AN INSIGHT INTO REVERSE LOGISTICS PRACTICES IN THE US

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ABSTRACT

With the cost of returns averaging disproportionately higher relative to the value of the product, a firm's Reverse Logistic (RL) practices may impact on its ability to efficiently recapture waste and unusable products resulting in revenue generation, expense reduction, and asset efficiency. This paper summarizes practices among US firms with RL activities geared to achieve the goals mentioned above. Survey summaries of companies' RL practices are analyzed and presented, such as: the proportion of supply chain (SC) activities devoted to RL; the percentage of products returned for various reasons; how the returns are handled; which IT types are deployed; and how these impact on the RL operational processes as well as RL performance.

INTRODUCTION

RL is "the process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the *point of consumption* to the *point of origin* for the purpose of recapturing value or proper disposal" [6]. RL as a field is "unique enough to undergo specialized research" [6] [8].

The goal in RL is to achieve practice excellence so as to enhance customer equity [7] by investing in resources to build customer loyalty and satisfaction. Such investments in RL processes can provide customers and business partners the capability to take back returned items quickly and credit them in a timely manner. As a byproduct to enhancing customer equity, RL, through its asset recovery efforts, yields other benefits to the firm including revenue generation, expense reduction, and asset efficiency.

Consequently, the purpose of this paper is to investigate the reverse logistics practices with a goal to identify key drivers for RL success. As such, the paper seeks to address the following questions:

1. What percentage of the products is returned for any specific reason?
2. What do the companies do with the returned items?
3. Which information technology (IT) types are used in RL? and
4. How do these IT types used impact the RL operational efficiency and performance?

SURVEY SAMPLE AND DATA COLLECTION

We first visited three companies and conducted in-depth interviews with their managers [4]. The survey instrument was developed on these results and extensive literature review on academic journals and trade magazines. The questionnaire was subsequently pretested by four people - two from academe and two from industry.

The primary company list is comprised of 594 companies of Automotive Aftermarket Industry Association, AAIA Member Directory, which encompasses all repairs and services of vehicles after the original sale. Each company's contact person of AAIA was received a cover letter, a questionnaire, and

a self-addressed stamped return envelope. The cover letter explained the purpose of this RL research, and asked the recipient to pass to the most qualified person when necessary. Three weeks after the first mailing, we sent a reminder to those non-respondents. We received 57 answered questionnaires and 38 undeliverables, and the return rate is about 10%. Later, we went to a local logistics society meeting in middle Tennessee, introduced our research, and collected 8 returned questionnaires; so a total of 65 useable questionnaires were utilized for our analysis.

FINDINGS AND DISCUSSIONS

Demographics

As to their positions in the SC, a majority of the respondents are either distributors (49.2%) or manufacturers (43.1 %). Others are service providers (18.5 %), retailers (15.4 %), and miscellaneous others (7.7 %). Also, about 85.9 % of the firms have fewer than 500 employees, 4.7% have 500-1000, and 6.3% have 1001-5000 employees.

Cost-Profit Picture

Figure 1 shows that most companies spend less than five percent of the total logistic cost on RL.

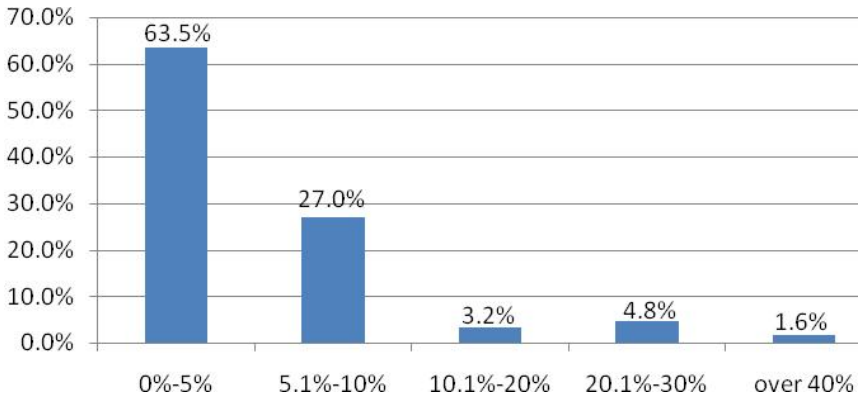

FIGURE 1. PORTION OF TOTAL LOGISTIC COSTS THAT RL CONSTITUTES

The responses profit margin are: ≤0 % profit (28.9 %), 0.1-5% profit (26.7%), 5.1-10% profit (20.0%), over 10 % profit (24.4 %). Thus, a large proportion of the firms reported that they lose money from their RL operations, confirming the prevailing notion that RL is regarded as a 'necessary evil (cost)'.

