DISSERTATION REPORT

on

SUPPLY CHAIN MANAGEMENT

AT

RADIANT PHARMA LTD.

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Letter of Transmittal

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Dear Sir,
With humble honor and respect, I am submitting my dissertation report on Supply Chain Management for the MSCM degree, I have completed my analysis from "Organization name" Radiant Pharmaceuticals for the MSCM degree, this thesis has been carried out under the supervision of you.

This report is an integral part of our academic courses in completion of the MSCM program which has given me the opportunity to have an insight into the (core part of topic). I hope this report reflects on the contemporary issues on the (Major Area) that are being Practiced by organizations in our country.

In completing the report, I tried my best to blend all my knowledge and imparted every available detail and also attempted to avoid unnecessary amplification of the report.
I humbly request you to accept this report for your kind evaluation.

Sincerely,

_____

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Letter of Authorization

Certified that this project report titled Supply Chain Management is the bonafide work of Md. Kutub Uddin, who carried out the research under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

……

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First of all, I want to thank Almighty Allah, the merciful, who made my efforts successful. I want to show my gratitude to all of those persons who have helped me and co-operated with me at the time of making this report. Without their supports, I would not be able complete this paper with such amount of information and insights.

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My special thanks go to **Mr. Mahbub Alam** Head of Department, SCM at Radiant Pharma

Thanks is a small word to my parents, teachers and all of my family members specially my Sons and wife for their encouragement and love that served as a source of inspiration, strength at each and every front of my life to transport my dreams into reality.

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Abstract

Supply Chain Management (SCM) is the process of planning, implementing, and controlling the operations of the supply chain with the purpose to satisfy customer requirements as efficiently as possible. The sub-areas comprising a supply chain include: Forecasting/Planning, Purchasing/Procurement, Logistics, Operations, Inventory Management Transport, Warehousing, Distribution, Customer Service etc. However, it is difficult to find a standard model of Supply Chain Management operating in the business community. Some business will refer to and manage their supply chains in a coordinated and all-encompassing fashion, including the entire sub areas defined above.

Radianr Pharma Ltd *is one of the largest and fastest expanding pharmaceutical companies in Bangladesh. The company, which has its headquarters in Tongi, Gazipur. was born 2006. The company is involved in the manufacture and distribution of a diverse range of pharmaceutical products and therapeutic drugs. The main research questions of this study are as (i) What is the supply chain of Radiant Pharmaceuticals Ltd? (ii) How does Radiant Pharmaceuticals Ltd manages its supply chain? (iii) Does the supply chain management of Radiant Pharma Ltd provide competitive edge? (iv) What are the challenges in Radian's supply chain?(v) How the barriers could be overcome to bring competitiveness? In view of the context and research questions, the broad objective of this study is to analyze the supply chain of Radiant Pharmaceuticals Ltd. The specific objectives are as (i) To assess the extent to which the supply chain function of Radiant has been operating;(ii) To understand the supply chain management of Radiant;(iii) To evaluate the supply chain sustainability. (iv) To identify the barriers and challenges of the supply chain of Radiant (v) To make recommendations for overcoming the challenges and to design an effective supply chain management.*

Given the increased attention of achieving effective supply chain management particularly in pharmaceutical industries around globe, this study is devoted assess the supply chain management of a leading pharmaceutical company in Bangladesh namely Radiant Pharmaceuticals Ltd. SCM is also important for achieving competitive advantages over the business rivals through a stronger relationship, closer and collaborative cooperation as well supplier development.

SCM also contributes in reducing cost of production and distribution through elimination of waste, compliance with standards and quality, promoting ethical sourcing, curbing unethical practices and diversity and equality in the workplace throughout the supply chain. The study focused on the overall supply chain management of a fast growing pharmaceutical company in Bangladesh. The study highlighted the theoretical aspects of SCM and its potential advantages for a manufacturing company where there is intense competitive rivalry within the industry. Relevant models and theories will be adequately analyzed in this study. Information gathered through secondary sources and survey questionnaires has supported to the research on what the extent of SCM is effective and contributing to achievement of corporate strategy of the organization under the study. Purposive and simple random sampling method are used to select 30 respondents who are directly involved in managing operations and supply chain of Radiant Pharma Limited procurement, 60 from retailers and 30 from end customers.

It is observed that 23.3% respondents have reported that they know the SCM very well followed by moderate knowledge (21.7%), sufficient knowledge (20%), somehow knowledge (20%) and 15% respondents have poor knowledge about SCM. The results show that only 25% respondents reported that they identified SCM as Data Collection, Supplier, Purchasing, Warehousing, Stocktaking, Distribution. While 46.7% respondents viewed SCM as Supplier Selection, Purchasing, Warehousing, Stocking, Distribution, 12% viewed SCM as warehousing and distribution and only 6% considered SCM as distribution. Multiple Response Analysis (MRA) is carried out to identify the benefits of SCM. Only 2.8% respondents identified no impact of SCM, 38.1% respondents reported high impact of SCM, 31% viewed medium impact. In regards to heavy impact 20.7% respondents opined that SCM has heavy impact on the supply chain.

Factor Analysis of the responses regarding the benefits of SCM reveals that shorter lead time has high mean (4.15) followed by reduced cycle time (3.97), Reduced waste (3.80), competitive advantage (3.83), reduced cost (3.78), greater supply chain visibility (3.72), reduced inventory (3.62) etc. From the component matrix it is found that 12 factors have high influence on the benefits of SCM. These are enhanced quality and service (0.772), greater supply chain visibility (0.757) reduced waste (0.753), effective business process (0.737), reduced cost (0.737), reduced cycle time (0.727), information sharing (0.698), improve responsiveness to customer requirements(0.680), competitive advantage (0.656), cooperative organizational relationships (0.6.50). Components 2 and 3 are not important as most of the factors have negative coefficients.

About 30.0% respondents reported that SCM of RPL is successful, 25% as very successful, 21.7% as successful somewhat. Only 8.3% respondent reported that SCM is not successful at all, 15% reported as not successful. Regarding view on cost of RPL products 43.3% retail respondents agreed that the cost is high as compared to other companies while 20.0% strongly agreed with high cost while 36.7% respondent are undecided on this issue. Regarding successfulness of SCM, 50% respondents from executives sample reported it as very successful. 27.7% respondents identified SCM as successful, 16.7% reported as successful somewhat and only 6.7% as not successful. The results of field survey reveals that 86.7% respondents has identified lack of coordination as a challenge to SCM while 80% as inventory management, 80% as order management, 33.3% as absent demand management, 50% as human resource management, 20% as shortage avoidance, 53.3% as expiration management, 66.7% as warehouse management, 63.3% as temperature control and 66.7% as shipment visibility.

RPL produces high quality products. The retailers survey results show that 36.7% of the respondents rated products from RPL as better, 31.7% as good, 18.3% as excellent as shown in Table: . Regarding availability of RPL products the survey results show that 33.3% rated as good, 31.7% as better and 21.7% as excellent. With regards to affordability 36.7 % respondents rated RPL as good, 28.3% as excellent, 26.7% as better and 8.3% as moderate.

Customer perception about SCM of RPL reveals that 46.7% respondents did not know it, 33.3% as know somehow and 20% know well. Regarding quality of RPL products 43.3% respondents rated as better, 36.7% as good, 13.3% as moderate and 6.7% as moderate. Regarding availability of products 36.7% respondents rated RPL as better, 26.7% as good, 16.7 % as moderate, 6.7% as excellent and 13.3% as poor. Regarding affordability of products 36.7% respondents rated RPL as good, 307% as moderate, 23.3 % as better, 6.7% as poor and 3.3% as excellent.

Regarding frequency of use of products 46.7% respondents reported more frequently use while 53.3 mentioned occasionally use. Regarding rating of products 33.3% respondents rated RPL as good, 26.7% as good, 23.3 % as moderate, 16.7% as excellent. Regarding perception SCM 46.7 respondents reported do not know, 33.3% as somehow know and 20% as know well. About 65% of the retailer respondents reported supply and supplier risks, 41.7% as organization and strategies risks, 68.3% as financial risks, 75% as logistic risks, 38.3% as market issues, 68.33% as regulatory risks, 61.7% as inventory risks, 56.7% counterfeit risks.

About 80% of the executive respondents reported supply and supplier risks, 26.7% as organization and strategies risks, 90% as financial risks, 86.7% as logistic risks, 63.3% as market issues, 86.7% as regulatory risks, 90% as inventory risks, 76.7% as counterfeit risks.

The pharmaceutical industry is one of the most technologically advanced sectors currently in existence in Bangladesh. It has grown in the last two decades at a considerable rate. The skills and knowledge of the professionals and innovative ideas of the people involved in this industry are the key factors for these developments. About 300 pharmaceutical companies are operating at the moment. Only 3% of the drugs are imported, the remaining 97% come from local companies. Positive developments in the pharmaceutical sector have enabled Bangladesh to export medicine to global markets. By overcoming the underlying obstacles this sector can develop more and can be an effective exporting sector of Bangladesh.

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Chapter One: Introduction

1.0 Prelude

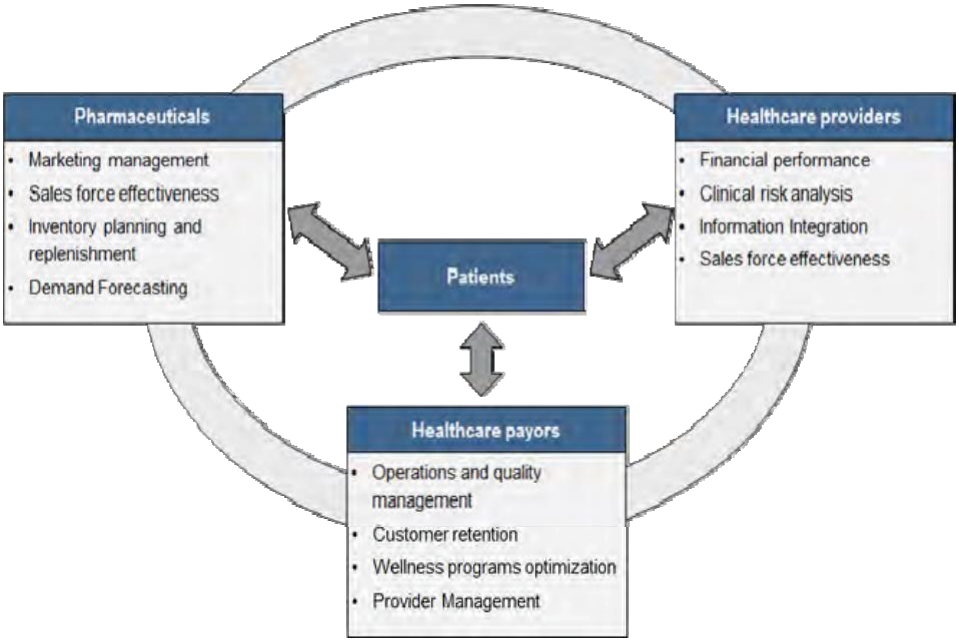
Supply Chain Management (SCM) is the process of planning, implementing and controlling the operations of the supply chain with the purpose to satisfy customer requirements as efficiently as possible. Supply chain management spans all movement and storage of raw materials, work-in-process inventory and finished goods from point-of-origin (POO) to point-of–consumption (POC). SCM is a conscious and deliberate control, integration, and management of the business functions. SCM contributes and affects that supply flow through the business for the purpose of improving performance, costs, flexibility etc, which bring the ultimate benefits of the end customers or consumers. The supply chain function includes many sub-areas such as: forecasting and planning, purchasing and procurement, logistics, operations, inventory management, transportation, warehousing, distribution, customer service etc. However, it is difficult to find a standard model of Supply Chain Management operating in the business community particularly in the pharmaceutical sector.

Supply chain management **(**SCM**)** is the oversight of materials, information and finances as they move in a process from supplier to manufacturer to wholesaler to retailer to consumer. Supply chain management involves coordinating and integrating these flows both within and among companies. SCM is both a horizontal business function (i.e. managing the supply chain in a business) and a vertical industry sector (i.e. businesses involved in managing supply chains on behalf of their clients). A company may operate as a supply chain services provider within the vertical supply chain industry sector. But each of the clients serviced by a company will employ supply chain staff within their business operating on a horizontal basis across their organizations.

All business needs to forecast and plan. To look forward and predict what will be required in terms of resources and materials in order to deliver their products or services to their customers in a timely manner. In this area we find SCM activities such as demand planning, inventory planning, capacity planning etc. The commercial part of the supply chain is purchasing or procurement. This is where a business identifies suppliers to provide the products and services that it needs to acquire in order to create and deliver its own service or product. Costs and terms of business are negotiated and agreed and contracts are formed. Thereafter the suppliers' performance and future contractual arrangements will be managed in this area. This area of the business is sometimes referred to as purchasing, sometimes, procurement, buying, sourcing, etc. In its strictest definition purchasing is limited to the

actual commercial transaction and no more, whilst procurement includes the wider elements of the acquisition, including logistics and performance management.

Figure 1.1: Basic Model of Pharmaceutical SCM



Source: www.slideshare.net/pharma-chain/accessed on 25-12-2015.

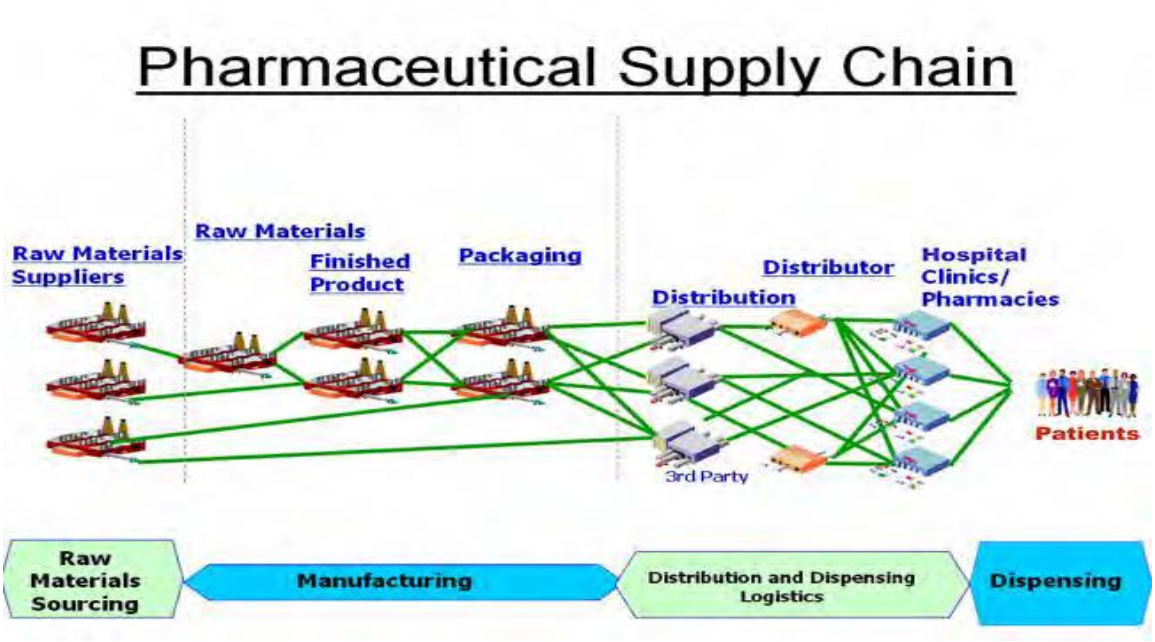
In its strictest definition logistics refers to the movement of goods or materials, whether inbound, through, or outbound. In some manufacturing businesses forecasting and planning will be found within a logistics department, in other businesses logistics will be exclusively managing the movement and transportation of goods and materials. Operations are a general management type activity ensuring that a business uses its resources effectively to meet its customer commitments. Inventory Management typically takes responsibility for both the replenishment of physical stock, the levels of physical stock, and of course storage and issue of physical stock. Stock may be materials and goods sourced from suppliers, work in progress, or finished goods awaiting sale/dispatch. Transport management can involve the control of a company owned fleet of vehicles, collecting, moving, or delivering materials and goods, or managing transport services sourced from a third party transport provider. Warehousing can involve the control of company warehouse space, or managing warehouse space sourced from third party providers. Distribution involves the physical distribution of the company's products to the sub-distributor or directly to the customer base.

Most people do not recognize customer service as part of supply chain management, but it is to be considered as an important element. Because the final element is to check that the customers' expectations were achieved, and manage any actions necessary to meet customer obligations and commitments. It is easily understandable that the success of a company depends a lot on their supply chain management system. The present success of many companies is the result of their successful supply chain management system. With the help of well organized SCM system a company takes the satisfaction from their suppliers and also from the consumers. Through SCM an organization can transmit properly what they are looking from the suppliers and marketers. The supply chain management of pharmaceutical products deserves high priority as it is related to the life and death of men and animals around the world. The present study is an attempt to analyze the supply chain management of a renowned pharmaceutical company in Bangladesh namely Radiant Pharmaceuticals.

1.1 A General View of Pharmaceutical Supply Chain

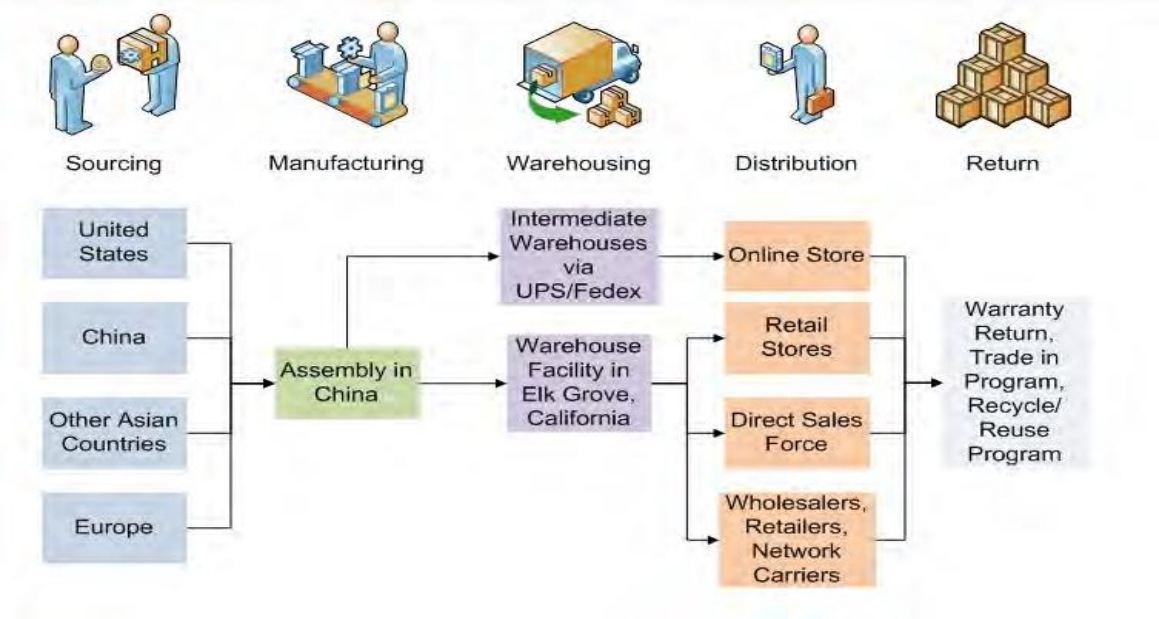
The pharmaceutical supply chain is somehow different from other supply chains of physical goods because of its urgency, importance, storage, transportation, regulation etc. The following figures help understanding the SCM in pharmaceutical sector.

