Reducing Cycle Time in Reverse Logistics

by

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Executive Summary

While products in the typical supply chain move forward toward the ultimate consumer, many organizations are beginning to realize the importance of reverse logistics. Reverse logistics addresses the flow of products back to vendors or suppliers. The reverse logistics process studied here involves a three-link supply chain for microcomputer products, in which products are returned to a supplier from an end user, and then from the supplier to a wholesaler. This study examines this reverse logistics process by mapping the current process, determining current cycle times, identifying obstacles that adversely affect cycle time performance, and exploring opportunities for cycle time reduction.

Although several cycle time impediments were identified, the key obstacles were the hand-offs. A hand-off is the process of transferring physical possession of product from one party to another along with the necessary information to allow processing. Delays result if there is a problem with either the physical transfer or the accompanying information. The reverse supply chain presented here involves three parties and two sequential hand-offs, resulting in unnecessarily long cycle times.

A number of cycle time reduction opportunities were identified, including preventing returns, protecting the product, making returns easier to process, partnering, and informing. The latter two are the most crucial and could allow the number of hand-offs to be reduced from two to one, significantly reducing cycle time.

This article presents an overview of the major project activities and provides cycle time reduction insights gained from the examination of this reverse logistics supply chain.

Introduction

The direction of the supply chain flow is typically thought to be forward with materials or services passing from suppliers to customers. This is an area where many organizations have focused their attention and energy to improve customer service, reduce costs, and shorten cycle times. However, in many organizations there is a need for some materials to move in the reverse direction, from customers back to suppliers. This reverse movement may involve new materials that are being returned or used materials that are sent back to be recycled, refurbished, or salvaged. This process is known as reverse logistics.

The area of reverse logistics has been largely ignored by many organizations until recently. Organizations are now realizing that this is a costly oversight with a detrimental effect on customer service (Dawe, 1995). The need for effective reverse logistics is growing, due in part to environmental concerns and regulations. More organizations are reusing and recycling items that would previously have gone into landfills (Melbin, 1995). However, the benefits of improving reverse logistics capabilities are not just environmental. Other benefits include improved customer service and reduced costs. In the case of new product returns, the ease with which products can be returned can significantly impact sales, as it may affect a customer’s choice of a supplier and the quantity purchased.

A case study is presented here of reverse logistics involving new product returns to a wholesaler of...
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...microcomputer products. This reverse logistics process involves a multiple link reverse supply chain rather than a single customer/supplier relationship. The reverse supply chain is mapped and opportunities to reduce cycle time, reduce costs, and improve customer service are explored. The approach presented here can be applied to other reverse logistics processes as well.

Return policies vary by industry and supplier (Padmanabhan & Pang, 1995). Returns are often restricted to a limited time period following the purchase. This is particularly important in the computer industry where products quickly become obsolete. In addition, commercial returns often involve limits on the volume of stock balance returns. A stock balance return occurs when a customer decides too much product has been ordered, the product is unused, and is resalable.

Returns not only reduce net revenue, they are labor intensive, information intensive, and fraught with exceptions. They are labor intensive because products may need to be repackaged, relabeled, or in some manner refurbished prior to return to stock. The products need to be taken to the right location to return to stock, returned to the supplier, or possibly destroyed. Customers often ship returns in a variety of nonstandard packages, each of which needs to be opened by hand. The contents need to be checked for condition and quantity and returnability assessed.

Returns are information intensive because of the amount of information that must be determined including: (1) what is being returned, (2) who is returning the product, (3) whether it was purchased from us, (4) the reason for return, (5) the length of time since purchase, (6) whether return policy criteria have been met, (7) the return merchandise authorization (RMA) number (in the case of commercial returns), (8) dispensation, and (9) amount of credit allowed the customer. All of this information is required for the return to be processed and the customer credited.

Finally, returns are fraught with exceptions. If the product does not meet the normal return criteria, the supplier may make an exception for unique circumstances or to appease an important customer. In mailed or shipped returns, some or all of the necessary return information may be missing. The customer may have made a mistake such as sending the product to the distribution center rather than to the returns center.

