



# **Qualitative Insights into Supply Chain Management of Herbal Medicine in Ghana**

**Charles Adusei<sup>1\*</sup> and Ramatu Agambire<sup>2</sup>**

<sup>1</sup>*Department of Accounting, Banking and Finance, Garden City University College, Ghana.*

<sup>2</sup>*Department of Nursing, Faculty of Health Science, Garden City University College, Ghana.*

## **Authors' contributions**

*This work was carried out in collaboration between both authors. Author CA designed the study and wrote the literature review. Author RA wrote the methodology, performed the thematic analysis and proof read the manuscript. Both authors read and approved the final manuscript.*

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## **ABSTRACT**

A qualitative exploratory study was conducted on supply chain and the related risk management at Adutwumwaa Herbal Industries Limited (AHL) in Ghana. The study employed a case study research strategy using semi-structured interview guide as data collection tool. Thematic analysis was used to analyse the qualitative interviews involving five senior officers from the company. They served as Key Informants for the study. Major Themes that were derived from supply chain management were supply chain approach, management of risk to avoid supply chain break down and supply chain management pitfalls facing organisations. The supply chain approach involved sourcing of raw materials, route to market and distribution of products. Management of safety stock for its flagship brands, using multiple sourcing and technological innovations were adopted in managing risk to avoid supply chain breakdown. Unreliable supply of packaging and labeling materials from suppliers and disruption from Food and Drug Authority were the key supply chain management pitfalls facing the company. The study suggests that if herbal medicine companies want to retain competitive edge then they must pursue supply chain operational excellence by reassessing and adjusting its distribution capabilities periodically to improve responsiveness.

\*Corresponding author: Email: [sircharly2002@gmail.com](mailto:sircharly2002@gmail.com);

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## **1. INTRODUCTION**

Operating an organization successfully requires organizations to become involved with their suppliers and customers. As global markets expand and competition increases, manufacturing products and services that customers need means businesses must pay close attention to where raw materials come from, how suppliers' products and services are designed, produced and transported, how their own products and services are produced and distributed to customers, and what their customers and the end-product consumers really want. The study focus is on the approaches to supply chain, managing risk to avoid supply breakdowns, supply chain pitfalls and how to address issues related to supply chain pitfalls. Supply chains depend on the successful flow of material in order to function and satisfy customer demand. Lynch [1] stressed that supply chain is the "management of upstream and downstream relationships with suppliers and customers in order to deliver superior customer value at less cost to the supply chain as a whole.

Every aspect of an organization plays a role in its strategy as it makes the fundamental decisions about the future direction of an organization be its purpose, its resources and how it interacts with the world in which it operates [1]. A good corporate strategy is one that is based on the supply chain activities within and beyond a company [2]. Glatzel and Rohren [3] stressed that intense competition and shrinking of markets have made effective and efficient supply chain management of a company more critical if it has to maintain or improve its market position. Efficient value chain system has the potential to deliver excellent customer's requirement and satisfaction through effective and efficient flow of materials [4].

Booker et al. [5] stated that value chain analysis is commonly used to understand socioeconomic and power relationships in the production chain from the initial starting material to a final product. Christopher [6] explained that in order to achieve a more profitable outcome for all parties in supply chain, the focus of supply chain management should be the management of relationships of all parties. Kotler and Armstrong [7] stressed that distribution channels are very important because it has great effect on other decisions made in the supply chain process. Palmatier et al. [8]

indicated that every firm makes a series of strategic decisions to determine how to distribute its products and services to the firm's end-user. Searching for potential sources is an important step in the purchasing process because a poorly thought out decision can be costly in terms of quality, service and delivery [9].

Chopra and Meindl [10] affirmed that supply chain must be the management of upstream and downstream relationships with suppliers and customers in order to deliver superior customer value. Dittmann [11] advised that supply chain in any form is likely to have associated risk with quality, compliance and safety challenges. The nature of a business environment in terms of network complexity can be an influential factor on supply chain risk exposure to an organization [12]. Coyle et al. [13] indicated that one of the main operational concerns of a company's supply chain activities is supply chain disruptions and its related cost, irrespective of the industry a company finds itself. Bandyopadhyay [14] affirmed that one of the challenges that supply chain managers have to deal with is unexpected challenges in the day-to-day operations of an organization.