Figure 1.2: Pharmaceutical Supply Chain



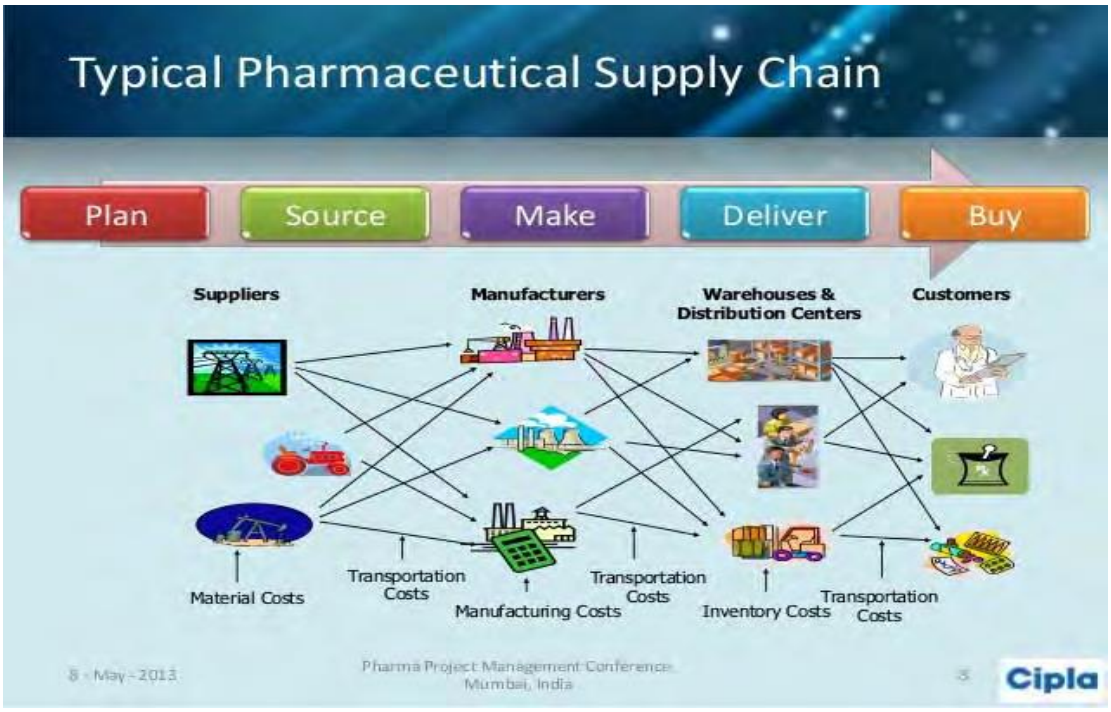
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Figure 1.3: Operations of Pharmaceutical Supply Chain



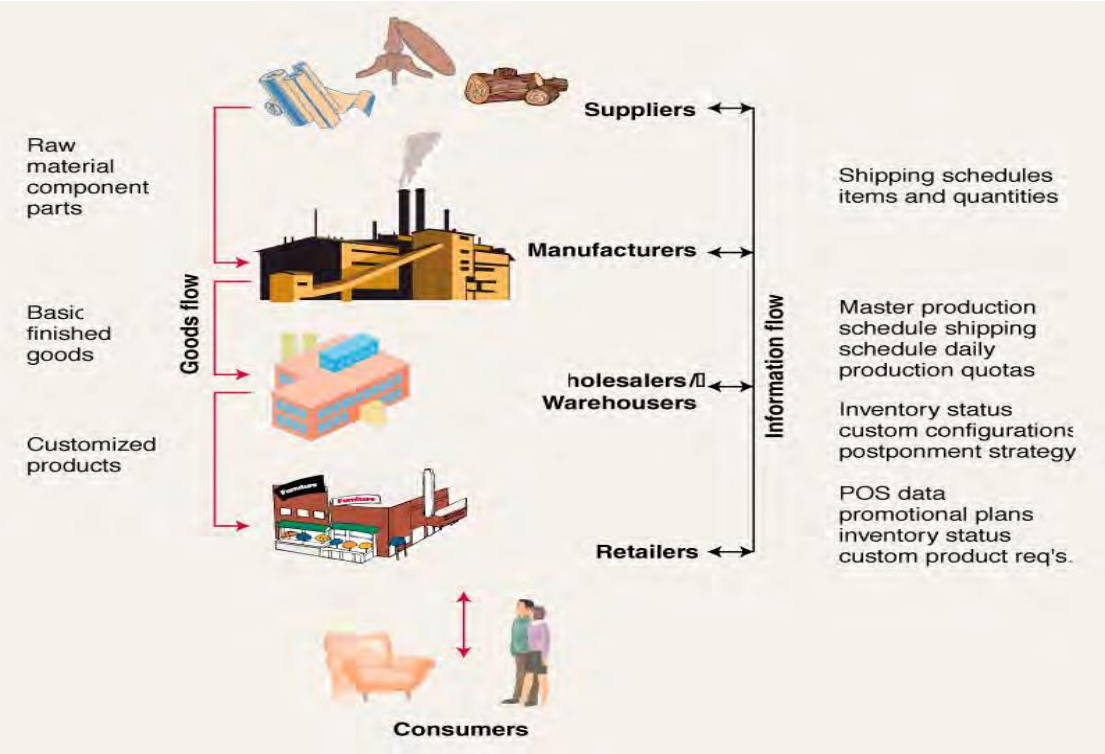
Source: www.slideshare.net/pharma-chain/accessed on 28-12-2015.

Figure 1.4: Typical Supply Chain Management - Main Components



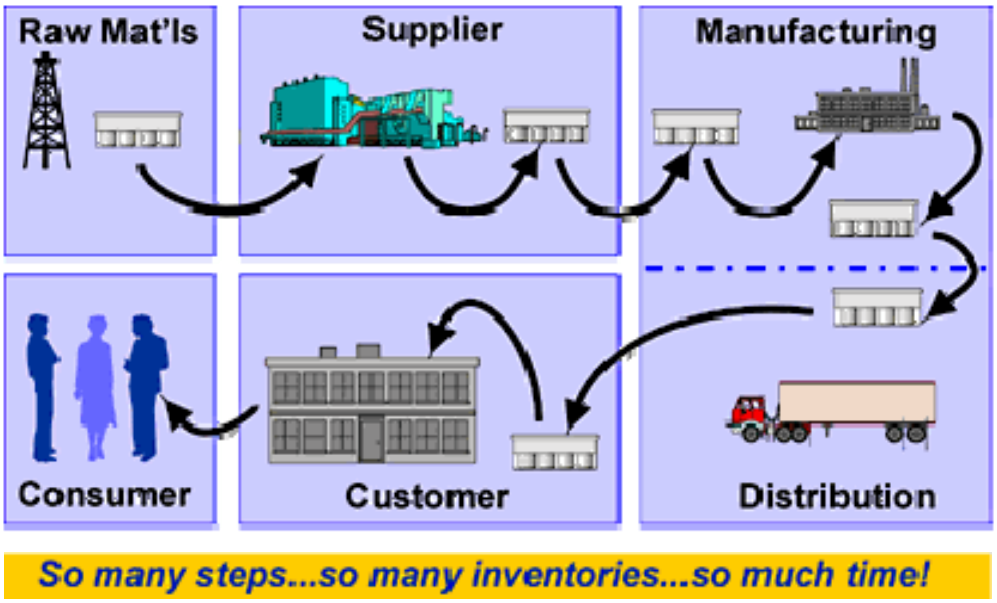
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Figure 1.5: Flow of Goods and Information in SCM Processes



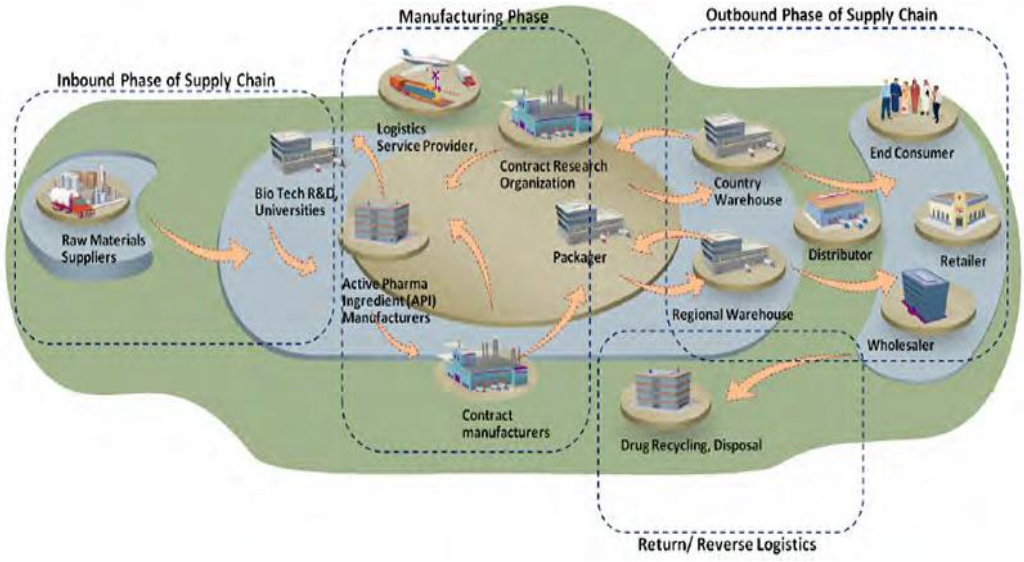
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Figure 1.6: Supply Chain Management: Raw Materials to Consumers



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Figure 1.7: Extended Pharmaceutical Supply Chain Management



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According to Whewell (2009), the pharmaceutical supply chain covers drug research, development, manufacture, distribution and application through a range of healthcare services and ancillary businesses that help effective functioning of these different stages. The pharmaceutical and healthcare industry 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. Ricci (2006) identified the importance of pharmaceutical companies taking control of the own distribution to maximize the potential of the different channels and to protect patients from errors or defects occurred during repackaging or relabeling.

1.2 Statement of Problem:

Radiant Pharmaceuticals Ltd is one of the largest and fastest expanding pharmaceutical companies in Bangladesh. The company, headquartered in Tongi, Gazipur. Radiant Pharmaceuticals Ltd was born 2006. The pharmaceutical company is engaged in the manufacture and marketing of a wide range of therapeutic drugs, bulk pellets and animal health and nutrition products with annual sales surpassing Tk.1200 cror. The company started its production of pharmaceuticals with the manufacture of generic products for the domestic market but has since moved into bulk products and the

veterinary market. RPL currently manufactures and markets 28 different animal health products in 57 different dosage forms.

With qualified, trained and skilled professionals on its staff and its unswerving standards of quality control, the company has distinguished itself as one of the most respected names in the pharmaceutical industry. Radiant manufacturing facility has transcended the frontiers after the accreditation of UK MHRA (United Kingdom Medicines and Healthcare products Regulatory Agency). The dedicated cephalosporin plant of Radiant Pharmaceuticals Ltd is the top class state-of-the-art manufacturing facility in Bangladesh Pharmaceutical industry. Radiant Pharmaceuticals Ltd. has been showing a significant outcome in exporting medicines to many countries. Radiant Pharmaceuticals Ltd. has started supplying medicines in 16 countries like Canada, UAE, Nepal, Bhutan, Sri Lanka, Myanmar, Vietnam, Ghana, Iraq, Indonesia, Kenya, Guatemala, Belize, Yemen, Macau and Somalia. The study is designed to analyse the supply chain management of the organization.

1.3 Research Questions:

The following research questions have been identified to conduct a meaningful study :

(i) What is the supply chain of Radiant Pharmaceuticals Ltd?

(ii) How does Radiant Pharmaceuticals Ltd manage the supply chain?

(iii) Does the SCM of Radiant Pharmaceuticals Ltd provide competitive edge? (iv) What are the risks and challenges in Radiant's supply chain?

(v) How the barriers could be overcome to bring competitiveness?

1.4 Objectives of the Study:

In view of the context and research questions, the broad objective of this study is to analyse the supply chain of Radiant Pharmaceuticals Ltd. The specific objectives are as follows:

- To assess the extent to which the supply chain function of Radiant has been operating;
- To understand the supply chain management of Radiant;
- To evaluate the supply chain sustainability.
- To identify the barriers and challenges of the supply chain of Radiant
- To make recommendations for overcoming the challenges and to design an effective supply chain management.

1.5 Literature Review:

It is widely accepted that the review of literature provides an understanding of the issues closely related to the research topic. It also helps to justify the research under study and to find out the knowledge gap in the respective field. A number of books, articles, reports, web-sites on supply chain management have been studied for this research work. It has been found that literature with specific focus on this sector in Bangladesh is not sufficient. However, a brief review of literature has been carried out.

As the pharmaceutical marketplace confronts daunting challenges with various stakeholders demanding the pharmaceutical products to be affordable, strategic planning would be of the essence (Holdford, 2005; Birdwell, 1994). For the pharmaceutical industry, it assumes special significance as medical commodities would require to be delivered through the supply chain timely and within the reach and means of the consumers to meet their needs and satisfaction (Enyinda, 2009). Supply chain is a set of players, processes, information, and resources which transfers raw materials, and components to finished products or services and delivers them to the customers. It includes suppliers, intermediaries, third-party service providers and customers. It also includes all of the logistics activities, manufacturing operations and activities with and across marketing, sales, product design, finance and information technology.

A Supply Chain is that network of organizations which are involved through upstream and downstream linkages in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer or consumer (Rexim, 2015). This definition highlights the key features of supply chain such as networks, linkages-upstream and downstream, processes, value and ultimate customers. Supply Chain Management is defined as the network of organizations 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 (Radiant Export & Import, 2016). 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 (Formum 2006). Handfield and Nichols (2006) 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".

SCM can be viewed as a set of activities to implement a management philosophy (Mentzer, J.T. et. al., 2001). They identified seven activities in this regard such as integrated behavior, mutually shared information, mutually shared risks and rewards, cooperation, the same goal and same focus on serving customers, integration of process, partners to build and maintain long-term relationship. Dubey and Kumar (2007) mentioned 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. The benefits of SCM are included as quicker customer response and fulfillment rates, shorter lead time, greater productivity and lower costs, reduced inventory supply throughout the chain, improved forecasting precision, fewer suppliers and shorter planning cycles. The pharmaceutical industry is a more than $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 (Kaye, 2010).

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 (2006) 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 (2006), 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.

Kiran Bala (2014) showed the evolution of Supply Chain Management as depicted in the following Table-1.1.

Table 1.1: Era in the Evolution of Supply Chain Management

Sl No.	Era	Description
01	Creation Era	The term supply chain management was first coined by an American industry consultant in the early 80s. However, the concept of supply chain in management , was of great importance long before in the early 20th century, especially by the creation of the assembly line.
02	Integration Era	This era of SCM was highlighted with development of EDI systems in the 1960s and developed through the 1990s by the introduction of ERP system.
03	Globalization Era	This era is characterized by the globalization of SCM in the organizations with the goals of increasing competitive advantage, creating more value added and reducing costs through global sourcing.
04	Specialization Era (Phase one)	In the 1990s industries began to focus on core competencies and adopted a specialization model. Companies abandoned vertical integration, sole off non-core operations and pout-sourced those functions to other companies.
05	Specialization Era(Phase Two)	Specialization within the supply chain began in the 1980s with phase two- supply inception of transportation brokerages, warehouse management, and non-asset based carriers and has matured beyond transportation and logistics into aspects of supply planning, collaboration, execution and performance.
06	Supply Chain (SCM 2.0)	Web 2.0 is defined as a trend in the use of the World Wide Web that is meant to increase creativity, information sharing and collaboration among users.

Source: Kiran Bala(2014)

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 the market demands global solutions and customers are requesting the ability to order correct quantities and lower inventory levels. This situation 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 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 harmonization enhances the possibility of maximizing effects in a supply chain.

The goals of the pharmaceutical supply chain, as indicated by Chopra and Mendel (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., 20 06). According to Chopra and Mendel (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 is n 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.

Lambert *et. al.* (1998) identified eight SCM processes such as Customer Relationship Management (CRM), Customer Service Management(CSM), Demand Management, Order fulfillment, Manufacturing Flow Management, Supplier Relationship Management, Product Development and Commercialization, Returns Management. In the perception of Chopra and Mendel (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: Item-level data management; Standards for available data and how it will be

accessed and maintained; Data sharing infrastructure to accommodate cost efficient management and retrieval of data; 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.

Most enterprises in the pharmaceutical supply chain have the ability to manage integrated business information at a transactional level (orders, shipments, payments, etc), which provides visibility into operational and financial events (Dubey and Kumar, 2005). 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 Mendel (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.

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.

The research work carried by Privett and Gonsalvez (2014) identified the top ten challenges of global pharmaceutical supply chain such as Lack of coordination, Inventory management, Absent demand information, Human resource dependency, Order management, Shortage avoidance, Expiration, Warehouse management, Temperature control, Shipment visibility. There are many examples now in the news about counterfeit drugs circulating in black market

channels and the places in which it is the biggest recurring problem is in the developing world where, in Africa and parts of Asia and Latin America, the proportion of counterfeit medicines has been estimated to be as high as 30%. Pharma companies have to manage incredibly complex supply chains and manage the operational challenges of working and interacting with huge numbers of suppliers contributing ingredients and components to drug production. And now they need to meet track and trace directives and comply with new serialization regulations that require inventory to be auditable as it moves through the supply chain. The article states that lack of coordination in the pharmaceutical supply chain is a root cause issue since it aggravates every other issue either directly or indirectly. The authors also highlight the opportunities for pharmaceutical companies that should drive future actions, policies and research and point out that measures should be taken to improve pharmaceutical delivery in regions that need it. This will make the global health challenge easier to take on and will help save lives.

It is evident from different literatures (www.healthcarepackaging.com/trends-and-issues) that ten steps are required to improve efficiencies in the pharmaceutical supply chain. In order to improve efficiencies and to cut cost in the pharmaceutical supply chain the following ten steps can contribute significantly:

1. Cut out the middle man (wholesaler.) This will do three things:

• Speed up the distribution process as the company will be delivering directly to the customer.

• Cut costs by cutting out the middle man.

• Sell more product: with better prices the companies will be more competitive and outsell competitors.

2. Improvements in tracking product, which will cut down counterfeits and competitors copying product. This will help the pharmaceutical companies to stay ahead of the competition and be more efficient.

3. Improve technology in the manufacturing process. This will help:

• The products to be created quickly and efficiently.

• Better technology will help product cost to be reduced and sold at a more competitive price. This will ensure dominance over competitors.

• Upgrade manufacturing equipment and processes to make manufacturing product more efficient.

4. Shift manufacturing outsourcing to new markets like India and China. This will cut costs as labor is cheaper here and products can be made more cost effectively. When this is done it will allow

pharmaceutical companies to be more competitive and cut costs in the manufacturing of their products.

5. Quality control will be increased. This will ensure better quality products. Sales will increase with improved quality. There will be less wastage from substandard product that cannot be sold. When proper analysis of the quality of a product is done it can save disastrous recalls that hurt the company and can cost a substantial amount of money. With the pharmaceutical industry there is little room for mistakes and substandard product as peoples' lives can be at risk. Additionally, the industry is highly competitive and sub-quality product can mean that contracts will move to competitors.

6. Analyzing how money is being spent and where it is going is a factor. In order to cut costs an initial financial analysis must be done. It will then be possible to know where to cut costs and how to make budgeting better.

7. Cutting costs in areas where there is wastage and money is not being used efficiently. There are always areas in any company that are not working as efficiently as they could. Too much money can be squandered in places where less investment would be equally effective.

8.Supply chain analytics should be done. What do we mean by this term? It is when a company scrutinizes the supply chain process. They can assess which areas need to be improved and made more efficient. The supply chain is complex. Management deals with several suppliers and works on a global basis. This makes supply chain analytics challenging. Questions need to be asked in order to analyze the supply chain correctly:

• Examine which suppliers are the best and most efficient: some suppliers are better than others. The more efficient the suppliers are the better the supply chain will work.

• Different factors can affect the supply chain. The impact of various elements like weather or the rise and fall of fuel prices on the delivery system will affect cost of supply.

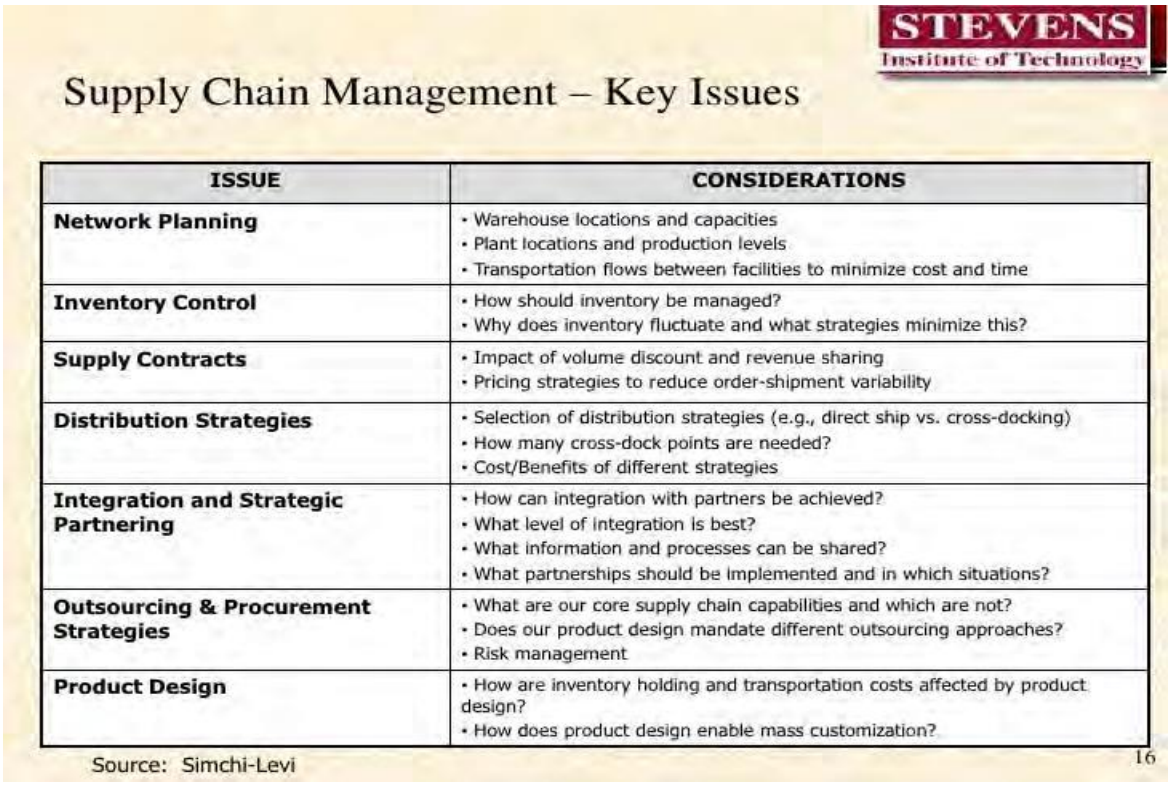
• How much inventory to keep for certain products. This involves accurate analysis of supply and demand. Overstocking can cause wastage and force companies to lower prices to get rid of old stock in order to prevent heavy losses. Understocking can incur losses as the company will need to back order and sometimes need to compensate the customer for waiting. Worse scenario is that customers can go to competitors to get their order done on time, rather than wait for the back order.

