Role of ICT in Reverse Logistics: An Analytical Approach

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Abstract - Although there is no generation of revenue for the organization in the reverse logistics operation, but market analysis does not allow this be ignored. ICT has been used in RL operation and penetrated into it with entropy. DSS, EDI/XML(Electronic Data interchange / Extended Markup Language) ,NCT(Network Communication Technology) RFID,HTML etc are the components which are governing and controlling different phases of RL. This paper highlights certain specific domain where Information and Communication Technology and Network and Communication Technology are used optimally. Authors also propose two distinguish working model to reduce cost and generation of revenue in RL.
Key Words: Reverse Logistics,I CT,NCT,EDI,XML, Supply chain Management .

I. INTRODUCTION

The process of planning, implementing, and controlling the efficient, cost effective 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 is called Reverse Logistics[1]. The flow of the RL can be observed as shown in fig 1.
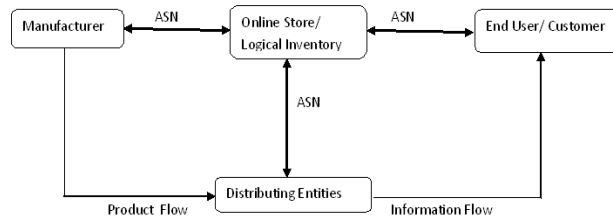
. Fig 1 Forward logistics information and physical flow

Question also arises why it is necessary to introduce this flow? In case of failure of selling a fresh product the price can be revised by reconditioning, refurbishing or remanufacturing the product, the firm may perform these activities before selling the product. If above procedure is not possible then a third party firm may be contracted, or the product can be sold outright to a reconditioning/remanufacturing/refurbishing firm. [1] . Table 1 shows all possible common RL activities.

Reverse logistics is more than just returns management, it is "activities related to returns avoidance, gatekeeping, disposal and all other after-market supply chain issues". Returns management – increasingly being recognized as affecting competitive positioning – provides an important link between marketing and logistics. The broad nature of its cross-functional impact suggests that firms would benefit by improving internal integration efforts. In particular,

a firm's ability to react to and plan for the influence of external factors on the returns management process is improved by such internal integration [2].

Table 1. Common reverse logistics activities

Materials	Reverse Logistics Activities
Products	Return to Supplier Resell Sell via Outlet Salvage Recondition Refurbish Remanufacture Reclaim Materials Recycle Landfill
Packaging	Reuse Refurbish Reclaim Materials Recycle Salvage

Authors structure the paper in following way. The part one starts with introduction of SCM (Supply Chain & Management) and RL (Reverse Logistics) model with mentioning significance of RL in SCM. Second part discusses the ICT and NCT tools used in RL, third part analyzes the role of ICT in RL followed by some genuine suggestions for vendors in RL chain. Finally paper concludes with the future scope of ICT.

II. THE DEVELOPMENT: RL IN E-COMMERCE

E- Commerce observes the RL model is equipped with well connectivity ie proper coordination among all entities in network structure. The RL model has been characterized in network structure in E-Commerce four ways. First is system complexity, which is increased by inefficient control in RL system. Since uncertainly is associated on customer's returned product time, quantity and quality.

Second is system objective diversity, it is not only concerned with the cost and supply needs but protection, security threats are equally significant. Third is lack of balance in Demand and Supply, waste and scrap product quantity is a conflict with production units. Fourth is Many to Few as remarkable 30% products are part of RL process, this huge number leads to huge items to few collection centres.[3]

III. ICT : IN REVERSE LOGISTICS

Angelika K, Rob Zuidwik have identified that ICT systems for RL have indeed attempted to address one Or more issues related to firstly , Product data that is data regarding the condition and configuration of he returns secondly Process facilitation and more specifically supporting operations of RL and finally Redistribution to the market, in particular attempts to consolidate the fragmented market places [4]. In forward logistics, Warehouse Management Systems (WMS) fulfils administrative tracking andhandling support. To support the returns process, either special purpose reverse logistics ICT systems have been developed or WMS were extended with proprietary systems to control returns.

