

An Exploratory Study on Building a Connected, Intelligent, and Responsive Closed Loop Supply Chain: The Harbinger to Smart Reverse Supply Chain

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Abstract: In the current economic climate, it's hard enough to manage the forward flow of products to meet the volatile customer's expectation. But not thinking about the reverse flow of products could mean missing important opportunities for guiding the company through tough times. Reverse flow plays a significant role and must be seen as a revenue generator rather than cost. Effective returns management can provide additional means of positively impacting your firm's financial performance as well as building stronger relationships with key customers. Many of today's supply chain and operations leaders are finding it increasingly difficult to manage the complexities of modern market requirements, shifting customer expectations and disruptive competitors. They are hampered by inefficient legacy systems and outdated processes which are affecting their competitiveness. Most importantly, the clarity on the process and associated vitalities are missing.

It's important to understand the total impact of return products. Financially, returns represent a negative adjustment to sales. But it's much more than just a top-line impact. Most firms don't understand the operational cost of returns because these costs often get buried in the financial line items of facility operations. But every return product incurs transportation as well as holding/storage to the customer, then back to the company. If replacement product is being sent, a third transportation charge is incurred.

Additionally, employees are paid to process the claim, organize the return from the customer, receive the product, inspect, and determine disposition. When the returned product is re-entered into the inventory ledger, it starts incurring inventory carrying costs, and takes up warehouse space. Each of these logistical activities is expensive and must be considered part of the total cost of returns—beyond the negative adjustment to sales.

Keeping in mind the returns dynamics as well as the impact on customer relationships, designing of reverse supply chain plays a pivotal role and paves a path for closed loop supply chain. A 360 degree visibility is the need of an hour with real time transactions. The market is dynamic and hence to cater the overwhelming customer expectation, technology hand shake and close customer collaboration is revolutionizing the era 2020. The paper focuses on how to design the efficient and intelligent reverse supply chain leveraging the technology and data science. The purpose of this paper is to consider theory development related to returns management within supply chain strategy. An intelligent supply

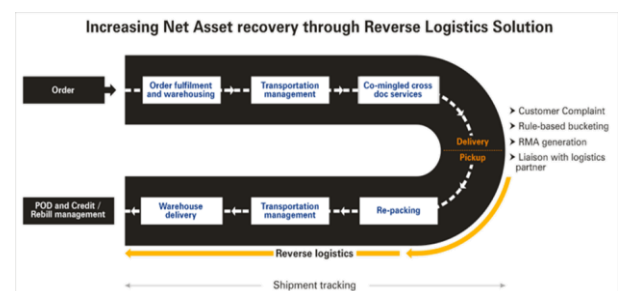
chain is built upon digital technologies that empower businesses to keep up with the speed of their customers' needs and expectations. Digitally transforming how we source and deliver goods to end-customers helps improve visibility and agility, reduce costs and operate a customer-centric supply chain. Artificial Intelligence (AI), machine learning, blockchain and the Internet of things (IoT) help turn data into intelligence to make and execute supply chain decisions and making reverse supply chain more responsive and reflexive. Returns management has been under-represented in much of the logistics and supply chain literature. This paper represents the first stage of an on-going research project aimed at providing a theoretical framework for understanding the returns management process within a firm's supply chain strategy.

Keywords: Reverse Supply Chain, Goods Returns, Reverse Logistics, Artificial Intelligence, Augmented Reality, Data Management, Regulations and Compliance, Recalls.

1. Introduction

A. Returns Management

Returns management is the supply chain management process by which activities associated with returns, reverse logistics, gatekeeping, and avoidance are managed within the firm and across key members of the supply chain.



Perhaps even more important, however, is the impact of returns on customer relationships. Every return represents a failed service encounter. For some reason the customer was not happy with the sale (product & services), and this can turn result in dissatisfaction with the company itself. If returns become a

hassle for the customer, the longevity or quality of the customer relationship may be impacted. Companies that handle returns effectively—by working with customers to resolve service issues—can actually improve a customer’s loyalty to their firm.

2. Concerns/Challenges/Discussion & Focus areas

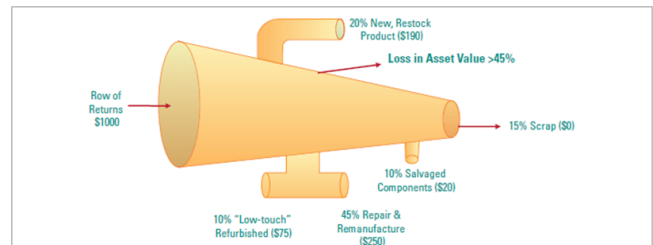
A. Know the Source and Reasons for Returns

