, 3.9% being neutral and only 5.9% agreeing.



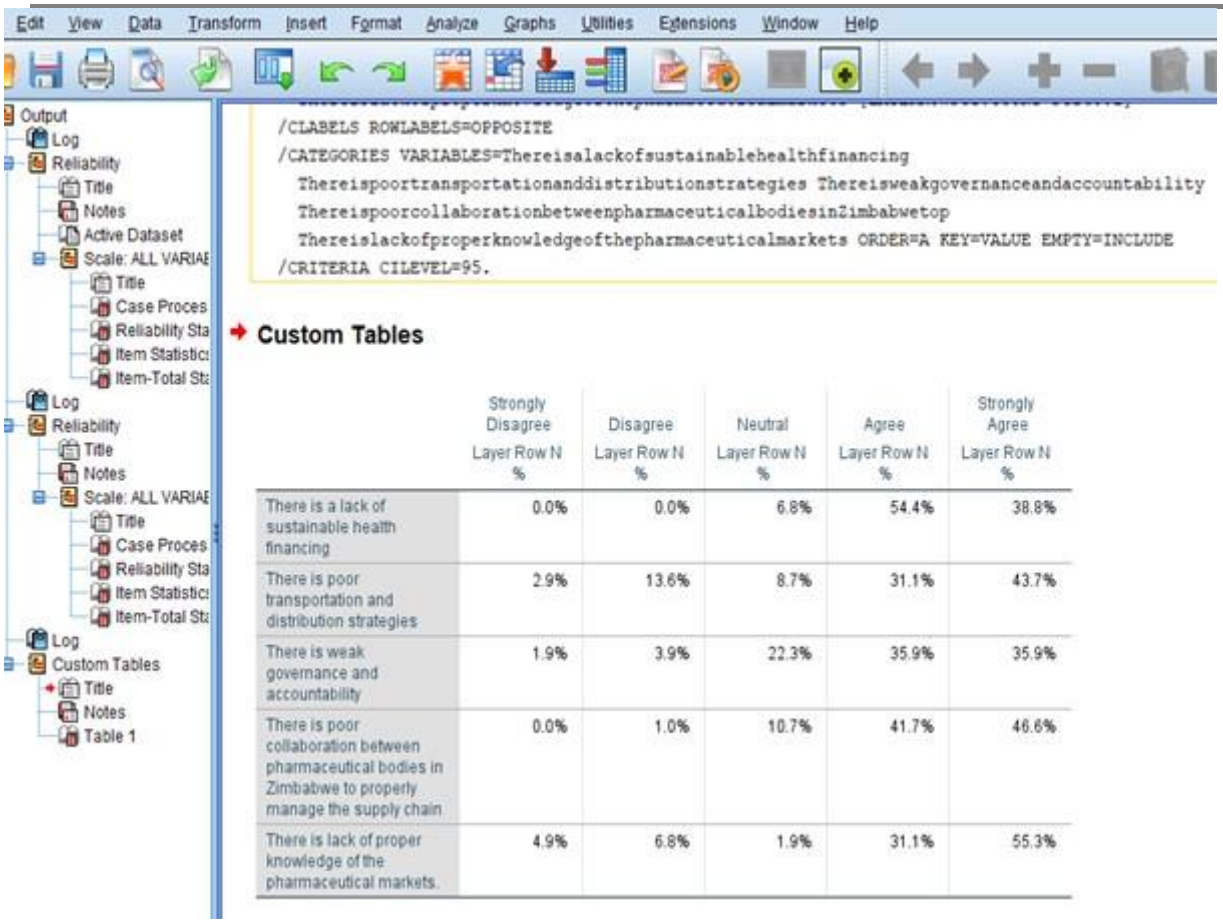
	Strongly Disagree Layer Row N %	Disagree Layer Row N %	Neutral Layer Row N %	Agree Layer Row N %	Strongly Agree Layer Row N %
The current supply chain management framework ensures low distribution costs	13.6%	75.7%	7.8%	2.9%	0.0%
The current supply chain management framework offers efficient inventory management.	22.3%	69.9%	1.0%	6.8%	0.0%
The current supply chain management framework enables effective and efficient sharing of information with suppliers and partners and internal parties	33.0%	56.3%	5.8%	4.9%	0.0%
The organization has modern information technology infrastructure for supply chain management enabling data consistency and information security	33.0%	57.3%	3.9%	5.8%	0.0%

Figure 4.2.2: The distribution of responses of the last four aspects on the key performance indicators of supply chain management for the pharmaceutical sector of Zimbabwe.