The returns process and the manner in which the necessary information is obtained varies among businesses. However, all returns begin with a customer indicating that a return is desired and end after the product has been returned to the supplier and the customer has received credit. Retail returns (in-store) are typically performed in person, and the customer usually must produce a receipt. Such returns are fairly fast and simple because all the information is provided quickly via the receipt and verbal information. The merchandise can change hands and credit can be issued almost immediately. Consumer direct mail returns are not as fast or simple because of the need to ship the product back to the supplier, which means the customer is not available to answer questions verbally when the return is processed. This type of return is rapidly increasing due to growth in direct mail purchases. It is estimated that by 2005, direct mail will account for more than 50 percent of consumer purchases (Witt, 1995). Most direct mail merchandisers include a return form, shipping label, and instructions for returns with every shipment. The return form provides the information necessary for processing the return, thus making it easier for the customer as well as the merchandiser. It is difficult for customers not to follow directions, a notion sometimes referred to as front-ending or “idiot proofing” the process. In commer-
cial returns, the customer typically is expected to contact the supplier to request an RMA number, at which time the supplier opens a corresponding record with the relevant information, a process to be discussed in detail later.

**Background Information**

This study examines the returns process of a large wholesaler of microcomputer products and services. The company markets nearly 100,000 products from approximately 1,000 of the world’s leading hardware manufacturers and software developers to a worldwide customer base of over 100,000. They are competitive in product selection, pricing, and product availability. The superior use of information systems at their distribution centers allows them to accept and process orders quickly and accurately. Orders received by 5:00 p.m. are shipped the same day 99.75 percent of the time, and 99.87 percent of the orders are shipped complete. Shipping accuracy is 99.8 percent. This organization may process $50 million worth of returns in a given month.

The company’s customers include owner-operated chains, franchises, independent dealers, value-added resellers (VARs), superstores, mass merchants, and corporate resellers. The company’s reseller program provides a variety of services including direct fulfillment. Direct fulfillment is a program where a vendor holds no actual inventory and is solely a sales and marketing organization. Once an order is received from the customer, the direct fulfillment vendor (DFV) has the wholesaler (i.e., subject organization) drop-ship the product(s) to the customer (see Figure 1). The package has the DFV’s name on it so the whole process is seamless to the customer. By holding no inventory, DFVs are...

![Figure 1: Order/Return Process for Direct Fulfillment](image-url)
able to offer lower prices. While the relationship between the DFV and the wholesaler works smoothly most of the time, it is not without problems. The product returns process can be particularly problematic.

Causes of Returns

Returns in this industry account for about two percent of the total sales volume, and occur for a variety of reasons including customers changing their minds, errors—such as shipping the wrong quantity or the wrong item(s), products damaged during shipment, and defective products or products perceived to be defective by the customer. In the latter case, it may be that there is nothing wrong with the product, but after installing the new hardware or software, it appears to be defective to the customer. In this situation, the return might be prevented if the supplier provides technical assistance to the customer.

Another type of preventable return involves customers’ misunderstanding of partial order shipments. Orders are sometimes filled from more than one distribution center (DC) with each DC shipping directly to the customer, so the shipments may not arrive together. When the first package arrives, the customer may think an error was made and place another order for the “missing” items. Ultimately, the customer ends up with duplicates of those items and returns the extra items.

The Direct Fulfillment Vendor Returns Process

As previously noted, the returns process at times can be problematic. Unlike the order process, where DFVs do not handle the product, customers return the product directly to the DFV, who in turn ships it to the wholesaler (see Figure 1). The product returns process (see Figure 2) begins with the customer placing a telephone call to the DFV. The DFV will take the customer through a question and answer session to determine if the product is returnable. For example, in the case of stock balance returns where the customer has changed his/her mind, the DFV will not accept the return unless the item(s) can be returned to the wholesaler. The wholesaler generally does not accept the return unless the item(s) can be returned to stock and subsequently be resold. This usually requires that the product packaging has not been opened, damaged, or marred in any way that would prevent the product from being resalable. If the product is deemed returnable, the customer is issued an RMA number and instructions on how and where to send the product. In most cases the RMA number is issued during the initial phone call, but if there is a question as to whether the product is returnable, it may take as long as three days before the RMA is issued. In Figure 2, the time involved in moving from one point in the process to the next is shown on the arrow between the two points. Thus, the amount of time from when an RMA is requested until it is issued is shown as typically being zero days, but ranges from zero to three days.

