

Chapter 17

Reverse Logistics

“In an ideal world, reverse logistics would not exist.”⁹⁶

“1.9 million Dishwashers recalled.”

“Chrysler issues recall.”

“Cadmium prompts new recall. 12 million of the McDonald’s collectibles affected.”⁹⁷

“Netherlands recalls 600,000 face masks from China due to low quality”⁹⁸

“Toyota recalls 3.2 million vehicles worldwide over fuel pump problem”⁹⁹

These are just a few of the recent headlines that have impacts on reverse logistics operations. As Jim Whelan stated in his article, “In Through the Out Door,” in March 2001, if we lived in a perfect world, we would not have to worry about the reverse logistics operations. Obviously as the above recent headlines show, we do not live in an ideal world. Because we do not live in an ideal world, as operations managers and supply chain leaders, we need to be concerned about stuff in the supply chain going backward. This chapter looks at reverse logistics and its impacts on operations management and supply chain management.

⁹⁶ Jim Whalen, “In Through the Out Door,” *Warehousing Management*, March 2001.

⁹⁷ *The Kansas City Star*, Justin Pritchard, The Associated Press, June 5, 2010, p. 2.

⁹⁸ Stuart Lau, <https://www.scmp.com/news/china/diplomacy/article/3077428/netherlands-recalls-600000-face-masks-china-due-low-quality>, 29 March 2020

⁹⁹ David Shepardson, <https://www.cnbc.com/2020/03/04/reuters-america-update-1-toyota-recalls-3-point-2-million-vehicles-worldwide-over-fuel-pump-problem.html>, 4 March 2020

The Chrysler recall noted above involved over 35,000 cars. This is small in comparison to the early 2020 recall for Toyota which involved an estimated 3.2 million vehicles worldwide in 2020 or the 1.5 million General Motors vehicles recalled in 2014. The above referenced McDonald’s recall of Shrek collectible glasses involved over “12 million” glasses that contained cadmium, a toxic metal known to cause cancer. “In all, the Wall Street Journal reports, 51.26 million vehicles were recalled in 2015, just slightly more than the 50.99 million officially recalled in 2014.”¹⁰⁰

Each of these recalls requires collecting the recalled items and shipping them backward through the reverse logistics pipeline and possibly impacting the forward flow of materials and supplies through the forward supply chain as we will see in this chapter. In this chapter we will look at reverse logistics and attempt to answer the following question: Is Reverse Logistics a Problem, an Irritant, or an Opportunity?

What is Reverse Logistics?

The APICS Dictionary defines reverse logistics as: “A complete supply chain dedicated to the reverse flow of products and materials for the purpose of returns, repair, remanufacture, and/or recycling.”¹⁰¹ Another commonly used commercial definition of reverse logistics is: the process of moving products from their typical final destination to another point, for the purpose of capturing value otherwise unavailable, or for the proper disposal of the products.

¹⁰⁰ <https://consumerist.com/2016/01/22/2015-was-another-record-year-for-vehicle-recalls/> , accessed September 12, 2016.

¹⁰¹ Reverse Logistics, APICS Dictionary, 14th Edition, 2013, APICS—The Association for Operations Management.

The Reverse Logistics Association defines reverse logistics as: “as all activity associated with a product/service *after* the point of sale, the ultimate goal to optimize or make more efficient aftermarket activity, thus saving money and environmental resources.”¹⁰² According to Gailen Vick, Founder and Past-President of the Reverse Logistics Association, “In other words, anytime money is taken from a company's Warranty Reserve or Service Logistics budget that is a Reverse Logistics operation.”

“Over the past dozen years or so, and increasing number of businesses have recognized the need to ramp up their reverse logistics operations to a global capability...

*The areas of Logistics and Reverse Logistics probably represent the greatest opportunities for cost savings and are, therefore, among any organization’s most important functions.”*¹⁰³

The attention to reverse logistics is relatively new in the history of logistics and supply chain management. The US Army did their first study of reverse logistics operations in 1998.¹⁰⁴ The first commercial study of reverse logistics was conducted the same year by Dr. Dale Rogers

¹⁰² Reverse Logistics, Reverse Logistics Association, <http://www.reverselogisticstrends.com/reverse-logistics.php>, accessed June 5, 2010.