9. Once supply chain analytics have been conducted the pharmaceutical company can then apply the necessary changes needed to increase efficiency and cut costs in the supply chain.

10. Examining the purchasing team in the company. The company must ensure that they are getting product of high quality but at the same time not spending too much on product from the suppliers. This may mean that they need to change suppliers to get better prices but still maintain quality. It is important to get detailed data from the purchasing section of the company to make the process more efficient and cost-effective.

The pharmaceutical industry in Bangladesh is one of the fastest growing sectors, which is on the brink of attaining self-sufficiency in meeting the country's domestic demand. Dominated mainly by the local manufacturers with their market share of around 87% and the rest by the multinational companies, the export earnings by the drug manufacturing firms now stand at approximately $27.54 million to more than 90 countries globally (Muktadir, 2011). This has been partly helped by the fact that Bangladesh, as a least developed country, currently enjoys some benefits in drug manufacturing as it is exempted by the Doha declaration from complying with patent protection until 2016 (Chowdhury, 2010). As this flexibility under the TRIPS (trade-related aspects of intellectual property rights) agreement will expire in a couple of years, this is likely to put the pharmaceutical industry in stiff challenges from its regional counterparts. As this industry in Bangladesh is playing such a vital role in country's economy through employment generation and boosting foreign exchange reserve, it is of utmost significance that the factors influencing the various dimensions of supply chain management (SCM) practices are looked into. The research questions set for this study are, therefore, two-fold: first, what are the influencing factors of SCM practices as being currently observed? Second, how do these factors impact on one aspect of organizational outcome, i.e., such as customer satisfaction (CS) of the drug manufacturers in the pharmaceutical industry of Bangladesh? The objective of the study is to address these two questions. This is very pertinent as there is a significant lack of studies performed in this regard, particularly from the perspective of a developing country.

Figure 1.8: Supply Chain Management- Key Issues



Source: www.slideshare.net/pharma-chain/accessed on 25-12-2015.

A study of Fawcett, *et al*., (2008) identified benefits, barriers and bridges to effective supply chain management. the results of the study are summarized in the following Tables 1.2, 1.3, 1.4:

Table 1.2: Benefits of Effective Supply Chain Management

Benefits	Means	Rank	% 5-7*
Respond to customer requests	4.69	1	62.0
On-time delivery	4.65	2	61.0
Customer satisfaction	4.62	3	59.4
Order fulfillment lead times	4.59	4	54.9
Cost of purchased items	4.58	5	59.7
Firm Profitability	4.51	6	53.7
Handle unexpected challenges	4.49	7	59.2
Inventory	4.48	8	53.0
Overall product costs	4.38	9	51.0
Productivity	4.31	10	52.0
Overall product quality	4.16	11	44.3
Transportation costs	3.88	12	37.9
Market penetration	3.85	13	34.2
Product innovation lead times	3.75	14	31.3
Cost of new product development	3.43	15	24.2

Source: Fawcett (2008) p. 43
* 1 = not improved, 7 = greatly improved

Table 1.3 : Barriers to Effective Supply Chain Management

Barriers	Means	Rank	% 5-7*
Inadequate information systems	5.19	1	71.2
Lack clear alliance guidelines	4.87	2	62.4
Inconsistence operating goals	4.84	3	64.0
Lack shared risks and rewards	4.83	4	65.6
Processes poorly controlled	4.61	5	56.4
Non-aligned measures	4.56	6	55.5
Lack willingness to share information	4.56	7	56.1
Organizational boundaries	4.49	8	52.4
Measuring SC contribution	4.32	9	49.2
Measuring customer demands	4.26	10	49.9
Lack employee empowerment	3.80	11	34.8
Lack resources for SCM	3.73	12	38.5

Source: ibid, p. 43
* 1 = not a barrier, 7 = serious barrier

Table 1.4: Bridges to Effective Supply Chain Management

Bridges	Means	Rank	% 5-7*
Frequent communication	4.64	1	54.2
Willingness to share information	4.59	2	55.0
Use of cross-functional teams	4.37	3	47.2
Shared expertise with suppliers	4.32	4	46.0
Common goals	4.31	5	45.7
Supply base reduction	4.21	6	42.8
Senior management interaction	4.21	7	46.0
Cross-functional processes	4.21	8	43.4
Shared expertise with customers	4.14	9	41.6
Customer selectivity	4.11	10	43.5
Increase SC training	4.09	11	39.4
Use of SC measures	4.08	12	42.3
Use of consistence measures	4.05	13	39.8
EDI linkages	4.02	14	43.2
Clear selection guidelines	3.97	15	38.2
Vendor managed inventories	3.86	16	36.2
Use of total cost analysis	3.85	17	47.5
Sharing risks and rewards	3.83	18	35.6
Shared mission statement	3.80	19	36.3
Clear alliance management guidelines	3.76	20	32.0
Common operating procedures	3.74	21	27.5
Use ERP/SCM software	3.36	22	25.3
Use supply chain teams	3.31	23	24.8
Use activity based costing	3.08	24	20.2

Source: ibid, p. 43
* 1 = not a facilitator, 7 = greatly facilitator

1.6 Significance of the Study

Given the increased attention of achieving effective supply chain management particularly in pharmaceutical industries around globe, this study will seek to assess the supply chain management of a leading pharmaceutical company in Bangladesh namely Radiant Pharma Ltd. Supply Chain Management addresses supply chain strategy, supply chain planning, procurement, logistics, asset management and product lifecycle management. Supply chain management is crucial tool for economy, efficiency and effectiveness in sourcing, manufacturing, processing, inventory management, logistic, transport, distribution and customer satisfaction. SCM is also important for achieving competitive advantages over the business rivals through a stronger relationship, closer and collaborative cooperation as well supplier development. SCM also contributes in reducing cost of production and distribution through elimination of waste, compliance with standards and quality, promoting ethical sourcing, curbing unethical practices and diversity and equality in the workplace throughout the supply chain. The study will seek to assess the supply chain management in pharmaceutical industries. No comprehensive study has so far been done in this regard. The proposed research will attempt to fill up this gap.

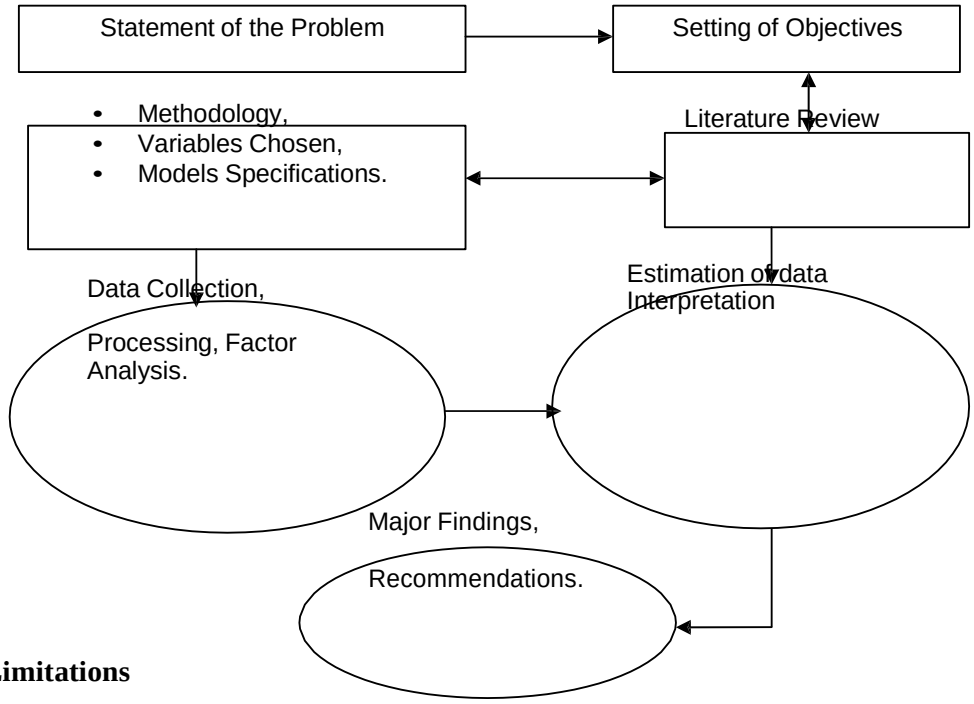
1.7 Scope of the Study

The study will focus on the overall supply chain management of a fast growing pharmaceutical company in Bangladesh. The study will highlight the theoretical aspects of SCM and its potential advantages for a manufacturing company where there is intense competitive rivalry within the industry. Relevant models and theories will be adequately analyzed in this study. Information gathered through secondary sources and survey questionnaire will lend support to the research on what the extent of SCM is effective and contributing to achievement of corporate strategy of the organization under the study.

1.8 Diagram of Research Design

The research process of this study is shown in Chart 1[1].

Figure 1.9: Diagram of Research Design



1.9 Limitations

The study has encountered a number of limitations which also discount the authenticity and reliability of the findings of the study. Some of the limitations are as follows:

(a) Time constraint is the main limitation of the study. It was prescribed to submit the dissertation within one month. There should have sufficient time to conduct a study through a standard research protocol.

(b) Budget constraint is also a vital lacking of this study. Sufficient budget allocation is required for collection of data and information from the primary sources. It is very crucial when the field study covers different cities.

(c) Due to the two constraints mentioned above. The sample size of this study had been limited. Pharmaceutical supply chain has wider network both at home and abroad. The study is only limited to selected downstream partners. Only 60 respondents from retailers had been purposely selected from four major cities viz. Dhaka, Chittagong,

[1] M. Zainul Abedin, *A Handbook of Research* (2nd Revised ed.; Dhaka: Book Syndicate, 2005), p. 50.

Khulna and Rajshahi. But only 30 consumers had randomly selected from Dhaka city and 30 executives from the pharmaceutical company and distribution company under study had been selected.

(d) Each and every respondent of this study was not well concerned about the whole supply chain system of the pharmaceutical supply chain.

(e) The supply chain of Eskayef Bangladesh limited is not well documented. Therefore the researcher faced numerous difficulties to collect secondary data in relation with the supply chain system of Shrimp. No exclusive study had been found relating to pharmaceutical supply chain in Bangladesh.

1.10 Time Frame

December 2015-January 2016

- Preparation of proposal
- Completion of data collection and processing of data.
- Completion of draft dissertation writing. • Editing and upgrading the draft.
- Submission of the final dissertation.

1.9 Thesis Plan (Breakdown of Chapters)

The paper is structured as follows: following this introduction, a literature review is provided first, on the theories adopted in this study, and then on the dimensions of supply chain management practices and their impact on customer satisfaction demonstrating the theoretical framework of the study. Next, in the methodology section, instrumentation of the measurement items concerning the SCM practices and customer satisfaction is provided by mentioning the articles that have been reviewed for this purpose. Besides, how data were collected and analyzed is also stated. In the findings section, first, the reliability measures of the pertinent variables are presented. Factor analysis for the dimensions representing the SCM practices is then highlighted.

The outline of chapters or organization of the dissertation is as follows:

Chapter 1 : Introduction

Chapter 2 : Methodology of the Study

Chapter 3 : Overview of Pharma Sector and Company Profile

Chapter 4 : Analysis of Data and Discussion of Findings

Chapter 5 : Summary, Recommendations and Conclusion

Bibliography, Appendices

Chapter Two: Methodology of the Study

2.0 Prelude

Methodology is an important part of any research work because without choosing and adopting an appropriate method a systematic investigation is not possible. Research methodology refers to the science of studying how research is conducted scientifically or how research problem is systematically solved (Kotahari, 1990). Method is originated from two Greek words such as 'Meta' and 'Hodos' meaning a way of conducting a work systematically. Research method is a process which consists of various techniques or steps of gathering data or information, processing and presenting of collected data and analyzing data (Aberdin, 2005). The method of research is a process of establishing a general proposition of gathering and weighing evidence (Hans Raj , 1987).

The broad objective of this study is to evaluate the supply chain management of RPL. The study follows cross section data analysis techniques and tools for identified different aspects of SCM of RPL. The survey method of field investigation is utilized and standard tools are applied to achieve the objectives of this study.

Nature and Method of Study

This dissertation has investigated the issues and challenges of the supply chain management of a leading pharmaceutical firm in Bangladesh. This study is not only an exploratory but also an evaluative research. The Exploratory, Evaluative and Content or Documentary Analysis methods are applied to achieve the objectives of the study.

Data Sources and Methods of Data Collection

Primary Source

The data from the primary sources have been gathered through field survey from the relevant respondents. Total number of respondents is 150. The respondents are retaile4rs, executives, consumers and medical services officer. This method is employed to assess the stakeholders' opinions towards the process, benefits, views, knowledge, risks of the supply chain management of Radiant Pharmaceuticals Ltd. The suggestion tfor achieving an effective supply chain are also taken from the respondents. The distribution of sample is shown in Table 2.1:

Data was collected from both staff and managers of Radiant Pharma & Radiant Distribution Company, Retailers of Radiant's products, and end customers through structured interviews and administration of questionnaire. The sample distribution is as follows:

Table 2.1: Distribution of Respondents

Category of Respondents	Frequency	Location	Types of Sampling
Retailers	60	Dhaka = 15 Chittagong =15 Khulna = 15 Rajshahi= 15	Purposive
Executives	30	Dhaka	Purposive
Consumer	30	Dhaka	Random
N	120		

Secondary Sources

Secondary sources include published official statistics, reports, documents, laws, ordinances, books, articles, periodicals of different domestic and international agencies etc. Annual reports of Radiant, different reports and statistics on the pharmaceutical sector in Bangladesh has been used.

2.1 Data Analysis and Presentation

Data processing: The collected data from secondary sources have been processed in an orderly manner so that it could be used for econometric modeling. The survey data from primary sources are arranged and scrutinized carefully on the basis of the completed questionnaire. Appropriate processing steps such as editing, coding, classification and tabulation are followed carefully.

Analysis plan

The collected data are analyzed by applying statistical tools and techniques such as correlation, Factor Analysis, Percentage Form etc.

Data presentation: Some suitable data have been presented in graphs, charts, and pictogram.

Interpretation of results: Results are interpreted suitably and unambiguously.

Data processing and models testing are performed by **Ms-Excel, SPSS** softwares.

2.2 Techniques of Data Analysis

To address the research objectives, this study utilizes a mixed methods approach comprised of quantitative and qualitative techniques. Questionnaire technique of survey method is used to collect primary data. Purposive and simple random sampling method are used to select 30 respondents who are directly involved in managing operations and supply chain of Radiant Pharma Limited procurement; 60 from retailers and 30 from consumers (end customers).

A semi structured and pre-tested interview schedule has been used to collect data. Necessary correction, modification and alterations will be done accordingly. Data has been collected through personal interview during December 2015-January 2016. Respondents were asked to indicate on a five-point scale ranging from 1 to 5.

The responses of the respondents that were recorded in the interview schedule has been transferred into a master sheet for entering the data in the computer. The recorded data has been put into the computer for statistical analysis. The SPSS computer programme was used for analysis of data. Various descriptive statistical measures such as number and percentage distribution, range, mean and standard deviation will be calculated. Simple tabular techniques will be used to explain the data. Minimum, maximum, mean, standard deviation and percentage for quantitative variables and T- test and percentage for qualitative variables are used to illustrate the results. Multiple response analysis, Factor analysis are also used to reflect the research objectives.

Chapter 3: Overview of Pharma Sector and Company Profile

3.0 Overview of Pharma Sector in Bangladesh

In Bangladesh Pharmaceutical sector is one of the most developed hi tech sector which is contributing in the country's economy. After the promulgation of Drug Control Ordinance - 1982, the development of this sector was accelerated. The professional knowledge, thoughts and innovative ideas of the pharmacists working in this sector are the key factors for this developments. Due to recent development of this sector we are exporting medicines to global market including European market. This sector is also providing 95% of the total medicine requirement of the local market. Leading Pharmaceutical Companies are expanding their business with the aim to expand export market. Recently few new industries have been established with hi tech equipments and professionals which will enhance the strength of this sector. The pharmaceutical industries in Bangladesh are gifted with unparalleled potential to grow in the days ahead as they enjoy a number of competitive advantages, industry insiders said.

The $700 million sector with more than 230 manufacturers is continuously expanding with new products to new international destinations. Among all the 50 LDC countries Bangladesh is the only country having quality pharmaceutical manufacturing base with marketing potential, and exporting to at least 80 destinations of the world, they said.
The industry's ability to comply with guidelines of quality assurance has put it on a solid base. Almost all companies are equipped with World Health Organization (WHO) Good Manufacturing Practice (GMP) standards. It has the ability to face competition from developing countries like India, China, Brazil and Turkey in its export markets due to strict quality compliance.

However, experts in this sector suggest to form a banner within the 50 LDC's of Asia-Pacific, Africa, Pharmaceutical Union (AAPU) amongst the Ministry of Health and Family Welfare (MoH&FW) or Ministry of Food and Drug Administration (DA) authorities to avoid re-registration of companies and products within the member countries under this umbrella. The export value of pharmaceuticals is small but growing at 50 percent per year. Exports increased from $8.2 million in 2004 to $28.3 million in 2007, while export destinations climbed from 37 countries to 72 during the period. A good number of companies including Square Pharma, Renata and Radiant have won accreditation from the UK Medicines and Healthcare Products Regulatory Agency (MHRA).

Incepta and Beximco Pharma have been accredited by EMEA (Austria) and the Therapeutic Goods Administration (TGA-Australia), respectively. These accreditations will allow them to enter the lucrative market with very competitive prices and standards as reputed global players.

The most important indicator is the capability of the industry to achieve excellence and go beyond general international standards. Pharmaceutical export market can be categorized into three types, firstly, stringently regulated markets in USA, EU, UK, Australia, GCC which requires USFDA, UKMHRA, TGA, cGMP, GCC certifications and only a few from top ten companies can hardly afford these certifications.

The mild regulated export markets which categories as second consisting the markets of Singapore, Sri lanka, Vietnam, Philippine also need ACTD formats along with bio equivalence clinical test reports of pharma products and these are critical procedures with time and money consuming factors and many of the mid level companies cannot afford. The final category is the less regulated export markets which are the only target markets remain in our hand to explore under the umbrella of AAPU.

The products, which are registered by the DG of Drug Registration Authority (DRA), Bangladesh may be treated as registered within these countries, pharma official claimed. If required only Free Sales Certificates/Certificate of pharmaceutical products, Valid GMP Certificate, Product Approved Annexure, DML can be asked directly from our DRA Bangladesh by the importing countries MOH/FDA for the import of pharmaceutical products from Bangladesh. This will not only safe time and money but the current pharmaceutical turnover will grow many fold higher within shortest possible time before the implementation of WTO/TRIPS by the year 2015. Only 39 pharmaceutical manufacturing and marketing companies exported about Tk. 4.21 billion out of around 256 pharmaceutical manufacturers of Bangladesh. Moreover, pharma industry is now exporting active pharmaceutical ingredients (APIs) and a wide range of pharmaceutical products covering all major therapeutic classes and dosage forms to 79 countries. Besides, tablets, capsules and syrups, the country is also exporting high-tech specialized products like HFA Inhalers, CFC Inhalers, Suppositories, Nasal Sprays, Injectables, IV Infusions, etc. The packaging and the presentation of the products of Bangladesh are comparable to any international standard and have been accepted by them, said the official.

According to the UKTI report 2010, the total size of the pharmaceutical market of Bangladesh was estimated to be $700 million in 2007. It also reports that the industry produced medication worth $715 million in 2007 with the market growing over 12pc

annually over the last half a decade and firms primarily focus primary on branded generic final formulations by using mostly imported APIs. According to a World Bank report of 2008, about 80pc of the drugs sold in Bangladesh are generics and 20pc are patented drugs. It also reports that domestically Bangladeshi firms generate 82pc of the market in pharmaceuticals and locally based multinational companies account for 13pc, and the final 5pc is imported. There are 240 registered pharmaceutical companies in Bangladesh where 164 of these actively involved in the manufacture or marketing of pharmaceutical products.