Once the RMA number is generated, the DFV must wait for the product to be shipped. Responsibility for shipping costs depends on the reason for the return. In the case of damaged product, defect, or error, the DFV pays shipping. If it is a stock balance return, the customer pays. The mode of transport is usually left to the customer’s discretion. As shown in Figure 2, the time from RMA issue until the product arrives is typically eight days, with a range of one to thirty days. However, some returns never arrive. Of the stock balance RMAs generated by direct fulfillment vendors, 20 percent of the products never arrive. Customers either forget to ship the product(s) or decide to use them.

Once the product is received, it is processed and its returnability to the wholesaler evaluated. On a stock balance return, customers sometimes indicate that a product has never been opened, but upon receipt, the DFV discovers that the product has been opened and, in some cases, used. Customers know the only returns that wholesalers will usually accept are those...
Figure 2: Current Direct Fulfillment Vendor Returns Process Flows
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that can be returned to stock or are non-operational. Consequently, customers will sometimes indicate that the product meets one of these conditions in order to receive an RMA. Product is processed at the DFV returns facility on the day it arrives. The customer then receives credit from the DFV if the product has arrived in the condition expected.

After the product has been deemed returnable, the DFV contacts the wholesaler to request an RMA. Direct fulfillment vendors typically will wait until they actually have the returned product in hand and have verified its returnability before contacting the wholesaler for an RMA. The RMA is generally not requested from the wholesaler prior to this time because the wholesaler’s RMA expires within 30 days. Also, if the product was never received from the customer or was in un-returnable condition no RMA from the wholesaler would be necessary. Issuing the RMA typically takes an insignificant amount of time, but there can be a delay (up to seven days) if there is some question regarding returnability. As in the first hand-off, the “returner” (i.e., the DFV) generally pays shipping costs on a stock balance return, and the wholesaler generally pays shipping costs in the event of product defect or wholesaler error.

The next step for the DFV is to ship the product back to the wholesaler’s returns facility. Since the DFV studied does a sizable amount of business with the wholesaler, returns are consolidated to reduce shipping costs. The consolidated shipment is usually sent by LTL (less than truckload) carrier once a week, resulting in a delay of up to five days. The shipping time using the LTL carrier ranges from one to seven days, and averages five days.

When the wholesaler receives the shipment, the products are processed to verify returnability, after which the DFV is credited. As shown in Figure 2, the time from product arrival at the wholesaler until credit has been issued to the DFV is one to two days.

Overall, the cycle time on the returns process ranges from 5 to 55 days and averages about 18 days. It should be noted that the high and low values, of 55 and 5 respectively, are rare.

Opportunities for Improvement

A number of problems associated with the returns process are described below and include the delay of hand-off time, customers not following correct returns procedure, tracking problems, and others.

Hand-Off Time

As shown in Figure 2, the greatest delays involve hand-off time, which is defined as the time from RMA issue until product arrives. The first hand-off involves getting the product from the customer to the DFV, and the second involves getting the product from the DFV to the wholesaler. Hand-off time includes both waiting-to-ship time and shipping time. For the first hand-off, which typically takes seven to ten days, these two are not separated because data were not available on how long customers wait before shipping. However, since most returns take seven to ten days to arrive and can take as long as 30 days, clearly customers often wait before shipping. For the second hand-off, the DFV’s practice of consolidation imposes the waiting-to-ship time. The total hand-off time between the DFV and the wholesaler would typically be about eight days and range from one to twelve days.