¹⁰³ Pollock, William K., “The Globalization of Reverse Logistics Operations,” *Reverse Logistics Magazine*, May/June 2008, pp. 16–19.

¹⁰⁴ The US Army defined reverse logistics as: “The return of serviceable supplies that are surplus to the needs of the unit or are unserviceable and in need of rebuild or remanufacturing to return the item to a serviceable status.” The study by the US Army revealed that over 50% of every item ordered and 50% of the dollar value of all orders were being returned for whatever reason.

and Dr. Ron Lembke. This study by the Reverse Logistics Executive Council was published as *Going Backwards: Reverse Logistics Trends and Practices*.¹⁰⁵ This study is still the most comprehensive commercial study on reverse logistics.

Prior to the Army's study and the study by Drs. Rogers and Lembke many companies did not want to even admit that they had reverse logistics problems or processes. For many years, reverse logistics and returns was a lot like many families' crazy uncle or aunt. Everyone knew that returns and reverse logistics were taking place but no one wanted to admit it. In fact, some companies viewed returns and the resultant reverse logistics as the seedy side of the company and refused to discuss it. The study by Rogers and Lembke put a new light on returns and reverse logistics and opened the door for others to start looking at the processes. The authors of *Going Backwards* wrote, "Reverse logistics is a new and emerging area, and as such, only a limited amount of information has been published to date."¹⁰⁶

In 2003, The Reverse Logistics Association was formed as an industry association to focus on returns, recycling of materials, and ways to turn the reverse logistics processes from money pit to profit center. The first annual conference for the Reverse Logistics Association was held in Las Vegas in February 2004. This conference had about 100 attendees and about 20 vendors that focused on reverse operations. The 2020 conference had over 1000 companies represented, and a convention center ballroom filled with vendors that focus on returns and

¹⁰⁵ The book *Going Backwards: Reverse Logistics Trends and Practices* is available as a free download at <http://rlec.org/reverse.pdf>

¹⁰⁶ Rogers, Dale, and Tibben-Lembke, Ron, *Going Backwards: Reverse Logistics Trends and Practices*, Reverse Logistics Executive Council, 1998, University of Nevada-Reno, p. xix.

reverse logistics activities. An example that more companies are becoming aware of the need to focus on reverse logistics.

In 2006, reverse logistics was reported as a \$100 billion industry in the United States alone. This was up from the \$35 billion estimated in *Going Backwards* just eight years earlier. The problem of returns and reverse logistics is becoming an international problem but is a problem created in the United States and the liberal returns policy of most retailers and suppliers have created a “try it before you buy it” mindset. This mindset is partially what drives the reverse logistics processes. The other driver is overproduction and excess. By 2020, reverse logistics has grown to a multi-trillion dollar business worldwide.

If liberal returns policies help drive the reverse logistics problems, why do companies continue to offer these liberal returns policies? The biggest reasons for these policies are customer service and to provide a competitive advantage or at least provide the company with an order qualifier to keep them in the game. If all of the competition is offering liberal returns programs, a company has to do the same to remain competitive.

Reverse Logistics in History

Although it would appear that the problem of reverse logistics is a late twentieth century/early twenty-first century problem, it is far from a new problem. Let’s take a look at some of the earlier examples of reverse logistics:

- ❖ After the end of the American Civil War in 1865, North Carolina lore has it that as General William Sherman was heading north to link up with General Ulysses Grant after the surrender of General Joseph E. Johnston in North Carolina he encountered a problem. This problem was that the spring rains in North Carolina caused the Neuse River to rise well above normal levels. Rather than take all of the now unnecessary supplies north over the

swollen river, General Sherman's logisticians decided to dump the supplies on the south side of the Neuse River north of Raleigh. The idea of dumping excess/obsolete items carried well into the twentieth century as a method of "dealing" with unwanted stuff.

