Critical Issues in Establishing a Viable Supply Chain/Reverse Logistics Management Program

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Abstract

In this paper, we intend to analyze the complex issues that OEM's face in managing their worse nightmare – Reverse Logistics. Viable solutions will be proposed to solve the problems, streamline the operation and ultimately enhance the bottom line. Since our company, Supply-Chain Services Inc. (SSI) is a 3rd party reverse logistic service provider for major corporations from a variety of industries, the numbers used and scenario described are based on our own experience and data. However, a number of published research papers are also used as references and appropriately noted.

Keywords

Supply Chain/Reverse Logistic Management

INTRODUCTION

In today's competitive business environment, it is critical for OEMs to focus all their energies and core competence into the execution of an efficient and effective forward supply chain. However, after the OEMs sell the products to their distributors, major retail chain stores, or consumers directly, their supply chain process does not stop there. There is an entire part of the business they cannot ignore. OEM's eventually are forced to face the enormous amount of problems at the back end of their business which can create the biggest headaches.

- **Problem # 1: Field and Customer Returns**

    As dealers and retailers compete for the attention of consumers, lenient return policies have left stores and OEMs' warehouses flooded with returned goods inventories. On average, the typical return rate for all products in the U.S. Market is about 6%. However, the average return rate for some national brand consumer electronics is around 8.46%[1].

    There are a wide variety of reasons for end-users' returns. According to SSI and its clients' experience, predominately, the reasons could include:

    - True Product Defects (major or minor)

    - Perceived defects due to the complexity level of the product or unclear operation manual. When customers are not able to operate the product properly, they normally perceive the product to be defective.

    - Pricing: find better price elsewhere

- Broken or damaged during shipping and handling

- Not as expected when compared to the images or functions shown on the packaging carton

- Decide not to own the product

- Wrong size or model

- Recalls or Warranties

- Bad intention: for example, returning a printer after taking the new cartridge out.

In business-to-business (B2B) situation, returns from wholesalers, distributors, retail stores, etc. can also be the results of the following scenarios:

- Errors in ordering, picking or shipping

- Damages due to transportation and handling

- Cancellation of orders

- Trade-in's

- Overstock items due to seasonal business cycle

The myriads of reasons make the Reverse Logistic no less a complicated issue than Forward Logistic in the complete Supply Chain Process. It would be simpler if only "defective products" need to be dealt with. However, based on SSI and its clients' data, the "non-defective returns" can actually account for 55% or more of the total returns. An ill-managed Reverse Logistic operation can have substantial adverse affect on the profit margin that a company works so hard to achieve during the Forward Supply Chain process. Therefore, it is critical for the OEMs to institute an effective and efficient Reverse Logistic Program. In other words, Reverse Logistics should be considered as a set of Supply Chain processes that adds value to the OEMs. However, unfortunately, not many OEMs realize the impact that the Reverse Logistic may play and do not view Reverse Logistics as a value-added business process because it is not their core competence.

- **Problem #2: Excess and Obsolete Inventories**

SSI's clients often tell us that the financial loss in this area has been statistically significant due to rapid product obsolescence rate and inaccurate sales forecast both at the OEM's and their business customers' side. For example, a major retail chain may place a substantial order for Christmas related items. However, they fail to move the products and would negotiate with the OEM to return the overstock inventory. If this retail chain is an important client, in an effort to keep the client and assure future sales, the OEM may have no choice but to accept returns on certain items and terms.

Other reason for excess inventory may have resulted from OEM's own promotional program, such as special volume discount. The OEM's sales team may push the business customers to purchase more than what they can sell. In the end, costs on returning excess inventories would have to be absorbed by the OEM.

- **Problem #3: Costs Associated with Managing Reverse Logistics**

The costs associated with reverse logistics could be quite intricate due to the enormous amount of details involved. It is clear that whether an OEM possesses the ability to control the costs could have a positive or negative impact on the company's bottom line.

