Centre for Business Services Science

Designing 3PL Services

Valuable insights from customers

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Contents

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Foreword by Chief Investigator

As markets become more global and competition continues to intensify, firms are beginning to realize that competition is not exclusively a firm versus firm domain but a “supply chain against supply chain” phenomenon.

For the providers of supply chain services the implications of even a modest increase in strategic importance implies greater complexity, as their operations are now more important to a thickening web of stakeholders that are more discerning and market literate.

Associated with this strategic elevation is the expectation that service providers will do more than simply meet the operational needs of their customers. Today, new requirements for value-adding services are emerging based on greater information access, information transparency and inventory reduction. Research has suggested that these services represent the basis for future competitive success and organizational survival. The strategic challenge for supply chain service providers, therefore, is that they must not just determine what their customers want but they must also be able to translate the implications of these demands across their own functional boundaries to maximize value.

In this study we seek to open the black box of customer demand by identifying those factors that contribute most to the selection of a supply chain supplier.

We hope that you find the report to be a practical and useful guide.

Dr Tim Coltman, Director
Centre for Business Services Science

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Section 1: Introduction

Plenty of ink has been devoted to the importance of customer demand? what current and potential customers want from suppliers? and why firms need to align their product and service offerings with the customer's needs. This point is not new and dates back more than 50 years, when Peter Drucker (1954) wrote "it is the customer who determines what the business is, what it produces, and whether it will prosper."

In supply chain management the customer alignment concept is also not new? having been variously termed demand chain management, marketing logistics, customer responsiveness, demand pipelines and dynamic alignment (Gattorna, 2006). However, because of limited customer visibility, or the lack of perceived relevance of the supply chain to downstream customers, supply chain executives have infrequently delved into the minds of their customers to understand their needs. The implication is that customer preferences have rarely been the starting point for strategic, operational or tactical improvement efforts.

The purpose of this report is to develop a deeper understanding of the subtleties of customer demand for service operations in the supply chain. Before tackling this research we need to be mindful that the supply chain management (hereinafter, SCM) domain is quite broad in scope. To ensure clarity, we focus on a particular component of the supply chain, namely the customers of third party logistics (hereinafter, 3PL) suppliers. Third party logistics is a burgeoning industry that can be defined essentially as the contracting of all or part of a firm's transportation and logistics operation to an independent service provider.

This study explores new ground by concentrating on those factors that contribute to genuine demand for a 3PL provider. Represented by market leading brands such as DHL, FedEx and UPS, these service providers have become increasingly important to a globally diverse range of organizations. Visible evidence of the emerging importance of 3PLs can be found in the multi billion dollar increase in industry revenues; with a recent Georgia Institute of Technology report claiming that 76-79 percent of firms in Western Europe and 83 percent of firms in Asia-Pacific rely on 3PL providers (Langley, Dort and Ross, 2005).

What is important to 3PL customers?
A review of the literature indicates that it is relatively easy to extract a list of 20 to 30 distinct attributes (characteristics of a 3PL provider) that are considered important to vendor selection. Notwithstanding the importance of this work, such lists do not provide clear prescriptions upon which managers can act. At best, managers know the top issues but can say little about what differentially matters to specific customers or their decisions. To establish "best practice" we require an understanding of the relative importance of these attributes.

"Good customer service requires a can-do attitude" (DHL Australia)

A small body of prior research indicates that customer demand is changing and that the implications of this change on the way demand is fulfilled has generally not been well understood or accepted in the supply chain business community. Hence, four research questions provide the focus for this study:

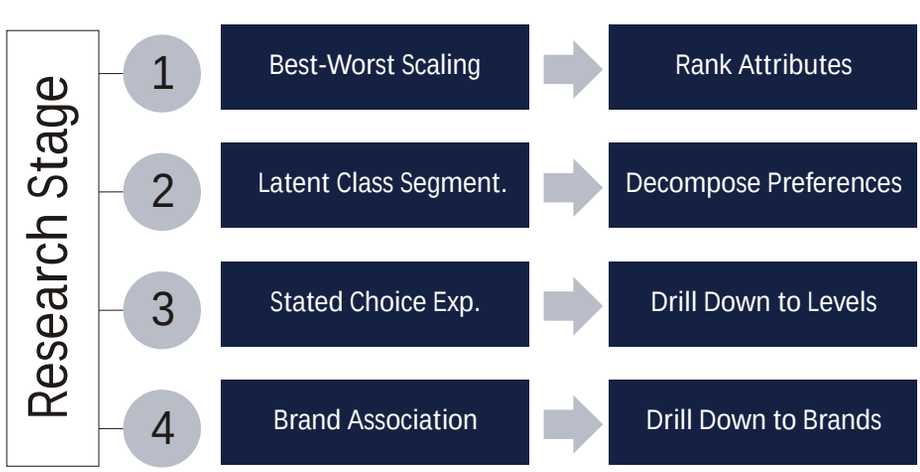
1. What service features do customers prefer?
2. To what extent are these preferences segment specific?
3. How are the preferences affected when customers are forced to trade-off across the levels of an attribute?
4. Do these preferences vary for different 3PL providers?