When it came to the current supply chain management framework ensuring low cost of distribution the merged results showed that 89.3% disagreed, 7.8% being neutral and only 2.9 % agreed (figure 4.2.2). In terms of ensuring effective and efficient inventory management 92.2% disagreed, with 1% of the respondents being unsure and only 6.8% agreeing on that idea. With regards to there being effective and efficient information sharing within the current supply chain management framework of the pharmaceutical sector the merged results showed that 89.3% disagreed with 5.8% of the respondents being unsure and 4.9% agreeing to the idea. The merged results for the responses also showed that, when it came to the current supply chain management framework ensuring data consistency 90.3% of the respondents agreed with 3.9% being neutral and 5.8% agreeing.

Responses on the main challenges faced in the supply chain management framework for the pharmaceutical and health sector in Zimbabwe.

The merged results for the responses showed that 93.2% agreed that there is a lack of sustainable health financing for the SCM framework in the sector whereas the rest were not sure (figure 4.3). The results also showed that 74.8% of the respondents agreed that there is poor transportation and distribution strategies within the SCM framework of the pharmaceutical and health sector of Zimbabwe with 16.7% disagreeing and 8.7% being neutral. In terms of governance and accountability 71.9% agreed that the SCM framework in the sector was weak while 5.8% disagreed and 22.3% were not sure.



	Strongly Disagree Layer Row N %	Disagree Layer Row N %	Neutral Layer Row N %	Agree Layer Row N %	Strongly Agree Layer Row N %
There is a lack of sustainable health financing	0.0%	0.0%	6.8%	54.4%	38.8%
There is poor transportation and distribution strategies	2.9%	13.6%	8.7%	31.1%	43.7%
There is weak governance and accountability	1.9%	3.9%	22.3%	35.9%	35.9%
There is poor collaboration between pharmaceutical bodies in Zimbabwe to properly manage the supply chain	0.0%	1.0%	10.7%	41.7%	46.6%
There is lack of proper knowledge of the pharmaceutical markets.	4.9%	6.8%	1.9%	31.1%	55.3%

Figure 4.3: Picture showing the distribution of responses on the main challenges faced in the supply chain management framework for the pharmaceutical and health sector in Zimbabwe

According to figure 4.4, 88.3% attested to the fact that there is poor collaboration between companies within the health and pharmaceutical sector while 1% disagreed and 10.7% were not sure. The responses from the respondents also showed that 86.4% agreed that the players in the health and pharmaceutical sector lacked proper knowledge of the pharmaceutical markets while 11.7% disagreed and 1.9% were not sure.

SUMMARY RESULTS

The results of the research from the questionnaire responses showed that the currently used supply chain management framework in the pharmaceutical sector of Zimbabwe is to a larger extent ineffective and inefficient. The results showed that the current supply chain management framework in the pharmaceutical sector fails to ensure effective and efficient reduction in operation costs, delivery speed and reliability, response to the market changes, low cost of distribution, inventory management, information sharing and data consistency. The framework used also faces challenges with poor financing, poor transportation and distribution strategies, lack of proper governance and accountability. The study also showed that there was poor collaboration between pharmaceutical bodies in Zimbabwe to properly manage the supply chain and a lack of proper knowledge of the pharmaceutical markets.

DISCUSSION

Distribution network and drug transportation requirements in Zimbabwe

Major findings of the research showed that the current supply chain management framework in the pharmaceutical sector fails to ensure effective and efficient reduction in operational and delivery costs. According to Akhter et al (2018) this is a common phenomenon in a poorly managed supply chains, pointing out the fact that in poorly managed supply chains cost of operations including those of deliveries also increase from time to time. This increase in the costs is mainly due to the fact that companies in the sector would be

operating in isolation instead of collaborating together in the pharmaceutical sector and thus instead of some of the costs being spread between organizations in the sector a company will be bearing the whole burden by itself and thus increasing the costs of its operations.

Findings of the study also showed that the current SCM framework does not ensure effective and efficient delivery speed and reliability. This was in line with what Arredondo & Tanco (2021) states. They pointed out to the fact that ineffective supply chain management usually causes late deliveries of commodities. These delays in deliveries are usually caused by a failure of the organization to predict the requirements and resources needed for the timely delivery of the products to the customers. This flaw could also be attributed to a lack of proper knowledge of current trends in the health care and pharmaceutical sector which was also another flaw that brought out through this research.

The results of the research also showed that the current SCM framework used in the pharmaceutical sector of Zimbabwe also has challenges in responding to the market changes timeously and effectively. This means that the SCM framework being used has difficulties in customizing itself to match up with the changes that occur in the market. According to Lysons & Farrington (2016) customization problems are also one of the major problems that are faced in a poorly managed supply chain and thus it has been found to be also a flaw in Zimbabwe`s SCM framework in the health and pharmaceutical sectors.

