

Supply Chain Management of the Pharmaceutical Industry for Quality Health Care Delivery: Consumer Perception of Ernest Chemists Limited as a Pharmaceutical Service Provider in Ghana

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Abstract

The disturbing emergence of substandard and fake drugs in Ghana is largely due to inadequate supervision of the distribution process and non-compliance with quality standards in the delivery processes of the pharmaceutical industry. This development affects the country's efforts to accelerate quality health care delivery. Improving pharmaceutical access is one of the core challenges facing health care delivery in Ghana. In this study, the researchers examine the supply chain of Ernest Chemists Limited and assess consumer perception of the degree of availability and affordability of efficacious pharmaceutical products in promoting quality health care delivery. They also analyse the challenges and constraints that affect the distribution process and evaluate supply chain management best practices for effective and efficient distribution. A descriptive qualitative and quantitative research was used as the design for the study. It involved the collection of data using questionnaire to solicit the views of management of Ernest Chemist Limited and consumers of their products. The study concluded that Ernest Chemists Limited has an effective supply chain management system that provides efficacious medicines that are available to all levels of income earners in Ghana. The study recommends that, Government of Ghana should encourage the development of local pharmaceutical manufacturing capacity by reducing or waiving off some of the taxes on pharmaceutical active ingredients (APIs).

Key words: Supply chain management, pharmaceutical industry and health care delivery.

Introduction

The pharmaceutical industry supply chain according to Whewell (2009), covers drug research, development, manufacture; distribution and application through a range of healthcare services, together with all the ancillary businesses that help these different stages function effectively. Fundamentally, the pharmaceutical industry is a business that is about health and therefore about people. The pharmaceutical and healthcare industry, in the opinion of Whewell (2009), is hugely complex because it involves so many markets, products, processes and intermediaries. It is also globally heavily regulated and used by everyone in life. Changes in one area impact upon the others and environmental factors such as pricing, regulatory change or actions by competitors, impact the whole supply chain in ways that are not easily understood or properly managed.

In the opinion of Ricci (2006), the pharmaceutical industry currently delegates distribution to third-party logistics providers and wholesalers and is less advanced in terms of channel management compared with other sectors. This weak spot in the pharmaceutical industry, he indicated, limits the amount of information about patient demand and product flow that is passed to the manufacturer. This encourages parallel importing from cheaper to more expensive regimes and prevents a company from being able to guarantee the integrity of products after they leave the warehouse. Ricci (2006), indicated that parallel trading costs the pharmaceutical industry billions of dollars each year, but much of that money goes to the importers and pharmacy chains rather than healthcare payers and patients. Most of the imports are repackaged or relabelled, which increases the risk of errors (such as tracing the original source of the product) and makes it more difficult for pharmacists to distinguish imitation from legitimate drugs. Given these problems, he identified the importance of pharmaceutical companies taking control of their own distribution to maximize the potential of the different channels and to protect patients from such errors as mentioned above.

One technique, in the opinion of Ricci (2006), is to deliver the most innovative products straight to retail pharmacies, hospitals, and specialist clinics without using wholesalers. In fact, with repeat prescriptions, drug companies could even supply directly to some patients. Wholesalers, he indicated, would still have a large role in distributing mass-market drugs with high volumes and could make a far larger contribution by assuming responsibility for packaging such products and managing their distribution on a regional, rather than a national basis.

Alternatively, according to Ricci (2006), companies may choose to manage the funds used to support pharmaceutical distribution and channel management more effectively. By relying on wholesalers to distribute

their products and using incentives and bonuses as motivation, pharmaceutical companies can manage the performance of their wholesalers and third-party logistics providers. To do so, he indicated that, pharmaceutical companies must create stronger relationships with retail pharmacies and hospitals that distribute their products and focus on the needs of patients through channel-to-market innovations. If they create strong relationships, companies can expect to control the channels, see margins recover, enjoy better market intelligence, accelerate the point at which sales peak, reduce planning inaccuracies and limit counterfeiting. There are no short cuts and there is no single solution when it comes to building a capable supply chain. According to Ricci (2006), the scale of change depends on the depth and length of the research and development productivity gap, the pace of technological progress and the length of time needed for management to act. The pharmaceutical supply chain, as he observed, can complicate or enable future growth. The supply chain can be used to accelerate time to market, maximize revenue from new products, block generic competition and protect patients from counterfeit drugs. By engaging in supply chain transformation and adopting an integrated approach to supply chain management, businesses will be able to position themselves to compete in the rapidly-changing marketplace. If managed properly, the supply chain can be a significant source of added value to any pharmaceutical company's bottom line.

Cohen et al (2004) identified the disparity in pharmaceutical access between developed and developing countries as stark. He further observed that, developing countries make up approximately 80% of the world's population but only represent approximately 20% of global pharmaceutical consumption. According to Cohen and Illingworth (2003), market failures, government failures and income differences account for this persisting inequity. They also stated that specifically, high drug costs, weak or corrupt institutions, contributing to less than effective pharmaceutical purchasing and distribution systems and the potential consequences of the Trade Related Aspects of Intellectual Property (TRIPS) Agreement all constrain drug access.

This study focuses on Ghana, a developing country that recently changed its patent laws to conform to TRIPS standards. In the opinion of Cohen and Illingworth (2003), while Ghana has made strides in improving public health, the country has urgent and serious health needs that cannot be met by the existing system. These include "Paragraph 6" of the Doha Declaration on the TRIPS Agreement and Public Health, compulsory licensing, parallel importing and attracting investment for the local production of essential medicines to combat HIV/AIDS, malaria and tuberculosis (World Health Organization (WHO), 2001).

In the opinion of Cohen et al (2004), Ghana represents the dilemma faced by many developing countries – "make or buy." That is to say, should a government invest more in local production or continue to import medicines? In short, the researcher examines Ghana's patent law changes in the context of the Doha Declaration and assesses their meaning for access to drugs of its population. New and existing barriers were discussed and options for addressing them proposed, to provide policy-makers with lessons learnt from the Ghanaian experience.

Statement of the Problem

According to Cohen et al (2004), the emergence of a lot of substandard drugs in Ghana is due to inadequate supervision of the distribution process of the pharmaceutical industry. Improving pharmaceutical access is one of the core challenges facing the Government. As such, there is a menu of choices available for possible use.

In the opinion of Cohen et al (2004), Ghana has made significant improvements in its overall health status over the past few decades, with life expectancy reaching 57 years in 2002 and infant mortality declining to 56 per 1000 live births. Despite these improvements, as they observed, there are significant health issues facing the country: Approximately 3.6% of the population is infected with HIV/AIDS, malaria accounts for 40% of outpatient visits and 25% of mortality under the age of five and the annual risk of tuberculosis infection is approximately 1–2%. High mortality rates, frequent epidemics, unequal access to health services and uneven health outcomes throughout the country are also major problems (World Health Organization (WHO), 2001).

Global Health (2005), observed that pharmaceuticals are available in many health facilities across the country; however, access is largely limited due to financial barriers for most of the people, particularly the poor. According to the World Bank, Ghana had a per capita income of US\$380 (2004), which is about one-fifth below the average of US\$490 for sub-Saharan Africa. Moreover, a recent study indicates that 40% of Ghana's population earns less than minimum wage with this proportion increasing in the rural areas. As a result, the poverty level makes it difficult for patients to purchase drugs (Cohen, et al, 2004). For example, HIV/AIDS patients receiving one-month of anti-retroviral therapy paid for by the Global Fund are still required to pay 10% of the costs of medicines, at approximately GHS 5.00 (over \$US 5) (World Trade Organization (WTO), 2003). In real terms, it would require a person who is earning the minimum wage more than five working days to cover

the co-payment. In a small random sample of interviews, done by Cohen et al (2004), with patients at the HIV/AIDS Clinic in St. Martin's De Porres Hospital, Agomanya, it was observed that many patients were not working at all and had to borrow money from family members to cover this co-payment.

Until recently, Ghana's public health and pharmaceutical system operated under the "cash & carry" (C&C) model, which assumed that drug co-payments could help finance and, therefore, improve the delivery of primary health care services. This system involved a series of self-financing revolving drug funds (RDF), which cascaded down each institutional level, marking up the basic purchase price for drug products to obtain revenue to re-supply the products (Global Health, 2005). These mark-ups could also increase the price of a drug well beyond the reach of most Ghanaians. The government provided exemptions for co-payments for specific categories, including TB patients, psychiatric patients, children under five years of age, the indigent, pregnant women and the elderly. According to Cohen et al (2004), identifying who is truly indigent is difficult to do in Ghana because poverty is viewed from a socio-cultural point of view as "shameful" and many poor people are reluctant to admit it. Essentially, this system did not achieve its intent to provide widespread affordable access to medicines for the population.

The Government of Ghana has abolished the cash and carry (C&C) system and passed a National Health Insurance Bill in 2003, which recently has been implemented (Cohen, et al, 2004). Several districts have also introduced health insurance in their localities. The Ministry of Health, as stated by Cohen et al (2004), is reviewing exemption policies and the proposed National Health Insurance drug list to ensure consistency with the Essential Drug List. Despite the difficulties noted above, the Insurance system hopes to use local structures to identify who is "poor" to ensure these categories can access healthcare. A national pricing policy, informed by a comprehensive examination of pharmaceutical pricing models internationally, can also facilitate better financial access of the population to medicines.

