Journal of Supply Chain Management Systems
9 (2 & 3) 2020, 08-19
http://publishingindia.com/jscms/

Challenges Facing Global Pharmaceuticals Supply Chain Management: The Case of Zaf Pharmaceuticals Private Limited Company, Addis Ababa, Ethiopia

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Abstract

The aim of this study was to assess challenges faced on global supply chain management (GSCM) practice of Zaf Pharmaceuticals in Ethiopia. A cross-sectional study was conducted between May and June 2018. Both quantitative and qualitative data was collected using a self-administered questionnaire and a structured interview guide. More than half (57%) of the respondents have reported that Zaf Pharmaceuticals has no documented suppliers selection criteria. Foreign supplier product market authorization processes, foreign exchange permit directives, and waiting for Ethiopian shipping vessels were mentioned as the leading challenges facing the company. Majority of the respondents (94.7%) in the study setting have replied that the fluctuation of currency exchange rate affected the GSCM practice of the company intensively. Response from 36 (63.25%) of the participants showed that there was no cultural issue which created instability of relationship between suppliers and the company. About 45 (78.9%) of the respondents also agreed that they faced little logistics challenge during their company's global sourcing. Overall, it can be deduced that global pharmaceuticals supply chain management in the present case is faced with a multifaceted challenge.

Keywords: Pharmaceuticals, Global Supply Chain Management, Challenges, Suppliers, Zaf

Introduction

The pharmaceutical supply chain management is a complex process that requires the participation of different stakeholders such as pharmaceutical manufacturers, wholesalers, distributors, customers, information service providers, and regulatory agencies (Kampoor et al., 2018; Singh & Goh, 2019; Settanni et al., 2017; Zahiri et al., 2017; Cullen & Taylor, 2009; Silva & Mattos, 2019). Its proper implementation ensures to avail medicines in the right quantity, with the acceptable quality, to the right place and customers, at the right time and with optimum cost to be consistent with a health system's objectives (Kaufmann et al., 2005; Muhia et al., 2017). There are instances where international trade can have direct health and safety impacts on poor individuals (Smith, 2006). Perhaps most importantly, improving the health outcomes of poor people usually involves imports of medical products. It is simply not possible for a small developing country such as Ethiopia to produce all the entire range of medical supplies, medicines, and advanced medical equipment (Reinert, 2005).

Firms internationalize the upstream side of their supply chain to have access to lower priced goods, higher-quality goods, and worldwide technology to benefit from timely delivery and reliability improvements (Monczka & Trent, 1991; Birou & Faucett, 1993). Firms also internationalize their downstream operations so that they are able to sell their products in new geographical markets (Kuemmerle, 2005, Tomas et al., 2017). However, the international dimension has also introduced complexity and risks in the supply chain of medicines, particularly in Africa (Brako et al., 2016; Goshorn & Usswald, 2014). In fact, the management of global supply chain poses more challenges, such as new and more suppliers, variable exchange rates, and the change of local policies, than the management of domestic supply chains (Domier et al., 1998). Further, the supply chain environment, including

the manufacturing and operations sector, is influenced by a multitude of technological enablers, such as big data and predictive analytics (BDPA) (Dubey et al., 2019a; Dubey et al., 2019b; Wamba et al., 2020), blockchain technology (BT) (Dubey et al., 2020), artificial intelligence (AI) and machine learning (Dubey et al., 2019). Empirical studies and theoretical postulates have shown the growing importance of data analytics as a means to improve information processing capacity and supply chain resilience in different organizations (Dubey et al., 2019).

Challenges within the pharmaceutical supply chain also comprise additional peculiarities. These include an increase in transportation costs, lead times, and inventories (Moosivand et al., 2019; Arikan et al., 2017). Infrastructural deficiencies in developing countries may also embrace transportation and telecommunications, inadequate worker skills, supplier availability, and supplier quality (Cogliano et al., 2008). Yet, global supply chain management (GSCM) carries specific risks such as variability and uncertainty in currency exchange rates, economic and political instability, and changes in the regulatory environment (Msimangira & Tesha, 2014; Meixell & Gargeya, 2005). The challenges in the sector fall at the supply chain design (capacity) and operational (responsiveness) stages (Shah, 2004). All the aforementioned challenges can lead to difficulties in realizing the benefits associated with internationalization. Taking into account that supply chains are becoming more and more global, the study of challenges and placing approaches to overcome them is of great importance in the area.