3.1 Drug Regulatory Authorities in Bangladesh

A regulatory agency is a public authority or government agency responsible for exercising autonomous authority over some area of human activity in a regulatory or supervisory capacity. An independent regulatory agency is a regulatory agency that is independent from other branches or arms of the government. Two organizations regulate drugs and pharmacies in Bangladesh, one governmental and one semi-government, which are:

The Directorate General of Drug Administration (DGDA)

The Pharmacy Council of Bangladesh (PCB)

The Directorate General of Drug Administration (DGDA): DGDA is the drug regulatory authority of Bangladesh, which is under the Ministry of Health and Family Welfare. DGDA regulates all activities related to import and export of raw materials, packaging materials, production, sale, pricing, licensing, registration, etc. of all kinds of medicine including those of Ayurvedic, Unani, and Herbal and Homoeopathic systems.

The Pharmacy Council of Bangladesh (PCB):

PCB was established under the Pharmacy Ordinance in 1976 to control pharmacy practice in Bangladesh. The Bangladesh Pharmaceutical Society is affiliated with international organizations International Pharmaceutical Federation and Commonwealth Pharmaceutical Association. The National Drug Policy (2005) states that the WHO's current Good Manufacturing Practices (GMP) should be strictly followed and that manufacturing units will be regularly inspected by the DDA. Other key features of regulation are restrictions on imported drugs; a ban on the production in Bangladesh of around 1,700 drugs which are considered non-essential or harmful; and strict price controls, affecting some 117 principal medicines.

3.2 Local Market Overview

The Bangladesh pharmaceutical marketplace is predominantly a branded generic marketplace. Pharmaceutical firms in Bangladesh can either sell to the private sector pharmacies, to the government and its public health care facilities, or to international organizations operating in Bangladesh (e.g. UNICEF). Bangladesh pharmaceutical industry is mainly dominated by domestic manufacturers. Of the total pharmaceutical market of Bangladesh, the local companies are enjoying a market share reaching around 97%, while the MNCs are having a poor market share. Out of the top ten pharmaceutical companies in Bangladesh, all are local pharmaceutical companies. The top two domestic manufacturers, namely Square and Incepta Pharma are having a combined market share of more than 30% of the total pharmaceutical market of the country.

Bangladesh Association of Pharmaceutical Industries (BAPI) was instituted in 1972, since then BAPI playing a pivotal role in shaping up the industry. Association's member include large, medium, small, national and foreign companies who together are responsible for manufacturing 97% of the country's pharmaceutical production.

3.3 Marketing Strategy of Pharmaceuticals in Bangladesh

Marketing is the process by which companies create value for customers and build strong customer relationships in order to capture value from customer in return (Kotler, 2005). Marketing is the backbone of all industries. Though pharmaceuticals produce life saving drugs, they also need marketing. But their marketing is to some extent different from other industries. Some major characteristics of marketing sector are given below:

- Their distributional channel includes invoice system, own distribution channel.
- Medical representatives are the key persons in marketing.
- For promotion, the groups such as doctors, surgeons are targeted.
- Major promotional strategies include printed promotional materials, physical sample, and clinical materials.
- Special incentives are given to the doctors. For example, the doctors are given honeymoon packages, the cost of which is borne by the pharmaceuticals.

The field level executives are playing the imperative role for marketing division. Basically, they have taken the responsibility to market the products of their companies. So, the success of a pharmaceutical industry intensively depends on the efficiency and effectiveness of the

medical representatives. If an organization wants efficient employees in this section, he should to satisfy this representative.

3.4 Drug Distribution

Bangladesh's drug distribution marketplace is composed of small independent pharmacies. This structure combined with an under-regulated industry, few firms manufacturing pharmaceuticals, and companies competing to sell branded generics based on brand names provides ample opportunity for the sale of low-quality drugs at higher prices. And this partly explains why the quality of drugs available for sale varies significantly in Bangladesh. The pharmacies sell from 200-22,000 types of medicines each. Each type of medicine has one to twenty five possible brands. Large pharmacies reported buying medicines according to sales trends – e.g. what sells the most. Medium and small pharmacies reported being linked with a medical doctor and thus sales are usually skewed towards that medical professional's preferences. Most pharmacies are individual shops, though some chains are starting to develop, especially in urban areas. On average, each pharmacy visited has 10-50 pharmaceutical firms that supply them medicines on a daily basis.

For example, Beximco Pharmaceuticals has 1,200 people visiting pharmacies daily to take orders for drugs. None of the pharmacies visited will keep restocking any medicine that they consider a slow item. Small pharmacies report of keeping a medicine for a maximum period of six months.

Although there are approximately 300,000 private pharmacies in Bangladesh, the government has only 26,000 pharmacies officially listed. The rest are illegal pharmacies as they have no license / licensed pharmacist on staff. Pharmacists have varying levels of education and many lack adequate training. For example, while the four large urban pharmacies visited each had one professional pharmacist (with four years of coursework), two of the medium-sized pharmacies visited had one person trained for one year along untrained coworkers working as pharmacists. Rural pharmacists can have high school graduates with approximately two weeks training. The Bangladesh Pharmacist Society is currently implementing the first phase of a three-phased program to improve the skills of pharmacists. The three-phased program should be complete in seven to eight years.

While about 95% of the consumers in big pharmacies visited purchase medicines with a prescription, as few as 50% of people in medium and small pharmacies visited have a prescription. If people don't have a prescription, they either come in and ask for a specific drug or come in and describe their ailment to the pharmacist who then makes a diagnosis and recommends a drug on the spot. Popular products include antibiotics of various levels, pain-

killers, and gastric remedies. People purchase one to ten tablets or capsules at a time. The amount purchased depends more on the financial capacity of the consumer than on the required dose of medicine.

Performance of pharmaceutical companies as a main player in pharmaceutical supply chain has significant effect on supply chain management efficiency. Risk identification and mitigating them in pharmaceutical companies not only can lead to process optimization, productivity increase and minimizing business risk, but also will help health systems to meet goals of supply chain management; Accessibility, Quality and Affordability. Many risks reported in this study are internal risks due to processes, people and functions mismanagement in a firm which could be easily managed by suitable mitigation strategies. Although only a few of the risks are external ones but their impact on business disruption have not studied. Therefore identifying their risk impacts of risks on business processes and functions and investigating mitigation strategies to manage them should be considered in future studies.

API/Raw Material Production Plant: The major advancement of Bangladesh pharmaceutical sector has been occurred only in the production of finished products. Manufacturing of pharmaceutical products are vastly dependent on imported raw materials, as almost 90% of raw materials are now being imported. This dependency on imported raw materials is resulting in increased production cost of the finished products. Ultimately the competition to offer export prize is becoming tougher, which is one of the major challenges of pharmaceutical sector of Bangladesh. Setting up of a standardized Active Pharmaceutical Ingredient (API) plant is very essential. Local production of raw materials will greatly contribute to pharmaceutical export to extend export volume, and also can potentially contribute to the country's economy.

Some APIs are now produced within the country, and the range is increasing. The government and industry are jointly planning the development of an "API Park" at Bausia, about 40km from Dhaka, to concentrate API process development and production in a single location. Services and infrastructure (such as an incinerator and an effluent treatment plant), can be shared. Approximately 40 pharmaceutical businesses are likely to establish API production in the Park. There were hopes that the API Park can become operational in 2012.

API Park

Name of the project: API (Active Pharmaceutical Ingredient) Industrial Park Project Project Implementation Period: January 2008 to December 2012 Location of the project: Bausai,

Upazila-Gazaria, Dist: Munshigonj (37 Kms. aways from Dhaka by Dhaka-Chittagong highway)

The regulatory authorities of Bangladesh: The documents provided by the Drug Administration of Bangladesh are not impressive; represent the poor status of drug regulatory authority of Bangladesh to the business community and to the regulatory authorities of importing countries. Besides, the website of DGDA is still lacking lot of necessary and up to date information, required and inspected by the business partners and regulatory authorities of importing countries.

Regulated Markets: To register pharmaceutical products in regulated markets it requires highly standardized documents. There are regulations directed by the regulatory authorities of United States of America, European Union, Australia and Japan along with other highly regulated and semi regulated countries. To meet all their requirements sophisticated and accredited manufacturing plant, standardized manufacturing process, proper quality control and above all highly skilled professionals are required. It is tough to meet all the requirements by small pharmaceutical companies of Bangladesh.

Medicine export should be emphasized to LDCs than any other countries: Some companies are aggressive to enter the highly regulated overseas markets, such as, USA, Australia, Europe, Canada, France, and Golf countries. But the practical observation is that getting export status to those countries requires huge investment in the manufacturing plant to achieve certification from different international drug regulatory authorities, highly sophisticated documentation, and huge initial capital investment. Actually the export volume to the highly regulated countries will not be easily feasible; rather we can perform pretty well and can potentially increase our export if the exporters become more attentive to LDCs. Among 50 LDCs, only Bangladesh has its strong fundamental and modern manufacturing base, hence we can easily share the drug market of rest of the LDCs. So, considering the practical situation, the LDCs should be the targeted markets of our pharmaceuticals, of course, side by side, moderately regulated and highly regulated markets may be explored gradually. However, we can establish joint-venture, tool manufacturing, and contract-manufacturing business with the companies of developed countries, not only for exporting medicines.

Establishing Export cell by the govt./private Consultancy firms may promote Pharma export: Government can establish specialized Export Cell to promote exports of pharmaceuticals to grab and capitalize the huge export opportunities in LDCs. Some private Consultancy firms having experience and expertise in drug export professionally can be

engaged to assist the pharmaceutical companies who do not have the technical and expertise know-how to go through the entire process of export, or have lacking in documentation skills or even do not have the skilled man power to deal with the drug export. Thus, Consultancy firms can play a significant role to explore export to maximum countries, accelerate export activities, and to reduce the overall cost of export. Even some small companies having International Marketing Department (IMD) can explore the benefits of outsourcing by hiring Export Consultants to reduce its overhead expenditure and make a comparative study of cost-benefit ration to justify having IMD.

3.5 Important Departments of Management of Pharmaceuticals

Human Resources:

Human resources are people recruited in the organization and treated as the prime mover and an important element for success of any organization (DeCenzo & Robbins, 2005). The sector consistently creates job opportunities, especially for highly qualified people. Pharmaceutical companies are either directly or indirectly contributing largely towards raising the standard of healthcare and standard of living by enabling local healthcare personnel to gain access to newer products and also to latest drug information.

Like other industries, pharmaceutical industry also believes that the human resources are most valuable asset for the organization. Pharmaceutical industry is making considerable investments in attracting and developing competent professional human resources. Pharmaceuticals not only foster entrepreneurship, but also consciously encourage entrepreneurship in their

Training and Development:

Training refers to instruction provided for a current job and has a rather narrow focus and should provide skills that will benefit the organization rather quickly. Development, on the other hand, has a broader scope and may not be focused on either the present or future job but more on the organization's general long-term needs (Anthony, *et al.*, 2003). Pharmaceutical industries are continuously striving to explore the necessary competences of the employees, especially the marketing executives to face the challenges of the competitive environment. They arrange different types of learning programs which are enforcing as a motivation too to upgrade necessary knowledge and skills of their employees. By interviewing the employees of different pharmaceuticals the researcher comes to know that they participated in various training programs that include: Pharmaceutical marketing situation beyond 2005, Company formation, regulatory compliance and company meeting, Industrial control and mechatronics, Continuous improvement and changing behavior, Presentation skills, General guidelines of

Standard Operating Procedure (SOP), Sanitation, hygiene and environment control, Maintenance of equipments, calibration and validation, Industrial automation, etc.

Human Resources:

Human resources are people recruited in the organization and treated as the prime mover and an important element for success of any organization (DeCenzo & Robbins, 2005). The sector consistently creates job opportunities, especially for highly qualified people. Pharmaceutical companies are either directly or indirectly contributing largely towards raising the standard of healthcare and standard of living by enabling local healthcare personnel to gain access to newer products and also to latest drug information.

Like other industries, pharmaceutical industry also believes that the human resources are most valuable asset for the organization. Pharmaceutical industry is making considerable investments in attracting and developing competent professional human resources. Pharmaceuticals not only foster entrepreneurship, but also consciously encourage entrepreneurship in their organizational environment. This leads to innovation and creativity transformed into new products, services and new ways of doing things. To get most effort strom human resources, pharmaceutical industries implement programs like decentralization, job enrichment and job rotation. The extent of empowerment enjoyed by people at various levels of the organization enables each employee from the very bottom to the top, to contribute to the overall momentum of the companies.

Data from the Labor Force Survey of 2005-2006 showed employment of 64,000 in the pharmaceutical sector of Bangladesh, of whom 3,000 were female. There has been strong growth in employment, driven mainly by growing domestic market sales, but also by significant growth in exports.

Modern Drug Testing Laboratory: A major limitation of drug control authority of Bangladesh that also affects pharmaceutical export is unavailability of a modern, well equipped drug testing laboratory (DTL) with the engagement of sufficient and skilled pharmaceutical scientists. Due to lack of this, our drug control authority cannot monitor the quality of drugs manufactured by different pharmaceutical companies in Bangladesh. Moreover, foreign buyers and regulatory authorities raise question about the status of our drug testing laboratory, the central quality monitoring facilities of drug authority of Bangladesh.

Bioequivalence Test Facility: Bioequivalence study of a product is a must for the registration of that product in many of the moderately regulated and regulated countries of the world. There is no standard facility for bioequivalence study in Bangladesh. In order to register a product, a pharmaceutical company has to carry out this test in foreign country by

spending of a huge charge. For this reason, many pharmaceutical manufacturers don't show interest to register their products in foreign countries that require Bioequivalence study. It is relevant here to mention that BAPI and pharmaceutical exporters first felt the necessity of having Bioequivalence test facility in our country and they proposed and demanded to set up a modern Bioequivalence test center to the govt. for the promotion of pharmaceutical export.

Custom Harassment in Sending Drug Sample: Considerable hazards or bureaucratic obstacles are confronted by the local pharmaceutical companies in sending samples abroad, to station or appoint representatives in foreign countries, in sending money for the purpose and doing other promotional activities. The customs authority of Bangladesh imposes restrictions in sending drug samples to the importing countries. Restrictions are being made on giving permission to send drug samples and also limiting the quantity of samples to be sent.

3.6 Exports of Pharmaceutical Products

Pharmaceutical exports from Bangladesh rose 15.65 percent year-on-year to Tk 553.3 crore in fiscal 2013-14 due to growing global demand, high quality products and competitive prices. Demand for Bangladeshi pharma products is growing in Asia, Africa and European markets as manufacturers follow international standards that ensure better quality. Exports grew 24 percent to Tk 478.4 crore in 2012-13 from the previous year, according to data from the Export Promotion Bureau. Bangladeshi medicine makers meet 98 percent of domestic demand and export to 88 counties. The country exported 30 pharmaceutical items in fiscal 2013-14. The sector incurred losses in the first six months of last fiscal year due to internal problems which almost broke the supply chain down.

The major problem is Bangladesh import raw materials due to lack of an API park in Bangladesh. India has API park and as a results it can offer competitive price in global markets compared to Bangladesh. As Bangladesh exports medicine to Europe which is known as stringent regulatory standards it gives impetus to our pharma industry and creates awareness among global customers particularly from emerging and developed markets. Although Southeast Asia and Africa are traditionally Bangladesh's major markets for generic drug exports leading companies have now focused on advanced markets. Top companies have registered products in countries like Netherlands, Latvia, Azerbaijan, Costa Rica, Estonia and Lithuania.

3.7 **Company Profile**

3.7. 1 Introduction

Radiant Bangladesh Limited, a successor of world-renowned multinational pharmaceutical company, Roche, Switzerland leading and fastest growing business conglomerates in Bangladesh. not many industrial groups in Bangladesh can claim a history of continuous business pursuits stretching back over 100 years. Over the time, its early industrial ventures have moved over to businesses involved in high-tech manufacturing, international trading and distribution, forming strong ties with a host of blue chip multinational companies.

After the acquisition of Radiant, the new company was named – Radiant Pharma Limited and it has subsequently culminated to become one of the leading pharmaceutical companies of Bangladesh. Rapid business growth since its inception have propelled Radiant to a position of eminence among the pharmaceutical companies operating in Bangladesh today.

Table 3.1: Radiant Pharma Limited at a Glance

Company name	Radiant Pharma Limited
Logo	RADIANT PHARMACEUTICALS
Slogan	Excellence through quality
Type	Private Limited Company
Acquisition from	Roche, France
Company inception	2006
Ownership	Radiant Pharma Limited
Chairman	Mr. Nasser Shehrear Zhedee
Managing Director & Chief Executive Officer	Mrs. Masrur Ahmed
Employees	1500+
Business	Pharmaceutical Finished Products, Bulk Pellets, Animal Health & Nutrition Products
Distribution	Radiant Distribution Limited (RDL)
Web address	www.Radiant.com.bd

Source: www.Radiant.com.bd on 10-1-2016

3.7.2 Major Landmarks:

Radiant Bangladesh Limited, a successor of world-renowned multinational pharmaceutical company, Roche, Switzerland

1990. After the acquisition, the new company was named 'Radiant Pharma Limited ' and it has subsequently culminated to become one of the leading pharmaceutical companies in Bangladesh. Rapid business growth, since its inception has propelled Radiant Pharma Limited to a position of eminence among the pharmaceutical companies operating in Bangladesh today. Owing to its qualified, trained and skilled professionals and through its unswerving standards of quality control, Radiant Pharma Limited is now one of the most respected names in the pharmaceutical industry of Bangladesh. The major landmarks of the company in different years have been shown in the

table:

Table 3.2: Major Landmarks of Radiant Pharma Limited

Year	Landmarks
2006	Inception of state of the art Tongi plant
2008	Achievement of UK MHRA accreditation Initiation of **Cepha Plant**
2010	Starting af Novo Nordisk's **Insulin Manufacturing**
2010	Attainment of **TGA Australia** accreditation
2011	Attainment of **VMD UK** accreditation
2013	Accomplishment of EU GMP accreditation and Launching of **Eye Care** Project
2014	Achievement of **UAE GMP** accreditation

Source: www.skfbd.com accessed on 10-1-2016

Radiant Pharma Limited is currently exporting its quality finished products to 19 countries across 4 continents as the part of the mission of Growing More Global. In the year 2012, Radiant Pharma Limited has entered into the regulated market with excellence through quality. Radiant Pharma Limited is among the pioneers to export products to Australia, United Kingdom, Netherlands and expanding its business horizon to other European countries.

The International Business Department has put a sincere business drive in 2012 and registered a remarkable growth of 54% over the year 2011. The technical knowhow, vision and innovative ideas of the professionals working in the company are the key factors for this achievement. In the coming years, Radiant Pharma Limited is aiming to be a global pharmaceutical company.

The company exports its products in 23 countries of the world through our distribution partners.

Table 3.3: Overseas Markets of EK+F

Region	Countries
Europe	Netherlands, United Kingdom
Australia	Australia, Fiji
Africa	Algeria, Burundi, Cameroon, Kenya, Niger, Somalia, Uganda
Asia	Afghanistan, Iran, Myanmar, Nepal, Philippines, Sri Lanka, UAE, Vietnam, Yemen

Source: www.skfbd.com accessed on 10-1-2016

Table 3.4: Relative Market Position of Radiant

SL	COMPANY	Value (Cr) TK	Share	Growth(%
	Total Pharma Market	**27659**	**100.00**	**18.70**
1	SQUARE	4761	17.21	24.20
2	INCEPTA PHARMA	3197	11.56	17.70
3	BEXIMCO	2497	9.03	27.00
4	HEALTHCARE	1894	6.85	35.10
5	RENATA	1489	5.38	20.4
6	OPSONIN PHARMA	407.84	5.07	28.81
7	ESKAYEF	1187	4.29	21.70
8	RADIANT PHARMA	1162	4.20	35.50
9	ARISTOPHARMA	1084	3.92	16.90
10	DRUG INTERNATIONAL	1018	3.68	3.40

Source: http://medibd.blogspot.com/2021/11/top-20-pharmaceutical-company.html

3.8 Mission, Vision and Quality Approach

Mission

To manufacture and supply products with quality and excellence and to contribute to improve the population's health & well-being.

Vision

To lead the national pharmaceutical market, to be recognized as a multinational conglomerate from Bangladesh and stand out as a model of efficiency & trust to our collaborators, consumers, health care professionals & society.

