Incentivizing No-Rush Delivery in Omnichannel Retail

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Summary: E-commerce sales have grown exponentially since the smart phone was introduced in 2007 and the trend is expected to continue. Customers want fast delivery, which is expensive. Incentives can be used to influence customers to choose no-rush delivery. This study focuses on the fast fashion industry and combines research on consumer behavior with a logistics cost model to determine the effectiveness of incentives to drive cost savings. This study showed that it is critical to study both consumer behavior and logistics costs together for a retailer to determine the correct incentives to offer.

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KEY INSIGHTS

1. **It is critical to study both consumer behavior and logistics cost when determining the effectiveness of incentives**
2. **Customer delivery lead time choice can be influenced by monetary incentives**
3. **Incentives can drive logistics cost savings depending on how many customers opt in to no-rush delivery**

Introduction

Consumer spending represents a large portion of the United States Gross Domestic Product. Within the retail industry, there has been a large shift toward e-commerce. Customers are looking for new ways to make purchases, including a mix of online and instore purchasing, at-home delivery, and instore pickup. The iPhone was released in 2007; the age of the smartphone added mobile options to the already growing range of e-commerce choices. As result of the smartphone, a trend of exponential growth started in 2007. With online retail growth trends expected to continue, retailers are moving into the omnichannel space to meet customer needs.

As omnichannel businesses expand and new delivery and pickup options are introduced, companies are pressured to provide many options while maintaining positive customer experiences and meeting profit goals. The options include purchasing direct from a brick and mortar store (traditional retail), purchasing online and picking up in store (shopping and delivery hybrid, sometimes called “click and collect”), and purchasing online for delivery – with multiple lead time options (pure-play E-Commerce). These channels can be blurred: a customer intending to make an instore purchase may purchase online through a mobile app from in the store (online retail plus showrooms), while a customer intending to make an online purchase may visit the store to try on clothing and ultimately complete the purchase instore (traditional retail).

Additional options add complexity and cost. While transaction costs are higher in a brick and mortar store than online, delivery costs, especially last mile delivery, are expensive for retailers. Delivery costs also provide the greatest opportunity for cost savings. The goal of this project was to determine incentives that persuade customers to choose longer shipping lead times (no-rush shipping options) and decrease the total cost of delivery.

The scope of this project is limited to fashion retail, though it is expected that the same principles can be extrapolated for other industries. The fashion

industry is wide reaching and provides the option to study multiple segments of products. This information provides data to determine whether product segmentation influences the likelihood a customer is willing to choose a no-rush delivery option, and by how much.

Methodology

A model was developed to determine the impact of incentives on total logistics cost. The logistics cost includes the incentive costs and delivery costs (including fuel and labor). The customer behavior model was based on a survey and provided data on the cost of incentive for additional lead time. The delivery cost model assigned a logistics cost to a week's worth of deliveries with and without a no-rush shipping option and calculated the cost savings

The customer behavior survey asked the respondents to answer questions about their current online shopping habits: "How often do you shop online?" and "How long do you usually wait for delivery?" Respondents were then provided two scenarios: (1) "Imagine you are shopping online at your favorite fashion retailer. You are purchasing a basic item such as a plain white shirt for $40. You are ready to check out" and (2) "Imagine you are shopping online at your favorite fashion retailer. You are purchasing the latest trendy item from the cover of this week's fashion magazine for $40. You are ready to checkout." For each scenario, respondents were asked to select a delivery choice between standard (2 day) and no-rush shipping (7 days). The incentive for no-rush shipped was assigned randomly and was either $5 or $10. Respondents were also asked their age, gender, employment status, zip code, and whether they have dependents. The median income associated with the provided zip code from census data was included in the results.

To determine cost savings, 50 random lists of 700 deliveries for 1 week were generated (roughly 100 packages per day). The packages were assumed to be randomly distributed within a 50-mile radius of the distribution center. Each delivery was randomly assigned a number 1-7, corresponding to the day of delivery. The route for each day was determined by solving the Vehicle Routing Problem (VRP) using the nearest neighbor, savings algorithm, and cheapest insertion heuristics and the shortest distance of the three was chosen to be the final route. The cost of the final route was determined. The process was repeated with a certain percentage of packages (varied from 5% to 80%) randomly changed to no-rush delivery. After the routes were determined as before, no-rush packages were added to one of the seven routes using the cheapest insertion heuristic. A cost of $1.18 per day (calculated from customer behavior model) was added to each package for every day past the original delivery date. The package was added to the route with the lowest cost of adding a package. The final cost of the route was calculated after all no-rush packages were added. The cost savings was determined between the routes with no-rush packages and those without.

Results and Discussion

Overall, 72% of customers chose no-rush delivery. Linear regression was run on the survey data and the results show that for each additional dollar of incentive, customers are willing to wait an additional 0.85 days for a basic item ($1.18/day) and 0.88 days for a trendy item ($1.14/day).

The average survey respondent is a 36-year-old female. She works full-time, making $53,120 per year and has dependents. On average, she is a monthly shopper and expects to receive her packages within 3-6 days. The basic and trendy models for Lead Time vs. Incentive for our average consumer can be seen in Figure 1. For any given incentive value, the accepted lead time for a basic item is less than the accepted lead time for a trendy item. Furthermore, an additional dollar of incentive yields a similar increase in lead time for both trendy and basic items. The survey provided $5 and $10 incentives; therefore, the results are most applicable between $5 and $10 incentive values.