- ❖ In 1894, Montgomery Ward's started what is now a major driver of the reverse logistics operations. Montgomery Ward's was the first retailer to offer a 100% guarantee with the promise of a full refund if you were not satisfied with the product. This is somewhat ironic that the company that started the returns problem is no longer in business.
- ❖ As a result of the critical shortages of materials such as metals and rubber during the 1940s as a consequence of the need to support the war efforts for World War II, the recycling of materials and the advent of remanufacturing was born. This new business practice continues today. A large proportion of the starters, alternators, and generators in the automobile repair parts industry today are remanufactured or rebuilt.
- ❖ At the end World War II in Europe there was over 77,000,000 square feet of storage locations holding materials and supplies that were excess to the needs of the United States Army. As the United States moved from a combat force to an occupation Army, items shipped to Europe for combat were no longer needed. The value of these items scattered across the European continent was approximately \$6.3 billion in 1945 dollars. All of these items had to be disposed of, donated, or returned to the United States. This is about \$90.5 billion in 2020 dollars.
- ❖ On the other side of the war in the Pacific Theater, reuse and recycling had a different theme. Because of the extremely long order cycle times to get resupplied in the South Pacific, Armed Forces units started "recycling" and salvaging clothes and shoes of Soldiers and

Marines being shipped home. The shoes were resoled and the clothes were repaired and reissued to counter the long replenishment lead times.

- ❖ In September 1982, McNeil Labs and Johnson and Johnson had an incident that provides us with a more modern example of a need to conduct reverse logistics. In Chicago, Tylenol[®] laced with cyanide was discovered. All of the Tylenol[®] across the United States was pulled off the shelves and returned to McNeil Labs facilities. The result of the reverse operations produced tamper resistant containers and was handled in such a manner that customer confidence was not shaken. This also provided Johnson and Johnson and McNeil Labs with a blueprint for similar recalls in 2010 as a result of contaminated raw materials used to produce Tylenol[®]. The problem in 2010 and 2011 was that instead of following the blueprint for success, they denied the problem was theirs and the result was another issue with Tylenol[®] a year later. In 2010, Johnson and Johnson tried to blame the wood pallets for a “musty” smell that was making customers sick. When analyzing this position, it would be quickly apparent that this was not a well thought out answer. Look at the example in Figure 17.1. It was later discovered that one manufacturing plant had some bad materials and this was the cause, not the pallets.

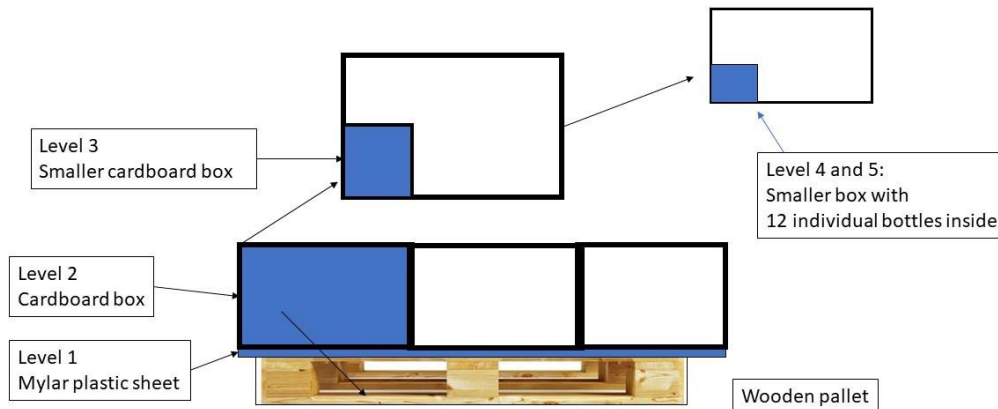


Figure 17.1: The number of layers between the Tylenol and the Wooden Pallet

- ❖ European concerns about the environment led to recycling initiatives and packaging concerns that have spread across the ocean to the United States. The Europeans as a whole have been concerned about the environment long before it became a Nobel Prize winning concern in the United States. Items that were being recycled in Germany in 1995 that still are not recycled in the United States. In Wiesbaden, Germany, there was a city official who had the sole responsibility of going through the trash dumpsters in the US Military housing areas to make sure the Americans were not throwing away items that should be recycled. Why is this important in a discussion of reverse logistics? Because, items that are recycled have to go backward in the supply chain. A 1991 Ordinance in Germany put teeth into recycling, thus impacting the reverse pipeline.
- ❖ Legislation in the United Kingdom in 1996 concerning the size and waste in packaging and shipping was followed by legislation by the European Union in 2001 that added goals for the reduction of packaging materials. The size of packages and the requirement to recycle or

return packaging materials impacts the reverse logistics pipeline. These legislations put the onus on the shippers and producers to minimize package sizes and forces the shippers to bring back the packing materials. Reducing the package size also contributes to a reduction in the energy and natural resources necessary to produce the packages.