The factors considered most and least important to a firm can vary for several reasons. For example, supply chain customers may face quite different strategic and operational circumstances that directly influence whether logistics is critical or not. Even firms with similar strategic and operational circumstances can still vary as a result of preference differences amongst decision makers.

This report utilizes a range of techniques from the discrete choice family of methods to explore how customer preferences vary between firms and clusters of firms. The remaining sections are organized as follows. The next section describes the methodology that is used. We then present the findings before concluding with a discussion of the implications of this work for practitioners.

Figure 1:

Links between method and research questions



Section 2: Methodology

In this study we use four related techniques best-worst scaling, latent class segmentation, a stated choice experiment, and a brand association task to examine how customers of 3PL services differ in their perceptions of various service offerings. Figure 1 illustrates the links between previously identified research questions/issues and the associated research stage.

Stage 1: Best-worst scaling

Best-worst scaling is a relatively simple method that can be used to get a quick snapshot of preferences for different attributes. Fundamentally, best-worst scaling is an ordering task that requires respondents to make a selection from a group of items by choosing the “best” (most preferred) and “worst” (least preferred) items in choice sets of two or more items (for a more detailed explanation, see Marley and Louviere 2004). In common with resource advantage theory, the items can be attributes of a product, human competences, organizational capabilities or bundles of services and products. Exploratory research identified 20 key attributes that influence the selection of a 3PL provider. The specific definitions of these attributes are given in Appendix 1.

Best-worst scaling forces respondents to make a choice between alternatives that more accurately reflect the cost of realistic market decisions. One of the important properties of best-worst scaling is that it measures all of the attributes on a common scale. As such, the resulting data provides an indication of a customer's preference for any specific attribute in the best-worst task. The method also addresses the measurement problems associated with traditional survey methods. These problems arise primarily from differences in response styles, and can be defined as a tendency to respond systematically to a survey question on some basis other than what the scales were originally designed to measure. Figure 2 provides an example of a best-worst task

Stage 2: Latent class segmentation

Prior research has shown that customers with relatively similar observable characteristics often behave in very different ways. We know that people are different. The question is, are they different in meaningful ways (i.e., can we identify useful segments)?

Latent class techniques have previously been applied to generate segment solutions in a wide variety of contexts. These techniques are particularly useful in estimating the likelihood that a specific firm fits into a specific class of firms based on the similarity and differences in their preferences (for a general explanation, see Wedel and Kamakura 2000). The advantage of using latent class segmentation is that it generates a statistical model that makes the choice of the preferred segment solution less arbitrary or subjective than other cluster-based techniques. This type of segmentation has also been shown to be more accurate, regularly outperforming other clustering techniques when recovering known segments.

Stage 3: Stated choice experiment

Stated choice experiments drill even deeper into customer demand to explore how customers differ in their preference for various attributes at the functional level. That is, rather than focusing on the attributes, we present customers with a series of experimentally designed service profiles in which the levels of an attribute are allowed to vary, and we ask them to make a choice (for a good introduction to discrete choice analysis, see Hensher, Rose and Greene 2005). As such, we are able to determine how a customer's

Figure 2:

Example of Best-Worst

Which feature matters LEAST to you? (Select ONLY ONE)	Sets of features for you to consider	Which feature matters MOST to you? (Select ONLY ONE)
○	Professionalism	○
○	Relationship Orientation	○
○	Customer Service Support	○
○	Surcharge Option Contract	○
○	Top Management Team Availability	○

Figure 3:

Example of Stated Choice

	Option One	Option Two
Professionalism	Acceptable knowledge of both logistics and customer's business	Deep knowledge of both logistics and customer's business
Price	0-4% lower than current price	0-4% higher than current price
Reliable Performance	91% of the time, or less	92-94% of the time
Customer Service Recovery	Better than average: responds to problems quickly and is able to propose effective solutions	Average response and Industry average performance
Supply Chain Capacity	Equal to Industry average	Excellent: Industry leader
Customer Interaction	Easy to deal with, but rarely rewards the customer	Easy to deal with, and frequently rewards the customer
Supply Chain Innovation	Able to provide innovative supply chain solutions	Unlikely to provide innovative supply chain solutions
If options One and Two were the only available, which option would you be most likely to choose?	☐	☐

preference for various attributes varies across the different levels of the attribute.