The pharmaceutical sector of Ethiopia is regulated by Food, Medicine and Health care Administration and Control Authority (EFMHACA) based on proclamation no. 661/2009 (EFMHACA, 2009) established under the council of ministers Regulation no. 189/2010 (EFMHACA, 2010). Ethiopian pharmaceuticals market is growing from time to time. Most of the pharmaceuticals (75%) are sourced from global suppliers. However, 25% of the pharmaceuticals are manufactured within the country (PFSA, 2016). In addition, International Federation of Pharmaceutical Manufacturers & Associations (IFPMA) facts and findings of 2017 stated that Ethiopia had imported $309.77 million worth of pharmaceuticals and exported pharmaceuticals having value of only $2.02 million (IFPMA, 2017). Currently, there are about 135 registered pharmaceutical importers in Ethiopia (EFDA, 2019). These importers distribute different kinds of pharmaceuticals originated from different global suppliers located in different countries.

Ethiopian pharmaceuticals supply chain managers may consider the above facts to concentrate their attention on GSCM issues. Even though, most pharmaceutical products are procured from global suppliers using redundant international competitive bids, there is no clear evidence on how the pharmaceuticals supply chain functions in the country as the buyer-supplier relationship is traditional and more tactical. In terms of GSCM, private pharmaceutical companies might be good examples since at least their buyer-supplier relationship is based on mutual benefit and cooperation. This, in turn, is presumed to improve vertical partnership and collaboration between retailers and suppliers (Renko, 2011).

Despite the importance of the topic and presence of unclear evidence, there are no adequate studies conducted in assessing challenges of global pharmaceuticals supply chain management in Ethiopian context. This paper explored the challenges facing global pharmaceuticals supply chain management, taking Zaf Pharmaceuticals Privately Limited Company (PLC) as a case, which sources different pharmaceutical products from more than 26 diversified global suppliers.

Methods

Study Setting

Zaf Pharmaceuticals PLC, named after its founder and owner Mrs. Zaf W/Tsadik, is a private company which was established in 1991 with an objective of importation and distribution of pharmaceuticals (Human and Veterinary), medical supplies, devices, infant formula, and medical equipment throughout Ethiopia. Its office is located in Bole sub-city, Addis Ababa (Zaf, 2017). It has three standard warehouses constructed as per the FMHACA's standards and one of them is fitted with cold chain facilities to ensure that the products are kept as per their respective recommended storage conditions.

The main business activities of the company include, but not limited to, import and distribution of safe, quality and efficacious medicines (Human & Veterinary), medical supplies and medical equipment, supplements, and infant formulas. At present, the company has a market authorization to import and distribute more than 300 different medicines and medical supplies/equipment from 26 different multinational and generic companies. Zaf Pharmaceuticals PLC, distributes its imported products mainly through wholesalers and retailers in the country. In addition, it supplies different governmental and non-governmental health facilities participating in their bids (Zaf, 2017). The company is selected purposively, because of its long experience, engagement of various multinational suppliers, product variability, and volume as well as market shares in the country.

Study Design and Period

A cross-sectional study design was employed in this study. A mixed approach that involved both qualitative and quantitative methods was used to collect data from 1st May to 1st June, 2018.

Study Population

The study population for the study was a single company, Zaf Pharmaceuticals PLC, with a total of 110 employees. Because of the peculiarity of pharmaceuticals supply chain function to employ both technicality and tactical decisions through the entire business transactions, respondents with bachelor degree and above, and who are familiar with GSCM, were involved in responding to self-administered questionnaires and key informant interviews. As the total population is finite and small in number, the study considered all the total population of the study setting. However, the respondents that represent the company were selected using purposive sampling. Managers, supervisors, and experts of concerned departments that are involved in the GSCM were included.

Data Collection Instrument and Procedure

Both structured and semi-structured data collection formats were prepared based on the literature (Moosivand et al., 2019; Cogliano et al., 2008; Msimangira & Tesha, 2014). Quantitative data was collected from managers, procurement officer, marketing officers, and warehouse managers using structured self-administered questionnaires. Gathered data included profile of respondents, supplier selection complexity, difference in standard and regulations, fluctuation of currency and exchange rates, volatile economic and political environment, cultural and linguistic difference, complicated logistics, and the effect of all such factors to the study setting. Qualitative data was collected using semi-structured interview guiding questions. The chief executive officer (CEO), general manager, procurement manager, business development manager, and marketing manager were considered during the key informant interview.