Handling Returns through Consolidated Center

A preponderant proportion (86.62%) of the companies report that same employees handle both forward logistics (FL) and RL through the same distribution center (DC). Companies also consolidate returns in the DC, a practice that has gained in importance lately [1].

Why Products Are Returned and How They Are Processed

Respondents were also asked to estimate the percentage of the products that are returned for various reasons. As shown in Figure 2, most products are returned not because they are defective or damaged, but for other reasons such as wrong product being ordered (11.1%), customer changing his/her mind (6.9%), and product being shipped to wrong destination (5.8%).

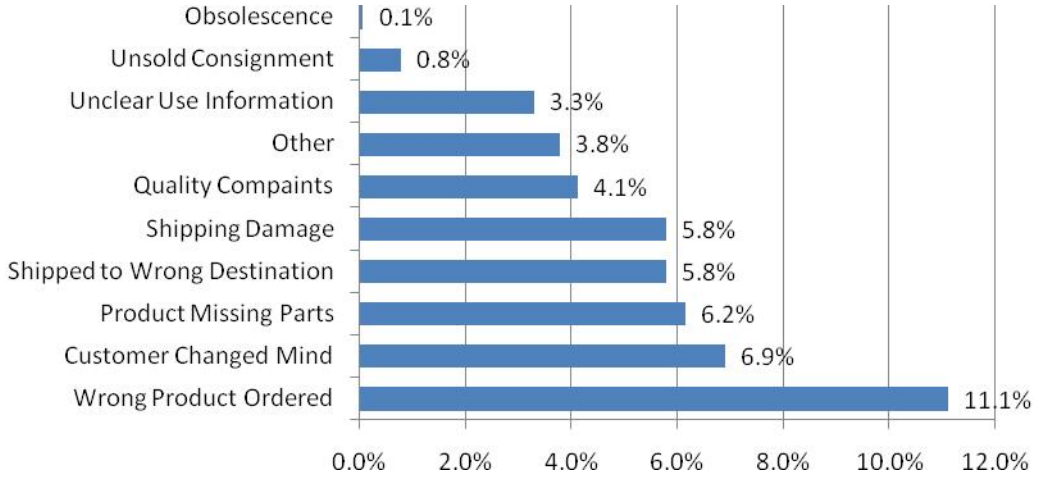

FIGURE 2. REASONS WHY PRODUCTS ARE RETURNED (%)

This finding confirms the observation made by [3] that "more than 75% of all returned products are not defective but are returned because of misinformation at the time of purchase". Consequently, most products are processed to put back to shelf without or with little re-kit, repair, or refurbish. Figure 3 shows various ways the respondents stated that their returns are processed.

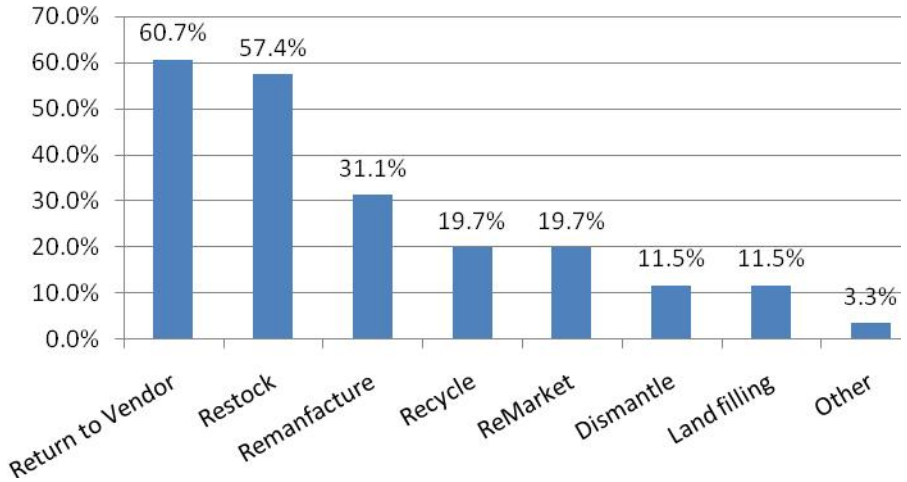

FIGURE 3. HOW RETURNS ARE PROCESSED

In Table 1, we demonstrate, through a Chi-square analysis, that these activities are not necessarily mutually exclusive. Thus, results in Table 1 shows that, for example, there is a statistically significant ($p = 0.05$) association between restocking and remanufacturing and returning products to vendors. However, the association is positive with remanufacture and negative with return to vendor. The

implication is that firms have a tendency to remanufacture and restock (possibly for resale or reuse). However, companies which restock are unlikely to return same item to the vendors.