The tangible and intangible costs borne by OEMs could include the followings:

- Return Merchandize Authorization (RMA) process
- Transportation: This is a major cost of the reverse logistic process. Everyday, we receive many LTL (less than trailer load) shipments on behalf of our corporate clients from places as far as Washington State, Florida and New Mexico. (SSI is located in Chicago which is considered a central location in the country). It could be costly. Depending on contractual agreement, the transportation cost is either entirely borne by OEMs or subsidized by consumer or business customers.
- Receiving and inventory control management
- Credit reconciliation and issuance
- Dispute resolution: disputes occur in the process may tarnish business relationship and impact future sales revenue.
- Labor: This is the heart of the Reverse Logistics cost activities. It involves multiple tasks including unpacking, inspection, testing, repair, refurbish, parts retrieval/replacement, cleaning, repackaging, reshelfing, re-deployment, recording, reporting and communication.
- Equipment: barcode scanners, test equipment, information software & systems, warehouse equipment, repair equipment, package materials.
- Space: Depending on the volume of return goods, excess/obsolete inventories and scrap material, OEMs are forced to allocate certain warehouse spaces for their reverse logistic operations. This is the cost that OEMs need to calculate to see if it is worthwhile to perform the tasks in house or outsourcing.

- **Problem #4: Managing the Disposal of Products and Production Scrap Material**

In order to avoid risks in product and environmental liabilities, OEMs realize the need to institute strict policies in handling scrap material. Non-functional and non-remarketable items need to be sent to reliable recyclers for product destruction and material reclamation. If the OEM's products are composed of valuable material such as precious metal, aluminum and copper, it is likely that the OEM is able to receive payments from recyclers even after transportation costs are deducted. However, if their material was mostly steel or contaminated plastic, disposal of scrap material would become a cost issue and should be calculated into the product cost.

KEY ELEMENTS OF REVERSE LOGISTIC MANAGEMENT

As analyzed above, the Reverse Logistic Management is not an easy task. It involves multiple parties and complex tasks. A well-organized and effective Reverse Logistic Program should be a well-integrated system of the following key elements:

Table 1. Reverse Logistic Key Elements
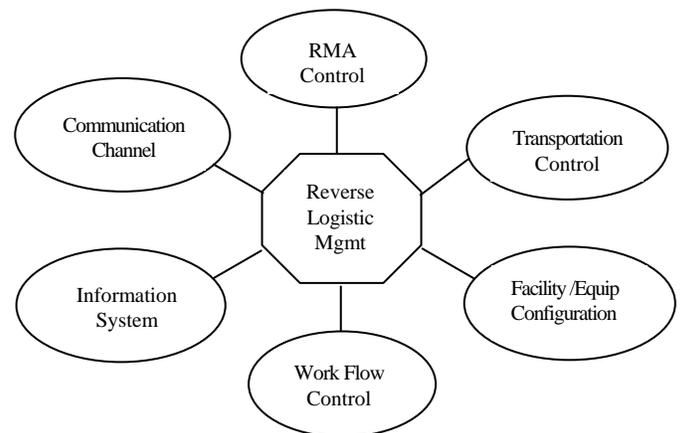
How to interweave these elements and make them work proficiently will be further discussed in the following sections.

INHOUSE OR OUTSOURCING

Whether to perform the Reverse Logistic operation in house or subcontract it to a professional service provider is a debatable issue which exists in almost every OEM headquarters. Based on our experience and discussions with OEM clients, the decision is usually dependent upon several factors:

- **Volume**: If return goods volume is low, there is no pressing need to use subcontractors.

- **Cost Control**: If subcontractors can perform the tasks more cost effectively, then there is a need to outsource. The cost refers to all the items listed in Problem #3: Costs Associated with Managing Reverse Logistic in page 2 of this article.

  Based on our experience, the predominate cost factors that prompt OEMs to use professional service providers such as SSI are:

  1) *Reverse Logistic is not OEMs' core competency. It is hard to achieve the efficiency of outsourced service vendors specialized in reverse logistics.*

  2) *The valuable warehouse space should be utilized for forward selling activities in lieu of returns.*

  3) *OEM's Overhead costs are higher than outsourced service vendors who, while servicing multiple clients, will only allocate a portion of the overhead to each client.*

- **Complexity of Tasks**: If the reverse logistic program involves a wide variety of tasks ranging from inspection, testing, repair/refurbish, parts retrieval and order fulfillment, re-labeling, repackaging, redeployment, etc., OEMs tend to be very selective in determining a subcontractor. Only a service provider who has adequate facility, trained staff and capable of providing in-depth tasks will be chosen.