Mikkola et al. [15] affirmed that companies are faced with greater challenges to manage the supply chain of their products and services due to political, environmental, economic and technological uncertainties. Manners-Bell [16] indicated that the possibility of supply chain disruptions includes poor planning and execution, intense competitive environment, increased complexity of operations, focusing on efficiency, outsourcing and single sourcing. Wisner et al. [17] advised that the successes of supply chain management to a very large extent are dependent on an organization's managerial team knowledge of risk management and its application of appropriate techniques to mitigate the risk. Giunipero et al. [18] indicated that any robust risks related system must have an action plan that has the ability to stipulates how and which risks need to be addressed.

Bozarth and Handfield [12] insisted that in managing supply chain disruption there is the need to identify the risk source, its assessment and how it will be mitigated. Schlegel and Trent [19] advised that mitigating risk must have an organizational perspective which must extend beyond the company to the supplier's site.

Wisner [20] was of the view that any time steps are taken to reduce or eliminate risks it definitely affects the risk profile of the organization which will have a direct effect on other parties of the supply chain network.

Decandia et al. [21] opined that the focus of supply chain is value creation for clients through innovations and continues improvement for better profits. Folinas and Fotiadis [22] affirmed that satisfying market needs and wants is one of the major goals of supply chain which is attained through collaboration and cooperation among all players in the chain. Wallace and Xia [23] suggested that senior managers must apply advanced strategic sourcing so as to significantly improve supply chain's efficiency, effectiveness and sustainability. Ravindran [24] advised that the concept of supplier partnering is one of the mutual dependencies, trust and choice where businesses must be viewed as independent but dependent on each other. Chopra and Meindl [10] stated that the effects of lack of coordination on performance can be costly across the supply chain. Mangan and Lalwani [25] indicated that indeed, supply chain can improve significantly if all participants in the supply chain are able to align their objectives and planning processes through an effective collaboration.

### **1.1 Need for and Purpose of the Study**

Herbal medicine is important and often an underestimated health resource with many uses, especially in the prevention and management of lifestyle-related chronic diseases and in meeting the health needs of people across the globe. One of the main reasons for the increasing use of herbal medicine is a growing trend for patients/consumers to take a more proactive approach to their own health and to seek out different forms of self-care. In the process, many consumers have turned to natural traditional medicinal products and practices, under the assumption that "natural means safe" [26]. WHO [27] stated that herbal medicine includes herbs, herbal materials, herbal preparations and finished herbal products that contain active ingredients, parts of plants, other plant materials or combination of all. In some countries, herbal medicines may contain, by tradition, natural organic or inorganic active ingredients that are not of plant origin.

In Ghana, there is a national policy on Traditional and Complementary (T&CM), titled Policy of Traditional Medicine Development in Ghana.

Traditional Medicine Practice Council (TMPC) is the regulatory body. The market surveillance system for safety of medicines has included herbal medicine since 2000. Herbal medicines are sold in pharmacies as prescription or non-prescription medicines, in shops that sell chemicals, in special outlets such as herbal medicine shops and by licensed practitioners in small clinics. Herbal medicines are used by 80-99% of the population [27]. The ratio of medical doctors to the patients is about 1:20000, while for the traditional healers, the ratio is 1:200. This plays a major role in decision making for health care. Other influencing factors such as the financial situation, educational level and advice from friends and family contribute to the choice of type of health care [28].