Pharmaceutical mark-ups are another policy issue that needs reform. According to Cohen et al (2004), the international research-based and generic pharmaceutical industries provide discounted medicines to Ghana, however once products arrive in Ghana, mark-ups between 11% to 275% wipe out many price advantages. Tax and tariff rates vary but are applicable to all medicines, except public sector procurement done according to the Essential Drug List. In the private sector, depending on the local agent or manufacturer, the cost of anti-retrovirals can exceed 32.5% more than the discounted price obtained through the Accelerated Access Initiative (AAI) (Cohen, et al, 2004). In some cases, the private health facility adds further margins to increase the cost. The study, therefore, intends to find answers to the following research questions: What is the nature of the supply chain of Ernest Chemists limited in the pharmaceutical industry? Is Ernest Chemists Limited able to provide good quality and efficacious pharmaceutical products that are affordable to the average Ghanaian? What are the challenges and constraints that affect the distribution process of Ernest Chemists Limited? What are the supply chain management "best practices" for effective and efficient distribution by Ernest Chemists Limited?

Objectives of the Study

The main objectives of this study are:

1. To examine the supply chain of Ernest Chemists Limited within the pharmaceutical industry.
2. To assess the availability and affordability of good quality and efficacious pharmaceutical products to the average Ghanaian by Ernest Chemists Limited.
3. To analyse the challenges and constraints that affect the distribution process of Ernest Chemists Limited.
4. To outline some supply chain management best practices for effective and efficient distribution by Ernest Chemists Limited.

Methodology of the Study

Data was collected from both staff and managers of Ernest Chemists Limited, through structured interviews and administration of questionnaire. Primary data were elicited through the administration of one hundred (100) structured questionnaires comprising two sections: social characteristics and study data involving both open-ended and closed-ended questions. The real data collection exercise was done through self-administered questionnaire. This technique was to guarantee accuracy of responses from respondents to enhance reliability of research results. Secondary data included data from academic literature, books, journals, reports and Internet sources. Purposive and stratified samplings were used for the sample selection. Purposive sampling is a non-probability sampling technique where sampling is done with a purpose in mind. Usually, one or more specific predefined groups are sought. With a purposive sample, the researcher is likely to get the opinions of the target population, but is also likely to overweigh subgroups in the population that are more readily accessible.

Purposive sampling is virtually synonymous with qualitative research since there are some objectives and interests that characterize qualitative research. Embedded in this is the idea of who a person is and where that person is located within a group is important, unlike other forms of research where people are viewed as essentially interchangeable. Research participants are not always created equal – one well-placed articulate informant will often advance your research far better than any randomly chosen sample of fifty – and the way we sample needs to take that into account. Expert sampling which is a subcategory of purposive sampling was also used. This involves the assembling of a sample of persons with known or demonstrable experience and expertise in some area.

Literature Review

The Concept of Supply Chain Management

Supply chain as postulated by Dubey and Kumar (2007), “is the network of organisations that are involved, through upstream and downstream linkages, in the different process and activities that produce value in the form of products and services delivered to the ultimate consumer”. According to Chopra and Miendel (2005), supply chain management “is the management of a network of retailers, distributors, transporters, storage facilities and suppliers that participate in the sale, delivery and production of a particular product”.

Handfield and Nichols (1999) defined pharmaceutical supply chain as “the integration of all activities associated with the flow of and transformation of raw materials through to the end-user, as well as associated information flows, through improved supply chain relationships to achieve a sustainable competitive advantage”.

Dubey and Kumar (2007) indicated that effective supply chain management can impact and improve upon virtually all business processes, such as data accuracy, operational complexity reduction, supplier selection, purchasing, warehousing and distribution. Other benefits include:

1. Quicker customer response and fulfilment rates
2. Shorter lead time
3. Greater productivity and lower costs
4. Reduced inventory supply throughout the chain
5. Improved forecasting precision
6. Fewer suppliers and shorter planning cycles

The pharmaceutical industry, as pointed out by Kaye (2010), is a \$500 billion global business that requires a tight, safe, and efficient supply chain. Modern pharmaceutical products rely on ingredients and materials from across the globe. The line between a company’s internal operations and its external environment, in the opinion of Graves (2009), are becoming increasingly blurred. He stated that no area exemplifies this better than the supply chain where pharmaceutical manufacturers have to coordinate their own activities with those of partner organisations, healthcare providers and patients. He also noted that without a clear understanding of the context surrounding the process of delivering a drug to market, the chain can become a tangled web.

Commenting on the challenges of supply chain management, Handfield and Dhinagaravel (2005) stated that, multiple events occurring on a daily basis are shaping the competitive and regulatory environment in which channel members operate their business. They pointed out that, regulators are demanding that wholesalers and manufacturers reveal pricing and are challenging the cost of pharmaceutical distribution. Market channels such as mail order, direct shipping and website pharmacies are also important competitive channels to consider.

Another major driver of change, according to Handfield and Dhinagaravel (2005), is the increasing share of generics that are coming into the market, as some largest branded drugs go off patent. They observed that although the process of manufacturing and distributing branded and generic drugs is quite similar, the design of the distribution channel might be substantially different. They also noted that many generic companies are exploring relationships with Indian and Chinese manufacturers to market their products. Given these changes, it is little wonder manufacturers, wholesalers, pharmacies, hospitals, and other participants are bewildered with the array of different competitive challenges that face them. They indicated that the unfortunate result is, poor perception has been created at different points in the supply and distribution chain; and channel participants have failed to communicate and work together to resolve the problems caused by this poor perception. Svantesson (2009) has stated that pharmaceuticals, being high value goods, demand a safe process at all hubs in the chain, and security measurements must be harmonized and rigorously checked across the operating lanes with its sub-warehouses and on/off loading places. He further stated that the importance of utilizing as few on/off loading places and changes of transport mode is one of the challenges for a time effective and secure solution;

this at a minimized cost level. According to Svantesson (2009), the market demands global solutions and customers are requesting the ability to order correct quantities and lower inventory levels. This situation he observed, brings a change to the order profile; with orders becoming smaller and production changing accordingly. This is a challenge to the distribution of pharmaceuticals and consolidation possibilities that can meet with the lead time demand to the end customer are highly valuable. Svantesson (2009) noted that a change of routine in the supply chain can have dramatic effects if not properly implemented at all levels. With clear communication, the cost of change reduces dramatically. Global harmonisation enhances the possibility of maximising effects in a supply chain.

The goals of the pharmaceutical supply chain, as indicated by Chopra and Miendel (2005), obviously emphasize regulatory compliance and safety of products, but also include leveraging information to be more responsive to the needs of consumers. They noted that, the unique nature of the supply chain for pharmaceuticals makes managing complex information for supply chain effectiveness challenging, but clearly the rewards for doing so are significant. They also indicated that, companies that excel in supply chain operations perform better in almost every financial measure of success. Supply chain excellence that improves demand-forecast accuracy leads to 5% higher profit margins, 15% less inventory, up to 17% stronger “perfect order” ratings, and 35% shorter cash-to-cash cycle times (VeriSign Inc., 2006). According to Chopra and Miendel (2005), many of these findings come from the Consumer Products (CP) industry, where supply chain excellence means tightly aligning operations with consumer demand to become “demand driven”.

Dubey and Kumar (2007) observed that, the shift to a demand-driven focus has been taking place within the CP industry for years. While perhaps leading the way in implementing demand-driven processes, the CP industry is not alone in this interest or intent. They noted that leading pharmaceutical manufacturers also recognize the value of adopting demand-driven supply chain practices and are benchmarking their organizations against CP manufacturers, and finding that their industry is generally behind the pace. They also indicated that the pharmaceutical industry is hindered by silos of information and a general lack of timely and reliable data as a result of historical business models and trading practices.

In the perception of Chopra and Miendel (2005), to robustly and reliably enhance patient safety and to become more demand driven, the pharmaceutical supply chain needs a ubiquitous technology framework that includes:

1. Item-level data management;
2. Standards for available data and how it will be accessed and maintained;
3. Data sharing infrastructure to accommodate cost efficient management and retrieval of data;
4. Reliable trust environment to determine who can access information, if information provided can be certified as authentic, and what can be done with information provided or accessed.

Item-Level Data Management

Most enterprises in the pharmaceutical supply chain, as noted by Dubey and Kumar (2005), have the ability to manage integrated business information at a transactional level (orders, shipments, payments, etc), which provides visibility into operational and financial events. They noted that, item-level data can extend this visibility to provide rich insight into the physical movement of particular products involved in these transactions and also enhance visibility of end-user demand, contract compliance, and reverse logistics. Achieving this level of visibility, as indicated by Dubey and Kumar (2005), requires unique identifiers in product labels or packaging. They further stated that, technologies such as barcodes enable packages to carry a unique identifier, and when coupled with an infrastructure of readers, can generate data about the events related to products. Commonly, this data would be stored in an event repository; either a single central item event repository or a network of local event repositories across geographies or business units within an enterprise.