Data Quality Management

The prepared questionnaire and interview guide was checked for content validity by a content expert. Additionally, before the questionnaire was dispatched for use, a pre-testing of 5 questioners was done by distributing to respondents who were not included in the study. A feedback was obtained and necessary correction was made to amend the questionnaire. A Cronbach's alpha was performed as a measure to check if the study repeats the same results. The reliability of the instrument & data was established following a pre-test procedure and before its use with actual research respondents. In the present study, the Cronbach's alpha test (0.713) indicated that the instrument is reliable as the value is in the acceptable range (George & Mallery, 2003). Qualitative data collection was performed as a triangulation after trends in the quantitative data were determined. Data explored in this method includes; challenges faced, specific impacts on the organization, coping mechanisms considered, and mechanisms of conflict resolution.

Data Analysis

Quantitative data collected was checked for completeness. It was then coded, entered, and cleaned manually in statistical packages for social sciences (SPSS) version 20.0 software before analysis. Qualitative data was used to triangulate quantitative findings. Descriptive statistics was employed to run univariate analysis. Results were presented as frequency, percentage, and mean using tables and charts.

Ethical Approval

Approval to conduct the study was obtained from department of logistics and supply chain management, school of commerce, Addis Ababa University. Permission to conduct the study was guaranteed from the chief executive officer (CEO) of Zaf Pharmaceuticals PLC. Informed verbal consent was sought from each study participant. Data was analyzed in aggregate and the identity of participants in this study was maintained confidential.

Operational Definitions

Supply Chain: The coordination of resources and the optimization of activities across the value chain of the company to obtain competitive advantage.

Supply Chain Management: The management of upstream and downstream relationships with buyers and sellers in order to create value in the end.

Global Supply Chain Management: An international network of pharmaceutical manufacturers and distributors who operate with Zaf Pharmaceuticals and are responsible for the successful delivery of goods/services to end customers.

Major Challenge: A challenge with a mean score of 3.0 or above as rated by respondents on the five scale Likert evaluation.

Minor Challenge: A challenge with a mean score below 3.0 as rated by respondents on the five scales Likert evaluation.

Results

Characteristics of Respondents

Sixty (60) Self-administered questionnaires were distributed to respondents at the same time. All of the questionnaires returned filled on time. Unfortunately 3 of them found to be incomplete and rejected from analysis at editing stage. Therefore, the response rate for self-administer questionnaires was 95%. Analysis was conducted using SPSS Version 20. Of the total 57 respondents, 43 (75%) were males. More than half (60%) were first degree holders in different fields of study. Respondents were selected from procurement (19 (33%)), business development, and marketing department (20 (35%)) and foreign suppliers' representative offices 12 (21%). In terms of work experience in the pharmaceuticals supply chain management, 27 (47%) of the respondents were found to have 5 to 8 years followed by those with 1 to 4 years of experience (19 (33%)) (Table 1).

Table 1: Characteristics of Study Participants at Zaf Pharmaceuticals PLC., Addis Ababa, Ethiopia, June 2018 (n = 57)

Major Characteristics		Frequency	Percent	Cumulative (%)
Sex	Male	43	75.4	75.4
	Female	14	24.6	100.0
Education Level	First Degree	34	59.6	59.6
	Master's Degree	23	40.4	100.0
Department	Procurement regulatory affairs	19	33.3	33.3
		6	10.5	43.9
	Suppliers' representative	12	21.1	64.9
	Business development &marketing mgt.	20	35.1	100.0
Experience	1-4 years	19	33.3	33.3
	5-8 years	27	47.4	80.7
	9-12 years	9	15.8	96.5
	>12 years	2	3.5	100

Suppliers Selection Complexity

As indicated in Table 2 below, 37 (65%) of the respondents were involved directly or indirectly in supplier selection processes. The rest, 20 (35%) responded were not involved in supplier selection. Among those involved in supplier selection, only 15 (40.8%) chose suppliers' representatives. In addition, the key informant interview with department managers has shown that the main source of information about global pharmaceuticals suppliers were the suppliers' representatives. Regarding the issue of whether the company has a documented supplier selection criteria, 33 (57%) of the respondents agreed that there is no documented supplier selection criteria.