There are several studies on why people use herbal medicine in the form of qualitative studies, quantitative studies, mixed methods and systematic reviews both abroad and in Ghana. Through a thorough search using the Google Scholar, Repec, Econs Papers and other reputable databases of restrictive access, using the abstracts of the studies suggest that there is scanty information on supply chain management on herbal medicine products and services, but a lot has been done on traditional and complementary medicine in Asia. There is no published study on the supply chain management on herbal medicine manufacturers within the Ghanaian context if not Sub-Saharan African. Thus, there is a need for research to fill the knowledge gap in this area. This study has the potential to fill the gap by examining supply chain management of herbal medicine manufacturer in Ghana through a qualitative study.

The study of supply chain management, especially approaches to supply chain, managing risk to avoid supply breakdowns, supply chain pitfalls and how to address issues related to supply chain pitfalls will guide Chief Executive Officer's, Production Managers, Logistics Managers, Distributor's, Customers, Regulators and other industry players to appreciate supplier sourcing, manufacturing, distribution and transportation of herbal medicine products and services. The use of herbal medicines in Ghana has greatly elevated and enhanced the primary health care system but much is not known about the supply chain activities of herbal medicine manufacturers though it is easy to observe the distribution of herbal medicine products and services even with that much education is

needed on the storage and the distribution channels used so as to protect the efficacy and safety of herbal drugs.

## **2. METHODS**

Qualitative research was used to explore and understand the complex nature of supply chain management activities in a detailed, naturalistic, and contextualized way as advised in [29]. The aim of gaining a deeper understanding of the supply chain management activities and its related risk management at Adutwumwaa Herbal Industries Ghana Limited made it appropriate and suitable to conduct this study from a constructivist viewpoint. The study was exploratory in nature and a case-based approach was adopted. A single case study was used for the purposes of intrinsic interest to the authors. Case research is particularly suitable for new or developing areas of practice where knowledge of the phenomenon is limited or not well documented [30].

Semi-structured interviews were conducted among five senior officers of the company who were recruited from the main administration, the purchasing and the production sections of the company. Recruitment of the officers as the interviewees was based on a purposive sampling. This is because the holders of the position/ office are well placed to respond to the questions. The criteria of choosing them were solely based on their knowledge and insight into the supply chain management approaches and its related risk management of the company. These officers are in charge of the operational activities and were available to the researchers thereby making up the sample size. The interview responses were supplemented with documents and records from the company. For this investigation, the specifics were approaches to supply chain and how to add value to the operations, managing risk to avoid supply chain breakdown and key supply chain management pitfalls facing the company. The five officers represent the larger population with the knowledge on the interaction.

Interviews were conducted by the researchers in March 2018. It took the researchers seven days to conduct the interviews due to the busy schedule of the officers. The duration of the interview was approximately between 60 to 90 minutes. The interview took place at the offices of the interviewees. The questions were open ended and concentrated on approaches to

supply chain, managing risk to avoid supply chain breakdown and key supply chain management pitfalls facing the organization.

In designing the interview guide substantial sources of information were drawn from the literature; the use of open-ended questions was to encourage descriptive and reflexive answers. A close friend to the Chief Executive of the company facilitated our access to the interviewees. The officers agreed to grant the authors the interview if only it will not be recorded in audio or digital, so the recording was done verbatim on a notepad. Since it was not audio or digital recording the interviewees were more relaxed to go over once more if the need arises. Though field notes have advantages such that it is fast, cheap and records initial thoughts, but its limitation is that it cannot be replayed, can be biased, there can be loss of information and overall lack reliability. These limitations were minimized by this study as after each interview day, the field notes were typed and stored electronically which was further converted from text to speech to avoid loss of information.

In this study, the vital criteria of rigor in qualitative researches such as credibility (whether the findings of the study can be trusted or believed); confirmability (whether the results can be validated by others); dependability (whether the study can be repeated to obtain same or similar findings) and transferability (whether the findings can be compared to similar findings from similar settings) were employed to ensure the trustworthiness of this study as indicated in [29]. Methodological rigor was achieved through concurrent data analysis coupled with member checking with participants to ensure the full understanding and true presentation of participant's realities. This allowed confirmation of the data from participants before conclusions were drawn. Replication of the study and potential applicability of the findings in alike settings was achieved by detailed description of the study methodology, design, and setting, as well as the participants' background. Also, taking detailed field notes at each interview and discussion of study findings among authors ensured auditability of the study.