The Need for Standards

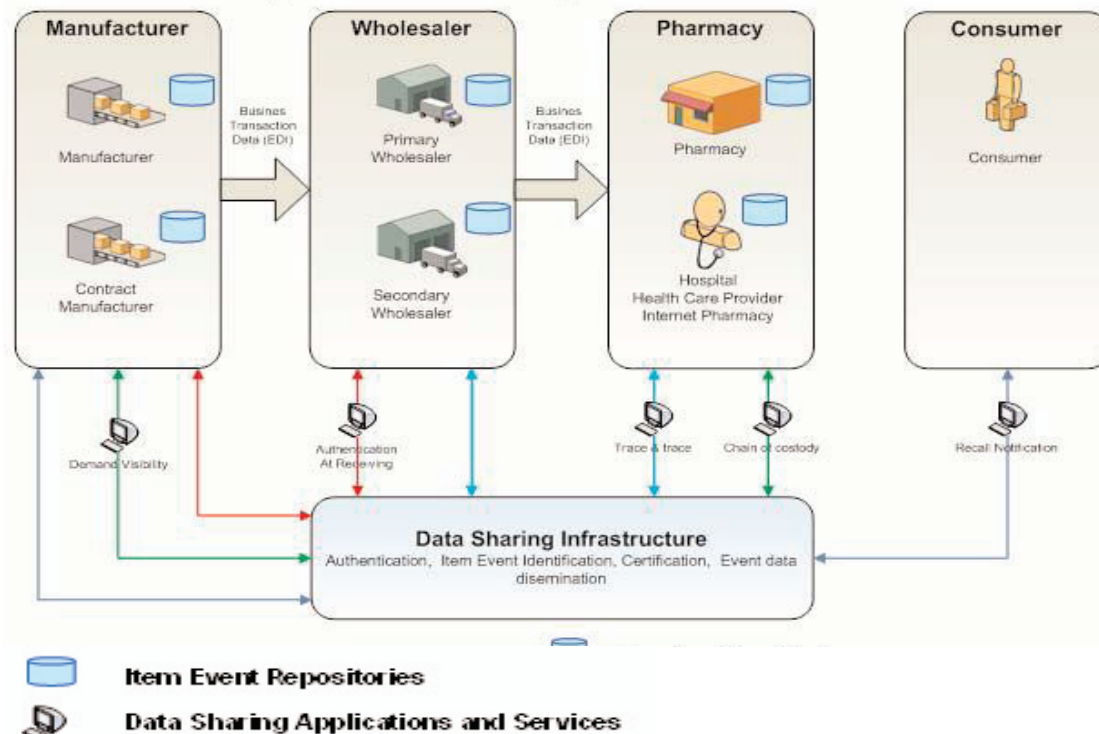
In the opinion of Chopra and Miendel (2005), while item-level data management related to events within the enterprise may provide some incremental value, the potential for revolutionary value comes from the ability to link item-level data to events and observations outside the enterprise. In order to leverage item-level data across enterprises, standards are needed to ensure interoperability.

Data Sharing Infrastructure

According to Dubey and Kumar (2007), what is clear from early initiatives in item-level data sharing is that new types of data will be generated at unprecedented scale and will need to be exchanged in order to achieve measurable benefits across the supply chain. Conventional systems for business-to-business communications, as observed by Dubey and Kumar (2005), were not designed to manage this volume of data, and therefore will need to be augmented for item-level data management.

System architecture, as observed by Chopra and Miendel (2005), that allows owners of products to “pull” information about item level events and observations without costly forwarding and storage of large data sets would create significant cost savings to all players in the supply chain. This architecture requires open network services to which participants can publish item observation information, and then subscribe to certain levels of information access. This infrastructure, they indicated, is not a “database in the sky” but rather a directory infrastructure that establishes linkage between item-level event repositories throughout the supply chain. In the opinion of Chopra and Miendel (2005), when data sharing needs to occur between multiple points and at multiple levels or tiers, this infrastructure will locate and identify event data, authorize and certify the event data and monitor and control the dissemination of event data based on the desires of the data’s owner.

Figure 2.1: A Conceptual Diagram of how Infrastructure can be set up to Accommodate Cost Effective and Efficient Availability of Item Information.



According to Dubey and Kumar (2007), the diagram is based on the assumption that manufacturers, wholesalers, pharmacy chains and hospitals establish their own item level data management capabilities.

Trust Environment

Chopra and Miendel (2005) have stated that, information technology professionals within the pharmaceutical industry are likely to challenge the notion of exposing data to anyone beyond their immediate trading partners. Similarly, companies accustomed to selling transactional data might be concerned about the impact of these data sharing infrastructures on existing business models. Implementing change is never easy, as earlier stated. They noted that, vital to the success of any standardized platform for information sharing within any industry is the inherent trust in the system to protect proprietary and valuable information from misuse or unauthorized access. Thus, trust management (the process of maintaining user authentication, access control and data protection) is probably the most significant challenge to network-based data sharing in the pharmaceutical supply chain.

An enterprise’s own item level data management infrastructure (tags and identifiers, devices, and item event repository) are protected within its umbrella of security controls, procedures and policies, according to Dubey and Kumar (2007). Each stakeholder within the supply chain needs a reliable, standards-based system to manage information that can be accessed, how that information can be used and to certify authenticity of information. Enterprises, they noted, define the level of authorization and certification necessary for other stakeholders to access information in their repositories and to update or use the information. They further stated that, all parties in the supply chain will be able to define what information they provide to whom and under what terms the information can be used within the context of the unique trading relationship.

The increasing number of incidents involving raw materials supplied to the pharmaceutical industry, in the opinion of Frankcom (2009), has put the regulatory spotlight firmly on the issue of managing suppliers. Regulatory bodies, he noted, such as the Food and Drugs Authority (FDA) have themselves come under congressional pressure due to deaths/illness caused by raw materials. The Heparin and Chinese tainted milk

powder issues of 2008 are examples which have increased public concern. The industry and regulatory bodies are now looking for systematic improvements in managing supply chains and suppliers.

According to Kaye (2010), at every stage of the supply chain, shippers must be intimately familiar with the customs and regulations of every country through which freight will pass. He indicated that, they have to observe any quarantine or inspection requirements in addition to understanding the associated service parameters and costs.

Kaye (2010) has observed that lack of understanding about the freight marketplace can delay or prohibit the importation of vendor shipments and—more likely—add unanticipated and unnecessary customs costs and possible exam fees. Also, a pharmaceutical company can incur unanticipated freight costs or surcharges as a result of improper or inefficient routing of cargo. All of these problems must be designed out of the supply chain before it can work properly. Since time-sensitive ingredients are often sent by air, as observed by Frankcom (2009), the regulatory logistics challenges that air cargo shippers face at a time when clients are already stressed owing to recession-reduced demand and high energy costs must be considered.

While the pharmaceutical industry can learn many lessons from the automotive and electronics sectors about managing risk, as observed by Frankcom (2009), there are characteristics unique to the industry that make implementing supplier quality management challenging with regard to risk management. In this study the term pharmaceuticals is used to embrace both the traditional pharmaceuticals as well as the biotechnology sector.

As pointed out by Frankcom (2009), all industries face the issue of multiple stakeholders. The pharmaceutical industry, according to Frankcom (2009), has five primary groups of stakeholders – Research and Development (R&D), Operations, Procurement, Corporate Compliance and Risk Management. He observed that, their interactions and the inherent risks are amplified by the long development cycle of a new drug (typically 10 years or longer), and the long period of commercialization thereafter (up to 20 years or more). During this extended lifecycle, the influences of various stakeholders and suppliers change. This, he further pointed out, takes place in a highly regulated environment; whereas product recalls and regulatory actions can severely impact the shareholder value.

In the opinion of Enyinda et al (2009), no modern supply chain is immune to both predictable and unpredictable risks. Because modern pharmaceutical supply chains are more than ever exposed to risks, it behoves on the global pharmaceutical industry to implement strategic risk management. They stated that, to prosper and flourish, it is imperative for the Ghanaian pharmaceutical industry to assess risks and develop comprehensive risk management strategies. One of the crucial factors of effective strategic risk management, according to Enyinda et al (2009), is risk identification and analysis. When risks are identified, they noted, firms can analyze them in order to understand their impact on business objectives. Thus, the Ghanaian pharmaceutical industry should have a methodology for identifying and evaluating the risks it faces and a process for generating intervention plans to mitigate the risks to an acceptable level.

Again, Enyinda et al (2009) identified the need for companies to achieve a sustainable competitive advantage by moving supply chain risk management issues up the corporate agenda. Although supply chain risk management, in the opinion of Enyinda (2008), is an important discussion in the academic and practitioner arenas, there is little or no research that has examined risks within the Ghanaian pharmaceutical supply chain. Indeed, “the link between risk and reward has never been more important than it is now in the pharmaceutical industry as with the challenges of delivering profitable, new solutions for better healthcare in the global marketplace”.

Challenges and Constraints in the Ghanaian Pharmaceutical Industry

From the publication posted by the United Nations Industrial Development Organization (UNIDO) (2010), the previous decade witnessed significant increases in the supply of life-saving essential medicines in developing countries. Notwithstanding this development, UNIDO (2010) recognised that, the gap between the drugs needed and those available remained profound. This gap, however, is most apparent with regard to three of the most significant pandemic diseases — HIV/AIDS, malaria and tuberculosis. UNIDO (2010), also identified at the same time that insufficient access to quality assured essential drugs to treat other diseases remained a major burden for developing and Least Developed Countries (LDCs).

In recent years, the potential role that pharmaceutical manufacturers in the developing world, in the opinion of UNIDO (2010), could play in a means of easing the access-to-drugs challenge has received renewed and increasing attention, with particular emphasis on Africa. The local production of medicines has for instance been identified as an important development objective by the African Union (AU) through its 2007 Pharmaceutical

Manufacturing Plan. In addition, the domestic pharmaceutical industry has also been earmarked as a priority sector in a number of countries by UNIDO (2010), including Botswana, Ghana, Kenya and United Republic of Tanzania.

According to Harper and Gyansa-Lutterodt (2009), although Ghana possesses a well established and developing pharmaceutical manufacturing sector, its pharmaceutical market encompasses roughly 30% locally produced and 70% imported products from India and China. The Ghanaian pharmaceutical industry, they pointed, is faced with the critical challenge of surviving and striving in today's environment which is laden with uncertainty and risks. To reduce reliance on imported pharmaceuticals, in the opinion of Enyinda et al (2009), that are draining foreign exchange resources, the Ghanaian Pharmaceutical industry is grappling with how to improve its capacity. For example, industry commentators suggest that out of 3,000 drugs registered by the Food and Drugs Board (FDB) only 900 are produced locally.