Quality Approach

Radiant Pharma Limited believes that pharmaceutical business is built solely on the blocks of trust and it takes perseverance for a pharmaceutical business entity to earn the trust of the people. Many global best practices are being cultured in the everyday activities of Eskayef, which are contributing in a big way to shape up its future & earning people's trust. "For a holistic working philosophy, the company is governed by three fundamental values: Total Quality Management, Business Ethics and Societal Commitment"

Radiant Pharma Limited is a quality driven and scientific information based company. The EU GMP (European Union Good Manufacturing Practice), UK MHRA (Medicines and Healthcare Products Regulatory Agency of UK), TGA Australia (Therapeutic Goods Administration of Australia), UAE GMP (United Arab Emirates Good Manufacturing Practice) and VMD UK (Veterinary Medicines Directorate of UK) approved state-of-the-art pharmaceutical manufacturing facility has further reinforced high standards of quality, safety and efficacy of Radiant Pharma Limited products. The company is currently exporting medicines to many countries across four continents, including some highly regulated markets in Europe and Australia. Radiant Pharma Limited Bangladesh Limited continues the journey of pellets development with pride and perfection since 2001. In addition to the consumption in the domestic market, Radiant Pharma Limited is successfully exporting its pellets to Australia, Indonesia, Iran, Myanmar, UAE and Vietnam.

Since its inception on 2001, across the nation Agrovet Division has been playing an important role in the business sectors of Poultry, livestock & Aquaculture. Quality premixes along with wide range of prominent therapeutic & nutritional brands are its major strengths. Recently commissioned Injectable brands have already attained its fame for premium quality. It is also marketing imported poultry & aquaculture products from world's top class companies. Since 2005 it has emerged as the pioneer exporter of animal health products from Bangladesh.

Radiant Pharma Limited believes that pharmaceutical business is built solely on the blocks of trust and it takes perseverance for a pharmaceutical business entity to earn the trust of the people. Many global best practices are being cultured in the everyday activity of Radiant Pharma Limited, which are contributing in a big way to shape up its future & earning people's trust. Radiant Pharma Limited, owing to its qualified, trained and skilled professionals and through its unswerving standards of quality control, Radiant Pharma Limited is now one of the most respected names in the pharmaceutical industry of Bangladesh.

3.9 Supply chain management of Radiant Pharma Limited Pharmaceuticals Ltd.

The pharmaceutical supply chain is the means through which prescription medicines are delivered to patients. Pharmaceuticals originate in manufacturing sites; are transferred to wholesale distributors; stocked at retail, mail-order, and other types of pharmacies; subject to price negotiations and processed through quality and utilization management screens by pharmacy benefit management companies (PBMs); dispensed by pharmacies; and ultimately delivered to and taken by patients. There are many variations on this basic structure, as the players in the supply chain are constantly evolving, and commercial relationships vary considerably by geography, type of medication, and other factors. The pharmaceutical supply system is complex, and involves multiple organizations that play differing but sometimes overlapping roles in drug distribution and contracting. This complexity results in considerable price variability across different types of consumers, and the supply chain is not well understood by patients or policymakers. Increased understanding of these issues on the part of policymakers should assist in making rational policy decisions for the Medicare and Medicaid programs.

3.9.1 Supply chain stages of Radiant Pharmaceuticals Ltd:

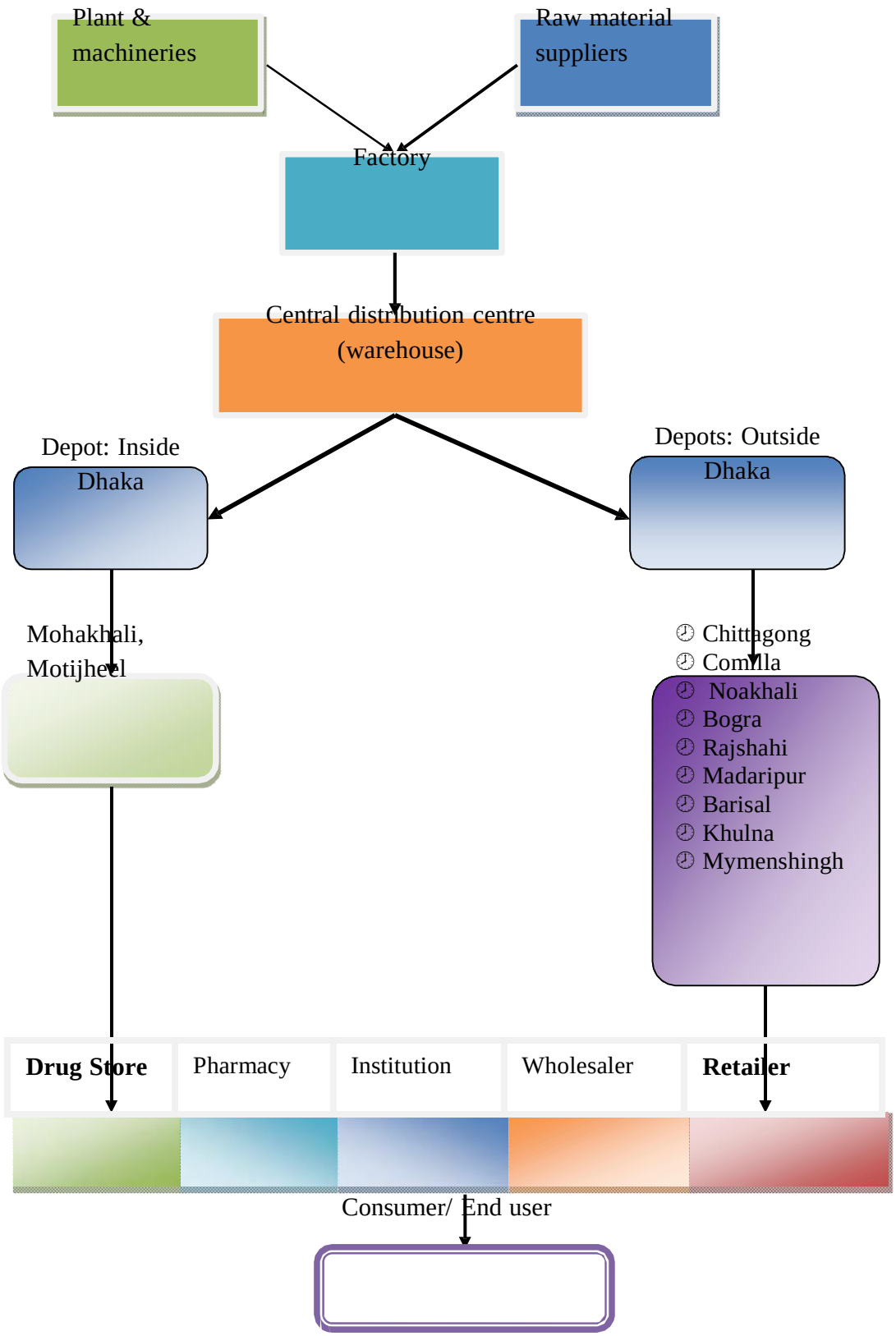
A supply chain consists of all parties involved, directly or indirectly in fulfilling customer's requirement. It includes not only manufacturers and suppliers, but also transporters, warehouses, retailers and customers themselves.

The key players and their financial relationships-

- Pharmaceutical Manufacturers:
- Wholesale Distributors:
- Pharmacies:
- Pharmacy Benefit Managers (PBMs)

Distribution channel of Radiant is shown in Figure: 3.1

Figure 3.1: Distribution Channel of Radiant



3.10 Suppliers of Radiant:

Major raw materials of Radiant include many different types of dyes and chemicals. Suppliers of this company are Weifang Shengtai, MSM Prai Berhad, Sainor, Magaldrate, Active Fine Chemicals Ltd, MEGAWIN, Implex Corporation, Drug International Ltd etc. provides these raw materials. Plant & machineries are imported from Germany, U.K, Italy. China, Taiwan, Korea, Japan by Radiant.

Table 3.4: Source of Major Raw Materials Procurement

Name of Items	Suppliers	Quantity(Kg)
Dextrose	Weifang Shengtai Pharmaceutical Inc., is a leading producer of pharmaceutical-grade glucose in China. The company estimates that its pharmaceutical glucose products account for about sixty percent of the total China pharmaceutical glucose market.	570000
Sugar	MSM Prai Berhad (*formerly known as Malayan Sugar Manufacturing Company Berhad*) operates the Prai sugar refinery in Penang. Located on the northwest coast of Peninsular Malaysia, the facility is the country's largest sugar refinery with an annual production capacity of 960,000 tonnes of refined sugar, accounting for up to 86% of MSM's total production capacity.	1500000
Omeprazole Pellets	SAINOR Established in the year of 2005, and today it is one of the fastest growing organizations in the niche area of drug loaded pellets. With combination constant product innovation and adaptation to suit the spirit and intent of customer requirements, constructed according to WHO GMP Specifications. The people behind this organization are young technocrats with an ambition to make SAINOR one of the topnotch companies in INDIA, to make a mark in the NATIONAL SECTOR and became a force through exports to Global Markets.	153000
Magaldrate	SPI Pharma is a global leader serving over 55 countries in the manufacture and marketing of antacid actives, excipients, taste-masking technology, drug delivery systems for tablets, fast-dissolve technologies, chewables, lozenges, and a variety of other patient-friendly dosage formats. SPI also specializes in drug development services, delivering in-vitro data packages in CTD Module 3.2 format.	128800

Source: Radiant CHQ, Dhaka

3.11 Manufacturing Facilities: Located at Tongi (outskirts of Dhaka city), Mirpur manufacturing site is spread over an area of 20 acres which houses a number of self-contained production units including oral solids, metered dose inhalers, intravenous fluids, liquids, ointments, creams, suppositories, ophthalmic drops, injectables, nebulizer solutions etc. The bulk drug unit for producing paracetamol is also located within this site. Radiant has its own utility infrastructure to ensure adequate generation and distribution of purified water at all times.

The manufacturing and packaging facilities have been designed to minimize generation and maximize containment of dust particles using closed transfer system and clean in place facility. All practicable measures have been taken to ensure that members of the staff are not exposed to unacceptable concentrations of dust particles. Process area, cubicles, storage area have been connected to vacuum dust cleaning. The design of the plant ensures automated materials handling systems and multilevel designs to enable gravity feed between processing stages. The building design has also allowed maximum engineering maintenance access without entering into the production areas.

3.11.1 Warehousing: Storing of raw and packaging materials to meet the requirements of production and also storing and dispatch of finished products as per concept of Good Storage Practice of pharmaceuticals per concept of Good Storage Practice of pharmaceuticals. After manufacturing, EK+F stores these products in their warehouses.

3.11.2 Depots: Then, from the storehouse TDCL distribute these products to its depots inside and outside Dhaka. EK+F can achieve responsiveness to customers demand by locating large inventory in the depots to the customers. This distribution centers distribute them to a variety of customers, including pharmacies (retail and mail-order), hospitals, and long-term care and other medical facilities (e.g., community clinics, physician offices and diagnostic labs). Radiant is successfully operating distribution of medicine throughout 54 districts out of 64 districts in Bangladesh.

3.11.3 Retailers (Pharmacy): After that, Radiant provides the medicine to many pharmacies all over the country. Pharmacies are the final step on the pharmaceutical supply chain before drugs reach the consumer/patient. Pharmacies purchase drugs from distribution centre and MPO's and occasionally directly from manufacturers, and then take physical possession of the drug products. After purchasing pharmaceuticals, pharmacies assume responsibility for their safe storage and dispensing to consumers. Pharmacy operations include

maintaining an adequate stock of drug products, providing information to consumers about the safe and

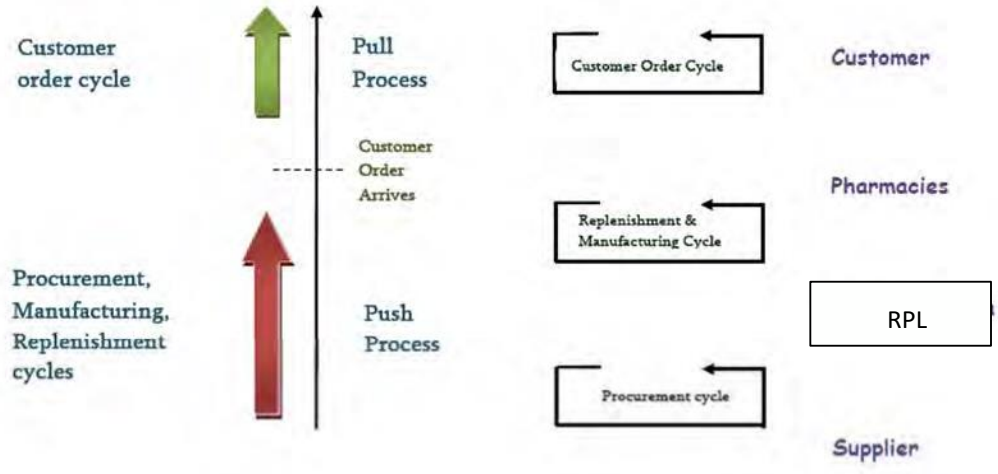
effective use of prescription drugs, and facilitating billing and payment for consumers participating in group health benefit plans.

3.11.4 Consumers: The ultimate destination is consumer. For different promotional activities, the doctors prescribes medicine to the customers and customers can get the medicine from many pharmacies and drug stores of hospitals.

3.12 Push/Pull view of the supply chain of Radiant Pharmaceuticals Ltd.:

All the processes in a supply chain fall into one of two categories depending on the timing of EK+F's execution related to end customer demand. With pull process, execution is initiated in response to customer order. With push process, execution is initiated in anticipation of customer orders. Therefore, at the time of execution of a pull process, customer demand is known with certainty, whereas at the time of execution of a push process, demand is not known and must be forecasted. Push processes operate in an uncertain environment because customer demand is not yet known. Pull processes operate in an environment in which customer demand is known.

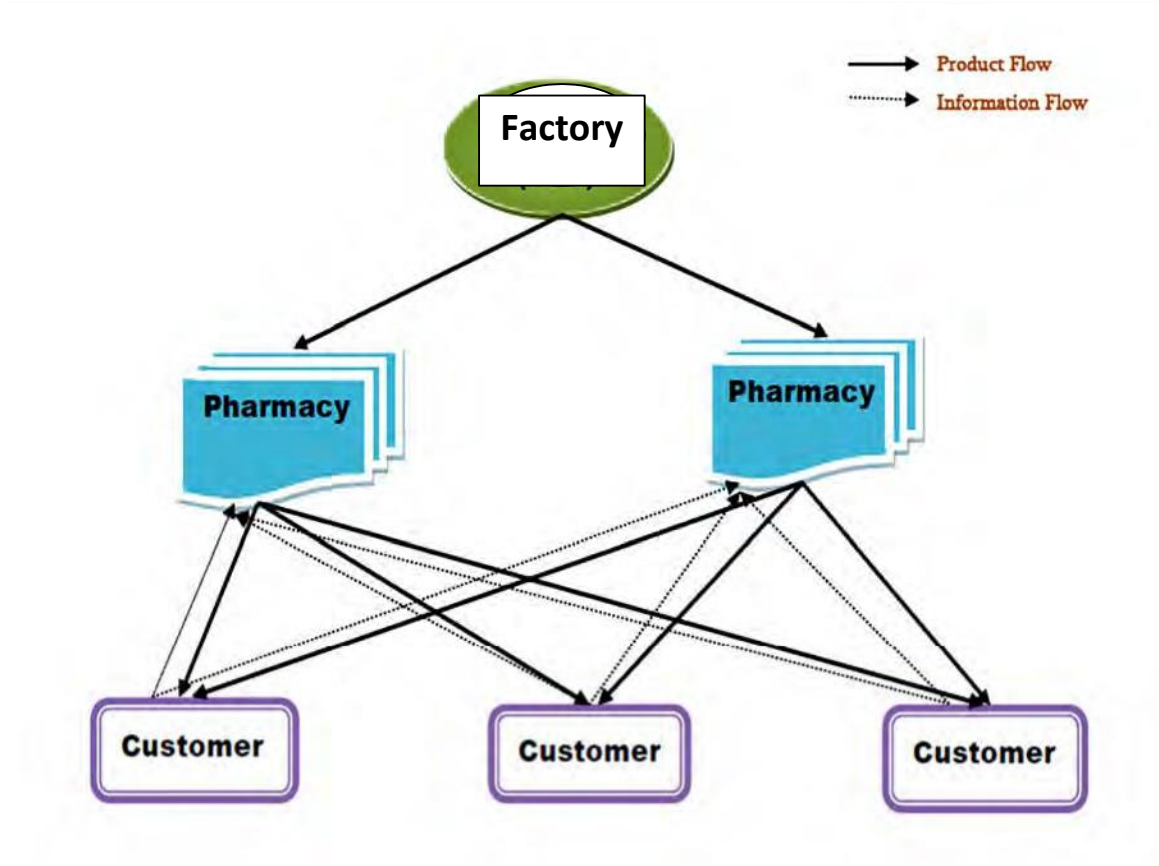
Here, EK+F Pharmaceuticals execute all process in the customer order cycle before the customer arrives. So, all the manufacturing activities procurement cycle, replenishment cycle are performed in anticipation of demand and are thus push process. The goal of replenishment cycle is to ensure product availability when a customer order arrives. In fact, raw materials such as chemicals are often purchased six to nine months before customer demand is expected. EK+F produce the medicine three to six months before the point of sale. And all processes that are part of the customer order cycle are pull process. The order fulfillment takes place from product in inventory that is built up in anticipation of customer orders. EK+F is often constrained by inventory and capacity decisions that were made in the push phase. The processes in the EK+F Pharma supply chain break up into pull and push processes, as shown below:



3.12.1 Design option for a distribution network of RPL: Distribution refers to the steps taken to move and store a product from the supplier stage to a customer stage in the supply chain. Distribution is a key driver of the overall profitability of a firm because it affects both the supply chain cost and the customer experience directly.

3.12.2 Manufacturer storage with carrier delivery: Here, Radiant follows "Manufacturer Storage with Carrier Delivery" design as distribution network system. Under this option, inventory is held by RPL in their depots and store house, and then distribute the medicine to many pharmacies all over the country by the delivery van of EK+F. Then, the customers get the medicine through these pharmacies. Pharmacies as retailer carry no inventories. Information flows from the customer, via the retailers to RPL.

Figure 3.1: Product Flow and Information Flow



3.13 Performance Characteristics of manufacturer storage with carrier delivery of EK+F: The supply chain strategy determines how the supply chain should perform with respect to efficiency and responsiveness. The supply chain of RPL must use three logistical and three cross-functional drivers to reach the performance level the supply chain strategy dictates and maximize the supply chain profits. The ideal supply chain will emphasize

efficiency but also maintain an adequate level of responsiveness. The biggest advantage of manufacturer storage with carrier delivery is the ability to centralize inventories at RPL. It can aggregate demand across all retailers that it supplies. The key issue with regard to manufacturer storage with carrier delivery is the ownership structure of the inventory at the RPL. The benefits from centralization are highest for high value, low demand items with unpredictable demand.

Table 3.5: Factors and Performance

Cost Factor	Performance
Facilities & handling	➢ Lower facility costs because of aggregation. ➢ Some saving on handling costs as CPL can manage small shipments or ship from production line. ➢ Increase efficiency at each distribution channel.
Inventory	➢ Lower costs because of aggregation. ➢ Benefits of aggregation are highest for low demand & high value medicines.
Transportation	➢ Higher transportation cost because of increased distance & disaggregate shipping and to keep responsiveness.
Information	➢ Significant investment in information infrastructure to integrate manufacturer and retailer.
Service Factor	**Performance**
Response time	➢ Quick response time because of availability of Medical Promotion Officers. ➢ Response time may vary by complicating receiving.
Product variety	➢ Allows a high level of product variety to be available to the customer.
Product availability	➢ Easy to provide a high level of product availability because of aggregation at CPL.
Customer experience	➢ Good in terms of delivery at pharmacies with drop shipping.
Time to market	➢ Fast, with the product available as soon as the first unit is produced.

3.14 No of Foreign Suppliers of Raw Materials and Major Items of Procurement

Table 3.6: Number of Foreign Suppliers

Year	No. of Foreign Suppliers	% increase
2010	180	-
2011	185	2.78
2012	204	10.27
2013	270	35.35
2014	356	31.85
2015	375	5.33

Source: Radiant CHQ, Dhaka

Table 3.7: Total Import Raw Materials during last Five Years.

Year	Imports (in Million US$)	Growth Rate (%)
2011	22.30	-
2012	25.45	14.13
2013	32.27	26.80
2014	34.61	7.25
2015	41.02	15.52

Source: Radiant CHQ, Dhaka

Table 3.8: Yearly Sales of during the last Five Years.

Year	Imports (in Million US$)	Growth Rate (%)
2011	451	-
2012	573	14.13
2013	618	26.80
2014	740	7.25
2015	855	15.52

Source: Radiant CHQ, Dhaka

3.15 Steps of Raw Materials Import Procedure

Radiant Pharma Limited has been maintaining the following steps for imports of required raw materials:

1. Material Requirements Planning (MRP)

MRP is a planning and inventory control system used to manage manufacturing processes. It provides answers for questions e.g. what items are required? How much

quantity is required and when are they required? Procurements of required raw materials usually start once they received MRP.