Gathering and analysing data was conducted concurrently and using a descriptive explorative approach as it added to the depth and quality of the data analysis. Qualitative descriptive approach such as thematic analysis was used. The primary aim of thematic analysis was to

describe data sets and interpret various aspects of the research topic, moreover it is a method for identifying, analysing and reporting patterns (themes) within data" [31]. Thematic analysis involved the search for and identification of common threads that extend across an entire interview or set of interviews [32]. A codebook or coding frame was used which contains the list of codes. More than one coder (Two) were used which were made up of the two authors. Transcribing data, reading and rereading the data, noting down initial ideas were done by both authors, initial codes were then generated. To check the accuracy of the transcription, a number of checks were done with participants before themes were drawn from the data as suggested in [33]. Coding of interesting features from the data was done systematically across the entire data set. It was then checked if the themes work in relation to the coded extracts and the entire data set.

Initial themes and patterns identified from the data were organized and grouped under themes to represent the main patterns. The organization of the emerged themes was done by their relationships and similarities. Themes emerged initially from the data were followed up in subsequent interviews and corroborated with field notes to fully develop themes. The coding was iterative; where necessary, some themes were merged, deleted or later added as the analysis progressed. Following the full development of the key themes and sub-themes, summary of participants' statements (quotes) were generated and this illustrated information about how supply chain management activities. Institutional permission was also sought. All participants gave their consent by writing to the interview prior to collecting the data. Participants' confidentiality was ensured by conducting the interview in an enclosed office with no interruption. Information that could reveal the identities of the participants were excluded from the transcripts to ensure participants' anonymity.

### 3. FINDINGS AND DISCUSSION

#### 3.1 Case Company: Overview of Adutwumwaa Herbal Industries Limited Ghana

Adutwumwaa Herbal Industries Limited is one of Africa's leading name in herbal drug manufacturing and herbal healthcare delivery with over thirty (30) years of being in the herbal drug manufacturing industry. Adutwumwaa

Herbal Industries Limited (AHL) is a consumer products company which manufactures herbal medicine products. Due to high products demand, AHL has established new ultra-modern herbal clinic to manage and treat conditions like sexually transmitted disease (STDs), diabetes, asthma, jaundice, skin diseases, infertility, amenorrhea, dysmenorrhea, malaria, rheumatism, stroke etc. The clinic has modern diagnostic and scanning machines that aid in proper health screening of patients and diagnosis. The drugs are sold in Ghana, Italy, UK and other West African countries. AHL employs forty-six (46) people at its production facility in Kumasi. It manufactures four main products "Adutwumwaa" malamix, "Adutwumwaa" bitters, "Adutwumwaa" tonic and "Adutwumwaa" capsules. "Adutwumwaa" has strong base of distributors in Ghana. Adutwumwaa Herbal won the best herbal blood tonic in 2018 Ghana National Herbal Awards.

A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain of AHL includes growers, farmers, collectors of herbs, manufacturers, middlemen, transporters, retailers and customers themselves. A supply chain is dynamic and involves the constant flow of information, product/services and funds between different stages. Wisner et al. (2015) asserted that the objective of every supply chain is to maximize the overall value generated in terms of supply chain profitability. The AHL's supply chain consists of four interrelated flow streams. *The input* stage concerns how materials flow into the organization. The *transformation* stage concerns converting the raw materials and certification from FDA, The *Output* stage concerns final products and the last stage concerns the distribution of the finish products to customers.

It was revealed from the result that AHL's supply chain had four stages as inputs, transformation, output and customers. One of the objectives of a supply chain is to network parties involved in the chain through upstream and downstream linkage in the processes and activities with the view of producing value in the form of products and services in the hands of the ultimate consumer. The four stages framework of AHL's supply chain is in line with the assertions of Chopra and Meindl [10] and Wisner et al. [17] indicating sequential nature of processes of any supply chain framework. The study suggest that supply chain framework must

be seen from a holistic view as a system to provide insights on how supply chain participants must operate independently and collectively toward achieving a real time supply chain.

