



## Reverse Logistics in Pakistan's Pharmaceutical Sector

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### ABSTRACT

*Pakistan's pharmaceutical sector consists of nearly 400 companies but top 100 companies handle 90 percent of the pharmaceutical business. The sector includes 30 multinational companies accounting for 50% of the business. The competition with multi-nationals has played a positive role in managing forward logistics through good supply chain practices. Management of returns is largely accommodated as a regulatory and customer service necessity and handled as a market and sales activity. The reverse logistics (RL) process if managed correctly can improve the efficiency of overall supply chain. This research found that medicines retrieved from the market often have residual life and due to improper management lose their value while lying in sales centers. In some cases where return is due to damaged packing full market value could be recovered. Donation of unexpired medicines to charitable hospitals can add to the corporate image. Proper management of RL will be helpful in ensuring security of supply chain and prevent infiltration of counterfeit medicines. Application of better inventory management through Radio frequency identification (RFID) and other information technology applications will improve RL as well as overall supply chain. It has been estimated that RL management could save at least 10% of the cost of present reverse logistics estimated at nearly Rs 5 billion.*

### Introduction

Pharmaceutical industry is among the most organized industrial sectors in Pakistan. The major players in this sector are the multinational companies accounting for almost 55% of the pharmaceutical business in Pakistan (Memon, 2009). The competition with global players has been a motivating factor for the local companies to strive for excellence and efficiency too. The total medicine sales in Pakistan was of the order of Rs 136 billion in 2009 projected to increase by 10% to Rs 154 billion in 2009 (Business Monitor International [BMI], 2009).

An estimated 386 pharmaceutical companies are registered to manufacture and sell pharmaceutical products in Pakistan. This number includes just over 30 multinationals companies (Pervez, 2008). Despite the above-mentioned strength of pharmaceutical companies the real players' number around 100. The top 50 pharmaceutical companies control 80% of the market share while the top 100 companies account for 90% of the pharmaceutical business (Pervez, 2008).

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\* The material presented by the author does not necessarily portray the view point of the editors and the management of the Iqra University, Karachi.

Pakistan meets 80% of its demand from local production while 20% of the medicines are imported. The local production however is largely dependent on imported raw materials as almost no raw materials are produced locally (Pervez, 2008).

Stiff competition among the top pharmaceutical companies, awareness of best global practices has meant that the need to establish efficient and responsive operations in the pharmaceutical sector.

### **Supply Chain Management**

What is interesting is that although supply chain recognized returns as a part of customer service; reverse logistics as a process has often been included as if it were an afterthought in the supply chain operations. The Council of Supply Chain Management Professionals (CSCMP, 2009), for example defines supply chain as “Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies” (CSCMP, 2009).

The return component of supply chain is often implied but not specifically mentioned in these definitions so much so that the reverse logistics is often given a separate definition with supply chain being defined as consisting of a forward logistics and a reverse logistics. The reverse logistics is introduced as: “The process of planning, implementing, and controlling the efficient flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal” (Rogers & Tibben-Lembke, 1998).

In simpler words reverse logistics (RL) can be understood as the process of moving the goods from their designated final destination to the point where they were initially produced in order to recover value or for proper disposal. The forward logistics being the focus of all businesses has meant that reverse logistics has mostly been considered necessary from a customer service perspective and its true potential for value extraction, reducing costs and efficiently meeting regulatory requirements.

Pharmaceutical sector in Pakistan has recognized the importance of supply chain management. This paper investigates if the sector is managing reverse logistics with the same concern and how could the sector benefit from efficient reverse logistics management practices.

### **Reverse Logistics**

De Brito and Dekker (2004) argue that reverse logistics process needs to be analyzed from four perspectives; why, how, what and who; the driving forces behind reverse logistics (why), the recovery process (how), (what) type of products and the facilitators (who) of reverse logistics (Skinner, Anway, Savenkova, Gore, & Crews, 2008).

- Why reverse logistics? The main reasons for considering RL are economic, legal and good corporate citizenship.
  
- The residual value in the returned product, ability to salvage some of the inputs and reducing disposal cost are some of the direct and indirect economic incentives of handling returns. A survey conducted by Rogers and Tibben-Lembke (1998) showed that 27.5% of those involved in reverse logistics cited recapturing value as one of the reason for implementing RL.