- **Accuracy and Data Control**: It is quite important for OEMs to gain accurate information on the flow of the products in the entire reverse logistic process because it has significant impact on accounting, tax, inventory and sales/marketing issues. Even though using an outsourced service provider may prove to be cost effective, OEM management will not make a final decision until they are sure that the service provider can perform tasks accurately and its information system is sophisticated enough to seamlessly communicate with the OEM's system.

- **Security**: This is a major and valid concern of many OEMs. Unless they can find reliable service providers, OEMs usually act prudently in relinquishing the management capacity.

MANAGING THE KEY ELEMENTS OF REVERSE SUPPLY CHAIN LOGISTICS AND ESTABLISHING A VIABLE PROGRAM

No matter if the reverse logistic operation is performed in house or by an outsourced professional service vendor, it is clear that the efficiency and effectiveness of this operation will have a positive or negative impact on the bottom line of OEMs. Cost and efficiency control are crucial factors to the following key elements.

- **RMA Control**

  Effectively controlling the RMA process is a first step; it serves as a doorkeeper to the rest of the reverse logistic pipeline. Multiple sales agreements (such as client specific return allowances) and various product packages (i.e. some with certain accessories and some without) further complicate the operation. The staff assigned to this function has to be well trained to identify and assess the followings:

  1) *Legitimate Return Cause*:

     Some of our OEM clients experience disagreement on the return goods sent back from distributors. For example, the damages might have been caused by the distributor staff's negligence while moving or unpacking products. In order to minimize unnecessary disagreement and potential loss, OEMs may send local 3rd party service providers to inspect the goods on-site and authorize the return goods before distributors can ship.

     It is also important to record legitimate return reasons in the database. It is valuable information to design engineers, plant and sales/marketing management.

  2) *Assure Clients Return What They Ordered*

     According to SSI's experience, 5-10% of the return goods are not the products that the OEM clients ordered. An OEM may carry over a thousand product assortments in its catalog. Different accessory combinations may be included in different packages. Clients (including direct and indirect clients) may return the wrong package (normally from commercial clients) or take certain accessories out before they return (normally from consumer clients).

  3) *Assure Clients Return As Per Sales Agreement*

     This is particularly true when dealing with excess or obsolete inventories sent back from business clients such as wholesalers, distributors and retail chains. The RMA staff must be trained to understand the terms of the sales agreement and assure the correct allowable quantity and model are returned. This could be difficult to execute if the client is a major distributor or powerful national chain store.

- **Transportation Control**

Transportation is a major component of the reverse logistic cost. There are several ways to control the cost:

1) *Use Regional Consolidation Depots*: All the regional returns are sent to a regional consolidation depot first. Examples would be transportation companies or OEMs' regional warehouses. However, if the depot is not a dedicated return goods processing center, the drawback is double handling and prone to more errors. For this reason, OEMs may use various 3rd party reverse logistic service providers as regional return centers. If for management control purpose, a centralized national return center is preferred, OEMs may use the following criteria to select a location from a transportation cost saving perspective:

   - Select a region where higher percentage of returns normally take place;

   - If the return percentage is similar in most of the regions, then a location situated in the center of the nation, such as Chicago, Indianapolis and Atlanta may be a better choice.

2) *Negotiate Preferred Rates with Several Transportation Carriers*

   The return size could range from one small parcel, several skids, to half or whole trailer loads. There is a need to negotiate preferred rates with different carriers specialized in particular size of shipment.

   SSI learned from its clients that one of the reasons we were chosen as their national or regional service provider is due to our capability to use our own fleet of trucks to perform regional or national trailer load pick ups. The rate is relatively lower than commercial carriers.

3) *Use Automated Systems for Shipping Documentation*

   In order to reduce shipping errors and facilitate shipping efficiency, web-based automated systems should be used. Once the RMA is generated, the client (shipper) should be able to automatically print a bill of lading and schedule a pick-up with the selected carriers. The RMA number, corresponding bar codes and recipient's information should be also printed on the shipping document.