For a question on whether they have ever faced challenges of finding qualified foreign source, about half of the respondents (51.8%) answered that they faced the problem but with little occurrence followed by 19 (33.9%) respondents who reported to have faced an intensive challenge. Interviewed marketing manager and business development manager also assured that there were no documented supplier selection criteria so far. Similarly, for a question forwarded to respondents regarding the criteria of priority in a supplier selection process, 35 (67%) responded that quality, price, technological capacity of suppler, and after-sale services will be considered, whereas 9 (16%) respondents answered that priority is given to high-quality products. Out of the 57 respondents, 28 (49.1%) reported that they did not conduct an audit at all, while 22 (38.6%) of the respondents answered that they conduct potential overseas suppliers occasionally.

Table 2: Practices and Challenge Faced during Supplier Selection at Zaf Pharmaceuticals PLC, Addis Ababa, Ethiopia, June 2018

Question	Response	Frequency	Percent
Engagement in supplier selection	Yes	37	64.9
	No	20	35.1
	Trade fairs	4	10.8
	Suppliers' websites	4	10.8
	Recommendation	1	2.7
	Suppliers' representative	15	40.8
	All	13	35.1
Does your company have documented supplier selection criteria?	Yes	24	42.1
	No	29	51
	Under development	3	5.2
	Do not know	1	1.7
Did you face the challenge of finding qualified foreign sources?	Not at all	8	14
	Yes, but little	29	51
	Yes, intensively	19	33.3
	Do not know	1	1.7
What is the most priority when you select a foreign supplier?	High quality	9	16
	Low price	5	8.8
	High technology	3	5.2
	After sale service	1	1.7
	All of them	38	66.6
	Do not know	1	1.7
Do you conduct an audit of potential suppliers overseas?	Not at all	28	49.1
	Yes, but occasionally	22	38.6
	Yes, frequently	7	12.3

Differences in Standards and Regulation

In this sub-topic, respondents were requested to select the regulatory standards of Ethiopia that affected the company's GSCM practice. Pharmaceuticals market authorization (registration of medicine to be distributed in Ethiopia), foreign exchange permit directive of national bank of Ethiopia, and Ethiopian multimodal transport regulations were given as alternative choices. Majority of the respondents (44 (78.6%)) answered that all of the mentioned regulations affected the GSCM practice of Zaf Pharmaceuticals PLC.

Among 57 respondents, 32 (56.1%) answered difference in regulatory standards between the suppliers' country and Ethiopia affected the pharmaceuticals market Authorization process but with little manner. They were followed by 21 (36.8%) of the respondents who reported that the difference affected the market authorization process intensively. A question was delivered to determine the perception of respondents if customs duties regulation had affected GSCM practice of Zaf Pharmaceuticals PLC. Nearly half (49.1%) of the participants answered that there was such a challenge but they assumed it was little in affecting GSCM practice of Zaf Pharmaceuticals. On the contrary, 18 (31.6%) of them responded that customs regulations were affecting global pharmaceuticals GSCM intensively.

Regarding Ethiopian shipping laws, 35 (61.4%) of the respondents acknowledged that shipping laws affected GSCM practice of the company but the intensity is little. On the other hand, 17 (29.8%) of the respondents answered that shipping law affected global operation of the company intensively. It was also pointed out, during the key informant interview, that customs issues for pharmaceutical products are standard and such challenges are minimal in affecting the supply chain management process.

Table 3: Challenges Faced due to Differences in Standards and Regulation on Pharmaceuticals Global Supply Chain Management at Zaf Pharmaceuticals PLC, Addis Ababa, Ethiopia, June 2018

Question	Response	Frequency	Percent
Which regulator standards of Ethiopia affect your Global Pharmaceuticals supply chain management practice?	Pharmaceuticals market authorization (MA)	4	7.1
	Foreign exchange permit directives	8	14.3
	Ethiopian multimodal transport laws	0	0
	All of them	44	78.6
	I do not know	1	
Do the different regulatory standards b/n your suppliers' countries and Ethiopia affects the processes of pharmaceuticals MA?	Not at all	4	7.0
	Yes, but little	32	56.1
	Yes, intensively	21	36.8