3.1   Reverse Logistics/Warehouse Management Systems(Rl/WMS)
 WMS can provide decision making for further recovery options and communicate this information to other actors involved. As it is able to analyze historical data of returns and generate comprehensive reports. Gradually WMS

converts data base into knowledge base which upgrades it upto decision maker. It also collects product information to optimize the processing of incoming returns.[4]

3.2 RFID-Based Information Tracking System

Radio Frequency Identification Technique is used to track product in logistics. It is similar to bar code identification With RFID, the electromagnetic or electrostatic coupling in the RF portion of the electromagnetic spectrum is used to transmit signals. An RFID system consists of an antenna and a transceiver, which read the radio frequency and transfer the information to a processing device, and a transponder, or tag, which is an integrated circuit containing the RF circuitry and information to be transmitted. One of the key differences between RFID and bar code technology is RFID eliminates the need for line-of-sight reading that bar coding depends on. Also, RFID scanning can be done at greater distances than bar code scanning. High frequency RFID systems (850 MHz to 950 MHz and 2.4 GHz to 2.5 GHz) offer transmission ranges of more than 90 feet, although wavelengths in the 2.4 GHz range are absorbed by water and therefore has limitations.

IV. WEB tools XML/EDI

Return logistics in e-business is usually performed by 3PL. In fact, what makes a reverse supply chain successful in E-Business is the visibility of products in motion as well as collaboration and trust amongst the various entities in the chain. The use of internet, electronic data interchange (EDI), enterprise resource planning (ERP), and radio frequency identification (RFID) is essential for efficient RL. ICT application in reverse logistics management includes: Sensing technology, Global Positioning System (GPS), Global Packet For Radio Signal (GPRS), Network and communication technology(NCT), Intelligent management technology[7].

V. POSITIVE ASPECTS OF ICT IN RL

A count can be done when the ICT is implanted in L in Supply Chain & Management system. WMS fulfils administrative tracking and handling support. The development of R-log provides qualitative and quantitative information to management [4]. The introduction of RFID adds values in terms of trace the life of the product and to gather information related to the life of the product, stimulate the selling, check the state of sales in real time etc[6]. Further RFID accurately defines standard of goods, maintains timeliness of information and synchronized financial accounting [5]. GPS, GPRS systems receivers can calculate positions very accurately and come in small integrated circuits [7].

VI. ANALYTIC APPROACH IN RL THROUGH ICT:

In south East Asia specially China has huge market network of Supply Chain & Management system. Hence it is easy to conclude that network of Reverse Logistics follows it as 30% of manufacturing products participate in RL business. The question arises when small of medium market this difficulties. Since there is no as such revenue generation in RL process still organizations opt for RL process because of brand building. Authors proposes following two working for small /medium organization.

6.1 Share mode of Transportation

All small/Medium organizations who share chain of Dealer-Distributor-Manufacturer or even part of it may opt for common transportation to reduce the cost in transportation. There is no as such common policy by any government which can encourage it so if it works certainly significant cost will be reduced.
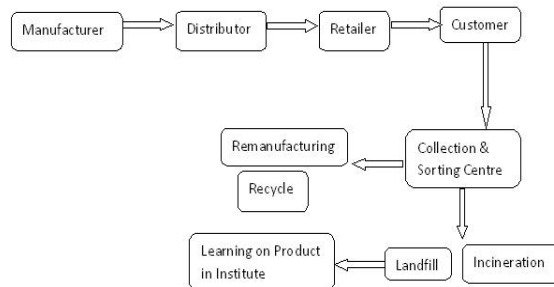
Fig 3. Proposed model for the product used for learning

6.2 *Market for Defective or low quality products*

In the RL process all those products which are to be sent for recycle/Servicing/re-engineering/dumping can be segregated at the site. The dumping product can be dumped at the site it self. Utilization for such products can be for the educational or training institutes, fig. 3. The availability of educational institute in any area where people live will be traced out. This model will generate revenue also. An organizational policy may encourage it.

VII. CONCLUSION

With In depth development of E-Commerce RL companies are gaining attention for all aspects including cost and image making. With the penetration of ICT/NCT in Supply Chain Management system all its tools like RFID methodology, XML,EDI,GPS GPRS etc will gradually become its standard language. Analytic approach will always suggest new ways to reduce cost and utilize all resources optimally.

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