- **Facility and Equipment Configuration**

Facility and equipment configuration could be a very challenging task, particularly for 3rd party reverse logistic service providers. There may be clients of different industries (i.e. telecommunication vs consumer electronics) or product type (i.e. components vs finished products; or consumer products vs industrial products). The nature of tasks as well as requirements and equipment called for could be drastically different.

There are several basic principles dictating the facility and equipment set up for an ideal reverse logistic operation:

1) *Every major project should have a dedicated processing area*

   This principle is essential particularly if there are several major clients or projects in the same facility; otherwise confusion and errors are prone to take place.

   Each client or project's processing area should be well segregated so incoming, in-process and outgoing work flow will not be interrupted or mixed with other client's or project's. Inventories should be kept in the same work area to eliminate any possible errors.

   As for smaller projects (i.e. smaller daily incoming volume), under space availability consideration, can be grouped together in one processing area. However, it is a good idea to separate the work schedule to avoid confusion. For example, X company's tasks are scheduled in the morning while Y's in the afternoon.

   Since each client or project's products and task requirements are different, each set up should be unique and needs to be customized. For example, some projects may require a full process, from inspection, testing, parts retrieval, all the way to repackaging. Some projects may only require inspection, cleaning, repackaging and recycle. The space required and the configuration of the processing area would be quite different.

2) *Every major project should have an assigned loading dock*

   According to our experience, controlling the incoming and outgoing flow at the loading dock area is the first and last step to assure total accuracy. The loading dock area is usually the busiest area in the plant while, comparing with the processing area, the smallest in terms of square footage. For projects where daily incoming and outgoing volume is large, an assigned loading dock may be necessary.

   SSI is fortunate to have a facility that has multiple loading areas in different parts of the plant. This further helps streamline the operation and eliminate the likelihood of mix-up.

If space allowed, a temporary holding area in the loading dock area would be ideal so checking and recording of incoming goods can take place immediately while the truck driver is present. This not only makes accurate receiving possible, it also could reduce the discrepancies between a trucking company and the receiving party. This proved quite essential to one of our corporate clients known for its small and large copiers, cameras, printer, as well as other office equipment. SSI's accurate receiving data helps the client to oversee its carrier to reduce all types of warehousing and shipping problems. If we do not perform the receiving task immediately while the truck driver is present, it is very difficult to make the trucking company admit their mistakes.

3) *Similar Task or Project Can be Located Near Each Other*

If two projects require similar procedures and the products involved are alike, the processing area can be placed close to each other. The benefit is to share some of the equipment, such as testing, packaging equipment and bailer to save cost and space.

4) *Traffic and Processing Flow Consideration*:

Facility configuration should also consider traffic flow as well as each task's processing flow so greater efficiency can be attained.

If space allows, it is ideal to have a dedicated traffic route for each of the major projects from loading dock directly to the processing area. The entrance of the project processing area should be the shortest distance to the loading dock or loading area. The end of the project processing area should have easy access to the inventory shelves.

A dedicated traffic route from loading dock to the work processing area can also minimize traffic jam that leads to time lost and chaos.

At the entrance and inventory zone of a given process area, sufficient space should also be reserved for forklift truck movement.

5) *Tasks Requires More Electricity Should be Closer to the Power Supply*

Some of the projects require more electrical energy due to testing, repair/refurbish, repackaging and bailing needs. It is better to place the projects near a main power supply to assure an uninterrupted supply of electricity.

6) *Lighting*

Adequate lighting is quite necessary, particularly to more complicated projects that require good illumination for working staff. In addition to ceiling lights, workstation lights should be well placed.

- **Work Flow Management Control**

The heart of the Reverse Logistic activities takes place in the processing area. Whether the workflow is managed in an effective manner has a pivotal impact on the bottom line of the reverse logistic operation.

