Reverse Logistics Challenges in e-Commerce

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Abstract

Reverse Logistics(RL), the process of returning goods from customer to a retail or manufacturing source is an increasingly important yet undermanaged business function. The advent of Internet and mobile technology and its rapid growth worldwide facilitates customers for online shopping. Research shows 54% of the customers are already buying goods online weekly or monthly. Online retail sales are expected to hit US$ 4.5 trillion by 2020.The shift in buying pattern is coming with a more worrying change in customer behaviour in the form of increasing return, the number of which is surging in alarming rate. In fact, statistics show 30% of all the products ordered online is returned. Returns represent a growing cost of doing business today and they represent unique challenges and that are separate from traditional forward moving distribution channel. This preliminary research paper summarises and analyses the challenges in reverse logistics (RL) and provides directional approach to solve /overcome these challenges.

Keywords

Electronic commerce, Reverse Logistics, Internet of Things (IoT), RFID, Real Time Location System (RTLS), BLE.

1. Introduction

In e-commerce business, the physical commodities can flow only through networks. Therefore, e-commerce business needs strong logistics system. Customers buy products through online. Often there is a dissimilarity found between the images shown on the website of the e-commerce firm and the actual products. And that is one of the reasons for the return of the goods. Also, in recent years, due to the severe competition in the e-commerce industries, many e-retailers have introduced zero return charge, and that gives freedom to customers to buy multiple products, for example dresses; however, after getting delivery of the product, the customer chooses whatever he/she needs out of many and the unselected products are being returned.
A considerable amount of research has been performed to understand e-Commerce buyer behaviours. From this research, a considerable number of findings have emerged related to return goods. "Online buyers tell us every day that the key to winning their loyalty is the level and quality of customer support." (Source: BizRate.com Survey). Other relevant findings from the BizRate.com research are:

- Eighty-nine percent (98%) of online buyers say return policies influence their decision to shop with an e-retailer.
- Three leading products, clothing (27 %), computer software (20 %) and books (15 %) were returned.
- Certain attributes of return policies can actually drive potential customers away. These include:
  i) The inability to receive credit on a credit or debit card (85 %)
  ii) Time limit to return products that is "too short" (68 %).

- Other attributes that online buyers consider important are:

  i) Whether the merchant allows products to be returned by mail (66 %).
  ii) The ability to exchange a product for another item (58 %).
  iii) Sixty-two percent (62%) of consumers said they would prefer to return products by mail instead of travelling to a brick-and-mortar store.

Handling of customer returns is an essential part in e-commerce business and its success. Returns are evidently an unavoidable and essential element of retail sector.

2. Literature Review

There are two (2) main types of logistics; Forward logistics where the products/services flow from manufacturer to consumers, and reverse logistics where the products flow from consumers back to manufacture (Figure 1).

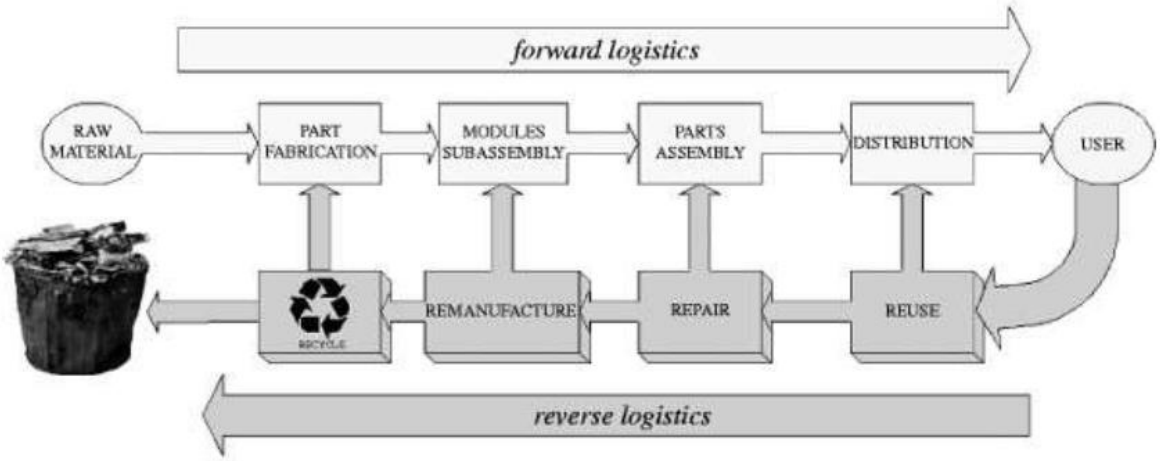

Figure 1: Forward and Reverse Logistics Process (Reference: Sahoo, Kingston University,2014)

RL has got four main steps as defined by most of the authors including Lambert, Riopel and Abdul-Kader (2011): gatekeeping (entry), collection, sorting, and disposal, as shown in Figure –2, below.