According to Mahama (2007), one of the remedies to importation of drugs is to source raw materials locally in order to contain cost of production and improve the competitiveness of the Ghanaian pharmaceutical manufacturing industry. The growth and capacity of pharmaceutical industry production is notably marginal, hampered by government's free market policy, and absence of tax exemptions for raw materials that severely impacts production and competition (Republic of Ghana, 2004). Ghanaian Pharmaceutical industry, in the opinion of Harper and Gyansa-Lutterodt (2009), is confronted with daunting challenges for its future development and growth. A major challenge that is confronting it is abject under employment of manufacturing capacity, often greater than 50%. They also stated some other major challenges facing the development of the pharmaceutical industry in Ghana encompasses are:

1. a chaotic and unregulated pharmaceutical distribution chain that leads to high prices and compromising of pharmaceutical chain security;
2. a focus of local production on over the counter product manufacturing;
3. inability to produce essential medicines that meet the standards for international tenders;
4. relatively high manufacturing costs for locally manufactured pharmaceutical products as compared to imports from Asia;
5. lack of or absence of an enabling environment;
6. difficult access to cost-effective investment;
7. limited focus and support for pharmaceutical research and development, when clear opportunities exist;
8. weaknesses in implementation of intellectual property right (IPR) issues related to trade aspects of intellectual property rights (TRIPS) flexibilities and inefficiencies in the utilization of in-licensing;
9. unmet professional human resource development/capacity building needs;
10. poor perceptions of sub-region produced medicinal products;
11. the growing threat of counterfeit and diverted medicines from Asia;
12. local inaction and in-coordination leading to increasing reliance on imported medicines from Asia and other parts of Africa; and
13. inadequate and in-coordinated sub-region pharmaceutical regulatory framework.

Sources of Pharmaceutical Supply Chain Risks

According to Christopher (2003), supply chain risk pertains to any threat of interruption to the well functioning of supply chain operations. Risk, as stated by Deleris and Erhum (2005), emanates from lack of knowledge about the nature of events that may disrupt supply chain operations and its resiliency to disruptions. Holton (2004) described risk as composed of exposure and uncertainty. Adams (1995) posits that "virtually all the formal treatments of risk and uncertainty in game theory, operations research, economics and management science require that the odds be known, that numbers be attachable to the probabilities and magnitudes of possible outcomes." Indeed, risk and uncertainty are the quintessential part and parcel of doing business.

Traditionally, the two general sources of risk drivers discussed in the literature, as posited by Enyinda et al (2009), are the internal and external risks. Internal risks are risks under the direct control of the organization, including faulty machine, planning, production, and internal customers. Whereas external risks are risks beyond a firm's control, including demand and supply risks, counterfeits, terrorism, regulation and legislation, third-party relationship, currency and exchange rate fluctuations. Because the internal risks are preventable, this review considers some of the important external risks affecting Ghanaian pharmaceutical supply chain. In agreement with Bernstein (1996), "the essence of risk management lies in maximizing areas where we have some control over the outcome while minimizing the areas where we have absolutely no control over the outcome and the linkage between effect and cause is hidden from us." As further stated by Enyinda et al (2009), pharmaceutical supply chain risks that can disrupt the reliability and continuity of the smooth flow of

pharmaceuticals and/or active pharmaceutical ingredients (APIs) include the aforementioned external risks. Pharmaceutical supply chain risk can manifest from a variety of sources.

In February 2008, the Ghanaian Ministry of Health adopted a five year program under the Theme “Creating Wealth Through Health”. The program sets clear goals and timelines for achievement. For the pharmaceutical sector, the main program focus areas are access to medicines, improved supply management systems, quality assurance and rational use. These objectives pointed at issues prevalent in all Sub-Saharan African countries. However, the emergence of health insurance as a major financing mechanism for medicines, according to Seiter and Gyansa-Lutterodt (2009), should put Ghana into a favourable position compared to other countries to implement the key objectives outlined in the programme of work 2007-2011.

They also stated that, traditional policy makers such as Ministries of Health in Sub-Saharan Africa have limited resources and usually focus on service delivery through government owned or contracted outlets. Limitations in the availability or quality of government sponsored services drive large parts of the population into buying health services for cash and outside the regulatory reach of the public administration. In Ghana, Seiter and Gyansa-Lutterodt (2009) stated the, the introduction of health insurance enabled pooling of this purchasing power to the extent that has reached critical mass as a powerful driver of change in the system. About half of the population has an insurance card, and about 40% of the funds paid out by health insurance are for pharmaceuticals. This explains why secure access to affordable, safe and effective drugs for their membership is high on the political agenda for those who represent health insurance in Ghana. They also indicated that compared to a ministerial bureaucracy with limited enforcement capacity, a health insurance fund can use its purchasing power to influence providers, which usually is more effective than regulation and public sector management alone.

In the opinion of Seiter and Gyansa-Lutterodt (2009), the impact of the modified power balance can already be felt in recent discussions between Ghana Health Service (GHS) and other units of the Ministry of Health (MOH) regarding a liberalization of pharmaceutical supply guidelines currently requiring GHS facilities to procure through the Central Medical Stores – Regional Medical Stores (CMS-RMS) system (although exceptions are possible and widely used already). Influence of National Health Insurance Authority (NHIA) policy actions can also be felt in drug pricing decisions and an increasing awareness of drug quality issues reflected in intensified monitoring activities by the Food and Drugs Board. In the longer term, they identified that, there is potential for Ghana to “graduate” from the state of chronic dysfunction of a publicly dominated pharmaceutical sector typical for many low-income countries and reach a state in which contracting between health insurance and public and/or private providers aligns incentives and ensures supply of quality essential drugs to health care providers for all insured patients. The main role of the public sector, as they put it, then would be to provide guidance in the form of a comprehensive policy framework and ensure an adequate level of regulatory oversight.

Analysis of Data and Discussion of Findings

Data collected in the field, with respect to the research objectives of the study. This includes an examination of the perception of consumers of the supply chain of management of Ernest Chemists Limited within the pharmaceutical industry, an assessment of the availability and affordability of good quality and efficacious pharmaceutical products, an evaluation of the challenges and constraints affecting the distribution process and adherence to supply chain management best practices for effective and efficient health care delivery.

Nature of Supply Chain of Ernest Chemists Limited (Wholesales and Retails)

Supply chain is the management of a network of retailers, distributors, transporters, storage facilities and suppliers that participate in the sale, delivery and production of a particular product. The results from the wholesale survey indicated that 50% of the respondents strongly agreed, 45% agreed and 5% were undecided as to the definition of the supply chain. This indicates that the 95% of the respondents are knowledgeable about the subject they provided answers for.

One hundred percent (100%) of the respondents who were surveyed in the wholesale facilities considered data collection, supplier selection, purchasing, warehousing, stock taking, distribution as stages in supply chain management.

However, the retail survey results indicated that 75% of the interviewees considered data collection, supplier selection, purchasing, warehousing, stock taking, and distribution as the stages in supply chain management.

Table 1: Respondents Understanding of Stages in Supply Chain Management (Retail)

Stages in Supply Chain Management	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Data Collection, Supplier, Purchasing, Warehousing, stock taking, distribution	15	75.0	75.0	75.0
Supplier selection, purchasing, warehousing, stocking, distribution	1	5.0	5.0	80.0
Warehousing, distribution	3	15.0	15.0	95.0
Distribution	1	5.0	5.0	100.0
Total	20	100.0	100.0	

Source: Field Data, May 2011

Fifty one point three percent (51.3%) of respondents said combination of quick customer response, reduction in inventory and improved forecasting were the benefits provided by effective supply chain management.

Table 2: Benefits of Effective Supply Chain Management (ESCM) (Wholesale)

Benefits of ESCM	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Quicker customer response and fulfilment rates	14	17.5	17.5	17.5
Shorter lead time	1	1.3	1.3	18.8
Greater productivity and lower costs	2	2.5	2.5	21.3
Quicker response, reduction in inventory, improved forecasting	41	51.3	51.3	72.5
Quicker response, forecasting, productivity, fewer supply	21	26.3	26.3	98.8
Shorter planning cycles	1	1.3	1.3	100.0
Total	80	100.0	100.0	

Source: Field Data, May 2011

Similarly, the retail study results show that 55% of respondents considered quicker customer response and fulfilment rates, greater productivity and lower costs, reduction of inventory and improved forecasting as the benefits of effective supply chain management (Table 3). Twenty five percent (25%) of the respondents also considered quicker customer response, greater productivity and lower costs are also benefits of effective supply chain management.

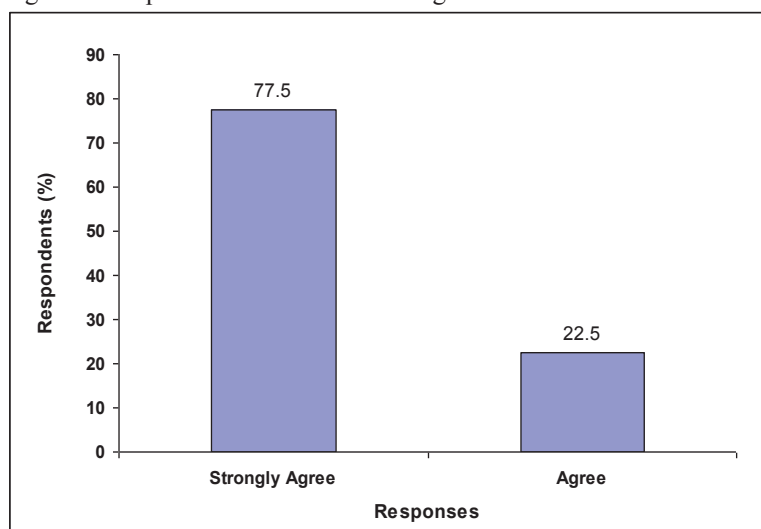
Table 3: Benefits of Effective Supply Chain Management (Retail)

Benefits of ESCM		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Quicker customer, greater productivity, reduction of inventory, improved forecasting	11	55.0	55.0	55.0
	Shorter lead time	2	10.0	10.0	65.0
	Greater productivity and lower costs	1	5.0	5.0	70.0
	Quicker customer response, greater productivity	5	25.0	25.0	95.0
	Quicker customer supply	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

Source: Field Data, May 201

According to the wholesale survey results collected, 63.8% of respondents mentioned that Ernest Chemist Ltd has an effective supply chain management while 36.2% of interviewees responded in the negative. In the wholesale survey results, 77.5% of respondents strongly agreed that Ernest Chemists Limited has a unique and competitive distribution while 22.5% said they agreed as shown in Figure 4.2. This they ascribed to the wide range of locally manufactured and imported pharmaceuticals the Company provides.