- The regulatory requirements to recover and /or take the items back (EEC Directives on Waste, 1975) in many cases are other reasons for implementing reverse logistics. Rogers and Tibben-Lembke (1998) found that 28.9% of respondent to their survey indicated legal disposal issues for RL.
- A good corporate image is another reason for considering reverse logistics. Companies pride themselves in protecting the environment and minimizing environmental impact of their supply chain.
- Like corporate image, competitive reasons are often cited as one of the most important reason for implementing RL. As a part of customer service companies are following liberal return policies of their competitors to stay competitive (Autry, 2005). Nearly 65% of the respondent to the survey cited competitive reasons for accepting returns (Rogers & Tibben-Lembke, 1998).
- In the analysis of what type of products are considered for reverse Logistics we need to consider what is being returned or discarded.
  - This is a vast area and purely form an economic consideration include items such as magazine and book publishing greeting cards, electronic distributors, computer manufacturers, CD-ROMs, printers, mass merchandise, auto industry parts, consumer electronics, household chemicals etc (Wan, 2007; Dhanda & Peters, 2005; Seitz, 2004; Rogers & Tibben-Lembke, 1998).
  - From regulatory perspective effectively any item made can be recalled due to manufacturing defect, expiry, safe disposal or recycling
  - The competitive reasons and clearing the old stock from the market (clean channel) effectively all products are subject to return and hence reverse logistics
- The actors who play a role in the reverse logistics process include member of forward supply chain, specialized facilitators of reverse logistics such as collection agents, recycling specialists, public private organization and even charitable organizations. For sensitive products where intermediaries can damage company reputation, organizations set up their own reverse logistics mechanisms. Issues such as safety and health risk in handling or misappropriation of returning product also justifies a company managed collection system.

Any man- made product is discarded after its useful life. What happens to this product afterwards is a concern for reverse logistics. In many cases, legal issues require the producer to handle its product's disposal.

The key to maximizing net asset recovery in the reverse logistics process is to move the recycled items as far up the value spectrum by refurbishment as possible (Sweeny, 2008). An item returned to the manufacturer may result in very little value recovery if it has to be scrapped. Refurbishment can result in substantial recovery of the asset and if the returned item can be restored for return to stock, as much as 70- 95% of its value can be recovered (Sweeny, 2008).

Reverse logistics for competitive, legislative or asset recovery perspective has a goal of high recovery rates at the lowest possible cost. In many cases, reduction of waste also supports the environmentally responsible behaviour (Wu & Dunn, 1995). However, the focus is not environment. A new term, 'green reverse logistics' has been coined to show the difference between green logistics and reverse logistics (Rogers & Tibben-Lembke, 2001).

In view of the importance of reverse logistics for the supply chains, desire to minimize costs, extraction of residual value and environmental friendly disposal of products, RL has acquired immense importance in the recent years. Advances in inventory management and information technology have enabled the supply chains to monitor and manage their products and systems from inception to ultimate disposal.

### **Reverse Logistics & Pharmaceutical Sector**

Pharmaceutical sector is possibly one of the most important sectors where the high costs of products, low to moderate shelf lives, and potential for unscrupulous intermediaries compromising the integrity of products are major concerns. In addition, infiltration of counterfeit medicine and hazards associated with misuse of many of the products give ability to track, recall, retrieve, salvage, and ensure effective removal when necessary a very high degree of importance for the pharmaceutical industry.

### **Expired & Damaged Product Return**

As we can see from above, the importance of effective RL management is obvious. The wrongly delivered, expired and products with damaged packing need to be quickly recovered and replaced with saleable product to avoid disruption in sales. It is imperative to make sure the channel is completely cleared of all expired medicines to avoid legal complications.

The forward supply chain follows a “one-to-Many” model that is one company supplies the product to many customers/channel members; the reverse logistics on the other hand follows a “many-to-one model” where more customers or downstream channel members are returning the expired or recalled product to the company (Chen, 2005).

An effective return policy by the company can ensure better cooperation from downstream channel members and ensure a complete clearing of channels. The planning of reverse logistics requires a multi objective optimized approach. What needs to be done with the returned material is the next part of RL management.

### **Counterfeiting Concerns**

Counterfeiting is a major concern for the pharmaceutical industry. According to the World Health Organization, “a counterfeit medicine is one, which is deliberately and fraudulently mislabeled with respect to identity and/or source. Counterfeit drugs may contain wrong active ingredients, wrong amounts of the ingredients or no active ingredients at all” (World Health Organization [WHO], 2009).