Question	Response	Frequency	Percent
Do customs duties regulations affect the processes of global SCM in your company?	Not at all	11	19.3
	Yes, but little	28	49.1
	Yes, intensively	18	31.6
Does shipping laws affect the processes of global supply chain practice of your company?	Not at all	5	8.8
	Yes, but little	35	61.4
	Yes, intensively	17	29.8

Fluctuation of Currency Exchange Rate

Majority of the respondents (94.7%) in the study setting have answered that the fluctuation of currency exchange rate was obvious and affected the GSCM practice of the company intensively. It was also of interest whether Zaf pharmaceuticals PLC has replaced its supplier because of the changes in exchange rate and price fluctuation. Accordingly, 21 (37%) of the respondents answered as "Not at all" while 29 (51%) answered as "yes but little" option.

Upon assessing the presence of supply delay due to lack of foreign exchange permit, 46 (80.7%) of the respondents answered that the challenge was confronted intensively followed by 10 (17.5%) of the respondents who reported that they faced such challenge but little (Fig. 1).

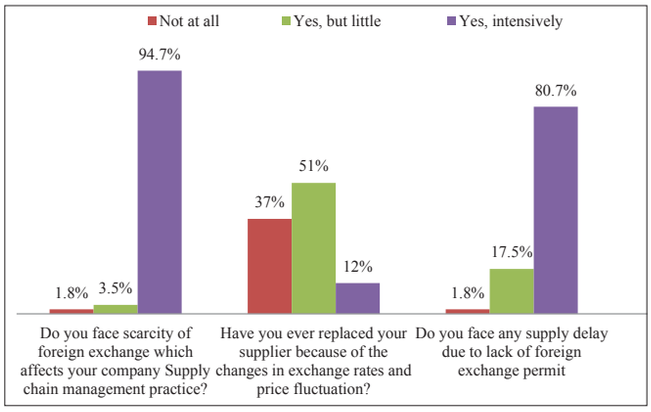

Fig. 1: Challenges due to Fluctuation of Currency Exchange Rate of Pharmaceuticals Global Supply Chain Management at Zaf Pharmaceuticals PLC, Addis Ababa, Ethiopia, June 2018

Cultural and Lingual Difference

Response from 36 (63.25%) showed that there was no such cultural issue which created instability of relationship but 19 (33.3%) acknowledged that the cultural differences were source of the problem with little manner. Similarly, a question was posed to assess whether Zaf Pharmaceuticals PLC encountered logistics problems due to cultural differences. Around a two-thirds (68.4%) of the respondents answered that the company faced such problems but found to be rare. To a question on whether language was a barrier to communicate suppliers, 36 (63.2%) of the participants answered that they faced such a problem occasionally. The last question in this category was delivered to know if any miscommunication with suppliers ever led to a conflict with Zaf Pharmaceuticals PLC. About half of the respondents answered that such miscommunications have not led to any conflict at all (Table 4).

Table 4: Challenges Faced due to Cultural and Lingual Differences on Pharmaceuticals Global Supply Chain Management at Zaf Pharmaceuticals PLC, Addis Ababa, Ethiopia, June 2018

Questions	Response	Frequency	Percent
Did you have any cultural issue between you and the supplier which led to instability of the relationship?	Not at all	36	63.2
	Yes, but little	19	33.3
	Yes, intensively	2	3.5
Did you face to the challenge of logistics problems due to cultural differences when you do engaged in GSCM?	Not at all	7	12.3
	Yes, but rare	39	68.4
	Yes, intensively	11	19.3
Do you face any language barrier to communicate suppliers from different countries?	Yes frequently	5	8.8
	Yes, but occasionally	36	63.2
	Not at all	16	28.1
Has miscommunication with a foreign supplier ever led your company to a conflict with that supplier?	Not at all	28	49.1
	Yes, but occasionally	28	49.1
	Yes, frequently	1	1.8

Complicated Logistics

Table 5 below shows challenges of complicated logistics in global pharmaceuticals supply chain management practice of Zaf Pharmaceuticals PLC. Among the 57 respondents, 45 (78.9%) answered that they faced little logistics challenge during their company global sourcing whereas, 7 (12.3%) respondents reported that they faced intensive logistics challenge during their global sourcing practice.