### 3.2 Theme # 1: Approach to Supply Chain

The researchers explored the supply chain approach used at AHL. The in-depth interview revealed that the approach to supply chain involved sourcing raw materials and production, route to the market and distribution of products.

#### 3.2.1 Subtheme # 1: Sourcing of raw materials

An important element of supply chain management approach is sourcing related issues. Raw materials are inputs to any manufacturer without the raw material production cannot take place. The study was interested in how AHL source its raw materials since efficient and effective sourcing strategy can give a company a competitive advantage.

On sourcing strategy, Participant Three had this to say:

*“AHL purchase raw materials from farmers who have track record of supplying herbal plants which are disease free. This help AHL to experience little wastage and spoilage of the drugs in the production process. Getting the right raw materials also improve the quality of the final drugs manufacture by AHL. Another strategy adopted by AHL is pre-financing of suppliers of raw materials, some of the farmers do come to the Chief Executive Officer (CEO) for loan to help in cultivation of the plants, and others also contract loan to travel to Nigeria to purchase the raw materials. This arrangement of pre-financing has solidified the trust and cooperation between AHL and its suppliers and therefore contributes to its competitive advantage”.*

Sourcing is the process of identifying potential suppliers that could provide needed products or services for the acquiring organization. It is a key driver in a successful purchasing and supply management process. There are key reasons why companies typically use sole, single, or multiple sources in the marketplace. AHL's sourcing strategy is thought through using multiple sourcing, pre-financing growers' activities and supplier partnership aligns with Mena et al. [9] advising that getting sourcing

strategy wrong can be very costly to an organization. The study suggests that it is important for every organization to perform a thorough and comprehensive search to identify potential sources as too narrow a search may lead to overlooking the best supplier.

#### 3.2.2 Subtheme # 2: Route to the market

It is of great importance that every organisation must align its resource capabilities and deploy a strategy that will help it to gain a competitive advantage in the market. In view of this the study explored the route to the market by AHL. Participant one had this to say:

*“AHL's line of medicinal products are sold through uniform price set by AHL, distributors received commission on quantities sold on daily basis. AHL has a policy of setting lower prices on its product. For example “Adutwumwaa Bitters” has been touted as high-quality herbal mixture is sold at reasonable lower price compared to other products on the market. This low-cost strategy has help AHL to achieve competitive advantage”.*

The response will benefit from Christopher [6] explained that in order to achieve a more profitable outcome for all parties in the supply chain the focus of supply chain management should be the management of relationship of all parties while Chopra and Meindl [10] affirming that supply chain must be the management of upstream and downstream relationships with suppliers and customers in order to deliver superior customer value.

The study suggests that management of AHL must align it capabilities to match its market position. It does no good to focus on a position a company cannot maintain or to develop competencies that provide no competitive edge. It is the cohesive relationship between strategy, structure and systems, coupled with skills, style, staff and superordinate goals that make an organization a success.

In a follow up question on whether it is the sole way enroute to the market and its effectiveness, it was revealed to the study by Participant Five that:

*“Another approach adopted by AHL was based on differentiation strategy focuses on*

*niche marketing, AHL has focused on the production of “Adutwumwaa Bitters” and “Adutwumwaa Capsules” for over 15 years. The drug mainly treats malaria and fever. AHL identify that there is unserved market for that particular product. The goal of AHL as a herbal manufacturing firm is to identify ways to set itself apart from competitors in serving client needs such that profitability is maximized. By differentiating on dimensions other than price, the AHL creates opportunities to meet unique customers/patient profitably in this niche market, and thereby meeting differentiation strategic objects of the company”.*

The response can be linked to the views of Glatzel and Rohren [3] and Jacobs [4] stressing that supply chain is critical irrespective of the market position of a company due to intense competition and shrinking of markets. Moreover, confirming that meeting customer’s requirement and satisfaction are influence by efficient value chain system through effective and efficient flow of materials. The study suggests that all business activities across a supply chain need to be structured differently and must be tightly intertwined for different market segments. Furthermore, a company must construct a multiple supply chains in order to meet the needs of its different customer segments.