Military and Commercial Perspectives of Reverse Logistics

As we mentioned earlier, the first real study of reverse logistics in the commercial sector was published in 1998 by the Reverse Logistics Executive Council about the same time that the US Army was analyzing their reverse logistics operations. So, let's take a look at the operations from both perspectives.

Reverse Logistics from the Military Perspective

“The Army’s reverse logistics pipeline processes are relatively slow and variable... for reference, we define improving the flow in the reverse logistics pipeline to mean timely movement to minimize the amount of inventory investment. In other words, the objective is to make the most cost-effective use of existing inventories.”¹⁰⁷

When the US Army conducted research in 1999 on reverse logistics, they found out that at one point in 1999 the value of the items going backward actually exceeded the value of the items going forward. This is no way to run a business.

In 2002-2003, the US Army moved the equivalent of 150 Wal-Mart SuperCenters from the United States and Europe into Kuwait in anticipation and preparation for the eventual invasion of Iraq to topple the Saddam Hussein Regime. Any time that much stuff is moved there

¹⁰⁷Diener, David, et. al., “Getting Value from the Reverse Logistics Pipeline,” Rand Arroyo Center, 2000, p. xiii.

is bound to be excess or the wrong stuff sent. In 1997, the US Army went into Bosnia to provide humanitarian support. Within 48 hours excess items started coming backward in the supply chain. The same situation was seen when in 1992 when the Army went into Somalia to provide humanitarian assistance. Within a few days of US forces arriving in Somalia, items started going backward in the supply chain.

The movement of supplies and equipment in 2002-2003 created excess and the steady flow of personnel, supplies, and equipment into and out of the country complicated the situation by adding some fog and complexity to the supply chains. In August of 2003, the US General Accounting Office did an audit of supplies in Kuwait and Iraq. The result was a renewed focus on reverse logistics. The initial draw down of forces and the accompanying evacuation of American Soldiers and Marines from Iraq at the conclusion of the major hostilities created a huge reverse logistics operation that involved over 30,000 vehicles alone that had to be processed and returned to the United States.

Part of the problem with the excess supplies was that soldiers were sent to their staging areas prior to entry into Iraq from Kuwait. Prior to moving to the staging areas, the soldiers had recreation activities and fitness centers in Kuwait; however, while awaiting the invasion these soldiers had nothing to do in their free time. When the soldiers got bored, they ordered stuff to see if it would really come in. General George S. Patton, Jr. stated, “In battle, troops get temperamental and ask for things which they really do not need. However, where humanly possible, their requests, no matter how unreasonable, should be answered.” Based on that attitude, whatever was ordered was shipped. The result according to *Jane’s Defence Weekly* was an area approximately 100 acres (*Jane’s Defence Weekly* stated it was an area about 40 hectares)

filled with stuff waiting to be returned to the United States. Some of this can be seen in Figures 17.2 and 17.3 from the GAO report.



Figure 17.2: Items Waiting Return from Kuwait According to the General Accounting Office



Figure 17.3: Items Waiting Return from Kuwait According to the General Accounting Office¹⁰⁸

For every item ordered that was not really needed or that for whatever reason did not reach its intended customer, the reverse logistics problem grew. As the US Armed Forces started the withdrawal from Iraq and Kuwait, perhaps the largest reverse logistics operation in history occurred.

The Commercial Perspective

“Life is like a box of chocolates, you never know what you are going to get.”¹⁰⁹

Reverse Logistics is very similar. Even when a company knows what should be coming back based on the Returns Merchandise Authorizations, there is no guarantee that that is all that will show up at the distribution center. Experience shows that when you open the door to the truck, you never know what may be in the boxes of stuff coming backward.

¹⁰⁸ “*Defense Logistics: Preliminary Observations on the Effectiveness of Logistics Activities during Operation Iraqi Freedom*,” General Accounting Office, 2003.

¹⁰⁹ *Forrest Gump*, Paramount Pictures, Robert Zemeckis, 1994.