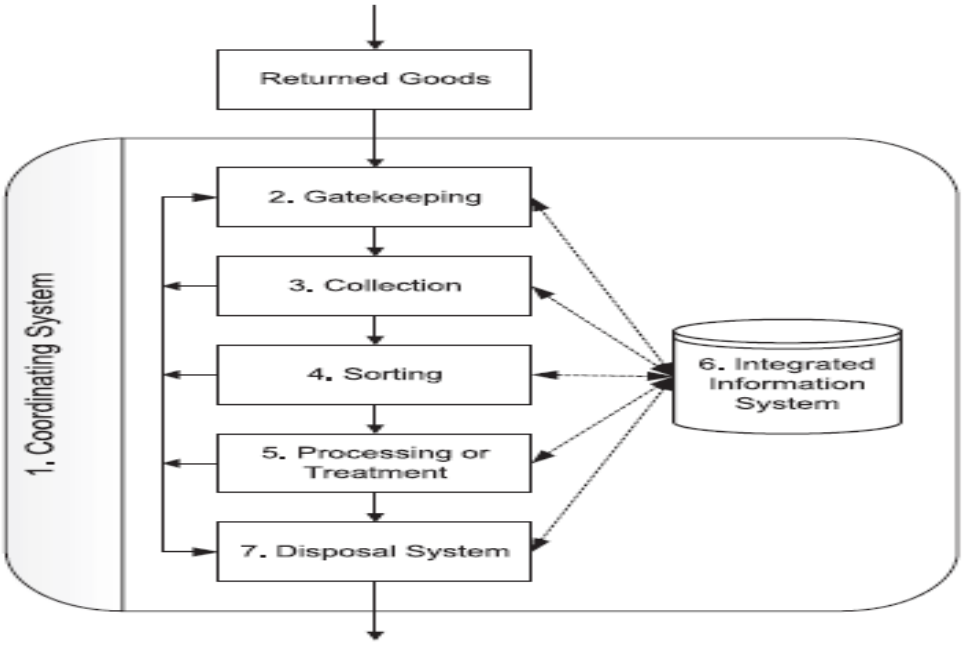

Figure 2: Reverse Logistics System Elements (Reference: A reverse logistics decision conceptual framework by Lambert, Riopel and Kader, 2011)

In the white paper published by PwC, named "Reverse Logistics: How to realise an agile and efficient reverse chain within the consumer electronics industry", (May 2008), focussed on examining the value drivers that trigger companies in setting up a reverse chain strategy and how they embed this strategy into their process, technology and organisation. The consulting firm Deloitte identified in their research paper named 'Moving forward in reverse, why reverse logistics need a dedicated channel: 2014', that managing reverse logistics through forward logistics channel is costly and increasingly complex.

Xu and Jiang (2009) on RL in e-commerce environment analysed some features of RL. The paper discusses about the reason for RL development in e-commerce and its problem in development. The paper outlines few major noteworthy features of RL in e-commerce, which are: i) Slow process to recover value, ii) In comparison to forward logistics, RL has multiple beginning points, iii) Poor predictability. The paper also discusses about the reason for RL development in e-commerce, which are: i) consumer protection; ii) due to the large scale surge in e-commerce industries in recent times, the return reaches almost 36% of the purchased items online; therefore, to remain sustainable in the business and to compete, RL has become imperative to have; iii) due to the difference in real and images of the product sold online, causing the return of the products. The paper recommends as part of procedure to develop RL in e-commerce is by having right attention on RL by the senior management, zero return policy for some commodities and nurturing right talent in the organization. However, the list is not enough to develop the right RL system in e-commerce.