- Two key inter-related aspects of returns include the source of the returns and reasons for the returns. In a supply chain context, a manufacturer’s products may be returned from intermediaries (e.g., distributors or retailers) or they may be consumer (or end-customer) returns from the person or firm that is actually using the products. Returns from intermediaries are very different from end-customer returns. Understanding why returns occur helps identify opportunities for improving supply chain processes and decision-making.
- At the consumer or end-customer level, defective product comes back after purchase and some level of use. Such returns could indicate quality problems that need to be resolved in manufacturing or distribution. It is important to get a handle on these returns as quickly as possible. But many times firms find no defects upon inspection of returned products. These no fault found returns may be indicative of customers not understanding how to use the product appropriately, not being able to properly install the product, or simply finding that the product was not what they were expecting. These returns signal the need to re-engineer the product or communicate more effectively to customers about what to expect and how to use/install the product. Understanding the reasons for defective returns and no fault found returns requires the involvement of a cross-functional team that might include product design, engineering, packaging, manufacturing, distribution and marketing. The goal is to identify why these types of returns are happening and work to reduce their volume.
- At the retail or intermediary level, returns often come back due to slow-moving stock, end-of-season inventory adjustments, or as a means to release capital so customers can buy more from your firm. As retailer power in the channel continues to grow, manufacturers are being asked to bear an increased responsibility for taking back unwanted retail-level inventory. This is not necessarily a bad thing, as “fresh” product can command a higher margin than old product, and can be more competitive in the battle for consumer dollars. On the other hand, manufacturers get stuck with old inventory. Such product may have diminished market value, thus making profitable sales to other customers increasingly doubtful. The key to managing these returns is to try to avoid them. That doesn’t mean playing hardball with customers by simply refusing returns; rather, it means better matching

demand and supply in the first place.

In a nutshell, probable reasons for returns can be classified into the following buckets,

- Damaged Material Return
- Defective Material Return
- Sales call (in customer good faith)
- In-transit damages
- Excess Material Supply Return
- Incomplete Material Supply Return
- Incorrect Invoicing
- Material Interchange by Transporter by mistake during transit
- Samples Return
- Unsuitable Product Specifications Return (Change in design & Specification, Warranty/Out warranty)

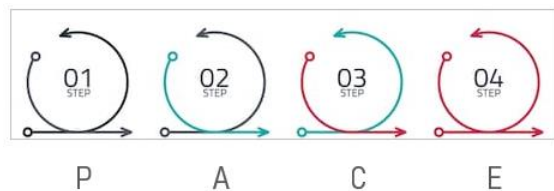


Shrinking pipeline of product returns (An example)

3. Approach to address challenges and making returns management process more lean, agile and smarter

Our holistic approach to address the returns management is ‘PACE’

- P → Pick the issue
- A → Assimilate the issue
- C → Catalyze the issue
- E → Execute the decision on issue

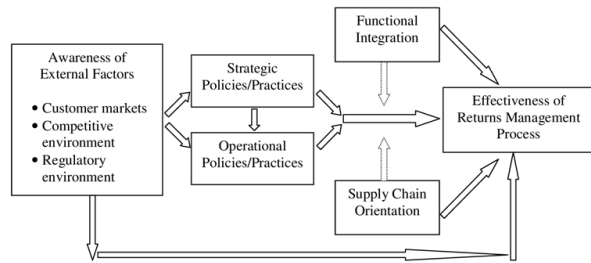


4. A dedicated channel for reverse logistics is the first step to converting returns from a cost center to a profit center

A dedicated channel for reverse logistics gives organization clear visibility into reverse flows. It also enables tighter cost controls. Most significantly, it can transform reverse logistics functions from cost centers into profit centers due to enhanced asset efficiency, greater employee productivity, and clear organizational goals. Also, the speed of reverse flow improves, minimizing the loss of value for products that tend to devalue quickly (for example, consumer electronics). Additionally, forward logistics channels are freed up to increase speed of

delivery and focus on improving customer service while balancing other supply chain pressures such as supply variability.

A. Factors impacting the reverse supply chain



B. Potential benefits of dedicated channel (reverse logistics)

A dedicated reverse logistics channel improves velocity of products and reduces complexity of the supply chain resulting in improved profitability.



Selecting the right disposition strategies and understanding their financial impact can help you turn the reverse supply chain into a revenue generator instead of a cost center.

C. Return Material Authorization Best Practices

- Initiate the Return Online – Minimum physical hands off. Portal based process
- Give an Option to Customers to Pick Exchange Items
- Provide an Option to Settle Price Differences Online
- Make sure the returns are an extension of the buying transaction
- Quick TAT (Turn Around Time)
- One Customer – One Portal (To have visibility across all transactions to the customer)

D. Critical success factors for Reverse logistics

1) Regulatory Factors

- a) Government norms & support
- b) Preferential tax policies
- c) Environmental management certifications
- d) Extended producer responsibility
- e) Waste management practices

2) Global Competitiveness Factors

- a) Competition
- b) Benchmarking
- c) Globalization
- d) Green image building
- e) Sustainability

3) Economic Factors

- a) Reduced consumption of raw material
- b) Decreased waste generation
- c) Financial opportunities

4) HR & Organizational Factors

- a) Stakeholders role & support
- b) Experts involvement
- c) Organization's policy and mission
- d) Top management commitment & support
- e) Employee expertise and involvement
- f) Customer environmental awareness

5) Strategic Factors

- a) Integration & coordination
- b) Technology advancements
- c) Management information system
- d) Infrastructure
- e) Understanding best practices
- f) Flexibility

5. Applying Artificial Intelligence & Machine Learning to Reverse Logistics

Some of the hardest jobs in reverse logistics involve grading and sorting returns, managing documents and rigorous claims follow up.