The current supply chain management framework in the health and pharmaceutical sector also fails to ensure effective and efficient inventory management. This was in line with what Akhter et al (2018) pointed out to be another result of poor supply chain management. He states that poor utilization of inventory assets is one of the most notable problems arising from poor SCM. Firms that have use a poor supply chain management framework usually experience large stock outs of products. Chief of the reasons for the stock outs of the products is the inability to predict the needs of the market in time and also inability to forecast the requirements needed for timely delivery of the products to the customers.

Challenges facing pharmaceutical supply chain from a global perspective

The findings of the research also showed that the current SCM framework used in the pharmaceutical sector of Zimbabwe does not ensure effective and efficient information sharing and data consistency. This flaw in the sharing of information and lack of data consistency is due to the fact that supply chain activities extend across various functional units within that organization and also across different organizations within the supply chain causing the data to be asymmetrical (Naude & Badenhorst-weiss, 2011). According to Lysons & Farrington (2016) inconsistency of data can be caused by two factors. One of the two factors is due to lack of incorporation of proper information technology needed in the recording, processing, storage and sharing of data. Data inconsistency can also occur due to the unwillingness of certain organizations to share their information with other organizations involved in the same supply chain.

The data collected also showed that the framework used also faces challenges with poor financing, poor transportation and distribution strategies, lack of proper governance and accountability. These factors are more likely to be the most pivotal factors causing the inefficiencies in the supply chain management of the pharmaceutical sector in Zimbabwe. This is because according to Arredondo & Tanco (2021) the financing, accountability and strategic planning are major contributors to the effective management of a supply chain.

The study also showed that there was poor collaboration between health care and pharmaceutical bodies in Zimbabwe in the management of the supply chain. According to Camilleri (2017) organizations that collaborate effectively in a supply chain have an advantage that there will be an increase in the efficiencies of all the members involved with their inefficiencies being resolved as a group rather than individually. On the contrary lack of collaboration in a supply chain results in the increase of the operational costs due to lack of communication and collaboration. ‘

CONCLUSION

From the findings of this research one can safely conclude that the currently used supply chain management

framework in the pharmaceutical sector of Zimbabwe is to a larger extent ineffective and inefficient. This can be owed to poor financing, poor transportation and distribution strategies, lack of proper governance, poor collaboration and poor accountability in the pharmaceutical sector of Zimbabwe.

Practical implications

From a managerial perspective the findings of this research have shown certain characteristics that are likely to be lacking among the managers of businesses within the health and pharmaceutical sector of Zimbabwe. These characteristics include lack of active strategic planning and implementation of strategies that would increase the effectiveness and efficiencies of the supply chain of the pharmaceutical sector of Zimbabwe an aspect which is very pivotal for the profitability of all the organizations involved. Another characteristic to note is that managers in the sector need to improve on proper governance and accountability within their respective organizations in order to ensure effective management of all company processes in the acquisition and distribution of health care and pharmaceutical products or services in Zimbabwe.

Globally market trends are always changing and it is pivotal that supply chain managers and like officers make efforts to acquire sufficient and latest information on the current trends in the pharmaceutical sectors globally, regionally and also in Zimbabwe so that they can be better at predicting trends, meeting consumer demands effectively and also able to solve any problems that arise though utilization of their in-depth knowledge. Firms also need to put a collaborative effort in trying to mitigate the challenges they are facing in the pharmaceutical supply chain in Zimbabwe as a group instead of doing so individually since this would guarantee better success.

Limitations and further research

The major limitation to this research was the data collection tool that was used which was the use of a questionnaire. According to Cropley (2021) questionnaire surveys have the shortfalls that there is a high chance that the researcher will be given information that is true to the extent that the respondent deems comfortable for them as compared to actual fact. This means that the information used in this study has a likelihood of containing some level of bias as pertaining to the representation of the actual situation in the pharmaceutical industry of Zimbabwe.

This research can be carried on further to examine possible solutions that can be used to alleviate the supply chain management crisis being experienced in the pharmaceutical sector of Zimbabwe. In such studies research can be conducted on how to solve the supply chain management problems through exploring various SCM frameworks that can be effective in the sector. Studies can also be carried out to analyze the use of various modern technologies in trying to smoothen some of the operational processes needed in the effective management of the supply chain. Furthermore, the study can be deepened to ascertain the contribution of Zimbabwe`s economy in the pharmaceutical supply chain (s).

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