Medicines are expensive. If patients receive a counterfeit medicine, the benefit they are expecting to derive from the drug is not available and they lose trust in the pharmaceutical companies. This lack of trust is also damaging to the future profits of the companies. Counterfeit drugs are a significant problem all over the world but in Pakistan, this is a problem of great magnitude. It has been estimated that 40-50% of all medicines marketed in Pakistan qualify for counterfeit drugs by WHO definitions (Gibson, 2004).

The Pakistan Pharmaceutical Association however claims that the figures are exaggerated and the percentage of counterfeit drugs is no more than 0.4% of the medicine produced in the country (Pakistan Pharmaceutical Association [PPMA], 2005). What is certain is that counterfeiting is undermining patients’ confidence in medicines and is damaging to the profitability of the industry. Tracking and tracing medicine in downstream channels is therefore of critical importance to the industry.

The information available on pharmaceutical reverse logistics suggests that 3-4% of the medicines sent out in the forward cycle eventually return to the pharmaceutical company (Basta, 2008). The ability to trace and track medicines supplied to the market can protect the

customers, pharmaceutical companies image and also ensure that only the genuine products are accepted back when the expired medicine are cleaned from the market.

### Security Issues in Pharmaceutical Supply Chain

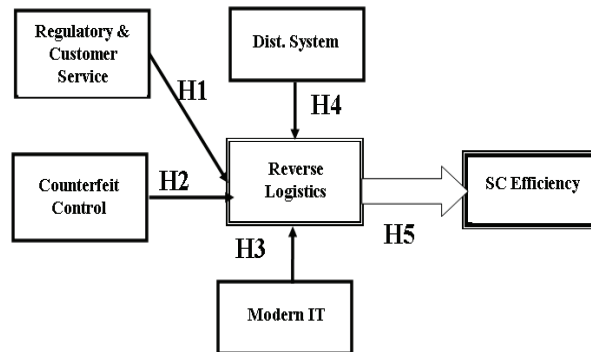
The concern with the integrity of medicine in the forward and reverse logistics, ensuring customer confidence in the genuineness of the medicine and protecting the supply chain from saboteurs and unscrupulous elements has created a need to invest in security technology for the supply chain. International Society for Pharmaceutical Engineering (ISPE, 2009) provides a more detailed assessment of security devices available for protecting the supply chain. From a simple unidirectional bar code that provides enough information for the sales point, 2-D, 3-D bar codes and Radio Frequency Identification (RFIDs) Systems are now available and are gradually being introduced to monitor the integrity of the medicines and ensure RL process too. Basta (2008) argues that even for highly unsafe product requiring mandatory recall, the recovery of recalled medicine is rarely 100%. Introduction of modern technology can eliminate these concerns.

### Reverse Logistics Model

Reverse logistics (RL) if managed well can help improve the supply chain (SC) efficiency. The factors necessitating the RL process impact the efficiency of reverse logistics, which in turn affects the overall supply chain efficiency. The factors include the regulatory and customer service reasons for returns, distribution system needs, ensuring security of medicine, counterfeiting concerns and the role of IT in managing RL.

The factors given above show that RL is dependent on the first four factors, while effective RL will result in efficient supply chain performance. The model can thus be depicted as below.

Figure 1:



The research on RL proposes to explore the impact of these factors through a survey of the stakeholders in pharmaceutical business. We propose to investigate the following hypotheses through a Likert scale based survey to ascertain the impact of these factors and perception of RL in the industry. The hypotheses are:

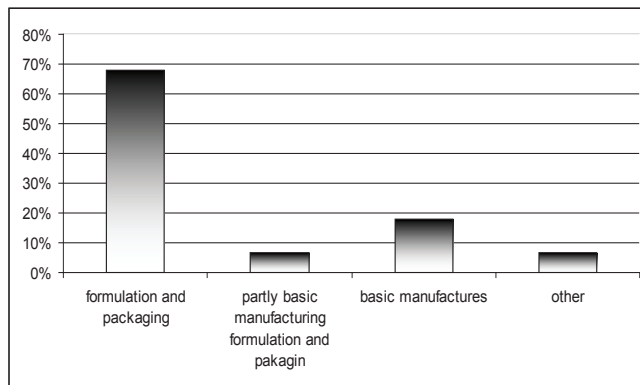
- H1** Regulatory and customer service returns are positively related to RL
- H2** Anti-counterfeit measures are positively related to RL
- H3** IT applications are positively related to RL

- H4** Distribution system effectiveness is positively related to RL
- H5** Effective RL is positively related to efficient supply chain

In addition to the Likert surveys mentioned above, interviews based structured survey was also carried out to qualitatively determine the perceptions regarding managing reverse logistics.