Work with large and small companies has revealed that many companies still do not know the rate of their returns. Companies often quote “industry averages.” The problem with averages is that half of the companies are above the average rate and half of the companies are below the average rate. If a company does not know its true rate of returns there is no way the company can get a handle on the problem—profit from the opportunity that the returns offer. In addition, companies do not seem to know what it costs to process a return. Again, this can create a problem for companies. A third problem for many companies is that they do not know how long it takes to get the resalable/serviceable product back on the shelf and ready for resale.

Regardless of the situation, rates of returns and time to get back on the shelf, there are costs to reverse logistics above and beyond the cost of the item itself. Figure 17.4 shows some of these costs.

- Merchandise credits to the customers.
- The transportation costs of moving the items from the retail stores to the central returns distribution center.
- The repackaging of the serviceable items for resale.
- The cost of warehousing the items awaiting disposition.
- The cost of disposing of items that are unserviceable, damaged, or obsolete.

Figure 17.4 Typical Costs of Reverse Logistics above the Cost of the Item

When an item comes back from the customer—for whatever reason, whether that customer is another distribution center, a retail activity or the ultimate end user—the cost of the item being returned is only a part of the reverse logistics equation. Someone in the reverse supply chain has to process the merchandise credits or payment to the returning party. Even if this is an automated process, someone has to process the request for reimbursement and the Returns Merchandise Authorization.

Once the item has been returned to the store by the customer, the item has to be transported to a distribution center—either corporate owned or a Third Party Logistics Provider such as GENCO.¹¹⁰ Either way, there will be transportation costs to get the returned item back to determine if the item can be resold as is, repackaged, repaired, rebuilt, remanufactured, or disposed of. Until their purchase of ATC a few years ago, GENCO focused solely on reverse logistics activities.

If the item is still serviceable or complete without damage—which means it can still be resold as new, it may need to be repackaged. As all parents know, children do not always carefully take products out of the package when opening gifts. Too often, children will receive more than one of the same gifts thus creating a need to take one of the gifts back to the store for exchange. If the package has been destroyed in the process of opening the gift, this item will require repackaging before it can go back on the shelf.

Once the item has been repackaged, rebuilt, repaired, or remanufactured for resale, it is usually stored somewhere in the supply chain awaiting return to a store or shipping after an online purchase. This storage, even if only for a short time, is still a part of the company's carrying costs and can therefore detract from the bottom line for the company. In addition, there is another unplanned transportation expense to get the item back to a store or shipped to a customer if purchased online.

If the returned item is not able to be resold, rebuilt, or remanufactured, then the item must be disposed of. If hazardous materials are involved in the operation of the product or the manufacturing of the product, additional disposal costs are involved. Disposal costs are incurred

¹¹⁰ For more on GENCO go to: <http://www.genco.com/Reverse-Logistics/reverse-logistics.php>

for items that may still be in a resalable condition but for whatever reason are now obsolete due to changes in trends or having been replaced by an updated product while the original product was moving backward in the system.

There is another cost of processing returns that sometimes gets lost in the system. This is the cost of lost sales because an item is bought bringing the inventory to a stockout situation or as the Army calls it a “zero balance” situation. If a customer buys a product with the intent of using it for a day or two and taking it back a lost sale may ensue when another customer really wants that product that is not on the shelf. This may sound farfetched but let me give you an example. When I was in college, a fraternity brother in charge of “Pledge Recruitment” bought a film projector to show films of the fraternity in action the previous year.¹¹¹ This fraternity brother did not own a projector so he “bought” one and took it back the next day for a full refund. Assuming this was the last projector on the shelf, if a customer that really wanted to buy and keep a projector came in after the fraternity brother and found an empty shelf, a sale would be lost and possibly a true customer would be lost for good. The majority of these items returned show no defects or no faults noted. This means that any given day there is a large number of salable items going backward and not available for sales to customers.

Another example of lost sales during the Christmas sales and post-Christmas sales is Wal-Mart. The returns after the Christmas season across Wal-Mart in represents approximately 4

¹¹¹ This was a Military Fraternity with a competitive drill team that competed in National Championships and also performed in local and national parades and had a Bicentennial Drill Team that served as the official representative for the Governor of North Carolina at official Bicentennial activities.

days of sales for Wal-Mart according to Wal-Mart officials.¹¹² To give you feel for the size of 4 days of sales for Wal-Mart, Wal-Mart makes approximately \$57 million an hour every hour of the day. By comparison, the sales of Wal-Mart for the three days after Thanksgiving in the United States (Black Friday, Saturday, and Sunday) exceeds the Gross Domestic Product for South Africa for an entire year.