2. Block List

After getting MRP they have to apply for block list permission and it is must for each imported raw materials which is usually held twice in a month and it is authorized by the drugs regulatory department.

3. Block List Amendment

If the price varies from the block list they have to apply for the amendment usually takes seven working days or more for low price amendment and if they require high price amendment then they have to wait for the next block list meeting.

4. Pricing

After that they have to ask price from their approved sourced through their local agent, sometimes they collect the price directly from the supplier if there is no local agent.

5. Vendor Selections

They usually select the vendors carefully after checking price feasibility and other compatibilities

6. Asked for Indent or Proforma Invoice

After the proper selection of source they have to ask for the Indent or PI which is issued by the local agent or supplier or manufacturer.

7**. Approval from Quality Assurance**

They send the PI/Indent to the QA department through fax/e-mail for getting approval from General Manager of QA department.

8. Purchase Order

Once they received the approval they have to make purchase order in ACCPAC.

9. Apply for Cover Note

They should apply for cover note which usually takes two or three working days.

10. L/C Proposal: In the mean time they have to make L/C proposal which must be signed by Import Manager and General Manager (Commercial)

11. L/C Typing

After that they have to arrange for L/C typing.

12. Signing

Once the typed L/C is received at their end, they should check it very carefully and do the correction where there is any mistake found and then they have to send it for signing.

13. Sending L/C Application to Bank

Then they arrange to send the signed L/C application to the bank with keeping proper copies in their respective files.

14. Draft L/C

After sending L/C application to the bank they have to wait for draft L/C which usually takes two working days.

15. Final L/C Confirmation

They have to confirm L/C by sharing it to the suppliers, after deleting or adding clause in accordance with suppliers they have to arrange it to swift and share it to the supplier.

16. Following up with the Source/Supplier

They should follow up regularly with the suppliers to get the materials on due time.

17. Document Processing

Once the shipment has been made they have to process the shipping documents as follows:

(i) Drug Clearance: After getting the shipping documents they have to apply for drug clearance to the drugs regulatory department anf usually it takes two days to get permission from the drug authorities.

(ii) Marine Policy: They usually apply to the Insurance Department to get policy and a single day is required for getting it.

(iii) Shipping Guarantee (for Air Shipment): if the mode of shipment is by air then they should apply for shipping guarantee to the bank with the non-negotiable copy and the application should be duly sign by their authority.

(iv) Retirement(for sea shipment): if the material is shipped by sea then they have to apply to the bank for teturing the original documents after getting the conformation from the bank and application of retirement must be properly signed by our respective authorities.

(v) Customs Clearance: Once they received all the documents which is required they usually go for customs clearance and arrange to take over customs documents to their C & F agent accordingly.

18. **Receiving and Inspecting Materials:** Receiving Report is issued after getting the RM at their warehouse and after receiving the RM their QC or warehouse department confirm them whether there is any rejection or not.
19. **Compensation or Insurance Claim:** If they found there is any rejection then they have to go for compensating with the supplier or insurance claim which depends on some factors.
20. **Compensation:** If they receive complain regarding the quality of the RM then they have to arrange the compensation from the suppliers which is related to the following steps:
    (i) Firstly they inform the suppliers over the mail regarding the quality issue.
    (ii) If they agreed with them (EK+F) then they fix the amount of compensation with proper discussion to their accounts department which considers the whole cost including landed cost.
    (iii) Suppliers usually provide the payments by cheque and then it goes to the accounts department with taking proper copies in their file for further inspection.
    (iv) In the mean time they have to arrange to send the faulty RM back to the suppliers.
    (v) Sometimes the suppliers can arrange to make compensation by adjusting with the next consignments.
    (vi) **Insurance Claim:** if they get company regarding other than the quality issues e.g. loss or damage of the materials they should go for the insurance claim which considers the following steps:
        (i) Firstly complain have to raise from the QC department
        (ii) Then they usually notify the insurance company over the claim letter
        (iii) Physical inspection has been made by the third party who is organized by the Insurance Company.
        (iv) They have to provide the necessary documents required by the third party.
        (v) In the mean time Insurance Company will arrange to send the prejudice letter.
        (vi) They have to share it along with the other documents which are required by the insurance company.

(vii) Insurance company will arrange to provide Loss on Voucher and they have to send it back to the insurance company with proper signing from their authorities with retaking a copy in their file.

(viii) Finally, the cheque is received from the insurance which should share it with the accounts as well.

22. C & F bill Processing: This is the final step of import procedure. After receiving the C & F bill they have to prepare the bill to submit the accounts department.

23. File Closing: After processing the bill they have to close the file and keep it at record room.

3.16 Export Procedure of Radiant pharmaceutical products to abroad.

The export procedure of Pharmaceutical products differs from the export of the other products mainly from the regulatory points. The products are to be first registered in the respective countries which may take at least two years or more. After successful negotiation with the prospective partners in the respective countries and product registration we receive the Purchase orders from the importers. We collected export permission from the DGDA and ship the goods. Unlike other consumable products Pharmaceutical products needs heavy promotions to the prescribers.

Major export destinations are Afghanistan, Myanmar, Sri Lanka, Nepal, Philippines, UAE etc. The total exports of pharmaceutical products are shown in Table-:

Table 3.7: Total Export of Pharmaceutical Products during last five years.

Year	Export (in Million US$)	Growth Rate (%)
2011	1.0	-
2012	1.6	60.00
2013	2.1	31.25
2014	2.6	23.81
2015	2.8	7.69

Source: ES+F, Corporate Office, Dhaka

3.17 Distribution System

All medicines and medical products of R are being distributed by Radiant Distribution Company Limited (RDL) which is also a sister concern of Radiant group. RDCL has the largest independent distribution setup in Bangladesh with full infrastructural facilities provided by a countrywide network of 30 branch offices along with one main office, warehouses and delivery vans, directly servicing over 8000 outlets throughout the whole country. RDL is an allied business company of Radiant Groups responsible for distributing multi-dimensional products across the country.

The company started its business with the distribution of quality pharmaceutical products manufactured by Radiant, Roche Biotech, SERVIER, ALLERGAN And consumer brands like Frito Lay, Heinz, Wrigley, Mars, Energizer, Schick, L'Oreal, Garnier, ConAgra Foods, McVities and Hemas. It started its diagnostic distribution division in 1993 by distributing laboratory equipments and reagents from Hettich(Germany), TREK Diagnostics(USA) and Fortress(UK). It also distributes crude oil and oil products from Vitol. Basically TDCL has twenty six distribution divisions.

Table 3.8: Main Distribution Centers of TDCL

Division	Distribution Centers
Dhaka	Dhaka South, Dhaka North, Narayangonj, Savar, Keraniganj, Bhairab, Kishoreganj, Tangail, Gazipur, Faridpur
Chittagong	Chittagong South, Chittagong North, Camilla, Noakhali, Chandpur, Cox's Bazar, Feni
Khulna	Khulna, Jessore, Kushtia
Rajshahi	Rajshahi, Pabna, Bogra
Sylhet	Sylhet, Moulovi Bazar
Barisal	Barisal, Patuakhali
Rangpur	Rangpur, Dinajpur
Mymensingh	Mymensingh

3.17.1 Sales Department of Radiant Pharmaceuticals Ltd

The sales department of Radiant has been functioning with the key personnel which is shown in the Table 3.9:

Table 3.9: Personnel of Sales Department

Position	Reporting Officer	Number of Persons
Director (Sales)	Managing Director	1
Zonal Head	Director (Sales)	6
Regional Head	Zonal Head	36
Field Manager/ Area Manager	Regional Head	282
Medical Services Officer	Field Manager/ Area Manager	2022

Job Description of a Field Manager

The main job responsibility of an area manager is to guide the fellows by following Sales Management guide-line to achieve the sales Target, taking market share & ensure product mix sales from assigned territory within companies sales policy.

The key responsibilities include**:**

OPERATIONAL

- Achieve Team sales target through Prescription generation.
- Ensure implementation of marketing & sales strategies provided by H.O. / Respective Department.
- Cross check up to grass root level- the activities of Team members in order to ensure optimum utilization of Company resources.
- Keep up to date information & convey it to H.O about each & every territory within the region & review action plan / strategies in response to changing market environment.
- Prepare & submit Daily call reports, feedback & market reports to the concerned person / Department in time (following day).
- Keep good relation with all the customers & commendable relation with **"A"** potential customers (Sp. Doctors) throughout the assigned territory.
- Keep very good rapport with the key persons of different organizations- (BMA, BPMPA, BCDS etc) in the territory. Disseminates related information in time to next level superior, so that appropriate measures can be taken.
- Keep all information of the competitor's activities, especially Sales & marketing strategies.
- Ensure effective time management & result oriented call by all Team members.
- Penetrate 100% of your territory to know all out of the market situation & effective product positioning by your Team members.

PEOPLE MANAGEMENT

1. Maintain the team administration by motivating & guiding towards the territory & the organizational goal.
2. Keep everybody in touch with the TECHNIQUE given by the marketing Depertment.

3. Keep very good & professional liaison with PMD to understand the Marketing Strategies.
4. Keep your team members at their best state of knowledge & skill.
5. Judge the motivation level of team members & make all efforts to keep the same at the desire level through regular coaching & counseling session.
6. Perform annual appraisal of team members & submit in time.
7. Observe, identify & analyze the training need of team members & subsequently train them on the job or recommend for training.

The job challenge of area manager is to achieve target monthly and annually by each team members

JOB DESCRIPTION & JOB SPECIFICATION FOR MSO

The objective of MSO is to promote Eskayef products to the Doctors to increase the prescription & sale to achieve the target

Job Summary is to ensure quality services to the doctors and chemists for building professional relationship with them, which will increase Companies image.

Job Duties vs responsibilities and accountability:

DAILY:

- ③ Visit different institutions & GP areas as per tour program approved by the Field Manager.
- ③ Visit doctors with selected products as per promotional plan and TECHNIQUE to generate prescriptions.
- ③ Visit Chemist to secure order from them to ensure product availability so that no prescription is being dishonored.
- ③ Check Doctors prescription habit, Chemist shelves to identify the products movement.
- ③ Go through the TECHNIQUE everyday to gather knowledge to ensure productive call to the Doctor.
- ③ Should write daily call report & send it to Head office, copy to Field Manager.
- ③ Keep record of all promotional material (sample &gift) in DCR regularly.
- ③ Arrange clinical meeting to increase companies image & establish product image.
- ③ Follow all the instructions and suggestions from Head Office or FM / RSM.
- ③ Keep good relationship with BMA, BCDS & TDCL.
- ③ Keep all official documents (Technique, Circular, official letter etc) confidential.
- ③ Keep very good professional relation with Product Management Department & feel free to contact them for any product related information.
- ③ Keep up to date the territory information sheet along with all Doctors list.

- ③ Top 20 Doctor should be visited regularly.
- ③ Maintain all official decorum & administration.

WEEKLY

Monitor sales achievement sheet to evaluate product wise sales performance & find out the facts of achieving or failure with selected products. Discuss with FM / RSM or head office for any official assistance you need. Give market feedback, like competitors activities, sales strategies, promotional activities etc in regular basis.

MONTHLY

- ③ Participate in the monthly Pre Cycle Briefing Session.
- ③ Prepare monthly tour program on the basis of Standard tour program considering complete coverage of different institutions & markets as per potentiality.
- ③ Give monthly report with expense bill to FM.

JOB DESCRIPTION & JOB SPECIFICATION

SELF DEVELOPMENT

- ③ Read and memorize the **TECHNIQUE** & all literatures pads given by PMD.
- ③ Should go through the exams in every month by PMD during PCBS.
- ③ Should be able to detail the literatures, pads or any detail tips given by PMD effectively.
- ③ Feel free to discuss with FM / RSM or head office- whenever you require for further clarification of any points of literatures, pads are not clear to you.
- ③ Should attend all training programs organized by local officials or Head Office.
- ③ Should not keep any contact by any means with any political

parties. MARKET DEVELOPMENT

- ③ Build-up the company & product image among Medical professionals, Chemists as well as to any customers.
- ③ Maintain good relation with Chemists in order to get better share of OTC items.
- ③ Maintain Professional relationship with all Medical professionals & Chemists.
- ③ Visit and maintain a good professional relationship with the members of different professional bodies like, BMA, DAB, BCDS, etc
- ③ Always try to find out new business opportunities, market etc to increase the sales.
- ③ Special Responsibility is to carryout any other responsibilities assigned by the top management time to time.

Chapter Four: Analysis of Data and Discussion of Findings

4.0 Introduction

Primary data has been collected through field survey with respect to the research objectives of the study. This includes an examination of the perception of customers (retailers), onsumers, executives of the supply chain of management of Radiant Pharma Limited , 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.

4.1 Analysis of Data of the Retailers (Pharmacy Level)

Total sample size for retailer respondents is 60 equally drawn fifteen from each four major cities in Bangladesh. The distribution of respondents from the retail sector has been shown in Table: 4.1:

Table 4.1: Distribution of Respondents (Retailers)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Dhaka	15	25.0	25.0	25.0
	Chittagong	15	25.0	25.0	50.0
	Khulna	15	25.0	25.0	75.0
	Rajshahi	15	25.0	25.0	100.0
	Total	60	100.0	100.0	

Source: SPSS Output of Field Survey, January 2016

The reliability statistics of the sample is shown by Cronbach's alpha which is 0.93.

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Table 4.2: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.903	.909	15

Source: SPSS Output of Field Survey, January 2016

The mean variance, co- variances and item-wise correlations are shown in Table 4.3:

Table 4.3: Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.664	3.267	4.150	.883	1.270	.059	15
Item Variances	.912	.541	1.690	1.149	3.123	.076	15
Inter-Item Covariances	.349	-.090	.662	.753	-7.328	.027	15
Inter-Item Correlations	.401	-.103	.806	.909	-7.846	.036	15

Source: SPSS Output of Field Survey, January 2016

The Anova with Tukey's Test for Non-additivity has been shown in the Table-4.3 and Table 4.5. The F-statistic is significant at 5% level. The Hotelling 's T-Squared Test is found significant at 5% level.

Table-4.4: ANOVA with Tukey's Test for Nonadditivity

			Sum of Squares	df	Mean Square	F	Sig
Between People			341.996	59	5.797		
Within People	Between Items		49.929(a)	14	3.566	81.49	.000
	Residual	Nonadditivity	.695(b)	1	.695	1.236	.267
		Balance	464.042	825	.562		
		Total	464.738	826	.563		
	Total		514.667	840	.613		
Total			856.662	899	.953		

Grand Mean = 3.66, Source: Source: SPSS Output of Field Survey, January 2016
a Kendall's coefficient of concordance W = .058.
b Tukey's estimate of power to which observations must be raised to achieve additivity = 1.701.

Table-4.5: Hotelling's T-Squared Test

Hotelling's T-Squared	F	df1	df2	Sig
79.365	4.420	14	46	.000

Source: SPSS Output of Field Survey, January 2016

Table-4.6: Intra-class Correlation Coefficients

	Intraclass Correlation(a)	95% Confidence Interval		F Test with True Value 0			
	Lower Bound	Upper Bound	Value	df1	df2	Sig	Lower Bound
Single Measures	.383(b)	.296	.491	10.302	59.0	826	.000
Average Measures	.903(c)	.863	.935	10.302	59.0	826	.000

Two-way mixed effects model where people effects are random and measures effects are fixed.

a Type C intraclass correlation coefficients using a consistency definition-the between-measure variance is excluded from the denominator variance.

b The estimator is the same, whether the interaction effect is present or not.

c This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Source: SPSS Output of Field Survey, January 2016

4.2 Retailers' Knowledge about Supply Chain Management

Retail Respondents' knowledge about SCM of EK+F is shown in the following Table 4.7. It is observed that 23.3% respondents have reported that they know the SCM very well followed by moderate knowledge (21.7%), sufficient knowledge (20%), somehow knowledge (20%) and 15% respondents have poor knowledge about SCM.

Table-4.7: Respondent's Knowledge about SCM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	9	15.0	15.0	15.0
	Somehow	12	20.0	20.0	35.0
	Moderate	13	21.7	21.7	56.7
	Very Well	14	23.3	23.3	80.0
	Sufficient	12	20.0	20.0	100.0
	Total	60	100.0	100.0	

Source: SPSS Output of Field Survey, January 2016

4.2.1 Respondents' View about SCM.

The results show that only 25% respondents reported that they identified SCM as Data Collection, Supplier, Purchasing, Warehousing, Stocktaking, Distribution. While 46.7% respondents viewed SCM as Supplier Selection, Purchasing, Warehousing, Stocking, Distribution, 12% viewed SCM as warehousing and distribution and only 6% considered SCM as distribution.

Table 4.8: Respondent's View about SCM.

A. Data Collection, Supplier, Purchasing, Warehousing, Stocktaking, Distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	15	25.0	100.0	100.0
Missing	System	45	75.0		
Total		60	100.0		

B. Supplier Selection, Purchasing, Warehousing, Stocking, Distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	28	46.7	100.0	100.0
Missing	System	32	53.3		
Total		60	100.0		

C. Warehousing, Distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	12	20.0	100.0	100.0
Missing	System	48	80.0		
Total		60	100.0		

D. Distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	6	10.0	100.0	100.0
Missing	System	54	90.0		
Total		60	100.0		

Source: SPSS Output of Field Survey, January 2016

4.3 **Benefits of SCM**

Multiple Response Analysis (MRA) is carried out to identify the benefits of SCM. Only 2.8% respondents identified no impact of SCM, 38.1% respondents reported high impact of SCM, 31% viewed medium impact. In regards to heavy impact 20.7% respondents opined that SCM has heavy impact on the supply chain. The results are shown in Table 4.9:

Table 4.9: Impacts of the Benefits of SCM (Retailers)

Benefits(a)	Responses		Percent of Cases
	N	Percent	N
No Impact	25	2.8%	41.7%
Moderate Impact	67	7.4%	111.7%
Medium Impact	279	31.0%	465.0%
High Impact	343	38.1%	571.7%
Heavy Impact	186	20.7%	310.0%
Total	900	100.0%	1500.0%

a Group

Source: SPSS Output of Field Survey, January 2016

Factor Analysis of the responses regarding the benefits of SCM reveals that shorter lead time has high mean (4.15) followed by reduced cycle time (3.97), Reduced waste (3.80), competitive advantage (3.83), reduced cost (3.78), greater supply chain visibility (3.72), reduced inventory (3.62) etc. The results are shown in Table 4.10.

Table 4.10: Descriptive Statistics of the Indicators of SCM Benefits

Indicators	Mean	Std. Deviation	Analysis N
Superior Customer Value	3.27	1.300	60
Reduced Cost Cooperative	3.78	.825	60
Organizational Relationships	3.58	1.046	60
Effective Business Process	3.47	.929	60
Information Sharing	3.68	.965	60
Integrated Relationships	3.78	.958	60
Shorter Lead Time	4.15	.799	60
Reduced Waste	3.80	.755	60
Reduced Cycle Time	3.97	.736	60
Improve Responsiveness to Customer Requirements	3.63	1.025	60
Greater Supply Chain Visibility	3.72	.993	60
Enhanced Quality and Service	3.42	.979	60
Competitive Advantage	3.83	.905	60
Improved Supply Chain Communications	3.27	.972	60
Reduced Inventory	3.62	.993	60

Source: SPSS Output of Field Survey, January 2016

KMO and Bartlett's Test is used to measure sampling adequacy of influencing factors to examine the appropriateness of factor analysis. Here the KMO value is 0.768 reveals that the sampling adequacy of factor analysis. The Bartlett's test of Sphericity (Table 4.11) indicates

that Chi-Square value i.e. 632.94 with 105 degree of freedom meaning that overall significant of the analysis.

