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Critical Success Factors of Reverse Logistics (RL) in Construction and Pharmaceutical sector in Pakistan

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Abstract—
In this paper, critical success factors of reverse logistics in Pharmaceutical and construction industries are discussed during the process of returning of expired medicines and multiple items in construction or during demolishing i.e. cement, bricks, paints, wises, pipes etc. Studies are conducted in the areas of planning of reverse logistics (RL) including risk, effects of customer relationship management (CRM), role of information technology (IT), Inventory management process, Re-Engineering for any value addition and disposal of items are observed. Role of state and its laws & policies are also discussed. It has been observed that all these factors have positive affects in the success of Reverse logistic except the re-engineering process for value addition which is not possible in Pharmaceutical sector which is producing lifesaving drugs. Re-Engineering is possible in construction sector but not practiced.

Index Terms— Reverse logistics, Critical Success factors (CSF), distribution centers, customer satisfaction, information flow and reprocessing, Construction

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1. Introduction:

REVERSE logistics is defined as the returns, recycle, and reprocess of products and materials. Reverse logistics moves products and materials again from their existing destination for the purpose of capturing value, or suitable disposal. Reverse logistics generally involves events necessary to retrieve, transport and dispose of goods. These goods are moved backward from the consumer and the process includes the information flows associated with tracking and credit processes.

To find the better solution of Reverse logistics as compare to competitors is becoming a huge challenge for investors and their execution teams (Wiggins, 2018). Reverse logistics is an approach that aims to increase the life of product before its expiry. A reverse logistics involves all stakeholders

across the supply chain. Management devises the strategy for the moving back the recycled items to its real manufacturer. Reproduction and reutilization of items after reprocessing or reengineering increase the performance of industries.

Production of long-lasting items required huge investment of money, labor, material etc (Wiggins, 2018). Some products having predictable life are discarded as they are costly. These products that reaches to end of their operational lives are refurbished by the manufacturers to get functional products. The core objective of reverse logistics in supply chain is to reduce costs. Item may move back at any stage of its life cycle. Moreover, moving back of items is financially concerning for retailers around the world. Items of estimated amount of $100 billion were returned at USA

Customer satisfaction and retaining is an external manipulating aspects for any organization in reverse logistics. Therefore, organizations should focus on product quality, reliability and specifications. Customers should be well guided about the procedures of reverse logistics. Companies need to determine strategic elements and competencies in the implementation of reverse logistics. It has been observed by the researcher that lack of alignment of critical success factors leads in failure of organizations. Therefore, failures in determining the critical success factors of Reverse logistics would create disorder in supply chain and hence in satisfying and retaining of customers (Wiggins, 2018).

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2. Literature Review

2.1. Challenges for Reverse Logistics

(Raouf2, Reverse Logistics: An Empirical Study for Operational Framework, 2013)

Sector	Items for Reverse logistics	Description
Construction	Concrete, Iron, Bricks, Woods, Tiles and ceramics, pipes, wires	Reprocessed concrete and bricks can be used in construction of temporary roads. It may also be used after qualified lab test for any further construction. Woods can be used in furniture or in case of low grades in lab test, it can be used as a source of energy
Pharmaceutical	Expired medicines	Pharmaceutical industry transport their products in multiple countries or cities. All unconsumed medicines are transported back to manufacturer for proper disposal
Steel	Steel	Leftover during manufacturing or in any utilization process, Scrap, broken parts etc are re-transported to steel industry either for repair or reprocess
Textile	Cartons, Plastics bags	Packing leftovers. Both can be recycled for production of paper and poly.
General	General	Publishing Material (Newspapers, magazines, books, greeting cards, electronic distributors, computer manufacturers, CD-ROMs, printers, mass merchandise, auto industry parts, consumer electronics, household chemicals etc

2.2. Awareness of Reverse Logistics

Initial product has a great value for consumer. Therefore all the focus and efforts are put on product manufacturing. Though a rejected material is low but has a great potential of bring money back. Scraps are sometimes handover to housekeeping companies despite recycling firms.