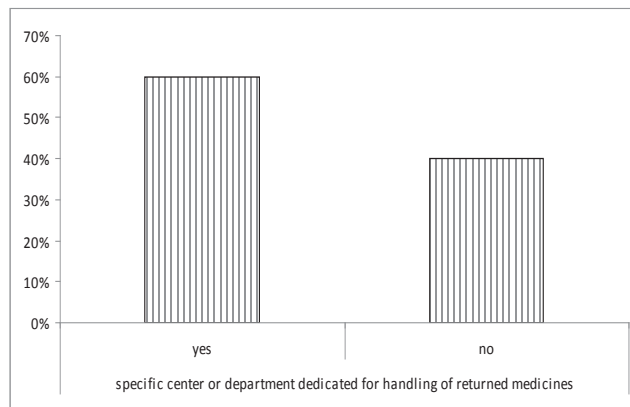
This survey showed that only 15% of the companies claimed to be involved in some kind of basic manufacturing (Exhibit-1). All others were importing basic raw materials and carrying out formulation & packing in Pakistan. The extent of basic manufacturing appeared to be restricted to last few stages of imported semi-finished active ingredients. The government is encouraging basic manufacturing and offers tax concessions for this purpose. At present for all practical purposes, the production can be considered to be based on imported raw materials.

**Exhibit 1:** Type of manufacturing



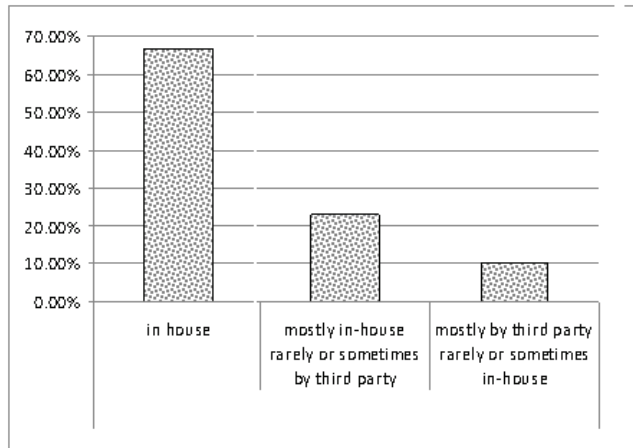
The survey also showed that supply chain practices are well entrenched with more than 60% companies claiming to have dedicated supply chain departments (Exhibit-2).

**Exhibit 2:** Respondent companies with dedicated SC Department



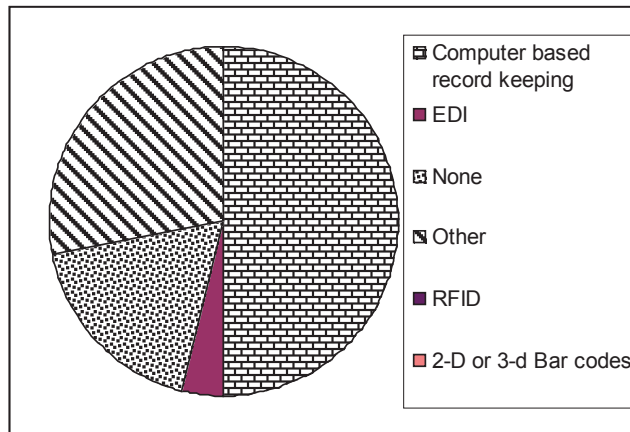
Almost 85% of the respondent indicated handling returns through company managed channels (Exhibit-3). Only 15% respondent trusted third parties to handle their returns.

**Exhibit 3:** Handling of return medicines (RL)



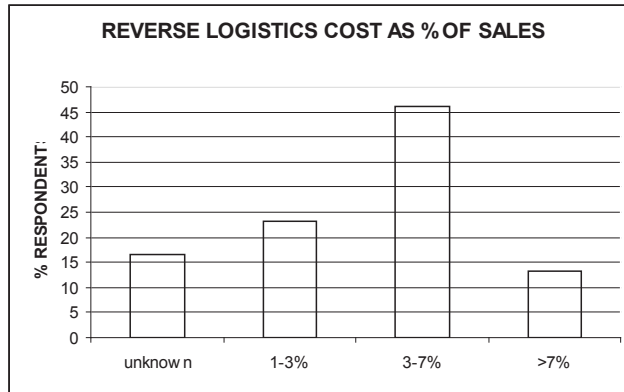
The information technology use in handling returns is mostly limited to computer-based record keeping, unidirectional bar codes that assist at sales point are being printed on packaging but 2-D and 3-D bar codes or RFIDs are not being used. Nearly 20% respondents indicated that information technology was not applied in handling returns (Exhibit-4).