TABLE 1. CHI-SQUARE ANALYSIS OF RELATIONSHIP BETWEEN RL ACTIVITIES (Numbers Shown Are p-Values)

	Restock	ReMarket	Landfill	Dismantle	Remanu-facture	Recycle	Return to Vendor	Other
Restock	-							
ReMarket	0.398 (-)	-						
Landfill	0.354 (+)	0.582 (-)	-					
Dismantle	0.112 (+)	0.583 (-)	0.180 (+)	-				
Remanufacture	0.001* (+)	0.555 (+)	0.376 (+)	0.003* (+)	-			
Recycle	0.602 (+)	0.053 (-)	0.418 (+)	0.130 (+)	0.030* (+)	-		
Return to Vendor	0.023* (-)	0.552 (-)	0.573 (-)	0.472 (+)	0.491 (-)	0.448 (+)	-	
Other	0.675 (-)	0.643 (-)	0.782 (-)	0.218 (+)	0.470 (-)	0.643 (-)	0.151(-)	-

*p < 0.05

Types of IT Used in RL

Our survey explored three major IT components - the backbone of logistics information systems, communication systems, and execution systems [2] [5]. The backbone includes enterprise resource planning (ERP) systems and legacy systems. Communications include electronic data interchange (EDI), internet, satellite, bar code and scanning, and radio-frequency data communication (RFID). Execution systems consist of warehouse management systems, transportation management systems, customized solutions integrating with ERP, and stand alone customized solutions. The responses are detailed in Figure 4.

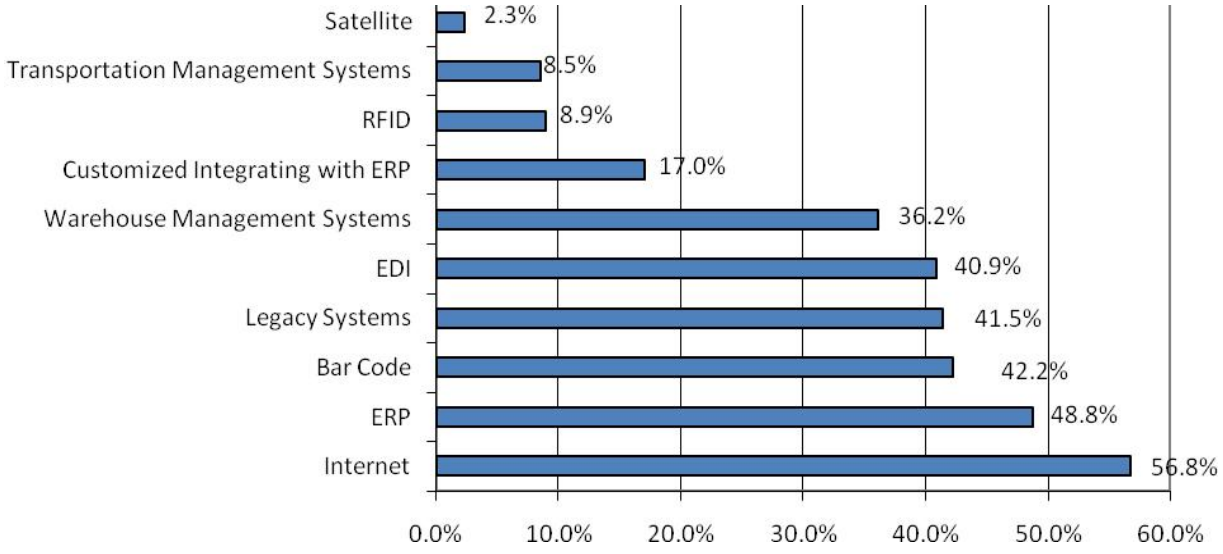

FIGURE 4. TYPES OF IT USED IN RL

To explore the possibility of multiple simultaneous deployments of different ITs, we conducted crosstab analyses for major ITs with high frequencies of use as indicated in Figure 4. In Table 2, the numbers in ( ) are in percent and are to be read row first and then by column. For example, in the EDI row and Internet column (33.3, 24.0) means that the number of firms reporting simultaneous use of EDI and Internet constitute 33.3% and 24.0 % of those that use EDI and Internet respectively. The sign (-) indicates a Kendal's Tau-b statistical direction of the association between the use of EDI and Internet. When that association is significant, then a significant Tau-b is also indicated. The level of significance is indicated by the '*' superscript. In this case, the use of either EDI or Internet tends to substitute each other.