Following the Correct Returns Procedure

While the correct returns process requires that a customer first contact the DFV, some customers do
not follow this procedure. As discussed earlier, a product drop-shipped to a customer has the DFV’s name on the return label. However, the address is that of the wholesaler’s DC from which the product was shipped, which can cause confusion if the customer does not contact the DFV first. Returned products sometimes arrive at the wholesaler’s DC with little or no explanation. These DCs are not equipped to handle returns, thereby creating a difficult situation and needless delay.

Instructions are not always followed correctly even after the customer calls and receives an RMA. For example, for a stock balance return, the box must be unopened and in “like new” condition for the product to be considered resalable. Writing the RMA number on the box or in some other way marring the box may result in nonreturnable merchandise. This can easily happen because the person who requests the RMA number and receives the instructions might not be the person who prepares the package for shipping.

When the package is received, the RMA number is the key to accessing the necessary return information. Customers are instructed to include the RMA number on the label (and not on the box), but sometimes the RMA number is missing. The returns center must then resort to ad hoc methods to determine the RMA number. For example, knowing which customer sent the package may prompt a look through a list of outstanding RMAs for that customer, and an attempt to determine the RMA number based on the package contents. This approach is labor intensive and time-consuming. Even if the RMA number is present, it typically must be manually entered to retrieve the return information from the RMA database. Even when customers have followed directions correctly, the process is labor intensive.

**Tracking problems**

The consolidation process that some DFVs use creates several problems. First, packages can be delayed up to a week before shipping. In addition, the practice of bundling packages together, usually on a pallet, can cause tracking problems. When the pallet arrives at the wholesaler, the wholesaler signs to acknowledge receipt of the pallet. This does not acknowledge receipt of each individual RMA that was on the pallet when it departed the DFV’s facility. Packages are sometimes lost in shipment, which creates a major area of contention between the DFV and the wholesaler. The DFV may indicate a package was shipped with the pallet, but the wholesaler has no record or receipt, and there is no means of tracking the individual package. To mitigate this problem, the current practice is to use express air freight for small, high value items (such as computer memory). The tracking information available when using express air freight shippers generally prevents these problems.

**Recommendations**

Recommendations for this reverse logistics process are given below. These involve several of the key principles of cycle time reduction as found in Wetherbe (1995). The key principles recommended here are front-ending, partnering, eliminating, and informing.

**Front-ending**

Front-ending involves anticipating problems before they arise and providing a means to prevent or mitigate the problem. Front-ending can be used in several ways in this reverse logistics process.

*Preventing Returns:* The most effective way to reduce the cycle time on returns is to prevent the return from occurring. The causes of returns discussed earlier include some which are preventable and some which are not. Errors in filling the order, such as wrong quantity or wrong item(s), are preventable but are not a significant problem for this wholesaler since shipping accuracy is 99.8 percent.
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A preventable type of return experienced in the computer industry is when the customer perceives the product as defective. Providing technical assistance to the customer can help prevent this type of return. Another preventable return occurs when customers receive a split shipment, believe an error was made, and order more of the “missing” items. Information provided earlier would prevent this problem. A lesson might be taken from the consumer direct mail industry where each partial shipment usually contains a statement of items in the shipment and items to be shipped separately. Little can be done to prevent the customer from changing his or her mind other than to provide a mild deterrent, such as the necessity of paying for the returns shipping cost. Customers already pay return shipping for stock balance returns. Any further deterrents to returns could have the undesirable effect of being sales deterrents. Damage in transit can be reduced by better packing materials and avoiding carriers with a poor history for product damage.

Protecting the Product and its Box: The issue of product damage gives rise to the issue of damage to the packaging. Manufacturers put products in boxes to protect them from damage. Protecting the original manufacturer’s box is also important since damage to the box often precludes returnability. For example, a DFV had a $10,000 computer returned, and the carrier damaged the box in transit. The computer was not damaged, so the box had done its job from the standpoint of protecting the product. The carrier acknowledged damaging the box and paid for the value of the box (less than $200). However, the DFV could not purchase a new box from the manufacturer. With a damaged box, the computer could no longer be considered new and was no longer returnable to the wholesaler. Suddenly the $200 box is worth $10,000 which means not only is a box needed to protect the product, but a shipping carton is needed to protect the original box. Thus, an additional step that could be taken, particularly for expensive items, is to institute the practice of using a shipping carton to protect the original manufacturer’s box.