Other examples from commercial industry that demonstrate the costs of returns to the companies include:

- One major home appliance company disposes of over \$40 million annually of their returned products rather than refurbish the items because the company is concerned about degrading the value of their new items. This is money lost to the system completely.
- Many companies do not really know the cost of processing a return and continue to process and refurbish items that are really cost prohibitive. A manufacturer of video recorders was spending approximately \$85 to process and repair a device that only sold for \$50. After discovering this problem, the company started shipping a new device to customers under warranty and having the customer dispose of the old product. Sure, this opened them up for some customer fraud but was still cheaper than the original system.

¹¹² According to one Wal-Mart representative the returns after the 2003 Christmas season equated to approximately two thousand (2,000) Twenty Foot Equivalent Units (TEUs) (a TEU is a standard 8x8x20 foot shipping container).

- In 2001, Corporate America processed over \$60 billion in returns. Of this it cost approximately \$40 billion to process these returns and once processed, they discovered that almost \$52 billion worth of products were excess to the systems that accepted the returns and therefore provided little value to the company. This is why reverse logistics and the returns process started getting corporate attention.
- One major distribution company conducted an auction for items that were excess to their operations and sold most of the items at about half price.
- A major West Coast discount company was in the practice of returning seasonal items to a central distribution center. In fact, this company leased a 300,000 square foot distribution center for the sole purpose of storing seasonal items that were returned by its stores. The problem was that a large percentage of the seasonal items for the Christmas season arrived back at the distribution center slightly damaged or were damaged during the year before they could be sold or shipped to the stores for possible sale. The consulting company working with this company recommended donating the seasonal products to local schools for arts and crafts and taking a write off rather than experience multiple handling and damage during the returns and storage processes. This brought the company reduced costs and more “good will” in the local communities.

Reverse Logistics and Uncertainty

Because of the uncertainty in the reverse logistics system, the time to process returns is considerably longer than the time to process items in the forward supply chain. One particular

major distribution center took an average of 1.1 days to completely process the expected and known inbound shipments. However, it took this distribution center approximately 8.5 days to process returns to the distribution center. This additional processing time included identifying the item, identifying the condition, and serviceability of the item (which included testing for electronic items) and then disposing of the item, repackaging it for restock, or sending the item out for refurbishment or rebuild for future sales.

Another distribution center had non-value-adding operations in its returns process for items that had been rebuilt or refurbished. These items coming back into the distribution center for the third time (the first time was as a brand new item; the second time as returned item; and the third time as a rebuilt or refurbished item) were unpacked, inspected, and then the batteries for the items were taken out and separated from the end item. When a refurbished or rebuilt item was ordered on the company's Web site, the end item and the battery were reconnected at another station before shipping to the customer. This appeared a bit strange and the only explanation I could get was that the company had "always done it this way."

My original thought was maybe there was some OSHA regulation prompting this action. There was no OSHA requirement, but it was only an outdated way of doing business adding additional costs and handling requirements to the returns process. When asked why again, I was told that sometimes customers ordered just the battery or just the end item. How often? This revealed that it was very rare when the battery or end item was ordered separately.

Other examples of waste in the reverse logistics chain include:

- Estimates show that returns immediately following the holiday seasons in 2004 and 2005 were approximately \$16.2 billion (USD) each year or about 25% of everything sold during the holiday season came back for whatever reason. It could

be that a child received more than one of the same gift item; you bought your aunt a new sweater size 16 but she insists that she is still a size 8; the sweater was the wrong color; or you just did not like the gift. This is one of the reasons that retailers like gift cards. Not only do gift cards not come back as returns, but the other reason that retailers like gift cards is that they are hoping that the recipient does not use the entire value of the card or even loses the card.