**Exhibit 4:** IT use in handling of RL



The reverse logistics costs are generally accounted as a part of marketing and sales expense. Nearly 15% of the respondents indicated as real cost being unknown, while 45% estimated the cost to be between 3-7%. This is in agreement with the average reported internationally and in Pakistan (Basta, 2008; Hunter, Droege, Marsh, & Droege, 2005).

**Exhibit 5:** RL cost as a % of sales



The information collected through structured survey reinforces our belief that RL needs to be managed more efficiently to improve the efficiency of the supply chain. The statistical analysis of the survey validates our hypotheses as discussed below.

**Statistical Analysis**

A total of 150 questionnaires were sent out to potential respondent. Follow-ups and personal approaches resulted in over 50 responses. The proportion of these responses was 30% multinational and 70% Pakistani companies that is very close to the distribution of major pharmaceutical companies. The collected data from Likert survey as descriptive statistics showing the most dominant response; mode and the standard deviation.

For inferential analysis, we used T-test. T-Test can be applied to test is useful in testing if there is a considerable difference between the means of two groups such as those responding in affirmative and those disagreeing with the hypothesis. Statistical passage such as SPSS can be used to carry out T-Test and interpreted for equality of variance and equality of means (Exhibit-6).

**Exhibit 6:** T-Test results for the hypotheses

	Test Value = 4					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Hypothesis 1	-1.170	29	.252	-1.6667	-.4581	.1248
Hypothesis 2	-5.413	29	.000	-.80667	-1.1114	-.5019
Hypothesis 3	-8.028	29	.000	-2.000	-2.51	-1.49
Hypothesis 4	-1.027	29	.313	-.15556	-.4652	.1541
Hypothesis 5	12.042	29	.000	.833	.69	.97



The T-test analysis shows that our hypotheses are accepted with the exception of second hypothesis, which is not conclusively accepted.

**Exhibit 7:** T-Test results for the hypotheses

H1	Regulatory and customer service returns are positively related to RL	accepted
H2	Anti-counterfeit measures are positively related to RL	inconclusive
H3	IT applications are positively related to RL	accepted
H4	Distribution system effectiveness is positively related to RL	accepted
H5	Effective RL is positively related to efficient supply chain	accepted

### Discussion and Conclusions

The implications of this research for Pakistan's pharmaceutical industry are numerous. It is clear that reverse logistics has been recognized as a necessity for regulatory and customer service objectives. Cleaning the channel of nearly expired drugs is necessary for consumer satisfaction. Reverse logistics has not received the attention it deserves and little or no attempt is being made to manage RL for managing costs and efficiency.

Delayed responses, long return processing times, poor control of returned medicines create potential problems for the pharmaceutical companies. Poor control of returned medicine exposes pilferage and infiltration of the expired medicine into the market with counterfeit packaging. Cleaning of the channel for customer service reasons results in return of medicines, which have some time left to expire. This medicine could help boost company image if they are given away to charitable hospitals to provide free medicine for the poor.

It is clear that present RL focuses on retrieving the medicine that have a few months of shelf life due to consumers' reluctance to buy medicines that have been on the shelf for more than 90% of their shelf life. These medicines are part of cleaning channel and could be legally used to help the poor and improve corporate image of the companies. The damaged packaging based returns can be returned to the supply chain. If managed properly, even in this sensitive area 10 percent or more of the returned medicine could be used to add value to the supply chain resulting in value addition of nearly Rs 500 million at the present estimate cost of reverse logistics.

The pharmaceutical sector in Pakistan consists of 285 to 300 companies but the real business is limited to the top 50 companies who control 80% of the market share. In fact, the top 100 companies control 90% of the market share. This leaves the remaining 200 or so companies with a minor share of 10% of the total market. Very few of these companies have the logistics support to ensure an efficient network of product delivery and reverse logistics. We sent out more than 250 survey forms to known addresses of all companies. The extent of response from the smaller companies indicates that some of these companies are either exporting generic medicines or have little or no business in Pakistan. Lack of marketing infrastructure in smaller companies can be problematic in ensuring efficient reverse logistics and can even create additional risk of counterfeiting of their products.

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