Table 4.11: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.768
Bartlett's Test of Sphericity	Approx. Chi-Square	632.935
	df	105
	Sig.	.000

Source: SPSS Output of Field Survey, January 2016

4.3.1 The Communalities of the Factors

Extraction Method: Principal Component Analysis is used find the importance of the factors. Here shorter lead time (0.857), reduced cycle time (0.838), reduced waste (0.825), improved supply chain communications (0.790), integrated relationship (.0.762), information sharing (0.691) are the most important factors for the benefits of SCM. The results are shown in Table 4.12:

Table 4.12: The Communalities of the Factors

Indicators	Initial	Extraction
Superior Customer Value	1.000	.282
Reduced Cost	1.000	.724
Cooperative Organizational Relationships	1.000	.602
Effective Business Process	1.000	.713
Information Sharing	1.000	.691
Integrated Relationships	1.000	.762
Shorter Lead Time	1.000	.857
Reduced Waste	1.000	.825
Reduced Cycle Time	1.000	.838
Improve Responsiveness to Customer Requirements	1.000	.649
Greater Supply Chain Visibility	1.000	.761
Enhanced Quality and Service	1.000	.709
Competitive Advantage	1.000	.745
Improved Supply Chain Communications	1.000	.790
Reduced Inventory	1.000	.548

Extraction Method: Principal Component Analysis.
The extraction sums of squared loadings that component 1 has 45.05% variance, component 2 has 17.65% and component 3 has 7.23% variance. .
Source: SPSS Output of Field Survey, January 2016

The total variance explained of the factor analysis is shown in Table 4.13. The initial eigenvalues for components 1, 2 and 3 are respectively 6.758, 2.65 and 1.09. It reveals that the component 1 has alone explained 45.07% of variance while component 2 has explained 17.66%, Component 3 has explained 7.27%. Other components are insignificant in terms of explaining total variance of the model. The rotation sums of squared loadings for component 1 is 4.82 (32.16%), 3.49 (23.28%) for component 2 and 2.18 (14.55%) for component 3.

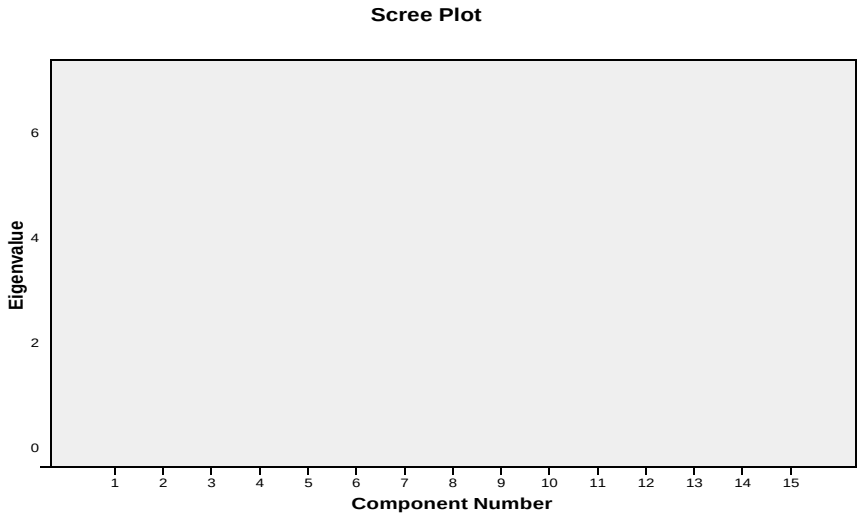
Table 4.13: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.758	45.057	45.057	6.758	45.057	45.057	4.824	32.159	32.159
2	2.648	17.656	62.713	2.648	17.656	62.713	3.491	23.276	55.435
3	1.091	7.273	69.986	1.091	7.273	69.986	2.183	14.551	69.986
4	.838	5.587	75.573						
5	.657	4.383	79.956						
6	.628	4.185	84.141						
7	.560	3.731	87.872						
8	.401	2.672	90.545						
9	.344	2.295	92.840						
10	.318	2.121	94.962						
11	.251	1.673	96.635						
12	.207	1.383	98.017						
13	.148	.984	99.001						
14	.093	.618	99.619						
15	.057	.381	100.000						

Extraction Method: Principal Component Analysis.
Source: SPSS Output of Field Survey, January 2016

The Scree Plot for Principal Component Analysis is shown in Figure 4.1:

Figure 4.1: Scree Plot for Principal Component Analysis



4.3.2 Component Matrix Analysis

The weight of each factor in each component is shown in Table 4.14:

Table 4.14: Component Matrix(a)

Indicators	Component		
	1	2	3
Superior Customer Value	.492	-.148	.135
Reduced Cost	.737	-.404	.137
Cooperative Organizational Relationships	.650	-.300	.300
Effective Business Process	.738	-.398	.104
Information Sharing	.698	-.430	.139
Integrated Relationships	.733	.474	.003
Shorter Lead Time	.646	.250	-.614
Reduced Waste	.753	.492	.125
Reduced Cycle Time	.727	.383	-.404
Improve Responsiveness to Customer Requirements	.680	.430	-.031
Greater Supply Chain Visibility	.757	-.349	-.258
Enhanced Quality and Service	.772	-.282	.184
Competitive Advantage	.656	-.519	-.214
Improved Supply Chain Communications	.432	.633	.450
Reduced Inventory	.471	.546	.168

Extraction Method: Principal Component Analysis.
a 3 components extracted.

From the component matrix it is found that 12 factors have high influence on the benefits of SCM. These are enhanced quality and service (0.772), greater supply chain visibility (0.757)

reduced waste (0.753), effective business process (0.737), reduced cost (0.737), reduced cycle time (0.727), information sharing (0.698), improve responsiveness to customer requirements(0.680), competitive advantage (0.656), cooperative organizational relationships (0.6.50). Components 2 and 3 are not important as most of the factors have negative coefficients.

The rotated weight of each indicator for each component is shown in Table 4.15:

Table 4.15: Rotated Component Matrix(a)

Indicators	Component		
	1	2	3
Superior Customer Value	.490	.194	.066
Reduced Cost	.832	.126	.126
Cooperative Organizational Relationships	.742	.225	-.038
Effective Business Process	.822	.118	.156
Information Sharing	.821	.087	.102
Integrated Relationships	.248	.738	.394
Shorter Lead Time	.176	.279	.865
Reduced Waste	.280	.811	.298
Reduced Cycle Time	.204	.505	.736
Improve Responsiveness to Customer Requirements	.228	.665	.394
Greater Supply Chain Visibility	.719	.022	.494
Enhanced Quality and Service	.793	.256	.120
Competitive Advantage	.761	-.142	.382
Improved Supply Chain Communications	.031	.882	-.105
Reduced Inventory	.047	.724	.147

Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 5 iterations.

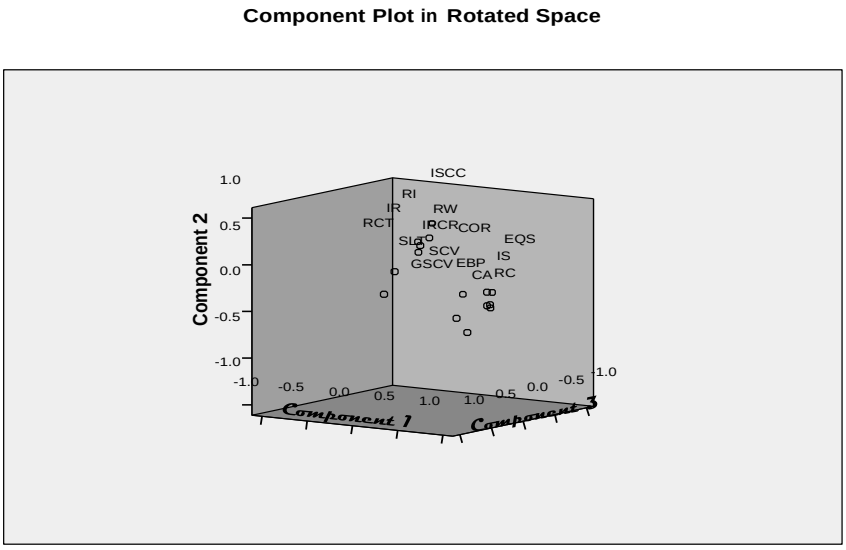
Table 4.16 shows the component transformation. Here component 1 has more weight as compared to component 2 and component 3.

Table 4.16: Component Transformation Matrix

Component	1	2	3
1	.742	.515	.430
2	-.627	.760	.172
3	.238	.397	-.887

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Figure 4.2: Component Plot in Rotated Space



The component score coefficients are shown in Table 4.17:

Table 4.18: Component Score Coefficient Matrix

Indicators	Component		
	1	2	3
Superior Customer Value	.118	.044	-.088
Reduced Cost	.206	-.010	-.091
Cooperative Organizational Relationships	.208	.072	-.222
Effective Business Process	.198	-.020	-.063
Information Sharing	.209	-.020	-.097
Integrated Relationships	-.031	.193	.075
Shorter Lead Time	-.122	-.102	.557
Reduced Waste	-.006	.244	-.021
Reduced Cycle Time	-.099	.018	.399
Improve Responsiveness to Customer Requirements	-.034	.164	.097
Greater Supply Chain Visibility	.109	-.136	.235
Enhanced Quality and Service	.192	.045	-.119
Competitive Advantage	.148	-.177	.182
Improved Supply Chain Communications	-.004	.378	-.297
Reduced Inventory	-.041	.254	-.071

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Component Scores.

Eigenvalues of the three functions and Wilk's Lambda is shown in Table 4.19. Function 1 has higher eigenvalue (2.041) and 65.2% variance of function 1 is explained while the eigenvalue for function 1 is estimated at 0.719 and 23.0% variance is explained. The eigenvalue of function 3 is 0.371 and only 11.80% variance is explained.

Table 4.18: Summary of Canonical Discriminant Functions

A. Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	2.041(a)	65.2	65.2	.819
2	.719(a)	23.0	88.2	.647
3	.371(a)	11.8	100.0	.520

a First 3 canonical discriminant functions were used in the analysis.

B. Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 3	.140	97.471	45	.000
2 through 3	.425	42.411	28	.040
3	.730	15.609	13	.271

The Chi-square test of function 1 through 3 is significant at 1% level where the p-value is .000 and the same for function 2 through is also significant at 5% level.

Table 4.19: Standardized Canonical Discriminant Function Coefficients

	Function		
	1	2	3
Superior Customer Value	.435	.455	.060
Reduced Cost	1.067	.136	-.584
Cooperative Organizational Relationships	-.953	.084	-.206
Effective Business Process	.294	.418	.935
Information Sharing	-.649	.134	-.262
Integrated Relationships	.069	.619	.035
Shorter Lead Time	.169	-.249	-.419
Reduced Waste	-1.576	-.698	.023
Reduced Cycle Time	.076	-.548	.206
Improve Responsiveness to Customer Requirments	.216	.394	-.092
Greater Supply Chain Visibility	.107	-.590	-.023
Enhanced Quality and Service	-.365	.081	.520
Competitive Advantage	1.017	.397	-.043
Improved Supply Chain Communications	.539	.696	-.668
Reduced Inventory	-.229	.005	.733

Table 4.20: Structure Matrix

Indicators	Function		
	1	2	3
Reduced Waste	-.416(*)	.311	.061
Enhanced Quality and Service	.048	.499(*)	.392
Improved Supply Chain Communications	-.306	.491(*)	-.202
Superior Customer Value	.063	.403(*)	.134
Reduced Cost	.125	.394(*)	.081
Information Sharing	.005	.373(*)	.124
Cooperative Organizational Relationships	-.125	.367(*)	.016
Integrated Relationships	-.224	.358(*)	-.043
Improve Responsiveness to Customer Requirements	-.176	.329(*)	.155
Competitive Advantage	.231	.233(*)	.167
Shorter Lead Time	-.005	-.073(*)	-.052
Effective Business Process	.031	.349	.491(*)
Reduced Inventory	-.241	.159	.350(*)
Greater Supply Chain Visibility	.136	.165	.314(*)
Reduced Cycle Time	-.121	-.009	.135(*)

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions

Variables ordered by absolute size of correlation within function.

* Largest absolute correlation between each variable and any discriminant function

Table 4.21: Canonical Discriminant Function Coefficients

Factors	Function		
	1	2	3
Superior Customer Value	.346	.362	.048
Reduced Cost	1.349	.172	-.738
Cooperative Organizational Relationships	-.943	.083	-.204
Effective Business Process	.335	.475	1.065
Information Sharing	-.689	.143	-.278
Integrated Relationships	.077	.688	.039
Shorter Lead Time	.206	-.304	-.512
Reduced Waste	-2.428	-1.075	.035
Reduced Cycle Time	.102	-.739	.277
Improve Responsiveness to Customer Requirements	.220	.401	-.094
Greater Supply Chain Visibility	.110	-.605	-.024
Enhanced Quality and Service	-.404	.090	.577
Competitive Advantage	1.178	.460	-.050
Improved Supply Chain Communications	.635	.820	-.787
Reduced Inventory	-.245	.005	.782
(Constant)	.663	-2.611	-.162

Table 4.22: Functions at Group Centroids

Location of Respondents	Function		
	1	2	3
Dhaka	.952	.762	-.758
Chittagong	-2.139	-.492	-.287
Khulna	-.254	.820	.824
Rajshahi	1.441	-1.090	.220

Unstandardized canonical discriminant functions evaluated at group means

Table 4.23: Classification Function Coefficients

	Location of Respondents			
	Dhaka	Chittagong	Khulna	Rajshahi
Superior Customer Value Reduced	1.264	-.239	.944	.809
Cost Cooperative	3.126	-1.607	.342	2.744
Organizational Relationships	.105	2.819	.924	-.709
Effective Business Process	1.319	.189	2.627	1.643
Information Sharing	.158	1.978	.557	-.715
Integrated Relationships	-1.719	-2.802	-1.710	-2.917
Shorter Lead Time	5.005	4.507	3.928	5.168
Reduced Waste	-2.129	6.739	.792	-1.290
Reduced Cycle Time	-.292	.450	-.019	1.398
Improve Responsiveness to Customer Requirements	-.257	-1.484	-.647	-.984
Greater Supply Chain Visibility	-3.289	-2.879	-3.494	-2.137
Enhanced Quality and Service	-1.387	.020	.017	-1.188
Competitive Advantage	5.801	1.558	4.327	5.475
Improved Supply Chain Communications	5.857	2.498	3.895	3.880
Reduced Inventory	1.116	2.234	2.648	1.750
(Constant)	-30.043	-30.312	-30.927	-25.669

Fisher's linear discriminant functions

4.4 Regression Analysis

Table 4.26: Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
	R Square Change	F Change	df1	df2	Sig. F Change	R Square Change	F Change	df1	df2	Sig. F Change
1	.527(a)	.278	.053	1.265	.278	1.235	14	45	.285	2.055

a Predictors: (Constant), Reduced Inventory, Competitive Advantage, Shorter Lead Time, Improved Supply Chain Communications, Cooperative Organizational Relationships, Effective Business Process, Improve Responsiveness to Customer Requirements, Information Sharing, Integrated Relationships, Enhanced Quality and Service, Reduced Cycle Time, Reduced Cost, Greater Supply Chain Visibility, Reduced Waste

b Dependent Variable: Superior Customer Value

Table: 4.25: ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27.680	14	1.977	1.235	.285(a)
	Residual	72.054	45	1.601		
	Total	99.733	59			

a Predictors: (Constant), Reduced Inventory, Competitive Advantage, Shorter Lead Time, Improved Supply Chain Communications, Cooperative Organizational Relationships, Effective Business Process, Improve Responsiveness to Customer Requirments, Information Sharing, Integrated Relationships, Enhanced Quality and Service, Reduced Cycle Time, Reduced Cost, Greater Supply Chain Visibility, Reduced Waste

b Dependent Variable: Superior Customer Value

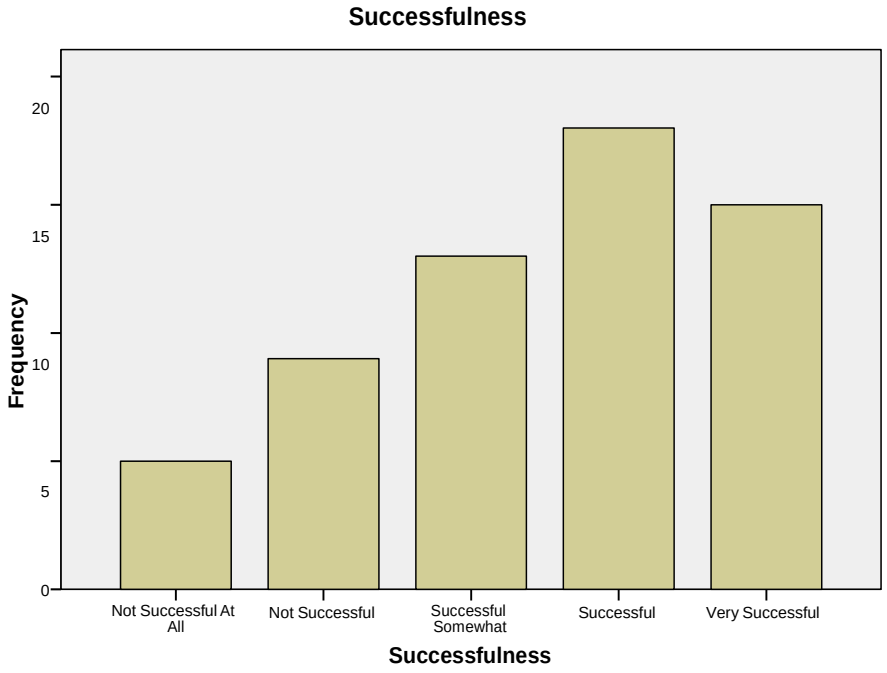
4.5 Successfulness of SCM of SK+F (Retailers)

The successfulness of SCM as reported by retailers is shown in Table 4. 26. About 30.0% respondents reported that SCM of SK +F is successful, 25% as very successful, 21.7% as successful somewhat. Only 8.3% respondent reported that SCM is not successful at all, 15% reported as not successful.

Table 4.26: Successfulness of SCM of Radiant (Retailers)

Indicators		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Successful At All	5	8.3	8.3	8.3
	Not Successful	9	15.0	15.0	23.3
	Successful Somewhat	13	21.7	21.7	45.0
	Successful	18	30.0	30.0	75.0
	Very Successful	15	25.0	25.0	100.0
	Total	60	100.0	100.0	

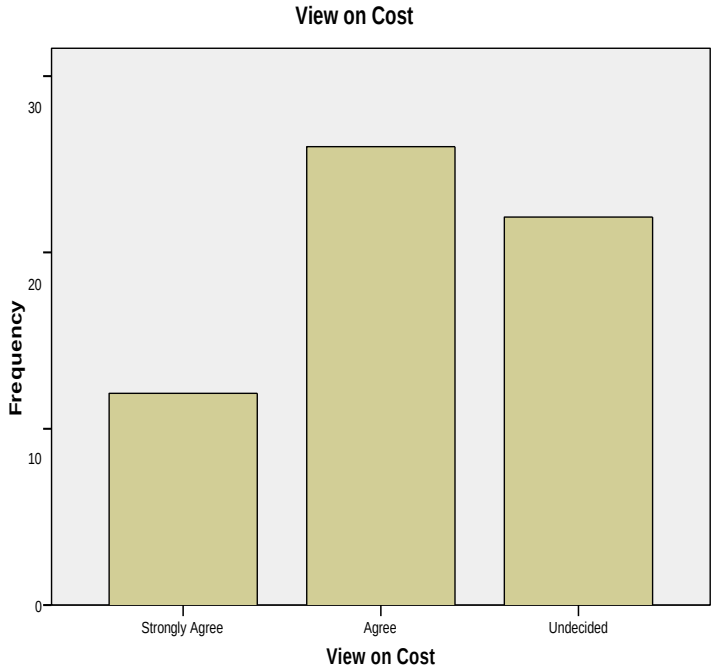
Source: SPSS Output of Field Survey, January 2016.



Regarding view on cost of EK+F products 43.3% retail respondents agreed that the coist is high as compared to other companies while 20.0% strongly agreed with high cost while 36.7% respondent are undecided on this issue. Table 4.22 shows the view on cost:

Table 4.27: View on Cost (Retailers)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	12	20.0	20.0	20.0
	Agree	26	43.3	43.3	63.3
	Undecided	22	36.7	36.7	100.0
	Total	60	100.0	100.0	



4.6 Analysis of Responses of Executives

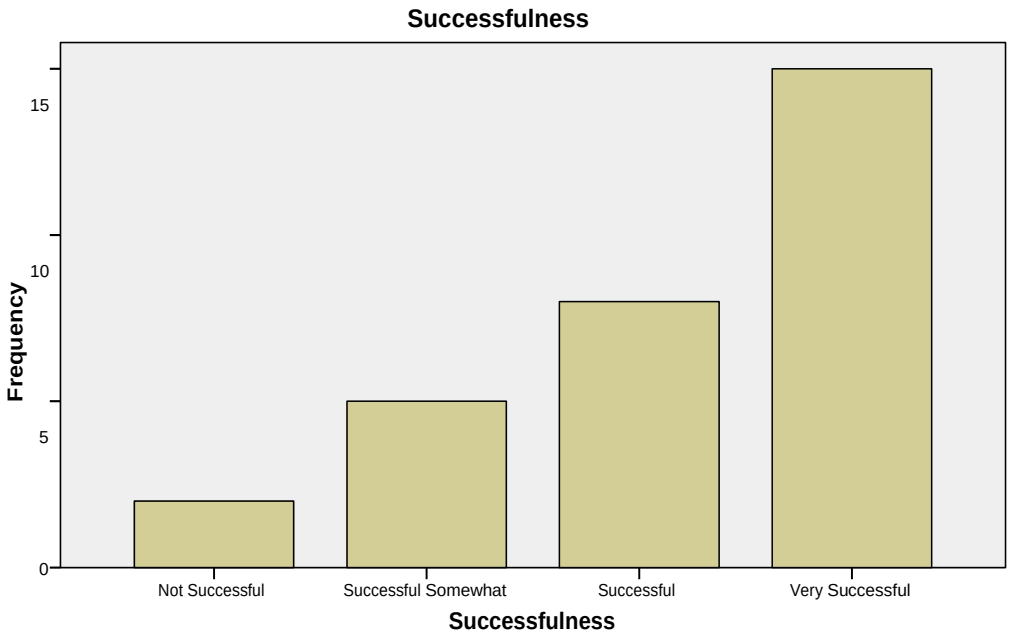
Supply chain is the management of a network of retailers, distributors, transporters, storage facilities and suppliers that participate in the sale, delivery and production of a particular product. The results from the responses of executives indicated that 50% of the respondents strongly agreed, 45% 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

4.6.1 Successfulness of SCM

Regarding successfulness of SCM, 50% respondents reported it as very successful. 27.7% respondents identified SCM as successful, 16.7% reported as successful somewhat and only 6.7% as not successful.