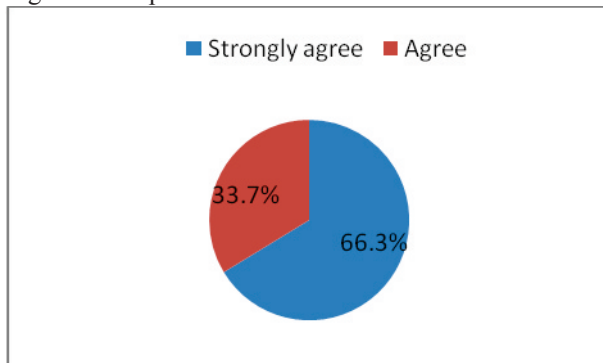
Figure 1: Respondents Views Concerning Ernest Chemist Limited’s Competitive Advantages (Wholesale)



Source: Field Data, May 2011

Ernest Chemists Limited imports pharmaceutical products that are ethical or originally patented and branded generic pharmaceutical products from some of the world leading pharmaceutical companies all over the world. This was confirmed from wholesale survey results, which indicated that 66.3% of respondents strongly agreed that healthcare products offered by Ernest Chemist were consistent with ethical or original patented while 33.7% of respondents also agreed to this (Figure 2).

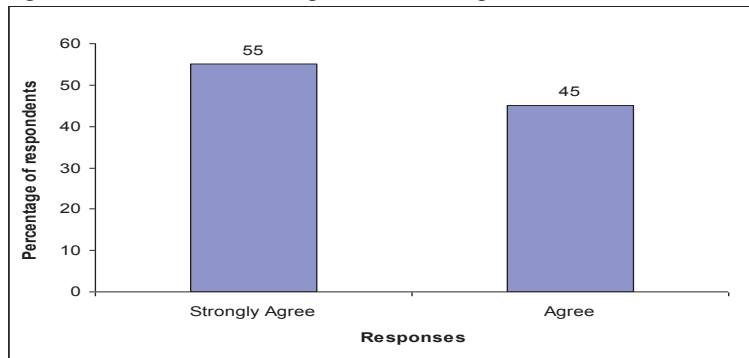
Figure 2: Respondents View on Sources of Products of Ernest Chemists Limited (Wholesale)



Source: Field Data, May 2011

Similarly, the retail survey shows that 55% of the respondents strongly agreed while 45% agreed on the issue as shown in Figure 4.4. This shows that 100% of the respondents agreed to the fact that Ernest Chemists provides good quality and trusted brands of pharmaceutical products.

Figure 3: Distribution of Respondents' Perception of Source of Ernest Chemist Limited's Products (Retail)

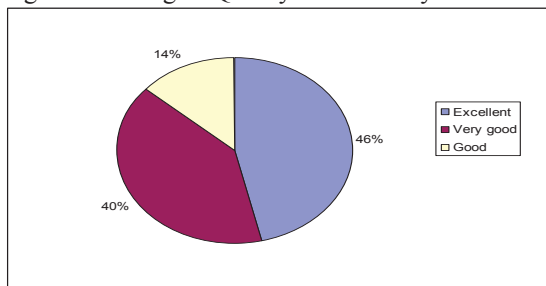


Source: Field Data, May 2011

Quality, Availability and Affordability of Products Provided by Ernest Chemist Ltd (Wholesales and Retail)

Ernest Chemists Limited produces high quality products. The wholesale survey results show that 46% of the respondents rated products from Ernest Chemist Ltd as excellent as shown in Figure 4.5. This they indicated was due to the fact that Ernest Chemist Limited, had quality control checks which ensured that efficient and quality products were produced and those imported are from leading pharmaceutical companies in the world which have their reputation to keep. The retail pharmacists ascribed another reason saying that, throughout their experience they have not seen patients come to them with relapses in treatment.

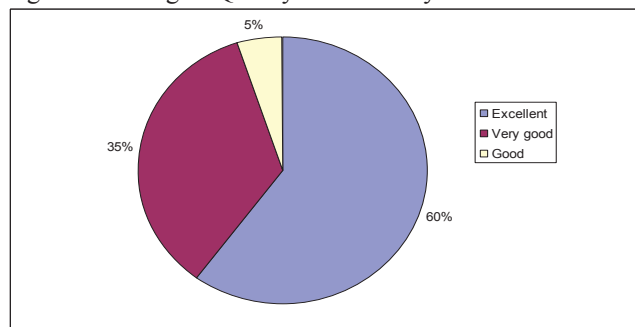
Figure 4: Rating of Quality and Efficacy Ernest Chemists Products (Wholesale)



Source: Field Data, May, 2011

However, 60% of the respondents from the retail survey rated Ernest Chemist Limited products as excellent in terms of quality and efficacy (Figure 5).

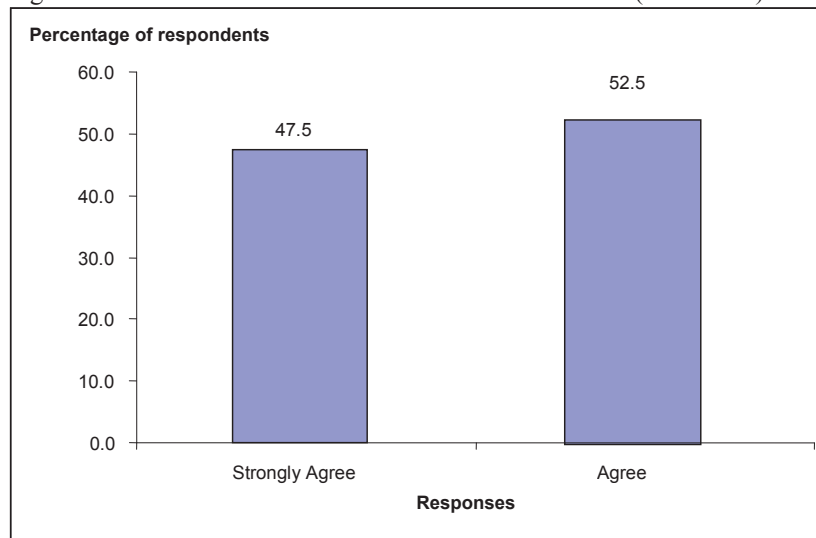
Figure 5: Rating of Quality and Efficacy of Ernest chemists Products (Retail)



Source: Field Data, May 2011

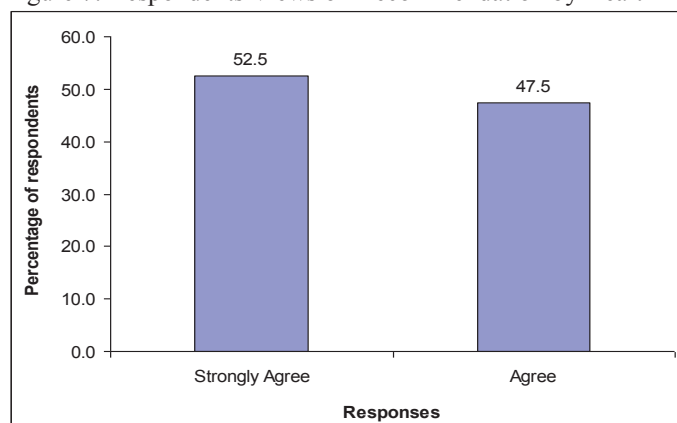
Adherence to standards of good manufacturing practices is one of the measures which ensure production of quality and effective products. From the wholesale survey results 52.5% of the respondents agreed that Ernest Chemist Limited strictly adhered to registration of its products before marketing them, while 47.5% of the respondents strongly agreed to this as shown in Figure 6.

Figure 6: Adherence of Ernest Chemists Limited to GMPs (Wholesale)



Source: Field Data, May 2011

Figure 7: Respondents Views on Recommendation by Health Professionals (Wholesale)

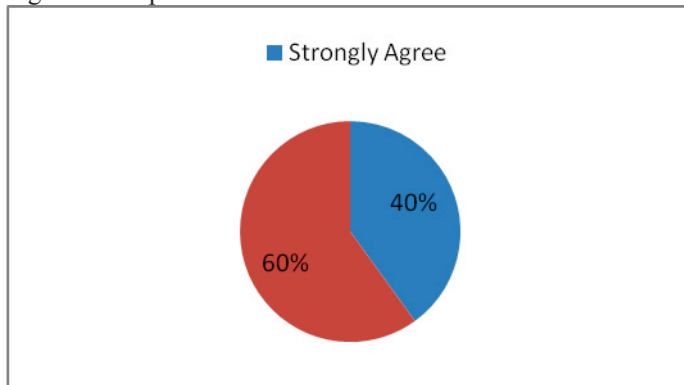


Source: Field Data, May, 2011

Ernest Chemists products, according to the retail survey results, are recommended by doctors, pharmacists, nurses and other health professionals in the country due to the high quality standard of the drugs, and their

efficacy. Forty percent (40%) of the respondents strongly agreed while 60% agreed (Figure 7) that Ernest Chemists products are recommended to patients in various hospitals and clinic by health professionals.