2.3. Technical Skill

Mostly uneducated people are working in reverse logistics and there are less educational platforms to educate them.

2.4. Quality

Quality of material cannot be of standard as it happens in product focus process. Therefore every time one has to deal according to existing level of quality.

2.5. Financial

Business facilitator like bank or other loan providing intuitions may not encourage to reverse logistics to the extent it is offered to forward logistics.

Following table shows the reprocess-able items to transport back from consumer (Sobotkaa, J. S., 2017):

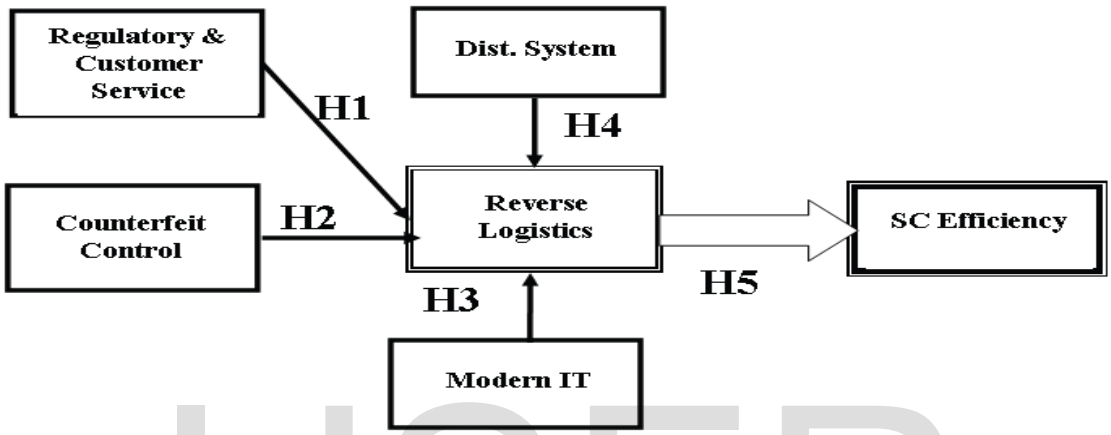

Figure-I (Subzwari, A. K. 2009)

A well-managed reverse logistics provide an efficient supply chain system. Research explores the impact following four factors have on reverse logistics to improve supply chain efficiency (Subzwari, A. K. 2009). The research was conducted in Pharmaceutical sector of Pakistan.

The said research concluded that three factors are positively related to Reverse logistics while H2 (counterfeit control) was inconclusive.

This research studied and compared the revenues of different pharmaceutical companies and their marketing strategies and segmentation. Research observed that there are different medicines that are manufactured for curing o particular disease but their sales are different due to prices. High prices will reduce the probability of selection of medicine and existence of medicine in the market having high expiry dates will increase the probability of their selection (Ing-udomnoogoon, K. 2018).

Reverse logistics is very important in US economy. Customers are returning numbers of items which are faulty in their opinions. Companies have no option despite accepting these returns due to competition. Companies prefer third party logistics due to limitation of resources. It has been suggested that third party logistics companies need to be given awareness about reserse logistics to handle the processes effectively (Krumwiedea, D. W., & C. S. 2002).

The purpose of the reverse logistics is a backward flow i.e. from consumer to reprocessing point or to the point where it can be disposed off in an environmental friendly techniques (Raouf2, I. Y. 2013). There are various value adding reverse logistics activities. Re-using, re-manufacturing and recovery of chemicals etc. Value addition is most important part for attracting investors in reverse logistics. If manufacturer keeps industrial waste category wise i.e. separate stacking for papers, poly bags and wood items; it would be easy to process returns in reverse logistics. It saves time and cost of segregation.

It has been concluded by the researcher that lack of alignment of critical success factors leads in failure of organizations (Wiggins, 2018). Therefore, failures in determining the critical success factors of Reverse logistics would create disorder in supply chain and hence in satisfying and retaining of customers (Wiggins, 2018).