A RL process has been designed by Yanyan (2010) where the IT challenges as well as logistics challenges are discussed. The paper discusses briefly about 4 types of RL processes: i) self-type, ii) 3PRL model, iii) strategic alliance RL model, iv) integrated solution provider model. This paper argued the effectiveness of RL model depends on enterprise's IT infrastructure and logistics capabilities. The recommendations provided are: a) building comprehensive logistics information tracking, b) establish return & repairable system, c) establishing a sound internal RL processing system. The paper mentioned that with appropriate RL system and processes, companies can reclaim products at the lowest cost with maximum benefit and for that companies must learn better use of electronic information system.

Harrysson and Landen (2015) has analysed the total cost in their thesis, a case study of a European e-retailer, and its customers have freedom to return through mail to distribution centre (DC) or to drop at the store. They studied two geographical markets, the UK and Germany. Their study found that cost of return to DC is much higher as compared to dropping at the store. However, return at store is not popular in German market because of credit issues. Store had certain limitations while the study was conducted, e.g., if the returned good is of specialty type, then selling the same at the store became difficult. There were some system issues, for instance, the receipt copy did not have the price of few return goods bought online and therefore, the collector used to have hard time to determine price, by making call to the call centre. The researchers suggested some improvements which can bring down the total cost substantially, as follows: i) incentivise dropping at the store, ii) improve the information technology system at the store, iii) promote pre-registration of the return good by the customer online and thereby reducing the gate-keeping time.

There has been lots of research on RL process and risks/uncertainties associated with it and Rezwan (2011)-shared his findings by addressing uncertainties, which are of 5 types, i.e., quantity, variety, cycle time, quality and market trend. As the return process falls under PUSH system, the author claims that if retailer/manufacturer does not have proper planning of the operation, it would have no choice but to dispose of the return product in order to avoid inventory. With the help of RFID technology, the quantity of products getting returned is determined and therefore, the decision /planning can be done much in advance. Earlier, return used to follow: collection, then to Centralized Return Centre (CRC) and then to OEM. But with the use of RFID, sorting can be done in the first step and then can be dispatched directly to OEM, thereby avoiding unnecessary transportation to CRC. By using RFID, it is possible to determine the time spent within the return logistics and knowing the variations, this data could be used effectively for planning. And when the purpose for return is to repair, by using this data, customer service centre can provide more accurate promise date to the customer. Active RFID tags and EDL (Electronic Data Log) can be used to save information about products while in use, which can be very well considered to determine market trend. And this market trend information can be used to reduce the other uncertainties. This paper emphasized the limitations of RFID usage by saying that: i) some tags cannot be detected by remote readers, ii) many manufacturers do not use same tags as they don't want their product information to be used by others

(competitors), iii) lack of international standard, iv) metal & liquid environment disturb significantly in reading RFID tags, and v) RFID tag is not cheap as compared to printed labels.

A further study /research can be done on how alongside RFID, with the intervention of Internet of the Things (IoT), IT, real time data of the return products can be received by the retailers and a design of effective framework to utilise these data for advanced planning of the entire RL.

3. Reverse Logistics at a glance.

A customer once decides to return the products bought online, will inform the e-retailer online and will drop the same product either at the physical store nearby or at the nearest post office. These receiving points are being identified as Collection Points. At the store, money is immediately getting credited to the customer's account after scanning the product bar code and the invoice copy. In order to return the product thru post office, customer first orders the return label, then receives it from e-retailer either via mail or e-mail, pastes it on the product, and drops it to the nearby post office. Depending on the return policy of the e-retailer, either this return label comes with prepaid postage in which case customer does not pay anything for return goods, or customer pays at the post office, depending on the parcel weight and destination.

From stores as well as post office, return products reach at CRC. If the product is returned through post office, customer has to wait, until it reaches CRC, where the return good is checked against the policy and credit is arranged afterwards.

At CRC, sorting is done depending on the condition of the returned good. From this point, the asset recovery comes into the existence. An asset has value and can be sold. The challenge is to find or recover the highest value for each item.The following are some of the activities that may follow (see also Figure 3):

- Restock –the product is found still current and immediately put on sale in the website.
- Repackaging for sale – The returned product is in "as new" condition and can be sold in clearance area of e-commerce site. These goods are often sold for slightly less than retail, but often higher than original cost.
- Return to Vendor – defective goods, warranty issues or service level agreements (SLA) often allow for return of goods. This channel often means you will recover full cost of the items, but the cost of transportation to be considered.
- Disposition –Products are destroyed when they cannot be sold/used at the current location and return to vendor is not feasible (perhaps because of prohibitively high transportation costs, too low of volume to warrant additional handling, etc.). For the destroyed disposition category, only two performance indicators – economic performance and operational responsiveness – were examined. A number of great disposition sources and services now exist for just about any products in any condition.
- Scrap – If you have a lot of it, someone is usually willing to buy it from you.