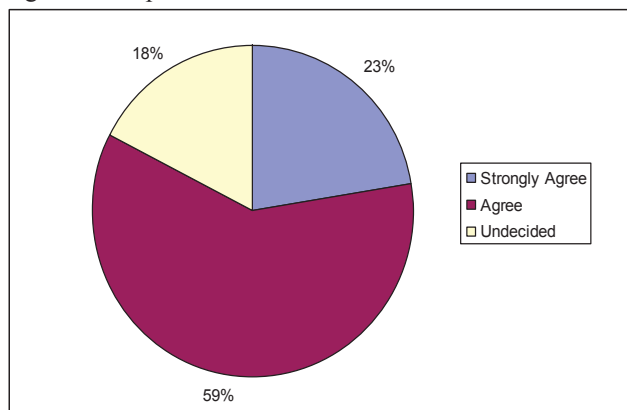
Figure 8: Respondents View on Recommendation of Ernest Chemists Limited Products (Retail)



Source: Field Data, May 2011.

The wholesale survey results show that 59% of respondents agreed that Ernest Chemists products are expensive, 23% strongly agreed to this while 18% were undecided (Figure 8). This is could be due to the fact that good quality products always attract higher cost.

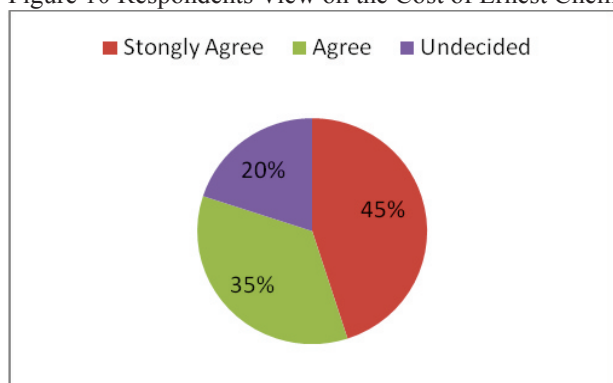
Figure 9: Respondents View on the Cost of Ernest Chemists Products (Wholesales)



Source: Field Data, May 2011

According to the retail survey results, 45% of respondents agreed that Ernest Chemists products are expensive compared to products from other pharmaceutical companies in the country while 35% of the respondents strongly agreed that Ernest Chemists products are expensive. Twenty percent (20%) of the respondents were undecided (Figure 9) arguing that affordability is a question of expected results. The undecided respondents argued that good quality products always attract higher cost. However, patients who patronized substandard pharmaceutical products end up spending more since they have to treat twice or more. This might cost them more than they would have spent to buy a trusted brand the first time. Moreover, the respondents who strongly agreed and agreed attribute this high cost to the quality of the drugs produced or supplied to the market.

Figure 10 Respondents View on the Cost of Ernest Chemists Products (Retail)



Source: Field Data, May 2011.

According to the wholesale survey results, the quality dimensions respondents ascribed to products from Ernest Chemists was combination of efficacy and reliability (Table 8). Thirty seven point five percent (37.5%) indicated that products from Ernest Chemists Limited are efficacious and reliable. This implies that products from Ernest Chemists have high efficacy and reliability to perform their functions effectively.

Table 4: Quality Dimensions of Ernest Chemists Limited's Products (Wholesale)

Dimensions of Quality	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Reliability, Affordable	24	30.0	30.0	30.0
Efficacious, Affordable	26	32.5	32.5	62.5
Efficacious, Reliability	30	37.5	37.5	100.0
Total	80	100.0	100.0	

Source: Field Data, May 2011

Even though almost all the respondents in the retail survey results indicated that Ernest Chemists Limited products are expensive, they also indicated consumers prefer it to others pharmaceutical products in the market due to the fact that the products are efficacious, user friendly and reliable when used. This according to 50% of respondents make it possible for them to sell their products at very good rate since most consumers of pharmaceutical products are more interested in products that are more reliable and can relief them of their pain or sickness. But 35% of the respondents disagreed; they considered Ernest Chemists products as affordable and reliable since similar products in the markets are of almost the same price or cost even though they are of lower quality. The Table 4: indicates why retailers sell more Ernest Chemists products than other pharmaceutical companies' products.

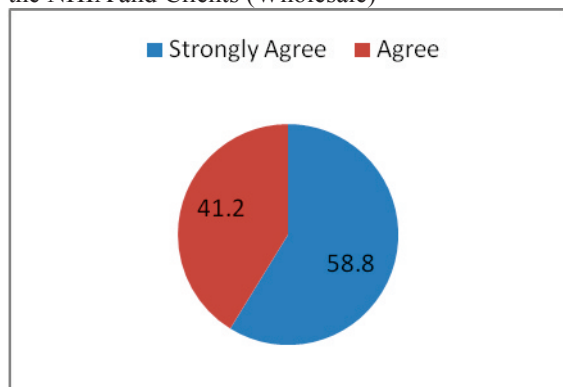
Table 5: Quality Dimensions of Ernest Chemists Limited's Products (Retail)

Dimensions of Quality	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Efficacious	3	15.0	15.0	15.0
Affordability and reliability	7	35.0	35.0	50.0
Efficacious, user friendliness, reliability	10	50.0	50.0	100.0
Total	20	100.0	100.0	

Source: Field Data, May 2011

Fifty eight point eight percent (58.8%) of respondents from the wholesale survey results strongly agreed that demand of affordable medicines by National Health Insurance Authority (NHIA) and customers drives Ernest Chemists to locally produce medicine because they indicated that Ernest Chemists is the largest local pharmaceutical company and provides a wide range of quality and affordable products. However, 41.2% of respondents agreed to this statement (Figure 11).

Figure 11: Respondents View on the Passion of Ernest Chemists Limited to Produce Affordable Medicines for the NHIA and Clients (Wholesale)



Source: Field Data, May 2011

Customers are important people for service providers. The results from the wholesale survey indicated that Ernest Chemist has various customers from different institutions. They include government and private hospitals, wholesalers and retailers (Table 6). Sixty six point three percent (66.3%) of respondents identified Government Hospitals and Regional Medical Stores, Private Hospitals, other Wholesalers, Retailers and Licensed Chemical Sellers as clients of Ernest Chemists Limited. This clearly shows that Ernest Chemist has a broad customer base.

Table 6: Main Customers of Ernest Chemists Limited (ECL) (Wholesale)

Main Customers of ECL	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Government Hospitals and Regional Medical Stores	1	1.3	1.3	1.3
Pharmaceutical Wholesalers	10	12.5	12.5	13.8
Pharmaceutical Retailers	16	20.0	20.0	33.8
Government, Private Hospital, Wholesalers, Retailers, Licensed Chemicals Sellers	53	66.3	66.3	100.0
Total	80	100.0	100.0	

Source: Field Data, May 2011

Similarly, 50% of respondents from the retail survey results identified government hospitals and regional medical stores as the major customers of Ernest Chemists limited as illustrated in Table 7. Since the Government of Ghana is interested in providing quality health care to the citizenry, she engages the services of pharmaceutical companies which produce or supply more efficacious, affordable, and reliable drugs to supply to all government hospitals and medical stores all over the country. Thirty five percent (35%) of the respondents also indicated that Ernest Chemists sells to private hospitals, wholesalers, retailers and licensed chemical stores.

Table 7: Main Customers of Ernest Chemists Limited (ECL) (Retail)

Main Customers of ECL		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Government Hospitals and Regional Medical Stores	10	50.0	50.0	50.0
	Private Hospitals, wholesaler, retailers, chemical sellers	7	35.0	35.0	85.0
	Pharmaceutical Wholesalers	3	15.0	15.0	100.0
	Total	20	100.0	100.0	

Source: Field Data, May 2011.

Challenges and Constraints of Supply Chain of Ernest Chemist Limited (Wholesales and Retail)

In an interview with the Chief Executive Officer of Ernest Chemists Limited (Mr. Ernest Bediako Sampong), he claims there were a lot of challenges and constraints facing the company. Notable among them he identified as excessively low prices quoted in the national health insurance scheme medicines list which encourages hospitals and clinics to stock products with low prices in order to make profit, high and many taxes that the company pays on imports of active pharmaceutical ingredients (APIs), lack of government subsidies or some tax relief for privately owned companies, theft cases in the company (like a recent theft case on the factory's raw material warehouse where a lot of the raw materials were stolen), relatively high manufacturing costs for locally manufactured pharmaceutical products as compared to imports from Asia, lack of or absence of an enabling environment, difficult access to cost-effective investment, limited focus and support for pharmaceutical research and development when clear opportunities exist, weaknesses in implementation of intellectual property right (IPR) issues related to trade aspects of intellectual property rights (TRIPS) flexibilities and inefficiencies in the utilization of in-licensing, unmet professional human resource development/capacity building needs, poor perceptions of sub-region produced medicinal products, the growing threat of counterfeit, cheap and diverted medicines from Asia, local inaction and in-coordination leading to increasing reliance on imported medicines from Asia and other parts of Africa, poor maintenance culture of Ghanaians, insecure raw material sourcing and inadequate and in-coordinated sub-region pharmaceutical regulatory framework.

There are a lot of challenges facing the Ghanaian Pharmaceutical Industry. The key ones are illustrated in Table 4.13 which was obtained from the wholesale survey results. Fifty two point five percent (52.5%) of respondents believed that counterfeit drugs, diverted over the counter medicines and under development of local manufacturers are the main challenges facing the Pharmaceutical companies in Ghana. Twenty six point three percent (26.3%) of respondents indicated counterfeit drugs alone as one of the main challenges facing the Ghanaian Pharmaceutical industry. In addition, 17.5% of respondents identified under development of the local manufacturing capacity and weaknesses in implementation of intellectual property rights by the legal authorities and the government as some of the main challenges facing the Ghanaian Pharmaceutical industry. They recommended that tackling these challenges would make the Ghanaian Pharmaceutical industry grow and develop in to a world giant industry which will fetch the country a lot of foreign exchange.