For e.g. How one person views an item may be inconsistent with how the next one does. So, an article of clothing that Worker A determines is fit to be resold as new may be an item that Worker B feels should be offered at a discount to retail customers. The lines can be thin and heavily blurred because so much for many companies is still managed by hand.

What if you had a grading machine that was totally impartial, had no emotional connections to anything and never got tired? AI could use tools like image recognition to grade materials and by taking advantage of internal machine learning algorithms, get better at grading products that might be difficult for it to understand otherwise. Perhaps in the near future we could have a robot open boxes, manipulate the returned item, have the imaging machine grade it, then place it in the correct bin for further processing. This is revolutionizing the entire concept of returns management.

Not only can AI be a great tool to improve efficiency in the reverse logistics facility, you could then redeploy your box opening workers to focus more on customer care. That might simply mean speeding up credits so shoppers are happier or it could be something like contacting customers about returns to help minimize them in the future.

“By leveraging AI into core processes, companies can invest more in strategic growth imperatives to modernize or eliminate legacy application systems,” explained Keith Dierkx, Leader for IBM Global Industry Freight, Logistics and Rail, in an interview with Supply Chain Digital. “This can make existing assets and infrastructure more efficient, while providing the workforce with time to enhance their skills and capabilities.”

Of course, that’s not all an AI can do for reverse logistics. It

could, for example, be used to help predict returns of a particular item based on the past behavior of your current customers. After all, if there's a pattern to be found, an AI with proper machine learning skills can find it. That's what they do! In the end, this sort of predictive look to returns could save you lots of money and headache.

1) *Automatic processing & data classification*

AI, or more precisely, Machine Learning, improves the processing capabilities of Material Returns Management Systems by repeated exposure to data and actions. This means that while the system is initially guided by a set of rules, its identification and processing capabilities continually improve. In the case of Optical Character Recognition (OCR), the use of AI helps teams digitize large amounts of documents reliably and effectively. This use of AI in Returns Material Management enables fully automated identification and classification of data in documents. This makes case more effective and accurate.

2) *Data extraction*

As large organizations are overwhelmed with more and more data, it becomes significant to extract the relevant data in order to accomplish a certain task. The ability of AI to accurately read the information and understand the context from data allows for taking data extraction to an entirely new level. This helps personnel save a lot of time and effort that otherwise would have been spent on the same task.

3) *Document clustering*

Document clustering or, grouping data together by topic without prior classification, is another process made easy by the use of AI in Returns Management. This contribution of AI in Returns Management helps employees to easily use data that was recognized as related by AI



B. *Maximizing recovery on returns through intelligent pricing*

Making better disposition decisions throughout the supply chain is only one element of a powerful returns management solution. After a decision is made, returns can be placed on B2B and B2C secondary marketplaces, giving retailers the ability to recover more profits. This is done by implementing AI supported dynamic pricing. Utilizing an automated pricing model and data curated via machine learning and data science, returns are listed and priced on over 50 online marketplaces. Initial pricing is set on items, but using AI automation, is adjusted throughout the listing life-cycle.

The intelligent dynamic pricing is calculated and adjusted

based on factors, such as online customer reviews, ratings, pricing trends, competitor pricing, sales velocity, purchase history, product launch date, life cycle, and more.

6. **Conclusion**

Certain benefits of streamlining and institutionalizing the dedicated reverse supply chain concept in organization are as follows,

- Clear visibility to reverse flows enables tighter cost controls and supports profit maximization goals.
- Forward logistics channel is freed up to increase velocity and to focus on higher customer service while balancing other supply chain pressures such as supply variability.
- Asset efficiency and labor productivity improves due to clear demarcation of flows and hence clear organizational goals and capabilities development.
- Velocity will improve for recovers flow providing tighter control over loss of value for products that lose value quickly.
- A dedicated reverse logistics channel can drive significant business value, potentially reducing the cost of handling returns by 15 to 20 percent and increasing revenues by 5 to 10 percent.
- Reduced administrative, transportation and aftermarket support costs.
- Increased velocity.
- Increased service market share.
- Higher achievement of sustainability goals.
- Greater customer service and higher retention levels.

With the right technology in place for reverse logistics process management beyond simply having a reverse logistics process in place, shippers gain more efficient benefits to include:

- Improved reverse supply chain visibility, increased productivity, and greater responsiveness to customers.
- A synchronized supply chain to now include forward traditional logistics, inbound logistics, and reverse logistics.
- Transparency in supply chain operations across your network.
- Automatic consolidation of data from partners and systems.

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