Table 4.23: Successfulness (SK+F Executives)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Successful	2	6.7	6.7	6.7
	Successful Somewhat	5	16.7	16.7	23.3
	Successful	8	26.7	26.7	50.0
	Very Successful	15	50.0	50.0	100.0
	Total	30	100.0	100.0	



4.6.2 Supply Chain Challenges:

From the responses of 30 officials from Radiant and RDCL the following challenges have been identified:

- Lack of coordination
- Inventory management
- Absent demand information
- Human resource dependency
- Order management
- Shortage avoidance
- Expiration
- Warehouse management
- Temperature control

- Shipment visibility

The results of field survey reveals that 86.7% respondents has identified lack of coordination as a challenge to SCM while 80% as inventory management, 80% as order management, 33.3% as absent demand management, 50% as human resource management, 20% as shortage avoidance, 53.3% as expiration management, 66.7% as warehouse management, 63.3% as temperature control and 66.7% as shipment visibility.

Table 4.29: Frequency Distribution of Challenges

Challenges	Frequency			
	Yes	Percentage	No	Percentage
Lack of Coordination	26	86.7	4	13.3
Inventory Management	24	80	6	20
Absent Demand Information	10	33.3	20	66.7
Human Resource Dependency	15	50	15	50
Order Management	24	80	6	20
Shortage Avoidance	6	20	24	80
Expiration	16	53.3	14	46.7
Warehouse Management	20	66.7	10	33.3
Temperature Control	19	63.3	11	36.7
Shipment Visibility	20	66.7	10	33.3

Source : Field Survey, 2016

As a group 60% respondents identified supply chain management challenges as yes while 40% as no.

Table 4.30: Challenges Frequencies (Group)

		Responses		Percent of Cases
		N	Percent	N
SCMC[a]	Yes	180	60.0%	600.0%
	No	120	40.0%	400.0%
Total		300	100.0%	1000.0%

a Group

4.6.3 Factor Analysis

The factor analysis of the multiple responses have been done excluding three factors such as absent demand information, shortage avoidance and expiration because of low correlation coefficient. The components have been identified. The results have been shown in Table: 4.31:.

Table 4.31: Component Matrix(a)

	Component		
	1	2	3
Order Management	.671	-.159	-.180
Inventory Management	-.643	.188	-.355
Temperature Control	.476	-.456	.211
Shipment Visibility	.228	.803	-.146
Human Resource Dependency	.542	.564	.275
Lack of Coordination	-.384	.115	.843

Extraction Method: Principal Component Analysis.
a 3 components extracted.

Table 4.32: Rotated Component Matrix(a)

	Component		
	1	2	3
Inventory Management	-.742	-.154	
Temperature Control	.668	-.173	
Order Management	.528	.143	-.457
Shipment Visibility	-.236	.802	-.136
Human Resource Dependency	.294	.770	
Lack of Coordination			.933

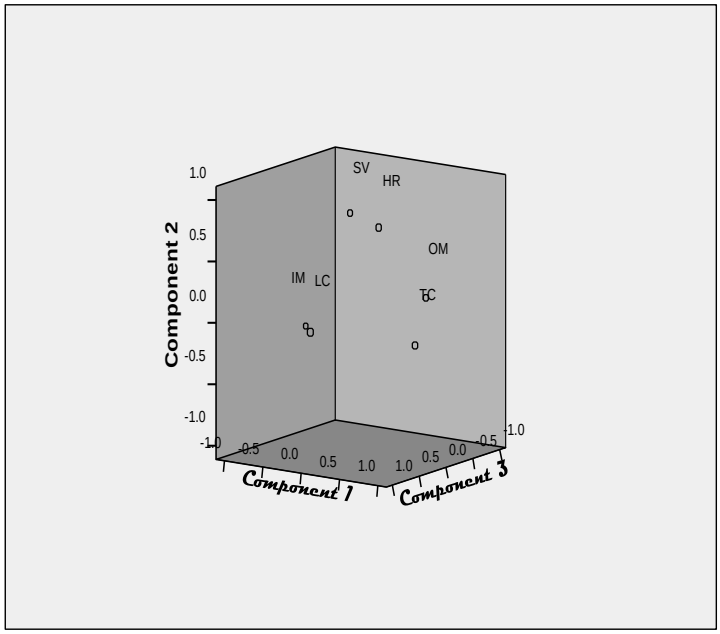
Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 5 iterations.

Table 4.33: Component Transformation Matrix

Component	1	2	3
1	.793	.448	-.413
2	-.444	.889	.111
3	.417	.095	.904

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Component Plot in Rotated Space



4.7 Quality, Availability and Affordability of SK+F Products (Retailers and Executives)

SK+F produces high quality products. The retailers survey results show that 36.7% of the respondents rated products from EK+F as better, 31.7% as good, 18.3% as excellent as shown in Table: . Regarding availability of EK+F products the survey results show that 33.3% rated as good, 31.7% as better and 21.7% as excellent. With regards to affordability 36.7 % respondents rated EK+F as good, 28.3% as excellent, 26.7% as better and 8.3% as moderate.

Table 4.34 : Quality, Availability and Affordability

A. Quality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	11	18.3	18.3	18.3
	Better	22	36.7	36.7	55.0
	Good	19	31.7	31.7	86.7
	Moderate	8	13.3	13.3	100.0
	Total	60	100.0	100.0	

B. Availability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	13	21.7	21.7	21.7
	Better	19	31.7	31.7	53.3
	Good	20	33.3	33.3	86.7
	Moderate	8	13.3	13.3	100.0
	Total	60	100.0	100.0	

C. Affordability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	17	28.3	28.3	28.3
	Better	16	26.7	26.7	55.0
	Good	22	36.7	36.7	91.7
	Moderate	5	8.3	8.3	100.0
	Total	60	100.0	100.0	

4.3 Customer View on SCM of RPL

Customer perception about SCM of **RPL** reveals that 46.7% respondents did not know it, 33.3% as know somehow and 20% know well.

Table 4.35: Customer Perception on SCM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Know Well	6	20.0	20.0	20.0
	Know Somehow	10	33.3	33.3	53.3
	Do not know	14	46.7	46.7	100.0
	Total	30	100.0	100.0	

Regarding quality of **RPL** products 43.3% respondents rated as better, 36.7% as good, 13.3% as moderate and 6.7% as moderate.

Table 4.36: Quality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	2	6.7	6.7	6.7
	Better	13	43.3	43.3	50.0
	Good	11	36.7	36.7	86.7
	Moderate	4	13.3	13.3	100.0
	Total	30	100.0	100.0	

Regarding availability of products 36.7% respondents rated **RPL** as better, 26.7% as good, 16.7 % as moderate, 6.7% as excellent and 13.3% as poor.

Table 4.37: Availability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	2	6.7	6.7	6.7
	Better	11	36.7	36.7	43.3
	Good	8	26.7	26.7	70.0
	Moderate	5	16.7	16.7	86.7
	Poor	4	13.3	13.3	100.0
	Total	30	100.0	100.0	

Regarding affordability of products 36.7% respondents rated RPL as good, 307% as moderate, 23.3 % as better, 6.7% as poor and 3.3% as excellent.

Table 4.38: Affordability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	1	3.3	3.3	3.3
	Better	7	23.3	23.3	26.7
	Good	11	36.7	36.7	63.3
	Moderate	9	30.0	30.0	93.3
	Poor	2	6.7	6.7	100.0
	Total	30	100.0	100.0	

Regarding frequency of use of products 46.7% respondents reported more frequently use while 53.3 mentioned occasionally use.

Table 4.39: Frequency of Use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More Frequently	14	46.7	46.7	46.7
	Occasionally	16	53.3	53.3	100.0
	Total	30	100.0	100.0	

Regarding rating of products 33.3% respondents rated SK+F as good, 26.7% as good, 23.3 % as moderate, 16.7% as excellent.

Table 4.40: Rating of Products

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	5	16.7	16.7	16.7
	Better	8	26.7	26.7	43.3
	Good	10	33.3	33.3	76.7
	Moderate	7	23.3	23.3	100.0
	Total	30	100.0	100.0	

Regarding perception SCM 46.7 respondents reported do not know, 33.3% as somehow know and 20% as know well.

4.9 Risks in Pharmaceutical Supply Chain

Access to medicine as a human right is one of the main objectives of healthcare systems. Pharmaceutical supply chain should provide medicines in the right quantity, with the acceptable quality, to the right place and customers, at the right time and with optimum cost to be consistent with health system's objectives and also it should make benefits for its stockholders (Kaufmann et al.). Any risks affecting the pharmaceutical supply chain, not only can waste the resources but also can threaten the patients' life by hindering access to medicines. Risk management is not only important in the pharmaceutical supply chain, but also is a major player in other aspects of pharmaceuticals such as prescription and uses of medicine (Schneider et al. (2008). Assessing and implementing the strategies to manage the risks in pharmaceutical supply chain is essential in health systems. The importance of the risk management is becoming more vital because medicine is a highly regulated product which is under the controls and tight limitations of public regulatory authorities(Craighead et al, 2006, Koh et al, 2003). Also supply of medicines as strategic goods in developing countries with much economic, social and political instability is faced with more uncertainties and vulnerabilities (Enyinda et al., 2010).

Supply chain risk management (SCRM) is a crucial and indivisible part of supply chain managements to achieve mentioned objectives. SCRM attempts to minimize supply chain vulnerability and uncertainties through mitigation plans(Breen, L 2008, Vanany, 2010) Therefore it is essential to identify, assess and prioritize all risks to reduce and control the probability and impacts of unfortunate events. It is aimed to managing the risks in a complex and dynamic supply and demand networks.

Various works have been reported regarding different aspects of supply chain risks and risks management in the manufacturing sectors. In pharmaceutical sector, although there are some review studies in supply chain risk management with focus on counterfeit, supply chain logistics, quality assurance and enterprise risk management but there is not any systematic review on the pharmaceutical risk management with perspective of manufacturers' risks; meanwhile, there are some systematic reviews on SCRM in other industries.

4.9.1 Risk Responses of Retailers

About 65% of the retailer respondents reported supply and supplier risks, 41.7% as organization and strategies risks, 68.3% as financial risks, 75% as logistic risks, 38.3% as market issues, 68.33% as regulatory risks, 61.7% as inventory risks, 56.7% counterfeit risks. The results are shown in Table 4.20: Supply Chain Risks (Retails)-

Table 4.41: Supply Chain Risks (Retails)

Sl	Risks	Yes		No	
		Frequency	Percent	Freq	Percent
1	Supply and Supplier Risks	39	65	21	35
2	Organization & Strategic Risks	25	41.7	35	58.3
3	Financial Risks	41	68.3	19	31.7
4	Logistic Risks	45	75	15	25
5	Market Issues	23	38.3	37	61.7
6	Regulatory Risks	41	68.3	19	31.7
7	Inventory Risks	37	61.7	23	38.3
8	Counterfeit Risks	34	56.7	26	43.3

From the above analysis it is evident that logistic risks is the most important risks followed by regulatory risks, financial risks, supply and supplier risks, inventory risks, counterfeit risks, organization and strategies risks and market issues.

4.9.2 Risk Responses of Executives

About 80% of the executive respondents reported supply and supplier risks, 26.7% as organization and strategies risks, 90% as financial risks, 86.7% as logistic risks, 63.3% as market issues, 86.7% as regulatory risks, 90% as inventory risks, 76.7% as counterfeit risks. The results are shown in Table 4.42:

Table 4.42: Supply Chain Risks (Executives)

Sl	Risks	Yes		No	
		Frequency	Percent	Freq	Percent
1	Supply and Supplier Risks	39	65	21	35
2	Organization & Strategic Risks	25	41.7	35	58.3
3	Financial Risks	41	68.3	19	31.7
4	Logistic Risks	45	75	15	25
5	Market Issues	23	38.3	37	61.7
6	Regulatory Risks	41	68.3	19	31.7
7	Inventory Risks	37	61.7	23	38.3
8	Counterfeit Risks	34	56.7	26	43.3

A. Supply & Supplier Risks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	6	20.0	20.0	20.0
	Yes	24	80.0	80.0	100.0
	Total	30	100.0	100.0	

B. Organisation & Strategies Risk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	22	73.3	73.3	73.3
	Yes	8	26.7	26.7	100.0
	Total	30	100.0	100.0	

C. Financial Risk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	3	10.0	10.0	10.0
	Yes	27	90.0	90.0	100.0
	Total	30	100.0	100.0	

D. **Logistic Risk**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	4	13.3	13.3	13.3
	Yes	26	86.7	86.7	100.0
	Total	30	100.0	100.0	

E. Market Issues

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	11	36.7	36.7	36.7
	Yes	19	63.3	63.3	100.0
	Total	30	100.0	100.0	

F. Regulatory Risks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	4	13.3	13.3	13.3
	Yes	26	86.7	86.7	100.0
	Total	30	100.0	100.0	

G. Inventory Risks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	3	10.0	10.0	10.0
	Yes	27	90.0	90.0	100.0
	Total	30	100.0	100.0	

H, Counterfeit Risks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	7	23.3	23.3	23.3
	Yes	23	76.7	76.7	100.0
	Total	30	100.0	100.0	

It is found that financial and inventory risks are the most important risks followed by logistic risks, regulatory risks, counterfeit risks, market issues and organization and strategies risks.

4.10 Recommendation for Effective and Efficient Supply Chain (Retailers)

The most important recommendation form the retail responses is provide more affordable drugs (26.7%). Customer relationship management is also found as an important recommendation (20%). The other recommendations are decentralized distribution system (16.7%), improve data and communication system (13.3%, competitive price(8.3%), provide more logistics(6.7%), strengthen management structure(5%) and open wholesale and retail branches(3.3%).

Table 4.43: Recommendation for Effective and Efficient Supply Chain(Retilers)

		Responses		Percent of Cases
		N	Percent	
RES(a)	Open Wholesale and Retail Branches	2	3.3%	3.4%
	Provide More Affordable Drugs	16	26.7%	27.1%
	Strengthen Management Structure	3	5.0%	5.1%
	Improve Data and Communication System Competitive	8	13.3%	13.6%
	Price Provide More	5	8.3%	8.5%
	Logistics	4	6.7%	6.8%
	Customer Relationship Management	12	20.0%	20.3%
	Decentralized Distribution System	10	16.7%	16.9%
	Total	60	100.0%	101.7%

a Dichotomy group tabulated at value 1.

Chapter Five: Recommendations and Conclusion

5.1 Recommendations

From the analysis of the results obtained from the surveys, the following recommendations have been made to enable 'Radiant Pharmaceuticalas Limited' to achieve its main vision is to lead the national pharmaceutical market, to be recognized as a multinational conglomerate from Bangladesh and stand out as a model of efficiency & trust to our collaborators, consumers, health care professionals & society. These include:

1. ''Radiant Pharmaceuticalas Limited' should employ more marketing staff in order to effectively distribute its products to a wider customer base.

2. 'Radiant Pharmaceuticalas 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 Bangladesh form a larger proportion of the population.

3. To help the distribution chain, ''Radiant Pharmaceuticalas 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 Bangladesh, 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. 'Radiant Pharmaceuticalas 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. ''Radiant Pharmaceuticalas Limited'' should buy more distribution vans to improve its supply chain system.

6. The Government of Bangladesh should encourage the development of local pharmaceutical manufacturing capacity by reducing or wavering 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.

7. Government should discourage foreign pharmaceutical companies from considering and/or taking Bangladesh as a dumping site for the substandard or disapproved products by other national food and drugs authorities.

8. **Medicine export should be emphasized to LDCs than any other countries:** Some companies are aggressive to enter the highly regulated overseas markets, such as, USA, Australia, Europe, Canada, France, and Golf countries. But the practical observation is that getting export status to those countries requires huge investment in the manufacturing plant to achieve certification from different international drug regulatory authorities, highly sophisticated documentation, and huge initial capital investment. Actually the export volume to the highly regulated countries will not be easily feasible; rather we can perform pretty well and can potentially increase our export if the exporters become more attentive to LDCs. Among 50 LDCs, only Bangladesh has its strong fundamental and modern manufacturing base, hence we can easily share the drug market of rest of the LDCs. So, considering the practical situation, the LDCs should be the targeted markets of our pharmaceuticals, of course, side by side, moderately regulated and highly regulated markets may be explored gradually. However, we can establish joint-venture, tool manufacturing, and contract-manufacturing business with the companies of developed countries, not only for exporting medicines.

9. **Establishing Export cell by the govt./private Consultancy firms may promote Pharma export:** Government can establish specialized Export Cell to promote exports of pharmaceuticals to grab and capitalize the huge export opportunities in LDCs. Some private Consultancy firms having experience and expertise in drug export professionally can be engaged to assist the pharmaceutical companies who do not have the technical and expertise know-how to go through the entire process of export, or have lacking in documentation skills or even do not have the skilled man power to deal with the drug export. Thus, Consultancy firms can play a significant role to explore export to maximum countries, accelerate export activities, and to reduce the overall cost of export. Even some small companies having International Marketing Department (IMD) can explore the benefits of outsourcing by hiring

Export Consultants to reduce its overhead expenditure and make a comparative study of cost-benefit ration to justify having IMD.

5.2 Conclusions

The pharmaceutical sector has already been declared as the thrust sector by the government of Bangladesh. Bangladesh has built a strong baseline and going towards the self-sufficiency for the production of medicine. Meanwhile, some companies have started to produce vaccine, insulin, anticancer drugs, etc. Our pharmaceutical industries are successful in domestic market. Now, it's the time to grow our international market because we passing golden time getting the opportunity of patent exemption by the TRIPS until 2030. Besides the above discussing points, providing cash incentive by the govt. to the medicine exporters, like RMG may encourage pharmaceutical exporters. International fair arrangement by Export Promotion Bureau (EPB) is a very effective way to search buyers and to establish business in a new country. A lot of initiative have been taken by BAPI in different times, such as, high level pharmaceuticals delegation team visited foreign countries to explore export initiated by BAPI. This organization also upheld the demand and urged to the government and other concerning authorities for API Park, Bioequivalence test laboratory, Central drug testing laboratory, cash incentives, problems in remit transfer and sample sending etc. But many issues are yet to resolve. We have already wasted our valuable time and still losing to build our infrastructure for export. The government should really be attentive to remove all the obstacles and solve all the problems to see pharmaceutical sector as a vital player in international market.

From the study it can be concluded that ''Radiant Pharmaceuticalas Limited' has an effective supply chain management strategy even though there is still room for improvement. ''Radiant Pharmaceuticalas Limited'' provides good quality and efficacious medicines that are affordable and available to all level of income earners in Bangladesh. ''Radiant Pharmaceuticalas Limited' does this by importing both patented and generic medicines from the world's leading pharmaceutical companies so nationals from all over the world in Bangladesh can have their trusted brands of medicines. Again, ''Radiant Pharmaceuticalas Limited'' produces some of the medicines locally from an ultra modern factory plant in Tongi and distributes them through its own wholesales and other members of the pharmaceutical distribution chain to make sure accessibility of good quality and efficacious medicines at affordable prices. Moreover, the Bangladesh 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 Bangladeshis, high concentration of retail pharmacies in major cities and rural areas, 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 ‘‘Radiant Pharmaceuticalas 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. The sector needs adequate support from the government to develop the API park to make the medicine products more competitive in global markets. The establishment of central drug testing laboratory is also required to strictly maintain the high standards of medicine and a bio-equivalence testing facility to the clinical testing which is prerequisite to register our products in the regulated markets. Manufacturers also need an uninterrupted supply of power and gas to the production units and special economic zones for the pharma industry with tax benefits, collaboration between the industry and universities is required to promote research activities particularly in developing specialized drug delivery systems.

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