State monitoring policies, taxation, disposal of wastages in environmental friendly manner, Green global effects, commercial competetions, human resource management, integration & coordination, advancement in information & other technolgies are critical success factors that influences the Reverse logistics output (Sachin Kumar Mangla a, 2016). Bussiness those are not developed according to their scope, may be motivated by state by devising policies and relaxing in taxations. Disposal of wastages are governement responsibilites in enviornmental friendly manner. This responsibitly can be shared with private sector through policies. It is necessary to meet global enviornemental requirements. It is a huge challenge for industries to dispose their wastages without demaging the global environment. Adoption of Reverse logistics is a great opportunity for industrial sector to present themselves as Green friendly. It is also an opertunity to lead in commerial competition by reprocessing or refurbushing the items and getting the value addition through it. Human resource i.e. investors, management and employees are also critical factor that influnces the execution of Reverse logistics. It is not possible to start any bussiness activity without the support of investors/top management. Moreover, management and employees expert knowlegde and training are considerable factor to influnce RL.Organizations need to show their dedication and support to involve management and employees for the adoptation and Implementation of Reverse logistics. Techonological advancement gave revoluation in all aspects of industrial and personal life. Therefore, involving new technolgy is non negoiable option in the development of infrastructure for Reverse logistics.

Electronic Industries grown rapidly in past few decades. Electronic industries has contaminated and valuable waste items, called E-waste (Murtaza1, 2015). E-waste contains metals i.e. iron, copper, aluminium, lead, mercury, arsenic, cadmium, chromium and gold. E-waste is more than 60% while plastic waste is half of it. E-waste creates high commerical value for bussiness through retrieval of

items through RL. E-waste is very dangerous for human health if dispose in non-environment friendly manner. Therefore, Reverse logistics system should be well managed to transport items back and to get bussiness value. Unfortunately, Reverse Logistics practices are not still adopted in under developed countires. Governement legislation can support it.

Recycling of expensive drugs (medicines) is possible. (S. Chand Basha*, 2015). Rs.500 core medicines are disposed annually. This study attempted to create awareness of recycling of expired medicine

3. Methodology

The study has been conducted in the industries of Islamabad and Rawalpindi. Qualitative research is adopted for reverse logistics (RL) with open-ended questionnaire. Semi structured interviews were conducted in ten different pharmaceutical industries and twelve construction companies. A total of 22 interviews were conducted out of targeted 25 interviews. Three interviews of food industries were taken but due small sample size, food sector is excluded from the results. Around 30-companies have been approached through emails, telephones and other references.

4. Results Discussion

Six main critical success factors were identified through theoretical model as mention above in figure-I. Planning (Risk) and Re-Engineering and Disposal of items are added in the model to study as given below

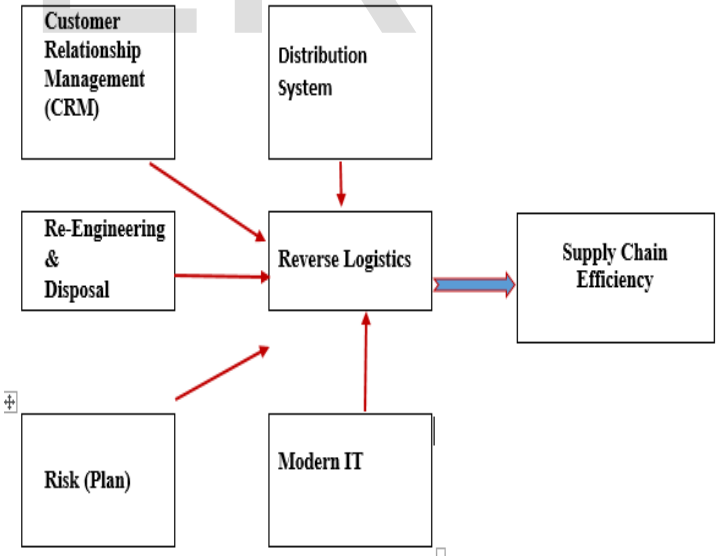

Figure-II

Those critical factors are Plan, Customer Relationship Management (CRM), Inventory management, Information Technology, Re-Engineering and Disposal of items and the role of

state agencies. Interviews are transcribed with individual struggle. To evaluate the results from transcript content, word-cloud has been used. It has been observed that all factors play critical role in reverse logistics except re-engineering process in Pharmaceutics.