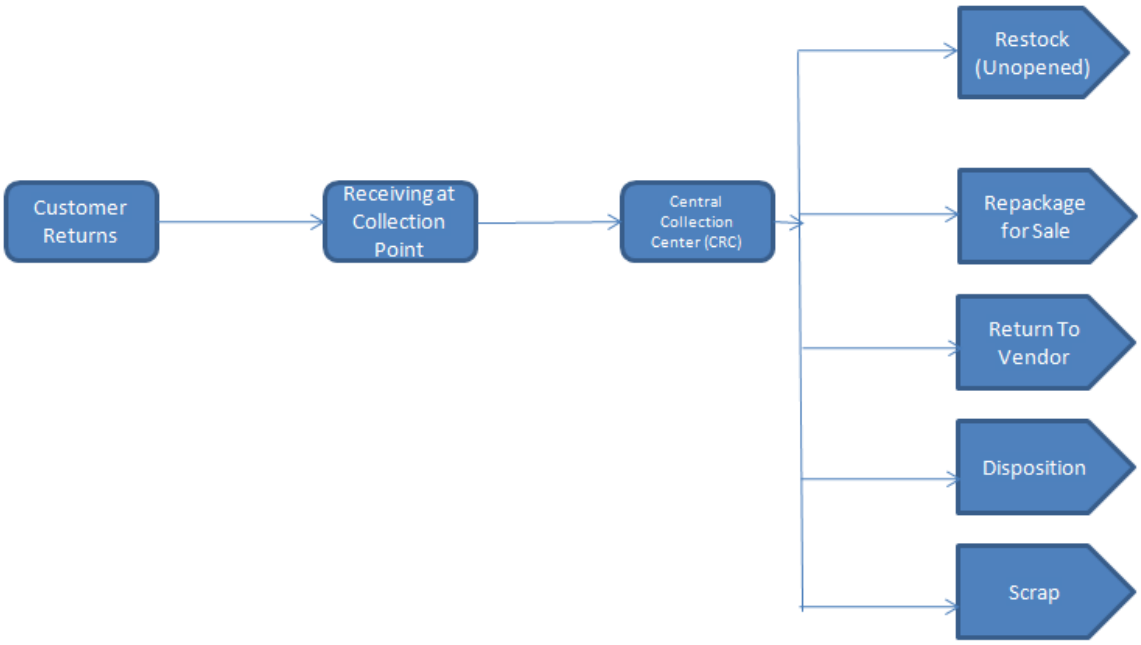

Figure 3: Reverse Logistics Process

4. Research Analysis

Following interviews with a few e-retailers, two major challenges are noted: a) tracking goods, and b) uncertainty on return quantity.

4.1 Tracking Goods:

This paper will analyse how internet of the things (IoT) can be leveraged for tracking return goods.

IoT promises far-reaching payoffs for logistics operators and their business customers and end consumers. These benefits extend across the entire logistics value chain, including warehousing operations, freight transportation, and last-mile delivery. And they impact areas such as operational efficiency, safety and security, customer experience, and new business models. With IoT, it would be possible to begin tackling more difficult operational and business questions in a more thorough manner.

Figure 4: IoT- enabled capabilities (Reference: Internet of Things in Logistics by DHL & Cisco,2015)

As shown in Figure 4, applying IoT to logistics operations promises a substantial impact. It permits monitoring the status of assets, parcels, and people in real time throughout the value chain.

It allows obtaining real-time data and analyses the business performance. Business processes can be automated and thereby manual interventions can be eliminated, which will lead to improved quality, predictability and lowering cost. Entire value chain can be optimized with the intervention of IoT wherein people, systems and assets work together and with the application of analytics, wider improvement opportunities can be identified.

To optimize the return process, the tracking and monitoring of the return goods is essential. Many researchers have proposed for application of RFID (Radio Frequency Identification Device) to track the goods. RFID is the use of an object called RFID tag which is applied to a product for the purpose of identification and tracking by using radio waves (Rezwan,2011).