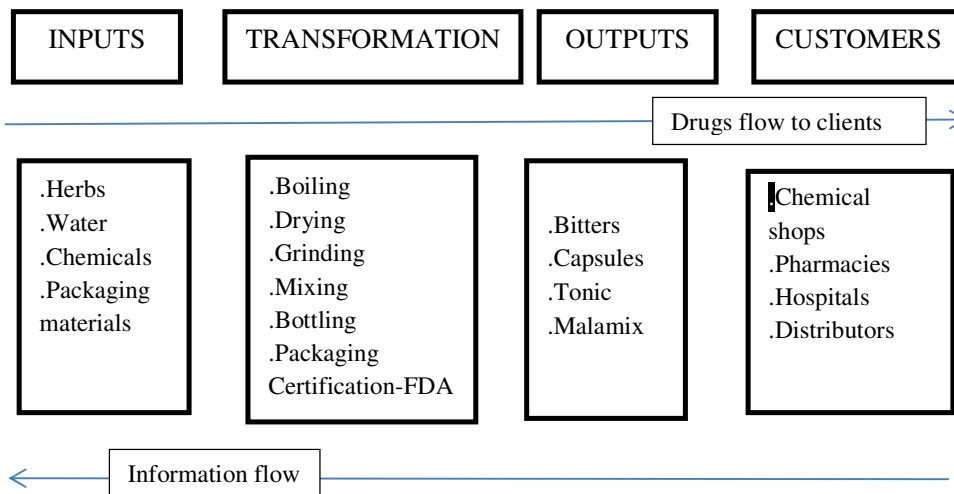
**3.2.3 Subtheme # 3: Distribution of products**

Distribution of products is an important element of any supply chain system. The distribution strategy indeed determines the coverage of the

market by a company. Due to intense competition in the herbal medicine industry it was of essence to gain insight on how AHL distribute its herbal products. Participant Two explained that:

*“AHL sell its drugs through licence chemical stores and other distribution channels in Ghana, Togo, Ivory Coast, Gabon, U.S.A, U.K., Italy and other European countries. This strategy helps AHL to focus on core production activities and allow the distribution outlets to handle operating cost including labour, equipment, inventory holding cost and capital cost of the facility. This market coverage distribution strategy gives AHL competitive advantage in the sense that, decrease in operational costs is translated into lower cost to customers and therefore increase sales and profitability as well as customer loyalty”.*

It can be derived from AHL that its approach focuses on the trade and the final consumer/end user. This is demonstrated by AHL by making use of distribution outlets which enhances availability and visibility of their products and services. This supports the suggestions by Kotler and Armstrong [7] and Palmatier et al. [8] on the need to take distribution decisions seriously due to its effects on a business operation. The study suggests that distribution and redistribution activities must be taken seriously by any company as it bridges the gap between the manufacturer and its customers via retailers. It has the primary responsibility to move and store merchandise to balance supply and demand.



**Fig. 1. AHL’s supply chain**

### 3.3 Theme # 2: Managing Risk to Avoid Supply Chain Breakdown

By understanding the variety and interconnectedness of supply-chain risks, managers can tailor balanced, effective risk-reduction strategies for their companies. It will be difficult for a business to be successful without depending on other businesses. Interestingly it is the interdependency that help members in the supply chain but this can also potentially cause supply chain disruptions. In finding out how AHL manages risk to avoid supply chain breakdown these subthemes were derived: Supply chain disruption, supply chain coordination and technology risk.