About a two-thirds of the respondents (68.4%) answered that they always applied a 3PL (Third Party Logistics) service provider when they source pharmaceuticals from foreign suppliers. On the contrary, 7 (12.3%) participants responded that they did not utilize the service of 3PL at all. The third question was intended to identify whether Zaf Pharmaceuticals PLC receives its orders as per its schedule when it imports from foreign suppliers. Accordingly, only 20 (35.1%) of the respondents answered that they receive goods as per the schedule, whereas 12 (21.1%) participants responded that they did not receive goods as per the schedule at all. Majority of the respondents (91.2%) reported that they faced problems when clearing of pharmaceuticals from customs upon arrival, while 5 (8.8%) responded that there was no such challenge. Among the difficulties faced in clearing pharmaceuticals from customs; damage, loss and unpredictable tax were mentioned as challenges by 30 (54.5%) of the respondents.

Table 5: Challenges Faced due to Complicated Logistics Practice on Pharmaceuticals Global Supply Chain Management at Zaf Pharmaceuticals PLC, Addis Ababa, Ethiopia, June 2018

Question	Response	Frequency	Percent
Did your company face to the challenge of logistics problems when you do global sourcing?	Not at all	5	8.8
	Yes, but a little	45	78.9
	Yes, intensively	7	12.3
Do you apply a 3PL providers' service when you import Pharmaceuticals from other countries?	Not at all	7	12.3
	Yes, but occasionally	11	19.3
	Yes, always	39	68.4
Do you receive your consignments on time as per you schedule when you import from your suppliers?	Not at all	12	21.1
	Yes, but occasionally	25	43.9
	Yes, frequently	20	35.1
Do you face difficulties when clearing Pharmaceuticals from customs upon arrival?	Yes	52	91.2
	No	5	8.8
If you face difficulties, which challenges do you face?	Damage	8	14.5
	Loss	8	14.5
	Unpredictable tax variation	5	9.1
	All	30	54.5
	Others (delay in inspection, warehouse charge)	6	10.5

Comparison of Challenges

Although all issues presented earlier have their own effect on the success or failure of GSCM practice, this does not necessarily mean that all issue have equal influence on SCM operation. This inquiry was assessed based on a five-scaled Likert question. Accordingly, ratings were computed into mean score from which a level of challenges was identified and categorized. As presented below, five of the challenges namely; supply uncertainty, finding qualified supplier, shortage of forex and fluctuation exchange rate, long lead-time to receive orders and pharmaceuticals regulatory laws for MA were found to have a score above the mean and are considered as major challenges. On the contrary, two factors namely; cultural and lingual differences as well as unstable political environment were regarded as minor challenges based on their respective mean score (Fig. 2).

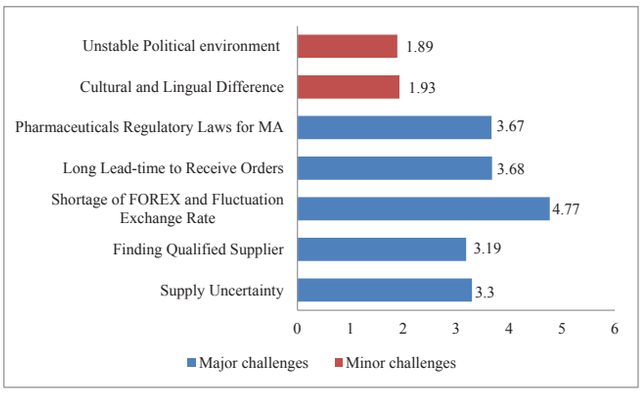

Fig. 2: Five-Scaled Likert Comparison of Challenges during Pharmaceuticals Global Supply Chain Management of Zaf Pharmaceuticals PLC, Addis Ababa, Ethiopia, June 2018

Discussion

In the present study, the main source of information for supplier selection was reported to be suppliers' representatives. In addition, more than half (57%) of the respondents have reported that Zaf Pharmaceuticals PLC has no documented supplier selection criteria. This was also confirmed through the key informant interview where the selection of suppliers was done through a competitive basis considering multiple circumstances. Nonetheless, high quality, low cost and high technology, and after-sales service have been found to be the default product selection parameters. Regarding the audit of potential overseas suppliers, most of the respondents agreed that they did not conduct such audit but some answered that they did it rarely. From the interview, it is found that the mandate of auditing pharmaceuticals suppliers regarding production capability is to FMHACA but the CEO annually conducts such an audit of overseas suppliers.