There are many issues dictating the success of workflow management. The key elements can be summarized as follows:

1) *Follow the Logical Flow of the Project Tasks*

For a comprehensive Reverse Logistic Management Program, the workflow is in general as follows:

Table 2. Reverse Logistic Task Flowchart
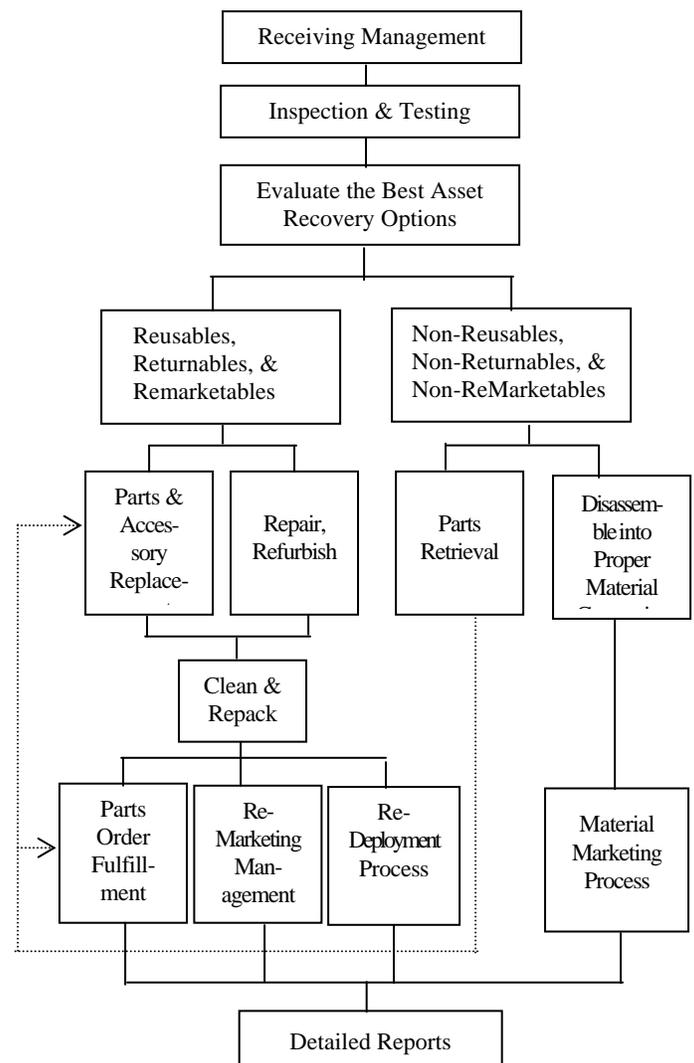
As to the layout configuration for each project workstation depends on the complexity of tasks required. The most common one is a vertical or horizontal layout with workstations along the two sides of a conveyor. Sometimes, it could be a square, rectangle or U shape. Nonetheless, inter-relation between task components is a major consideration so double handling and time lost could be avoided.

2) *Computer and Recording*

It is crucial to use scanning or other recording devices to record information at the critical point throughout the reverse logistic process. For example, recording the inspection and testing results, recording when a product is being repaired, refurbished, cleaned, repacked or recycled. Accurate recording assures a good tracking system which is very important to the OEMs. More details on the information system will be discussed in the next section.

3) *Personnel and Staff*

Adequate and quality staff plays a pivotal role in the reverse logistic management process. While overstaffing will make the operation costly, understaffing will result in inefficiency, error and delay. It is an art and science to balance the staff requirement.

For major projects, a dedicated project manager or supervisor is essential. This project manager shall determine and adjust work schedule, allocate the workforce as necessary, confirm all the required tasks are performed in a precise and timely manner, communicate with clients and generate regular reports. He/she also needs to confirm all data created at each step of the process is accurately recorded.

To achieve cost effectiveness, each project should be comprised of staff with different skills and pay levels. For some of the routine and simple tasks, a well-trained laborer can easily perform them. As to tasks such as repair, refurbish and parts replacement, higher level of technicians would be used. Based on our experience, utilizing a conscientious and diligent work force is more important than cost because one person can be used to perform multiple tasks and their accuracy level is greater.

In addition, constant job training is essential to enhance and strengthen worker's skill. It is also important to brief them on the reason behind their tasks. Once they understand the importance and consequences of their tasks, they can deliver higher performance.

Clear step-by-step instruction for each of the procedure is another key factor for high productivity assurance. Each workstation should have task specific instructions in both English and Spanish in front of the worker. In this way, no matter which worker is assigned to that workstation, they will not forget or omit any part of the process.