#### 3.3.1 Subtheme # 1: Supply chain disruption

In seeking insight on the supply disruption on the operations of AHL this is the response from Participant Three:

*“AHL carries out a level of safety stock on an average monthly production of all the four products. “Adutwumwaa malamix”, “Adutwumwaa bitters”, “Adutwumwaa tonic” and “Adutwumwaa capsules”. Particularly AHL increases the average level safety stock of “Adutwumwaa Bitters” because this is the pioneer and flagship product and it still enjoying high sales in Ghana and abroad, since shortage of this product may negatively affect the financial position of the firm, AHL ensure there are always enough stock to mitigate fluctuation in products demand”.*

The study is making a case for investment in safety stocking if customer service is to be maintained at an acceptable level if unexpected demand can be met. The study further suggest that safety stocks must be held to promote some protection against challenges such as crop failures and adverse weather conditions so far as herbal products are concern. Generally, inventory management provide both internal and external customers with the required service level in terms of quantity and order rate fill.

#### 3.3.2 Subtheme # 2: Supply chain coordination

Supply chain coordination requires each stage of the supply chain to take account the impact its actions have on other stages. The study posed the question on how AHL ensures guarantee of continuous supply of inputs. It was revealed by Participant Four that:

*“AHL source its raw materials (medical plants) from individual farmers from Sunyani in Brong Ahafo- Region in Ghana. AHL tries to minimize the effects of inadequate supply of raw materials and bottling and packaging materials. AHL has a policy of engaging five to ten suppliers for most of its raw material a component to avoid unpredicted supply shortage of essential production inputs. This process of finding backup suppliers helps in mitigating shortages of production inputs”.*

Participant Two added his voice on AHL diversification of supply base by explaining that:

*“AHL identified that relying on suppliers of raw materials and other production input from one source posed a supply chain risk problem, the firm source for medicinal plants from Nigeria, Sudan and Saudi Arabia. The equipment is also source from China and India. By purchasing same or similar raw materials and equipment from geographically dispersed suppliers reduces the risk of supply disruption, due to political instability, environmental disasters and other supply chain problems”.*

#### 3.3.3 Subtheme # 3: Technology risk

One of the risks that a firm is likely to face as it becomes dependent on technology to manage business process across supply chain is technology risk. Participant One on technology risk had this to say:

*“AHL has installed modern technological innovations such as tube filling machines, machines for bottling liquid preparations with their seals, semi-automated capsule filling machines and labelling machines to enhance its supply chain operations. AHL is engaging in regular interaction with the suppliers of these technologies for training, usage and maintenance so as to avoid the risk of breakdown which may stop production and delivery of the medicinal products to the end users or clients”.*

The responses from Participants One, Two and Four on supply chain risk aligns with the views of Dittmann [11] and Coyle et. al. [13] advising that supply chain in any form is likely to have associated risk with quality, compliance and safety challenges. They further stressed that one of the main operational concerns of companies is supply chain disruptions and its related cost. The study suggests that it is important for AHL to



adopt strategies that will help to rationalise and consolidate its supply base. Single sourcing strategy enabled companies to build stronger and more collaborative relationships that deliver a range of benefits such as improved supplier responsiveness and decreased efforts to track supplier performance and manage relationships, notwithstanding its benefit its risk exposure can be high.

Though multiple sourcing may reduce dependency on a single supplier and reduce capacity risks, but it may increase other supply chain risks such as quality, contractual, or management risk. It is imperative to state here that, the decision to use multiple sourcing strategy must depend on the category and relative importance of the relationship between trading partners. AHL must further assess the supplier relationship dependencies and evaluate scenarios by measuring the probability and severity of risk.

### **3.4 Theme # 3: Key Supply Chain Management Pitfalls Facing the Organization**

On the supply chain pitfalls facing the organisation the subthemes were poor information technology, unreliable supply packaging and government regulation.

#### **3.4.1 Subtheme #1: Poor technology**

Participant One on poor information technology infrastructure/information systems had this to say:

*“AHL’s has manual database at different units of production-drying room, mixing room, weighing room, packaging and warehouse and future production plans are not linked, the only software used in the company is Excel spreadsheet by the financial manager. This makes retrieving of information very difficult. Poor information exchange and retrieval between the various units or sections leads to forecast error and poor inventory management”.*

The study suggests the need for AHL to migrate its records from manual to electronic as this will speed up the process of information retrieval in real-time and enhance the integration of the various units, functions and departments within AHL and thereby speed up entire supply chain activities.