Retailers have been using **RFID** for tracking purpose in forward logistics for a long time, but using it in RL is not as common.

Real-time Location System (RTLS) is a robust, multi-purpose, enterprise platform that supports an infinite number of asset-related applications "on top." It uniquely offers security, safety, compliance, and RTLS functionality, all in one integrated system and includes both long-range location and instant choke point detection thanks to its dual frequency implementation (i.e., 433 MHz and 125 KHz).

The network is fully IP-based and built upon standard hardware and software. It can be implemented using either wired Ethernet (with or without Power over Ethernet (PoE)), or using Wi-Fi connectivity. It can be configured to be a standalone system, or can be a sub-net within the facility's primary local network, making installation simple and cost effective. The IP-based nature of the system also allows for remote monitoring, diagnostics, and software updates, making maintenance and management of the system easy and efficient. Active RFID tags are battery-operated remote sensors that report data back to a remote server that can run either on premise or in the cloud – exactly.

There is another RTLS system which is known as Bluetooth Low Energy (BLE) based iBeacon. Bluetooth Beacon Tracker is a real-time locating system (RTLS) that locates and tracks the movement of active Bluetooth Low Energy (BLE) devices. The system works inside multi-story buildings or throughout an entire campus. BLE signals from battery driven beacons are at the core of the indoor location technology. It has one of the latest technologies that has emerged and become an industry standard available on most devices today. It uses so called BLE beacons (or iBeacons) that are inexpensive, small, have a long battery life and do not require an external energy source. The device detects the signal from the beacon and can calculate roughly the distance to the beacon and hence estimate the location. Its ability to track the whereabouts of Bluetooth devices publishing their presence (that is, beaconing) enables tracking applications to monitor movements within a physical space.

Even Wi-Fi can be used in a similar way as BLE beacons, but requires an external power source, more setup costs and expensive equipment. The signal is stronger and it can cover more distance than BLE.

We see optimal conditions for IoT to take off in the industry. There is a clear technology push through the rise of mobile computing, consumerisation of IT, 5G networks, and big data analytics, as well as a pull from customers who are increasingly demanding IoT-based solutions.

The above-indicated solutions i.e., RFID, BLE, Wi-Fi and mobile computing can very well be integrated with ERM (Enterprise Recourse Management) system to track the parcel with return goods.

4.2 Uncertainty on return quantity

Return follows upstream of the value chain. Generally, return quantity is low and with high variety. With introduction of RFID tags, which can be pasted on the return goods package, system will get to know the exact quantity before it reaches to the CRC. And this helps to plan for sorting operation in advance.

The current practice is e-retailer estimates as certain percentage of the overall quantity of products to be sold in their site as return and accordingly, it designs the entire business models in term of its service level agreement (SLA) with vendors, its in-house sorting operation, transportation logistics, etc.

In this particular area, there is a scope of further research and to design a stochastic model, which can run as algorithm in ERM for every product model to determine a more accurate return ratio.

5. Conclusion

As compared to forward logistics, reverse logistics is a complex process. RL has got multiple starting points. It works on PUSH system and highly uncertain. At the same time, return is inevitable in e-commerce business as it provides freedom to customers. And appropriate return policy leads to enhanced customer satisfaction and retention. Therefore, itis highly imperative that e-retailer makes this process efficient. This can be achievable with right attitude of the management towards return and implementation of IoT in the process, including development and integration of right stochastic model with ERM for predicting the near perfect return ratio.

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Biographies

Chiranjib Biswas, is currently studying Master of Applied Science (MASc) in Industrial Engineering at University of Windsor. Mr Biswas holds Bachelor of Technology (B Tech.) in Industrial Engineering from Regional Engineering College (now known as National Institute of Technology), Jalandhar, India. Mr Biswas has got 20 years of experience in driving business process transformation in diverse domains like Automotive, Manufacturing, Consumer Products and Financial Service in world class organizations. Before commencing MASc, he was employed with Royal Bank of Scotland (RBS) in India, as Vice President-Process Optimisation. He is PRINCE2.0 certified and Master Black Belt (MBB) trained. Mr Biswas has been tutoring and coaching Lean & Six Sigma to several employees in industries from 2007 until 2016, in the capacity of Continuous Improvement Champion.

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