If this same percentage of items bought during the holiday season continues, when the data for 2019 is released, the value of returns for the most recent holiday season will exceed the 2001 value of all returns— or approximately \$250 billion. Although it appears that returns are slowing in the brick and mortar retail sector, since many reports only look at brick and mortar retail sales and not e-commerce. As e-commerce continues to grow, the value of products returned from online sales will continue to grow. The returns for online sales is habitually higher than for brick and mortar sales.

- Wal-Mart has reported at professional conferences that they value of returns for the company exceeds \$6 billion annually. There are companies that would love to have \$6 billion in annual sales going forward. The returns for Wal-Mart equate to approximately 17,000 trucks a year going backward with items returned by customers and stores. Simple math shows that this equates to about 46 trucks a day 365 days a year going backward for one company.
- One major cosmetics manufacturer was experiencing over \$60 million a year in returned products. Unlike other manufacturers there is no real after market for used cosmetics. How could there be such a large volume of returned cosmetics?

One simple explanation could be allergies to the products; another explanation is tied to formal events. Every formal event requires a new dress, shoes, hand bag, and matching make up. When the formal event is over there is no more need for the matching make up as formal event etiquette dictates that the outfit cannot be worn again. This helps to drive the cosmetic returns.

- In 1998, the year before they went into bankruptcy, K-Mart established a Vice President of Reverse Logistics. This corporate level position was necessary because of the company's \$980 million in returns the previous year. A conversation with this official revealed reverse logistics nightmares for retailers. In the early days of MP3 players, young folks discovered that the value of the players was in the memory chips used to store the songs. As these chips were easily removed, a large number of MP3 players were returned as defective. When the players finally arrived at the returns processing center it was discovered that the defect was the missing chips. Another reverse nightmare was lawnmowers purchased in the spring and then returned in late summer or early fall as defective as they were still under warranty. When the lawnmowers reached the returns processing center, it was discovered that the reason that the lawnmowers were "defective" was that the lawnmowers had no gas or oil. Thus, the owners got free use of the lawnmowers for the season.

Six Sigma and Reverse Logistics

Can you apply Six Sigma methodologies to reverse logistics? Is it possible to apply the methodology of Six Sigma to managing returns? Would that help prevent such wastes in the system? Absolutely!

- Define – What is our reverse logistics policy and what are the impacts to our operations from the current policies on returns? What is our reverse logistics chain and how many links are there in this chain?
- Measure – What is our actual rate of returns? What are our reverse logistics chain costs?
- Analyze – What are the average industry rates of returns and how do we compare to our industry? What are the average industry costs for processing items through the reverse logistics chain? How do our costs measure up against our competition? Do we have non-value-added processes in our reverse chain that add to the costs of processing returns?
- Improve – What best in class processes should we add to our reverse chain to make it more profitable and improve the bottom line of the company while improving customer support? This is becoming easier to identify as the interest in reverse logistics continues to grow.
- Control – Once we have identified the new processes and put them in place, how do we institutionalize these processes? That is the real challenge of applying Six Sigma to the reverse logistics processes.

Home Depot has applied similar logic to its returns processes. Although The Home Depot is the fastest company in the United States to reach in excess of \$100 billion in sales, its returns are only about \$10 million a year. When compared to other comparable size companies this is very small. The first step was to establish a data base of customers bringing products back to the company on a habitual basis—this was actually done to identify potential theft of products and initially was only for

customers returning items without a receipt. The next step to reduce returns to identify which product lines had the highest return rates.

The result of this analysis revealed that the largest volume of returns was for tools. Further analysis into the why of this discovery revealed that once a job was finished tools were no longer necessary so the “home improver” brought the tool back. Think about it, if you are putting in new tile you need a wet saw to cut the tile. Once the tile is in place, what is the need for the wet saw?

The Improve and Control steps of Six Sigma resulted in the “Tool Rental Centers” being established in larger Home Depot stores. This proved to be not only a method to reduce returns but after a few rentals the tools paid for themselves.