Table 8: Challenges Confronting the Ghanaian Pharmaceutical Industry (Wholesale)

Challenges of the Ghanaian Pharmaceutical Industry	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Under Development, Weakness property right	14	17.5	17.5	17.5
Counterfeit and diverted, OTC, under development, local manufacturers	42	52.5	52.5	70.0
Over-the-Counter medicines	3	3.8	3.8	73.8
Local manufacturers	21	26.3	26.3	100.0
Total	80	100.0	100.0	

Source: Field Data, May 2011.

Forty five percent (45%) of the clients interviewed in the retail survey indicated that the production of counterfeit and diverted medicines from Asia, and inability of local manufacturers to produce essential medicines that meet standards for international tenders, as shown in Table 9, were among the major challenges and constraints of the supply chain of the Ghanaian pharmaceutical industry. These activities are seriously affecting the efforts of Ernest Chemists Limited in providing products which are of high quality and reliable for fast relief from any sickness. In 2010, Food and Drug Board (FDB) arrested some Chinese and their Ghanaian counterparts for importing substandard or counterfeit health products into the country which they were selling at very low prices and they also claimed to provide a lot of health relief's. But these drugs rather worsen the situation for the patients and most of these drugs have long term severe side effects.

Table 9: Challenges Facing the Ghanaian Pharmaceutical Industry (Retail)

Challenges of the Ghanaian Pharmaceutical Industry	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Under development, counterfeit, low standard manufacturer	8	40.0	40.0	40.0
Counterfeit and diverted	9	45.0	45.0	85.0
Low standard of local manufacturers medicines	3	15.0	15.0	100.0
Total	20	100.0	100.0	

Source: Field Data, May 2011

Any industry that is chaotic and unregulated often produces products which are expensive. Results from both the wholesale and retail surveys indicated all the respondents said if the pharmaceutical companies would also be left unregulated, then the drugs that would be produced would have high treatment failures due to low quality and this in turn will increase the cost of treatment of diseases. Others indicated that if the industry is left unregulated this will breed the influx of substandard products that could increase resistance in the treatment of microbial infections which could worsen the health state of the population.

Certain factors determine the cost of drugs. The wholesale survey results show that 57.5% of respondents believed that unmet professional human resources and poor pharmaceutical coverage for most Ghanaians were the factors which are making treatments and drugs expensive in Ghana. There is therefore the need to increase access to drugs to all the communities within the country and the need to increase the number of professional pharmacists trained in the country. In an interview with the immediate past Dean of the Faculty of Pharmacy at the Kwame Nkrumah University of Science and Technology, in the person of Professor Edward Mahama, he stated that this challenge is what initiated the accreditation of the University of Ghana and Central University College as training institutes for Pharmacists so the nation can churn out more qualified professional Pharmacists.

Table 10: Factors Affecting the Cost of Treatment and Drugs in Ghana (Wholesale)

Factors Affecting Cost of Treatment and Drugs		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor pharmaceutical coverage	1	1.3	1.3	1.3
	Concentration of retail	10	12.5	12.5	13.8
	Unmet professional, poor coverage	46	57.5	57.5	71.3
	poor coverage, concentration of retail	23	28.8	28.8	100.0
	Total	80	100.0	100.0	

Source: Field Data, May 2011

The retail survey results show that 65% of respondents gave the reason for the high cost of treatment and drugs in Ghana as due to high concentration of retailers in Accra and Kumasi metropolis, poor coverage, and unmet professional human resource development in the system as illustrated in Table 11. There are a lot of non-professionals involved in the importation and distribution of pharmaceutical products in the country and their activities has adverse effects on the cost or price of health products.

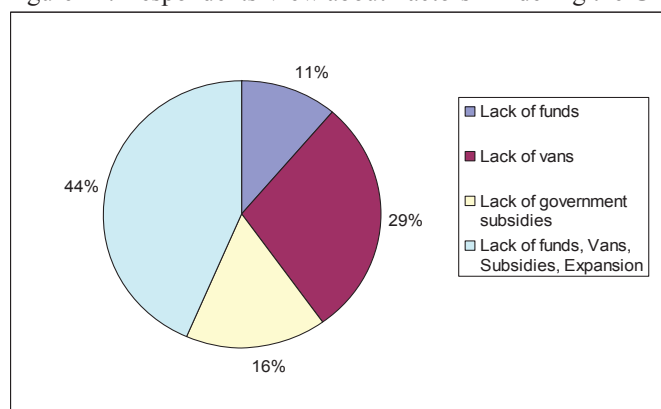
Table 11: Factors Affecting the Cost of Treatment and Drugs in Ghana (Retail)

Factors Affecting Cost of Treatment and Drugs		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor pharmaceutical coverage	3	15.0	15.0	15.0
	High concentration of retailer, poor coverage, unmet professionals	13	65.0	65.0	80.0
	Unmet professional and poor coverage	4	20.0	20.0	100.0
	Total	20	100.0	100.0	

Source: Field Data, May 2011

The growth of Ernest Chemists Limited is not being hindered by a single factor but a combination of factors. According to the wholesale survey results obtained, 44% of respondents mentioned lack of funds, lack of vans, no subsidies from government and lack of expansion projects as the main factors hindering the growth of Ernest Chemists Limited. Figure 12, shows the hindering factors against the growth the Ernest Chemist Limited. For the industry to grow, these factors should be dealt with holistically.

Figure 12: Respondents View about Factors Hindering the Growth of Ernest Chemists Limited (Wholesale)



Source: Field Data, May 2011

Various responses were elicited by respondents from the retail survey about the factors hindering the efforts of Ernest Chemists from growing and expanding. Thirty five percent (35%) of respondents expressed issues such as lack of funds, lack of government subsidies on taxes for privately owned companies, and lack of vans to improve distribution (Table 12). Over the years, local pharmaceutical companies had been complaining about their inability to produce high quality drugs at lower production costs. They indicated reasons such as most of their raw materials are imported and duties of these raw materials are very high resulting in high production cost.

Table 12: Factors Hindering the Efforts of Ernest Chemists Limited (Retail)

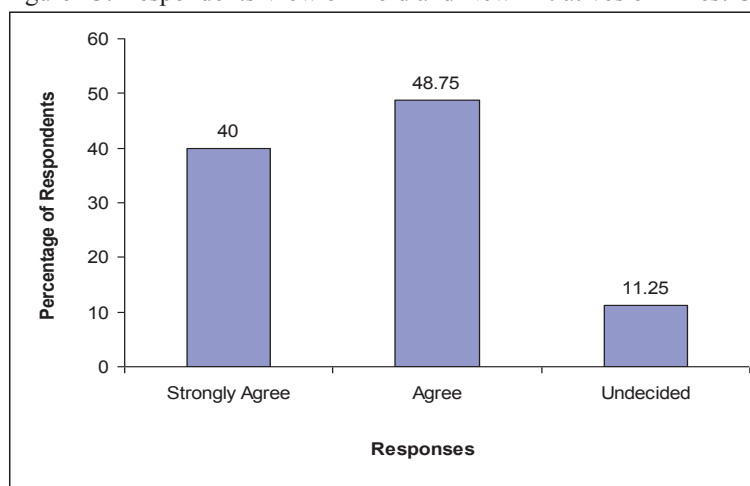
Factors Hindering Efforts of Ernest Chemists Limited		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lack of funds, vans, subsidies	7	35.0	35.0	35.0
	Lack of expansion projects	2	10.0	10.0	45.0
	Lack of vans	3	15.0	15.0	60.0
	Lack of government subsidies	4	20.0	20.0	80.0
	lack of funds, expansion	4	20.0	20.0	100.0
	Total	20	100.0	100.0	

Source: Field Data, May 2011

Supply Chain “Best Practices” for Effective and Efficient Distribution (Wholesales and Retail)

For effective and efficient distribution of drugs, Ernest Chemists Limited has taken some bold initiative including construction of new production plants and opening of other branches in across the country. 48.75% of respondents from the wholesale survey mentioned that they agree (Figure 13) that these initiatives being taken by Ernest Chemist were the factors that enables effective and efficient distribution of good and affordable products to the wider population of Ghana.

Figure 13: Respondents View on Bold and New Initiatives of Ernest Chemist Limited (Wholesale)



Source: Field Data, May 2011

Similarly, the retail survey results indicated that Ernest Chemists Limited had taken bold initiatives to effectively and efficiently distribute its products to the wider population of Ghanaians. Sixty percent (60%) of the respondents have agreed while 40% strongly agreed to confirm the Ernest Chemists bold initiatives.

For a company to be a leader in providing good quality health products it should have a wider range of products from which customers can choose and they should be affordable. According to the wholesale survey results, 73.8% respondents strongly agreed while 26.2% agreed to it. This is because Ernest Chemists Limited provides wide range of locally manufactured products and also imports good quality products for its customers. From the retail survey results, 45% and 35% of respondents mentioned that they strongly agreed and agreed respectively to that fact that Ernest Chemists range of health products whether manufactured locally or imported were of much affordable price. Their views were disagreed to by 20% of the respondents. They said Ernest Chemists

products are efficacious and much more reliable than other competitors. It means a lot of high quality materials were used and these costs were transferred to the consumers who paid high price for Ernest Chemists products. The quality of employees in any company also determines its output in the industry. The results from the wholesale survey indicated that 58.8% of respondents strongly agreed that Ernest Chemists Limited employs qualified professionals such as registered pharmacists. This was also agreed on by 41.2% of respondents. This is to ensure that all medicines produced were supervised by professionals throughout the supply chain. However, results from the retail survey indicated that Ernest Chemists Limited employs professionally trained pharmacists to manage all their nationwide branches. Fifty five percent (55%) of the respondents agreed while 45% strongly agreed.