It is documented in the literature that supplier selection and evaluation have important roles in the supply chain process (Thomas et al., 1996; Khalili et al., 2017). Taherdoost and Brard (2019) documented common aims, such as to reduce purchase risk, to maximize overall value to the purchaser, and to develop closeness and long-term relationships between buyers and suppliers. The process of selecting a group of competent suppliers for important materials, which can potentially impact the firm's competitive advantage, is a complex one and should be based on multiple criteria. Factors that firms should consider while selecting suppliers suggested by Wisner et al. (2005) are as follows: Product and process technologies, Willingness to share technologies and information, Quality, Cost, Reliability, Order system and cycle time, Capacity, Communication capability, Location and Service. Jafarzadeh Ghoushchi et al. (2018) argued that a method called data envelopment analysis (DEA) can be used for multilateral sustainable supplier evaluation and selection as it can employ variety of data types and imprecise data based on goal programing (GP). The model can, then, be changed to a coherent framework using a set of criteria which measure environmental, economic and social dimensions. A multi-criteria decision support model has also been applied in companies with variety of products and multiple factors playing in the distribution channel (Goncalo et al., 2014). Analytical hierarchy process (AHP) is also a popular approach used for selecting potential suppliers. This method is a widely used technique which has attained much attention as it deals with both quantitative and qualitative criteria and presenting decision-makers with a hierarchy of information which includes three levels: goal, dimensions and criteria (Narasimhan, 1983). Studies have also reported other methods of supplier selection which employ ratings based on pre-established criteria (Wills & Huston, 1990) which helps to label a performance as 'good', 'fair' or 'poor'. In addition, cost-ratio method (Timmermann, 1986) that considers the total cost related to quality, delivery, and service is employed. Nonetheless, different companies might have different criteria based on their products, prices offered, quality, on-time delivery, after-sales services, response to order change, supplier location and financial status (Ting & Cho, 2008; Beil, 2009).

Standards and regulations imposed by Ethiopian government were found to be major challenges facing global pharmaceuticals supply chain management in Zaf Pharmaceuticals PLC. Most of the respondents identified that complicated foreign suppliers' product market authorization processes, strict foreign exchange permit directives and restriction to use only Ethiopian shipping vessels as the leading challenges. However, it was remarked, during the key informant interview, that customs issues for pharmaceutical products are standard and such challenges are negligible in affecting the supply chain management process. Hill and Johnson (2004) argued that drug regulations and legislation in developing countries encompass international political issues such as Trade-Related Aspects of Intellectual Property Rights (TRIPS) and free trade agreements against access to essential medicines. They highlight that the countries should be supported by the World Health Organization (WHO) and developed nations to practice strong pharmaceutical regulation practices and advanced clinical trial tests apart from simple registration document reviews. On the other hand, Sweet and Anthony (2016) evaluated the practice of pharmaceutical regulation in developing countries based on three key indicators, namely state regulatory infrastructure, monitoring the private market and public quality control. Accordingly, it found out that a remarkable resistance to the implementation of global pharmaceutical norms for quality standards and regulatory infrastructure was a common challenge. A report from the United States has mentioned other challenges in the supply chain process (USTR, 2016). It stated that many regulatory agencies lack adequate training and resources to review submissions in a timely and consistent manner, creating enormous backlogs, approval uncertainty and market access delays. In the interim, there may also be concerns related to the security and maintenance of confidential business information (CBI), such as clinical data that must be submitted for approval (ITA, 2016).

Other challenges faced by shippers on global sourcing are tariffs and quotas (Sowinski, 1999) and non-tariff restrictions including complicated documentation requirements (Cho & Kang, 2001).

In this study, foreign currency shortage and fluctuation of exchange rates were found to be the major challenge for Zaf Pharmaceuticals PLC. Shortage of foreign currency is affecting the company's relationship with suppliers and its downstream customers according to the key informant interview. Fluctuation in exchange rate is also found to be common problem which leads to unpredictable cost mark up on medicines. More than 80% of respondents agreed that they face supply delay due to lack of foreign exchange permit. One key informant also elaborated that supplier replacement due to exchange rate fluctuation is not common, often times, as the case is severe from the company's side at home. It is reported that for companies which rely their sourcing on foreign currency-denominated inputs or products, accompanying costs become a larger portion of a company's total costs (Carbaugh & Wassingk, 1994). A case study in Kenya by Magenda and Iravo (2014) reported that currency fluctuation rests among the top factors challenging global sourcing. A policy research paper by the World Bank has recently reported that though currency devaluation is suggested to stimulate exports especially in low income countries such as Ethiopia, exchange rate adjustments need to take in to account the increase in cost of capital imports and debt (World Bank, 2019).