1. Plan

4.1.1 Pharma

Pharma companies only produces new research brand/medicine with their desired quantities. Otherwise, their sales department takes requirement from retailers and distributors and manufacturing of medicines are done accordingly.

After passing of quality test in companies, it takes around 2-3 months to supply medicines in market. Medicine in general have average expiry period of 3-4 years which is sufficient to avoid reverse logistics of drugs.

Retailers of Pharma highlights 6-months before the expiry of medicines to distributor to pick up the stock. Time of reverse logistics is relatively high as compare to forward logistics.

4.1.2 Construction

In construction industry, there are less chances of expiration of items during the movement across the supply chain as construction companies follow their schedules and material are demanded accordingly. Quality assurance and quality control plays main role for all i.e. manufacturer, retailer and construction company. Manufacturer avoids the movement of any concern full items to the market while retailers and construction companies check items at receiving and if they find any problem, they can return items right way for exchange. Mostly items expired (cement, paint etc.) due to the negligence of construction companies or end users.

Further some stake holders, particularly in public sector, give tender and responsibility of expired items is fixed on vendors.

2. Customer Relationship Management (CRM)

4.2.1 Pharma

According to feedback through interviews, Quality assurance is the important factor in CRM to avoid customers complain in both sectors. Patients only complains if there is any leakage in bottle of medicine or have lose packing. There are few cases in which patients complains that prescribed medicine by doctor is not curing, therefore alternatives may be suggested. In Pharmaceutical, possibility of skipping any quality standard is impossible however if there exists a genuine complain through doctors, pharmacies etc. companies announce respective batch numbers whose complains are coming and entire stock is transport back to companies.

In pharma sectors, information about any complain received from patients to Retailers and forwarded to distributors and they forward complains to manufacturer. In another scenario, patients complains to doctor, doctor complains to distributors and distributors forward to manufacturer.

In pharmaceutical sector, prices does not become the cause of Reverse logistics as medicines are research

items and patients are bound to use as per prescription of doctors.

4.2.2 Construction

It has been observed that price of items having same quality standards can influence the reverse logistic as in this case buyer prefer low cost.

Further reversal of items is a part of business and good companies try to entertain customers' reversal or exchange complains to the extent possible. Construction companies and retailers have direct coordination with suppliers and manufacturer through emails and phones.

3. Inventory Management:

4.3.1 Pharma

It has been observed through interviews that pharmaceutical sector does not has properly managed inventories for the items those are received through reverse logistics. Items received through reverse logistics are just placed for some particular area as damp items. All cartons in pharma are marked expired manually and batch number are mentioned too. Old batch numbers are also the indications of expired items. No specified coding are done on items that are received through Reverse logistics.

4.3.2 Construction

Interviews reveals that they are no separate warehouse for receiving of items through reverse logistics and no specific Identification marks are used in the return of items. This all process is managed manually.

Companies are placing tenders or taking quotation from vendors for cost effectiveness as compare to competitors. However, one respondent claimed that they used branded for maintain their standard.

4. Information Technology

4.4.1 Pharma

All representative of distributors and companies were agreed during interview that IT plays an important role in logistics. Companies are using different Enterprise Resource Planning (ERP) solutions and MS office (Word, Excel). These soft wares are Customer relationship Management (CRM) developed by company IT, Abuzer, EM: RAP, etc. Frequency of using of MS Excel is high.

All users were satisfied with their existing solution and no one was confident enough to claim that their IT solution is better than competitors.

4.4.2 Construction

Enterprise Resource Planning (ERP), Era-go, Oracle and MS Excel & word are informed as main software in companies and interviews reveals that companies believes that they IT solution and customization is better than their competitors.

5. Re-Engineering and Disposal of items.

4.5.1 Pharma

There is no reprocessing possible for life saving drugs and these all are disposed. No value addition is possible in pharma on items that are received through Reverse logistics.