To increase productivity, effective and efficient supply chain in Ernest Chemist Limited, respondents from the wholesale survey made some recommendations for management to implement. 36.3% of respondents, as shown in Table 4.18, said the Company should improve upon its communication and data collection system, should employ more marketing staff and provide more vans and other logistics. This they believe when implemented would improve or make the supply chain of Ernest Chemists Limited more efficient and effective.

Table 13: Recommendations for Effective and Efficient Supply Chain (Wholesale)

Recommendations		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employ more staff	13	16.3	16.3	16.3
	Produce affordable products	25	31.3	31.3	47.5
	Affordable products, more staff	13	16.3	16.3	63.8
	Improve communication and data collection system	29	36.3	36.3	100.0
	Total	80	100.0	100.0	

Source: Field Data, May 2011

Forty five percent (45%) of the respondents from the retail survey indicated that Ernest Chemists Limited needs to improve on its data and communication systems while 25% of respondents suggested that more distribution vans should be provided and the company to engage more sales personnel. In addition, 15% of respondents identified with the opening more wholesale and retail branches all over the country in order to make their products readily available for consumers (Table 14).

Table 14: Recommendations for Effective and Efficient Supply Chain (Retail)

Recommendations		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Open wholesale and retail branches	3	15.0	15.0	15.0
	Provide more vans and more salesmen	5	25.0	25.0	40.0
	Provide more affordable drugs	2	10.0	10.0	50.0
	Improve data and communication system	9	45.0	45.0	95.0
	Strengthen management structure	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

Source: Field Data, May 2011

Summary of Findings

The study found out that 75% of the respondents from the survey of the selected wholesale facilities in Ernest Chemists Limited across the country are knowledgeable of supply chain management. In addition, it was found

out that 51.3% and 55% of respondents, from the wholesale and retail surveys respectively, indicated quicker customer response, reduction in inventory, improved forecasting and fewer suppliers as the main benefits of effective supply chain management. It was found out from the wholesale survey that 63.8% of respondents admitted that Ernest Chemists Limited has an effective supply chain management while 36.2% felt otherwise.

Again, it was observed from the wholesale survey results that 77.5% of respondents mentioned that they strongly agreed that Ernest Chemists Limited has a unique and competitive distribution while 22.5% said they agreed. Results from the wholesale survey indicated that 66.3% of the respondents strongly agreed to the fact that Ernest Chemists Limited provided products from trusted branded leading pharmaceutical companies across the world.

Availability and Affordability of Good Quality Pharmaceutical Products to the Average Ghanaian by Ernest Chemists Limited

Results show that 46% and 60% of the respondents respectively, rated products from Ernest Chemists Limited as excellent in terms of quality and efficacy. In addition, 52.5% and 40% of the respondents respectively, strongly agreed confirmed that products from Ernest Chemists Limited are highly recommended by health professionals. Fifty nine percent (59%) and 45% of the respondents from the wholesale and retail surveys respectively, indicated they strongly agreed with the fact that there is a general perception that Ernest Chemists Limited's products are expensive.

In terms of the dimensions of quality ascribed to products from Ernest Chemists Limited, 37.5% and 50% of the respondents respectively, indicated reliability, efficacious and user friendliness as the main dimensions of quality for products from Ernest Chemists Limited. However, 30% and 35% of the respondents respectively, indicated affordability and reliability as the dimensions of quality of Ernest Chemists Limited products. This shows that a reasonable number of the population do not see products from Ernest Chemists Limited as expensive.

From the wholesale survey results, 66.3% of the respondents identified Government hospitals and regional medical stores, private hospitals, other wholesalers, retailers and licensed chemical sellers as the main clients of Ernest Chemists Limited. However, 50% of respondents from the retail survey identified Government hospitals and regional medical stores as the main clients of Ernest Chemists Limited.

Challenges and Constraints Affecting the Distribution Process of Ernest Chemists Limited

From the results of both the wholesale and retail surveys of the selected Ernest Chemists wholesales and retails, it was found out that 52.5% and 45% of the respondents identified growing threat of counterfeit and diverted medicines from Asia, focus of local production on Over-the Counter (OTC) medicines and under development of the local manufacturing capacity as the main challenges facing the Ghanaian pharmaceutical industry. However, 17.5% of the respondents identified weakness in implementation of intellectual property rights and inability of local manufacturers to produce essential medicines that meet standards for international tenders as some of the main challenges facing the Ghanaian pharmaceutical industry. All the respondents (100%) from both surveys confirmed that a chaotic and unregulated pharmaceutical distribution chain could lead to very expensive medicines and would compromise the pharmaceutical chain security of the Ghanaian pharmaceutical industry. Fifty seven point five percent (57.5%) and 65% of the respondents from both the wholesale and retail surveys respectively, identified high concentration of retail pharmacies in Accra and Kumasi metropolises, poor pharmaceutical coverage and unmet professional human resource development as the main factors affecting the cost of treatment and drugs in Ghana. Forty four percent (44%) of respondents from the wholesale survey and 35% of respondents from the retail survey, mentioned lack of funds, Vans, no subsidies from government and lack of expansion projects as the main factors hindering the growth of Ernest Chemists Limited.

Supply Chain Management "Best Practices" for Effective and Efficient Distribution by Ernest Chemists Limited

According to the survey results from both the selected wholesales and retails indicated that 48.75% and 60% of respondents respectively, agreed that Ernest Chemists Limited takes bold initiatives such as the construction of a separate penicillin plant for its penicillin range and the opening of new branches across the nation and these enables it to effectively and efficiently distribute good and affordable products to the wider population of Ghana. Again, 73.8% and 45% of the respondents from the wholesale and retail surveys respectively, strongly agreed to the fact that Ernest Chemists Limited's wide range of both locally manufactured and imported good quality products enables it to provide affordable medicines for all levels of income earners in Ghana. In addition, 48.75% and 55% of the respondents from the wholesale and retail surveys respectively, agreed to the fact that Ernest Chemists Limited employs professionally qualified pharmacists to head all its branches. This they mentioned because they all said any time they walked into any Ernest Chemists Limited outlet (wholesale or retail) and ask to speak to the Pharmacist they easily see them because they are always around to attend to their

needs.

Finally, all (100%) of the respondents from both surveys recommended that Ernest Chemists Limited should employ more staff, produce very affordable medicines, buy more vans and improve its data collection and communication systems to enable it achieve its vision of becoming one of the ten (10) leading pharmaceutical companies in Africa by 2015.

Conclusions

From the study, it can be concluded that, Ernest Chemists Limited has an effective supply chain management strategy even though there is still room for improvement. Ernest Chemists Limited provides good quality and efficacious medicines that are affordable and available to all level of income earners in Ghana. Ernest Chemists does this by importing both patented and generic medicines from the world's leading pharmaceutical companies so nationals from all over the world in Ghana can have their trusted brands of medicines. Again, Ernest Chemists Limited produces some of the medicines locally from an ultra modern factory plant in Tema heavy industrial area and distributes them through its own wholesales and other members of the pharmaceutical distribution chain to make sure low income earners in Ghana can also have access to good quality and efficacious medicines at affordable prices.

Moreover, the Ghanaian pharmaceutical industry has challenges and constraints. Notable among them are under development of manufacturing capacity, growing threat of counterfeit and diverted medicines from Asia, weaknesses in implementation of intellectual property rights, focus of local production on Over-the-Counter (OTC) medicines, inability for local manufacturers to produce essential medicines that meet standards for international tenders, poor pharmaceutical coverage for the majority of Ghanaians, high concentration of retail pharmacies in Accra and Kumasi, unmet professional human resource development and high mark-ups at every stage of the supply chain which tends to increase the price of medicines. Some of the challenges facing Ernest Chemists Limited include lack of funds for some expansion projects such as taking charge of its own pharmaceutical distribution chain and buying more vans to improve its distribution network. Also, lack of government subsidies on taxes for privately owned companies (for instance high utility bills) and high taxes on imported raw materials increases the cost of local production.

Recommendations

From the analysis of the results obtained from the surveys, the following recommendations have been made to enable Ernest Chemists Limited to achieve its main vision of becoming one of the ten (10) leading pharmaceutical companies in Africa by 2015. These include:

1. Ernest Chemists Limited should employ more marketing staff in order to effectively distribute its products to a wider customer base.
2. Ernest Chemists Limited should continue to produce the high quality pharmaceuticals products but at a less production cost so the prices of its products would be cheaper to ensure that low level income earners could also patronize them since the poor in Ghana form a larger proportion of the population.
3. To help the distribution chain, Ernest Chemists Limited should occasionally organize education seminars for communities to help them know the usage of drugs and the possible adverse effects of their abuse. It is well known in Ghana, that not all sick people go to the hospital or ask their pharmacists for correct medication, they rather purchase medicines from drug peddlers and unapproved retailers.
4. Ernest Chemists Limited should improve on its data collection and communication systems. These would enhance information flow within the Company and promote the implementation of new strategies and directives. It would also help to reduce its bad debts since customers can be followed up effectively to pay whatever they purchase. Good data collection system would help it improve on its forecasting system to reduce the shortages it encounters in order to effectively meet the needs of its customers.
5. Ernest Chemists Limited should buy more distribution vans to improve its supply chain system.
6. Ernest Chemists Limited should have franchise offices in the remaining three (3) regions and other business districts where it does not have a regional office or branch. This would enable it improve on its distribution processes and broaden its customers base. It would also increase its volume of business and market shares.
7. The Government of Ghana should encourage the development of local pharmaceutical manufacturing capacity by reducing or waiving off some of the taxes on pharmaceutical raw materials also called active pharmaceutical ingredients (APIs). In addition, the government should encourage the expansion of the local pharmaceutical companies by giving tax reliefs to companies with branches or offices in most if not all regional capitals and district capitals of the country.
8. Government should discourage foreign pharmaceutical companies from considering and/or taking Ghana

as a dumping site for the substandard or disapproved products by other national food and drugs authorities.

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