Most of the respondents in the present study answered that supply delay and interruption due to economic and political environment occurs rarely at Zaf Pharmaceuticals. This consequence might most likely follow because most suppliers require risk-free economic region to invest on an overseas industry. It was reported that many US companies are not willing to invest in Latin American and Africa because of the uncertainty of local economic environment (Tummala & Schoenberr, 2011). Events in the Middle East and North African have shown that local politics can dominate how companies set up commercial relationship with the companies in such countries (Tummala & Schoenberr, 2011). Similarly, a challenge of cultural and lingual difference with suppliers was found to have very low effect on the GSCM practice of the company. This possible reason could be due to the fact that all of the participants in this study are qualified with either a first or second academic degree. In a study by Accenture et al., it was outlined that the risk of misunderstanding and communication impasse cannot be underestimated in global sourcing (Accenture, 2007). If such problems are to be mentioned in the present setting, their intensity is rare but some departments perceived it as a major challenge specially when dealt with Chinese and Japanese suppliers. In addition interviewees mentioned the occasion of supply delay due to cultural issues such as Chinese and Europe long period annual vacations.

Complicated logistics is one of the major challenges of global pharmaceuticals supply chain management but majority of the respondents (78.9%) responded that this problem was rare in Zaf Pharmaceuticals PLC. Low-grade infrastructure, use of unqualified vehicles and drivers may be among the cause of problems in logistics. A study has reported that less-developed country suppliers are in short of experience with the most advanced approaches and, are usually unfamiliar with high-standard requirements, such as sequence deliveries combined with just-in-time electronic data interchange communications (Cho & Kang, 2001). Majority of the respondents believe that Zaf Pharmaceuticals PLC uses 3PL service providers' policy and such problem is minimized. More than 91% of respondents faced difficulties in clearing pharmaceuticals from custom area upon receipt from the supplier. Majority of the difficulties were, damage, loss, unpredictable tax and unnecessary warehousing charge due to delay to issue inspection release certificate from concerned regulatory bodies.

The study has tried to identify and illustrate the common challenges faced during global SCM practice of Zaf Pharmaceuticals PLC. Apart from serving as a benchmark for future studies, the findings could be used to inform government bodies, suppliers, manufacturers and distributors involved in pharmaceuticals supply chain and public health policy. The fact that the study utilized both quantitative and qualitative data from the procurement, distribution, regulatory affairs business development and marketing departments and foreign suppliers' representative offices makes it exhaustive to explore real experience in the company. However, it was limited only to the assessment of challenges of global pharmaceuticals supply chain management. Moreover, as the study is conducted in only one of the companies involved in global pharmaceuticals supply chain management practice, representativeness of findings could not be possible for all companies and further research is required for further generalization.

Conclusion

Zaf Pharmaceuticals PLC, as one of the distributors of the leading pharmaceutical in Ethiopia, faced multiple challenges when sourcing pharmaceuticals from more than 26 global suppliers. Supply uncertainty, finding qualified supplier, shortage of forex and fluctuation

exchange rate, long lead-time to receive orders and pharmaceuticals regulatory laws for MA were found to be the major challenges whereas, cultural and lingual differences, as well as unstable political environment, were regarded as minor challenges facing this company. These challenges negatively affect its relationship with suppliers and downstream customers. Concerned government bodies including; the ministry of health, ministry of trade and finance, Ethiopian food and drug administration, the national bank of Ethiopia and Ethiopian shipping agency should play their pivotal role to sustain global pharmaceuticals supply chain management in the country.

Abbreviations

AHP	Analytical Hierarchy Model
CBI	Confidential Business Model
CEO	Chief Executive Office
EFMHACA	Ethiopian Food, Medicine, HealthCare Administration and Control Authority
GSCM	Global Supply Chain Management
MA	Market Authorization
PLC	Privately Limited Company
SPSS	Statistical Package for Social Sciences
US	United States
TRIPS	Trade-Related Aspects of Intellectual Property Rights
DEA	Data Envelopment Analysis
GP	Goal programing
BDPA	Big Data Predictive Analytics
BT	Block chain Technology

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