4.5.2 Construction

It has been observed that all construction companies have focus on traditional construction. There is no

focus of business where demolishing of building are conducted. Separation and reprocessing of items from Debris is not under practice for value addition. Aero flex, cooper fitting, drain fitting items PVC pipes, electric wires, cemented stones etc mostly are treated as scrap.

6. Role of State Agencies

4.6.1 Pharma

During interviews, it has been updated that Drug Regulatory Authority of Pakistan plays an important in monitoring the expired medicines. While 2 interviewers claim that role of agencies are restricted only in papers and no practical and effective role is observed until something has been highlighted by Media.

4.6.2 Construction

It has been observed that all state laws are only developed for routine construction. Government agencies check the quality standards of items and buildings during construction. Demolishing monitoring is not conducted by Government agencies

5. Conclusion

Sr #	Area	Pharmaceutical Sector	Construction Sector
1	Plan (Risk)	• Sufficient time (3-4 years) available to sell product. It minimized the reverse logistics of expiration of items. • Companies bear cost of expired items	• Companies follow schedule and procurement is done accordingly. • Bidding is done to fix responsibility of expired items on vendors due to which cost of expired items are divided.
2	Customer Relationship Management (CRM)	• Any deviation in quality is not impossible. If find in market, companies announced to return specific lot. • Price has no influence	• Buyer are responsible for quality testing at the time of receipt of product. If skipped, buyer itself responsible. • Price has influence
3	Inventory management	Identification marks are only printed on items during forward flow. There is no specific warehouse and marks on items received through reverse logistics	
4	Information Technology	• Companies are confident that their opted solution is better • Customer relationship Management (CRM), Abuzer, EM: RAP and MS office are softwares which companies are using	• Companies are confident that their opted solution is better • Customer relationship Management (CRM), Era-go, Oracle which companies are using
5	Re-Engineering and Disposal of items	All items are disposed which received through reverse logistics. No value addition is allowed	• Reprocessing and re-engineering of items are possible but not practiced in Pakistan. All focus is on traditional construction. • Value addition is not practiced and reprocess able/refurbish able materials are sold in scrap
6	Role of State Agencies	Drug Regulatory Authority of Pakistan monitor the expiry and disposal of medicine in manufacturing unit, distribution centers and retailers.	Pakistan Standard & Quality Control Authority (PSQCA) is responsible for monitoring the standards in construction. However focus is on traditional construction and demolishing process is not followed.

6. Future Recommendations

6.1. Legislations and policies of Government can lead as most critical success factor to introduce and implement professional Reverse logistics practices in Pakistan.

6.2. Relief or favorable taxation can also play motivational role for investors and industries to implement Reverse Logistics

6.3. Inclusion of Reverse Logistics as a course in Academia.

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Questionnaire

Sr#	Area	Question number	Questions
1	Plan	1	What are preventive plans of company to avoid receipt of expired items?
		2	Do the delivery time from manufacturing unit to retailer is high and causing items to expire?
		3	What is the lead-time of delivery of expired items (Reverse logistics) from retailer to distribution center?
2	Customer Relationship Management (**CRM**)	4	What factors are important in a process to manage customer dissatisfaction in returns of items?
		5	What are the means of information flow from customer to distribution in Supply Chain Network?
		6	Does price reduction influence customers' demand in order to avoid Reverse logistics?
3	Inventory management	7	What are the identification marks given to the items received through reverse logistics?
		8	What are the means of storage of items in warehouse that received through reverse logistics?
		9	What strategies are adopted by your organization for cost effectiveness as compare to your competitor?
4	Information Technology	10	Which ERP software is used for company's logistics solution?
		11	Are IT solutions adopted by your company better as compare to company's competitor?
5	Re-Engineering and Disposal of items	12	Are returned items reprocessed in the company?
		13	Are returned items disposed off?
		14	Are the recycled items used for same purpose or for different purposes?
		15	Are the recycled items used for value addition purposes?
6	Role of State Agencies	16	What are the state agencies' role in order to monitor rejected items received through reverse logistics?