TABLE 2. CROSSTAB CHI-SQUARE ANALYSES OF MULTIPLE IT DEPLOYMENT (Numbers in ( ) Are in %)

	ERP	**Legacy**	**Internet**	**EDI**	**WMS**
ERP	•				
Legacy	(0, 0) (-)*	•			
Internet	(52.6, 58.8) (+)	(36.8, 46.7) (-)	•		
EDI	(50.0, 47.1) (+)	(50.0, 53.3) (+)	(33.3, 24.0) (-)*	•	
WMS	(57.1, 42.1) (+)	(28.6, 25.0) (-)	(53.3, 36.4) (-)	(53.3, 47.1) (+)	•

***p< 0.01**

Impact of IT on Operational Attributes of RL

We explored IT's enabling effect on such operational attributes as - speedy RMA, effective RL planning, effective RL operations, efficient product tracking information sharing inside the company (the items are shown in Figure 5).

Respondents were asked to evaluate to what extent they agree/disagree to the fact that the stated operational effectiveness/efficiency were gained. A Likert scale 1-5 was used for all attributes: where 1 = strongly disagree and 5 = strongly agree. The average for each operational attribute is summarized in Figure 5.

Overall feedback indicated that these attributes were just fine, between neutral (3) and partially agree (4). The best attribute was to obtain RMA speedily, while worst was integration with the whole SC system. The correlations among these IT attributes are positive and significant at 0.01 level (2-tailed test). It means operational attributes tend to support each other: - an improvement in one would lead to improvements in the others.

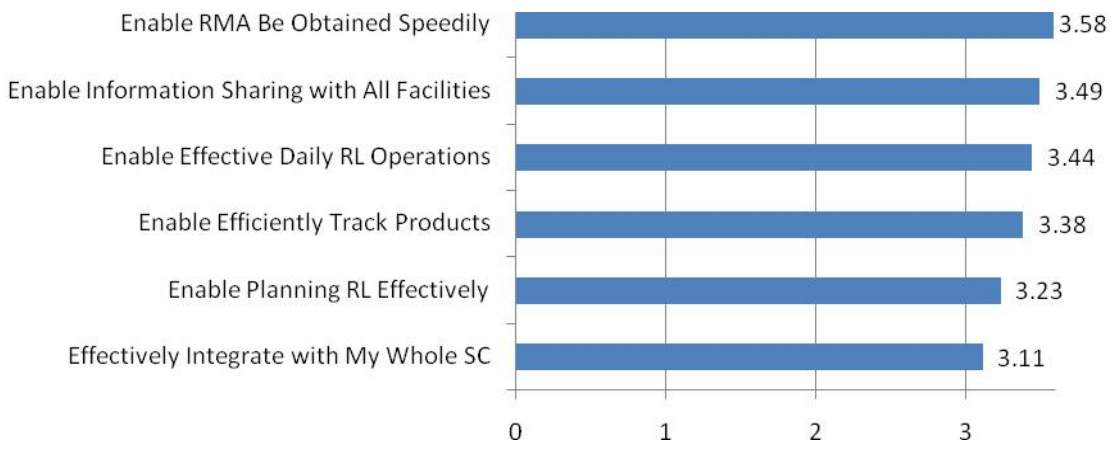

FIGURE 5. IT IMPACT ON RL OPERATIONS

Assessing RL Performance

RL performance was assessed via RL managers self assessment of their satisfaction with RL operations. Respondents were asked to express their satisfaction with how their facilities handle their returns. A 7-point Likert scale is used, where 1 = very dissatisfied and 7 = very satisfied. The results are as follows: very satisfied 21.0%, moderately satisfied 32.3%, marginally satisfied 24.2%, neutral 12.9%, marginally dissatisfied 6.5%, and very dissatisfied 3.2%.

CONCLUSION

Our survey study provides some important insights in RL. However, the limitations lies in the fact that most respondents are from the Automotive Aftermarket Industry and the survey sample could be larger.

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