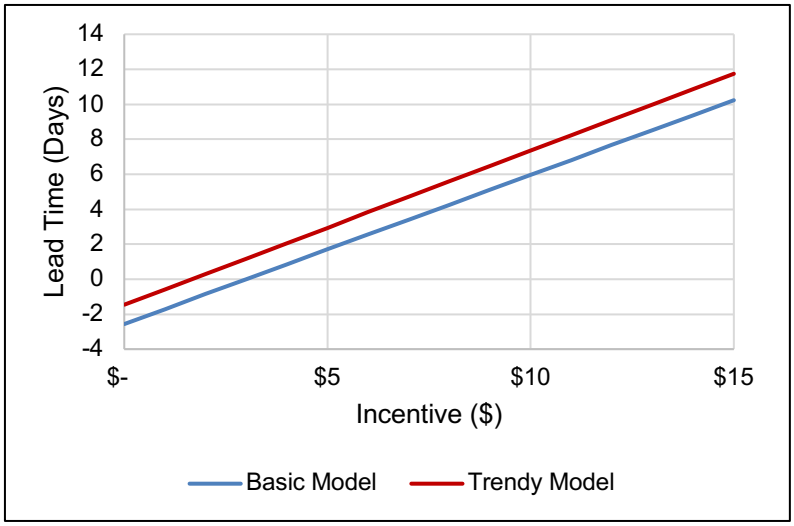

Figure 1. Lead Time vs. Incentive for the Average Consumer

It was hypothesized that customers would want to receive trendy items sooner to keep up with the latest fashion trends. Because of this hypothesis, it was also hypothesized that the incentive cost to the retailer for increasing the delivery lead time by one day would be greater for trendy items than for basic items. The reasoning was that a larger dollar amount would be necessary to override the desire of a

Table 1. Weekly Cost Savings Results Over 50 Trials

	Percent No-Rush					
	5%	**20%**	**40%**	**60%**	**72%**	**80%**
Mean	$ 119.64	$ 321.06	$ 686.12	$ 1,043.24	$ 1,226.81	$ 1,440.00
Median	$ 94.88	$ 299.06	$ 641.78	$ 1,024.72	$ 1,207.44	$ 1,441.00
Min	$ (88.00)	$ 45.38	$ 398.75	$ 784.13	$ 929.51	$ 1,180.15
Max	$ 672.19	$ 796.19	$ 1,189.19	$ 1,544.38	$ 1,718.06	$ 1,849.31
Lower Quartile	$ 28.19	$ 222.06	$ 587.13	$ 958.97	$ 1,122.00	$ 1,344.06
Upper Quartile	$ 153.02	$ 386.87	$ 786.84	$ 1,118.00	$ 1,311.89	$ 1,517.86
Mode	$ 64.63		$ 587.13	$ 983.81		
Mean (as %)	2.7%	7.2%	15.4%	23.5%	27.7%	32.4%
Savings per Package	$0.14	$0.43	$0.92	$1.46	$1.72	$2.06

customer to get a trendy item sooner. These models show the opposite: customers want their basic items faster than their trendy items. It is expected that this is because basic items provide a utility, while trendy items are not a necessity. Therefore, when making a decision about lead time, customers consider what they need more than what they want when they consider the option to wait longer for delivery

Over 50 trials of simulated data, using the incentive cost per day as calculated in the customer behavior model, the average weekly cost savings associated with 5%, 20%, 40%, 60%, 72% and 80% no-rush packages were calculated. Results can be found in Table 1. These results show the potential for an average of 3% to 32 % cost savings depending on the percent of customers who choose no-rush delivery. Figure 2 shows the distribution of cost savings for each percentage of no-rush packages. At 5% no-rush, it is possible for the cost of delivery with a no-rush option to be more expensive than the cost of delivery without the no-rush option. Above 5% no-rush, no trials were observed in which the cost of delivery with a no-rush option was more expensive than the cost of delivery without the no-rush option

The cost associated with each route was calculated assuming a fuel cost of $2.25/gallon, a fuel efficiency of 12mpg, a driving speed of 30mph, a 5-minute delivery time per package, and a labor cost of $15/hour. These values are likely to change for different retailers and types of delivery fleets. These parameters were varied to determine the impact of each value on the results. Labor cost and speed have the highest impact on mean cost savings. Higher fuel efficiency means lower cost savings as

Figure 2. Distribution of Weekly Cost Savings Over 50 Trials

fuel is the second largest cost after labor. The time it takes to drop off a package has no impact on the cost savings as that time is required for each package regardless of the route.

The value of this study lies in connecting the customer behavior model to the delivery cost model. The cost of the incentive required to change customer behavior is a direct cost in the delivery cost model and therefore these two models must be studied in parallel to gain full insight. The delivery cost model, when considering the incentive expected from the customer, can be used to determine whether the cost savings are greater than the incentive cost. If the incentive cost is greater, offering incentives does not save the retailer money.

Conclusions

While existing research studies consumer behavior and the influence of incentives, this study shows that there is an impact of customer behavior on vehicle routing and cost. It is critical to combine research on consumer behavior with a logistics cost model to determine the effectiveness of incentives to drive cost savings. As behavior can be influenced by incentives provided by the retailer, the retailer can influence behavior and thereby create cost savings. This study shows that by offering the correct incentives, a logistic cost savings of 3-32% is possible depending on the percentage of customers who opt in to no-rush delivery. Future studies can build on this foundation to determine incentives that can be offered by specific retailers to their customers in a program to reduce logistics costs.

Managerial Implications

Cost saving opportunities are critical to companies. Many of these initiatives require a cost that saves money in the long run. This study shows that investing in incentives to influence customer behavior can have delivery cost savings in the long term. It is critical to study the specific products and customers, and to study specific delivery networks and cost structures before offering incentives. With a well understood customer base and a well-defined delivery network and routing procedure, providing a no-rush delivery option to customers can lead to cost savings for retailers. In addition, a portion of the cost savings comes from shorter route distances and therefore lower fuel consumption, which can also have a positive environmental impact.