4) *Scheduling*

- Receiving/Pick-Up Scheduling

There are normally two sources of incoming shipment: UPS or Fedex for smaller parcels, freight carriers for larger deliveries on skids. Shippers may use a wide variety of carriers, this could make the receiving task a nightmare. However, with proper scheduling aided by good software, this challenging job can be under control. Better scheduling can assure each incoming shipment arrives at the appropriate time allocated for the corresponding project. It also avoids all carriers arriving at the same time which can cause chaos. The same rules apply to outgoing shipments.

- Work Scheduling

Project managers or supervisors are responsible for work scheduling based upon activity sequence and duration. The Critical Path Method (CPM) often used by the construction industry can be used to calculate the optimal daily work schedules.

Operation Director or Vice President to whom project managers report should review all the project schedule and help make necessary adjustments in view of daily fluctuations of multiple projects with various activities and volume.

- **Information System Management**

Information system is a crucial thread that interweaves and connects every aspect of the reverse logistic process. Without it, errors will be made and efficiency cannot be achieved. More importantly, management relies upon it to make right strategic decisions in both forward and reverse supply chain planning. However, one of the most serious problems exist in the industry is lack of a good information system dedicated for reverse logistics.

It is not easy to develop an ideal information system for reverse logistics given the diverse issues involved as discussed above. In addition, there are so many exceptions and variables in the process. Some of our large corporate clients use SAP system to manage its supply chain operations; however, reverse logistic is only an insignificant part of that program initially written for the forward supply chain.

In our experience of developing and constantly modifying reverse logistic and recycling programs due to rapid changes or realization of problems that were not addressed in an earlier version, several considerations for database development need to be taken into account:

1) *Flexibility and Easy Integration*:

This is especially challenging for a 3rd party service provider because its system needs to be flexible enough to communicate with so many different players in the pipeline, such as OEMs and their wholesalers, distributors, retailers, transportation carriers and their regional warehouses.

The system should be also scalable to accommodate the expansion needs in the future.

2) *Comprehensiveness*:

The system needs to be as comprehensive as possible so every aspect of the process can be tracked. Important data components should include:

- Return Party's company name, location, contact person and number
- Return reason
- RMA number generation
- Sales and Marketing Agreement terms and allowances
- Warranty terms
- Volume, Product, Model, Serial Number
- Receiving date
- BOL number or transportation carrier track number
- "Return to" location
- Credit conciliation
- Records on inspection, testing, parts retrieval, parts replacement, parts order fulfillment, repair, refurbish, re-packaging and re-deployment.
- Ability to analyze all pertinent data and diagnose the reasons for defectiveness and malfunction. This capability will allow OEMs to apply the information to their core business such as product design improvement, tighter supplier control, better production quality control, budgeting and forecasting.

3) *Real-Time Capability*

If some of the functions can be on web/real time basis, efficiency and accuracy can be greatly enhanced. For example, a shipper can print a bill of lading with MRA number, carrier and recipient's info from a dedicated website. OEM clients can also access the process status and report on line.

- **Communication Channel Management**

Keeping the communication channel open is the key to a successful Reverse Logistic Management Program, particularly when a 3rd party service vendor is used. The service vendor needs to:

1) Assign a dedicated project manager for each OEM's program. He/she needs to keep constant communication with OEM's designated personnel.

2) Enter data in a timely manner so the OEM can obtain up-to-date information.

3) Alert OEM of any unusual circumstances so immediate actions or adjustments can be made.

On the other hand, the OEM needs to inform its service vendors any changes that take place in the following areas:

1) addition or deletion of its clients
2) product specification
3) recall information
4) sales or promotional agreement
5) special allowances
6) return policies

SUMMARY

As discussed and demonstrated throughout this paper, Reverse Logistic, in fact, plays more of a strategic role in the Total Supply Chain Management Process than many people realize. The complexity of tasks and contribution to an OEM or retailer's bottom line are no less intricate or important than those in the Forward Logistic process.

In this paper, we have addressed some of the critical issues in establishing a viable Reverse Logistic Management Program based on SSI's actual experience. However, since this is a relatively new field, more in-depth research is needed. We hope this paper serves as a catalyst for the continuing growth of this industry.

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