Making Returns Easier to Process: Given that some returns are going to occur, the next issue is to make the process go as smoothly as possible for all parties. From the DFV and wholesaler’s perspectives, returns would be improved if customers followed directions and if the RMA labels were scannable. To help ensure that customers follow directions, the front-ending might require “idiot proofing” the process as much as possible. As discussed earlier, customers do not always follow the process correctly. For example, they may send the product to the wrong place. The correct process for the customer should be as simple as possible and readily apparent. Again, a lesson might be taken from the consumer direct mail industry where a return form and instructions are included with every shipment. These steps would reduce errors, make the process easier, and help reduce the process cycle time.

Partnering

Two kinds of partnering are possible. The first is partnering with one or more freight carriers that are capable of providing a scannable label for the return product at pick-up. The importance of this type of partnering will be discussed further in the next section. Potentially, a second type of partnering could involve one or more long-standing customers with good track records. From the customer’s perspective the most important step in the returns process is receiving credit from the supplier. Customers would like to receive credit at the time the RMA number is issued. Suppliers are understandably reluctant to do so until they have received the product and determined it to be creditworthy. For a major customer where the relationship is stable and trust has been developed, a supplier might consider issuing credit earlier as a service to the customer, agreeing that the account would be debited if the product was not found to be “returnable.” This would only work if the customer acts in good faith and sends the product promptly.
Eliminating and Informating

As discussed earlier and shown in Figure 2, the hand-offs consume the majority of the cycle time in the returns process. The first question to ask is: "if DFVs do not need to handle the package in the order fulfillment process, why are they involved in the returns process?" The DFV returns facility exists only to provide information and greater control for the DFV. Prior to the creation of the DFV returns facility, customers did return products directly to the wholesaler. The problem with this process was the lack of tracking information. When the DFV received credit from the wholesaler, the DFV did not necessarily know which RMA(s) were being credited, thereby placing the DFV in an information vacuum resulting in a lack of control. Creating the DFV returns facility filled the need for both information and control, but also created an additional hand-off, increasing the cycle time, the total amount spent by all parties on shipping, and overhead for the DFV. If the hand-off could be accomplished with complete tracking information, it would be possible to eliminate the DFV returns facility and have customers again return directly to the wholesaler. Informating, so that tracking information is available to both the DFV and the wholesaler based on a single tracking number, is necessary for this process to work. Providing a scannable label to the customer and having appropriate tracking and information systems would enable both the DFV and the wholesaler to access the status of each return. This could be accomplished by partnering with a freight carrier that is capable of providing this type of service.

This modified returns process is shown in Figure 3, and would be similar to the process that was in use prior to creation of the DFV’s returns facility, except that tracking information would be available. The process would begin the same way, with the customer contacting the DFV to request an RMA. The DFV could utilize the same question and answer session to determine if the product is returnable. If the DFV is satisfied that the product is returnable, the wholesaler would be included now to approve issuing an RMA as well. When the RMA is issued a carrier could be dispatched to the customer with a scannable label. If the carrier arrived to pick up the package on the day the RMA was issued, waiting-to-ship time could be virtually eliminated. The duration of shipping, as well as the cost, would vary based on the urgency of the return. Processing time at the wholesaler’s facility would be reduced by having scannable labels, making the process less labor intensive and time consuming, allowing packages to be processed on the day of arrival. At this point the wholesaler would credit the DFV who would in turn credit the customer.