Other Consequences of Reverse Logistics on Companies

“Approximately 8% of all merchandise is returned, surging to 10% over the holidays to match increased sales. Because the products returned can rarely be resold at full price, that equates to a matching loss of 10%, a significant portion of profits. Online return numbers are even higher, clocking in at 30% overall, or 40% for clothing.”¹¹³

As was mentioned earlier, for every item that is going backward and is in a serviceable or resalable condition there is the potential for a lost sale. Another aspect of the processing of returns was mentioned earlier in the processing times for reverse logistics items. An increase in the volume of items going backward coupled with the increased processing times creates impacts on customer order processing times and the flow of products forward. In some supply chains this

¹¹³ Jennifer McKevitt, Supply Chain Dive, <https://www.supplychaindive.com/news/reverse-logistics-returns-supply-management/432665/>, December 20, 2016.

creates a constipated supply chain where everything is moving very slow or not at all. This also contributes to customer confidence that leads to inflated orders which leads to more products going forward and then more products going backward, which constipates the system even more. This also leads to the requirement for larger logistics and supply chain footprints. The increased volume going forward dictates larger distribution centers to include more storage area, more inbound doors, and more outbound doors. This is coupled with the need to have a larger area in the distribution center to process returns.

Electronics and Reverse Logistics

Because of the rapid obsolescence of electronic products, a fear is the growth of electronic waste from the improper disposal of the old electronic products rather than properly recycling them. Worldwide, electronic waste accounts for approximately 20–50 million metric tons placed into landfills.

Electronic waste accounts for approximately 3–5% of items placed on municipal landfills but these products account for 70% of the toxins found around landfills in the air, water, and soils. Think about computers and monitors. Annually over four billion pounds of plastic and approximately four million pounds of lead are put in landfills annually. Both of these items are recyclable and there are known dangers from lead in the environment. Also remember that lead is a finite metal. Why throw away what can be reused. It is the responsibility of supply chain managers and operations managers to ensure that these products are properly handled in the reverse logistics pipeline.

One company that specializes in processing returned cellular telephones was able to mine 75 pounds of gold from approximately 6.5 million handsets in 2012. Another company used the recycled printer cartridges to make sustainable road signs and park benches. The proper handling

of electronics and the capturing of value from items going backward is a critical aspect of success in the realm of reverse logistics. Figure 17.5 shows an example of road signs being produced from recycled printer cartridges. These signs are more durable than aluminum signs, cheaper than aluminum signs, and because they are not made of aluminum, they are not stolen as often.



Figure 17.5: Example of Stop Sign made from recycled printer cartridges

Summary

“The truth is, for one reason or another, materials do come back and it is up to those involved in the warehouse to effectively recover as much of the cost for these items as possible.”

—Jim Whalen, “In Through the Out Door,” *Warehouse Management Magazine*

The Reverse Logistics Executive Council has estimated that the cost to process returned items can exceed 200–300% of the actual cost of the item and takes up to eight to twelve more steps to process the returns.

The reverse logistics operations have become a source of revenue for companies that are intensively managing the reverse logistics chain and continue to be a sore subject for companies

that have not yet got a handle on their returns processes. The continued growth worldwide of the Reverse Logistics Association is proof that this not a US-only problem and that more companies are becoming concerned about getting control of these operations.

Reverse logistics impacts other areas of the operations management chain while consuming precious resources and dollars in the company. Reverse logistics operations and activities impact:

- The accuracy of forecasting because of the counting of “sales” that may not actually be sales after all when the product gets returned.
- Carrying costs of inventory by impacting the number of personnel needed to inventory the items, process the items, and the needed space to “house” the items coming backward.
- Transportation costs for the move back from the retail store or customer to the distribution center or central returns processing center. In addition, it impacts the costs of transportation by having to ship the same items to a store or customer more than once.
- Marketing costs—this is a result of having to market refurbished or remanufactured items.
- Personnel costs for the employees that have to process the returns.
- Space costs – one of the reasons for the growth in the size of distribution centers is the requirement for space to receive and temporarily store returned items.

Reverse logistics as a topic of discussion and concern is relatively new in the study of operations management and may very well be the last great frontier for reaping profits and savings from the total supply chain.

Discussion Questions and Activities

1. Check with a local store in your area and ask what their returns policy is and what rate of returns they get as a percentage of sales.
2. What experience do you have with returning an item? Was it a pleasant experience or was the process a hassle? Was the time it took to process the return worth the effort?
3. Visit your local Cabela's (if there is one close to you) and look at the items in their "Bargain Cave." Look carefully at the items that were bought, used, and then returned.
4. Think about the impacts of the reverse logistics operations on your company's operations.