#### **3.4.2 Subtheme # 2: Unreliable supply packaging**

Participant Three on unreliable supply of packaging and labelling materials:

*“One of the major problems faced by AHL supply chain is unreliability of packaging and labelling materials from suppliers in Ghana. Even when AHL pre-finance their orders there is delay on the part of the suppliers which affects supplier lead time and delivery performance. This also affect negatively the entire production process because without packaging of the final product AHL is unable to take delivery of the products to the clients or customers, even when there are orders from the distributors which has to be fulfil”.*

The response agrees with Bozarth and Handfield [12] insisting for the need to trace the risk source and mitigate it to avoid supply chain disruption. However, Schlegel and Trent [19] advised that mitigating risk must have an organizational perspective which must extend beyond the company to the supplier’s site. In reducing the impact of unreliable supply affecting AHL, the study suggests that if possible, management of AHL must source from more suppliers instead of one supplier. The criteria for selection should not be based solely on low price offered by the suppliers, instead management can look at past delivery performance and financial capacity of the prospective suppliers before awarding contract to them.

#### **3.4.3 Subtheme # 3: Government regulation**

Participant Two on Governmental regulation said;

*“Government regulations implemented by Food and Drug Authority (FDA) delays the supply chain operations of AHL. During the production FDA can stop the process for inspection of the facility. Again, there are many drugs that AHLs clinical trials have proven to be effective, but it takes a long time for FDA to approve and certify the efficacy and safety of the drugs samples before AHL can start commercial production”.*

The responses agree with the views of Bozarth and Handfield [12] and Bandyopadhyay [14] indicating the nature of a business environment

and its effects on supply chain risk exposure to an organization. The authors further stressed that managers must have to deal with the unexpected challenges in the day-to-day operations of their organizations.

The study is of the view that AHL can reduce the impact of frequent inspection of its facility by Food and Drug Authority (FDA), by selecting correct raw materials, meeting the standards set by FDA and World Health Organisation (WHO), and testing the drugs for efficacy and safety. AHL can also engage the service of professional research firms to undertake clinical trials for the new drugs as that could enhance marketability of the drug.

#### **4. CONCLUSION**

Supply chain issues are increasingly getting the attention of management of diverse industries yet achieving supply chain excellence is getting harder. For a company to achieve this it must continue to evolve and reinvent their supply chains so as to be able to manage risks; respond to changes in the economic, technological, and competitive environment to be able to exploit new opportunities more effectively than competitors. There have been many studies on supply chain management in diverse industries. The unique contribution of this study is the insight it provides into the supply chain management of AHL's. The paper provides evidence from the study which suggest these conclusions.

Based on the responses there is a supply chain framework in place to guide the supply chain activities of AHL. Findings on supply chain approach revealed that low-cost strategy, differentiation through niche markets, distribution outlets and pre-finance of suppliers of raw materials were the approaches used by the company. Management of safety stock for its flagship brands, using multiple sourcing and technological innovations was adopted in managing risk to avoid supply chain breakdown. Unreliable supply of packaging and labeling materials from suppliers and disruption from Food and Drug Authority were the key supply chain management pitfalls facing the company.

The paper suggests that if AHL pursue marketing activities through efficient and effective distribution strategy it would help its brands presence through market penetration activities of the company. Effective sourcing strategy is needed and coupled with efficient stock

management with special attention to supplier's lead time and stronger partnership with key suppliers to ensure smooth delivery of products and services. Moreover, operational excellence hinges on the efficient flow of information and its retrieval to aid decision making activities of AHL hence affirmed the study recommendation of the need to transfer the manual database to computerized database. Finally, the study suggestion is that if AHL want to retain competitive edge then it must pursue supply chain operational excellence by reassessing and adjusting its distribution capabilities periodically.

#### **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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