This proposed returns process would improve customer service from the wholesaler to the DFV and from the DFV to the customer. It would reduce overhead cost for the DFV, in that the DFV would no longer need a returns facility. Packages would be shipped once instead of twice, reducing overall shipping cost. In the current system for a stock balance return, the customer and the DFV each pay to ship the package once. In the proposed system the customer could still pay, resulting in additional savings for the DFV; or perhaps some arrangement of sharing the cost could be used if the package is returned promptly, thus providing an incentive for the customer to return promptly. For non-operational returns, currently the DFV and the wholesaler each pay to ship the package once. In the proposed system, they might also arrange some means of cost sharing. Finally, on the issue of cycle time, there would be a considerable reduction from about 18 days to just a few days.

If obstacles prevent the above scenario of shipping directly from the customer to the wholesaler, the next recommendation is to shorten the time of the two hand-offs. The hand-off between the customer and the DFV is a major time consumer, involving both waiting time and shipping time. To reduce waiting time, some means of motivating customers to send packages more promptly, is needed. This could be done either with an incentive to ship promptly or a disincentive for not shipping promptly. As in the above scenario, the duration of shipping could vary based on the urgency of the return.
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Figure 3: Proposed Direct Fulfillment Vendor Returns Process Flow

- Customer requests RMA from DFV
  - Immediate
  - DFV verifies returnability to wholesaler
    - Typically: 0 days
    - Range: 0 - 3 days
  - RMA issued for stock balance return (customer pays shipping)
  - Immediate
  - Wholesaler waits for product to arrive
    - Typically: 3 days
    - Range: 1 - 5 days
  - Product arrives at wholesaler, and processing begins
    - Typically: 1 day
    - Range: 1 - 2 days
  - Processing completed
    - Wholesaler credits DFV
    - DFV credits customer
  - RMA denied, product not returnable
    - DFV verifies returnability to wholesaler
    - Typically: 0 days
    - Range: 0 - 3 days
  - RMA issued for a problem, such as damage or defect (DFV or wholesaler pays shipping)
  - Product deemed not creditworthy
    - Wholesaler credits DFV
    - DFV credits customer
For the second hand-off, an alternative approach from the DFV to the wholesaler is needed. Consolidation is causing needless delay, as well as tracking problems. One alternative is to discontinue consolidation. This would eliminate the delay caused by consolidation and prevent the tracking problems that are currently causing problems between parties.

**Conclusions**

A well-managed reverse logistics process across the supply chain can improve customer service and reduce costs and cycle time. While this study addressed reverse logistics for a wholesaler of microcomputer products, the approach used may be applied to other reverse logistics processes. This approach involved mapping the process, gathering data on the time required for each activity, and applying principles of cycle time reduction. The principles of cycle time reduction involved in this study are front-ending, partnering, eliminating, and informing. Eliminating was a key principle here in reducing the number of hand-offs from two to one, and partnering with an appropriate freight carrier is the key to making this happen.

The opportunity for improvement will vary by reverse logistics process. However, one improvement opportunity likely to be common to virtually all reverse logistics processes is the need for front-ending. The perspective that should be taken is that every customer order is potentially a return waiting to happen, whether a return of new merchandise, a product recall, or recycling of old merchandise. The reverse logistics process can be front-ended by designing a process that mitigates problems.

There are two primary means of front-ending that are likely to be useful for many reverse logistics processes. The first involves preventing returns before they happen, and the second is simplifying the returns process as much as possible. To help prevent returns, the process should be studied for the causes of returns and each cause addressed. For example, in this study, we found that split shipments were sometimes leading customers to reorder the “missing” items, causing returns of the duplicates after all shipments had arrived. Providing customers with appropriate information can help prevent this type of problem.

Although examining the causes may reduce the number of returns, some returns are inevitable. Simplifying the process makes it easier for the customer and for the organization in processing the return. As we have described, the returns process is labor intensive, information intensive, and fraught with exceptions. Designing the process to minimize the labor required and insuring that the necessary information is readily available to all parties involved are essential components. Getting customers to follow the correct process is critical. This requires that customer instructions be simple and obvious enough, that it is difficult not to conform. A simplified returns process that captures required information will benefit all parties involved in terms of both time and expense.

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