The findings from the best-worst scaling and latent class segmentation stages helped us to identify the key attributes for inclusion in the choice experiment. The specification of the attribute levels was made in consultation with a sample of 3PL providers to ensure that the levels represented realistic variations for the particular attributes. As a result of this exercise some of the original attributes were combined to more accurately reflect the types of service offerings available in the marketplace. Most notable was the emergence of a summary performance variable, Reliable Performance, that reflected the combined domains of *Reliable Performance, Delivery Speed, Track & Trace* and *Customer Service Support.* The final attribute definitions and levels (see Appendix 2) were validated by pre-tesing a sample of 3PL buyers and managers of a large 3PL provider. Figure 3 provides an example of a stated choice task.

The choice data was also split into groups to assess how the preferences of different customer groups varied across the different levels of the attributes. In particular, attention was given to high yield (above average revenue profile) and low yield customers (below average revenue profile); as well as customers who preferred efficient/low cost exchange versus those who desired collaborative relationships.

Stage 4: Brand association task

In most markets one sees leaders who outperform their rivals. A number of 3PL market leaders come to mind: UPS, DHL and FedEx for example. Closer scrutiny also indicates that the performance gap between these leaders and the average competitor is getting wider. For those companies wanting to learn from these role models several questions arise. What capabilities do these leaders possess that make their programs so effective? What enables these leaders to adapt management practices to fit ever-changing customer behavior?

Unraveling these issues is of theoretical and practical importance. The brand association task assists by examining how respondents vary in their perceptions of three major 3PL brands. Figure 4 provides an example of the task.

Figure 4:

Example of Brand-Association

	Significantly higher than what you currently pay (5-8% more)	Higher than what you currently pay (0-4% more)	Similar to what you currently pay	Lower than what you currently pay (0-4% less)
UPS	○	○	○	○
DHL	○	○	○	○
FedEx	○	○	○	○
Other (refer to question 2)	○	○	○	○

“The onus is on the supplier to prove to us what value-adds they can provide” (Australian Customer)

Section 3: Research Findings

The purpose of this report was to improve our understanding of those service attributes that contribute to genuine demand for a 3PL provider, and to explore how demand varied across segments of customers and between the brands.

The key findings reported in this study suggest that 3PL providers should design services to meet the needs of two emergent segments: (1) operational performance and (2) customer oriented. Furthermore, such service configurations need to start with the core aspects of reliable and timely delivery, before incorporating, selectively, other service attributes, such as professionalism and customer service recovery. Providers need to move away from a "one-size-fits-all" approach to service provision. Ideally, 3PL services should be designed to meet the underlying customer/segment preferences. Following is a summary of the observations arising from our analysis.

1: Providers need to offer a range of performance and customer oriented service attributes.

2: The top identified attributes accounted for 78% of the variation in the 3PL choice.

3: Service offerings should reflect the divergent needs of the operational performance and customer oriented segments.

4: Reliable performance is a standard requirement of all customers irrespective of their segment preferences.

5: Providers should be careful not to adopt a relational strategy with performance oriented customers.

6: Aggregate data indicates that providers need to offer reliable performance at a competitive price.

7: Revenue profile appears to be an effective proxy for understanding the exchange preferences of customers.

8: Supply chain innovation is a requirement for providing efficient and low-cost services.

9: The penalties for poor performance will generally be greater than the rewards for good performance.

10: Customer orientation seems to represent a distinct competitive advantage for the lead provider (DHL).

11: Providers need to exhibit caution when responding to explicit customer demands.

"We select on price initially, and then we look at what is offered for that price" (Australian Customer)

Stage 1: Best-worst scaling

Ninety-six 3PL customers completed the questionnaire, yielding a 38 percent response rate. The distribution of respondents covers most of the main segments of business activity (see Figure 5). The most represented industry classification were "transport and storage" (37%) followed by "wholesale and retail trade" (18%). Firm size was also well distributed, with 46 percent small-to-medium sized firms (200 employees or less) and 54 percent large firms (more than 200 employees). The mean and median sizes for the entire sample were 20,417 and 250 employees respectively. The results indicate that our sample is skewed towards larger firms.

We first calculated a best-worst frequency score for each of the attributes according to the number of times the attribute was selected by respondents. The simple rank ordering process creates individual-level scales for each attribute that are easily comparable across the entire sample (see Appendix 3). The "best" column illustrates the frequency that the particular attribute will be ranked "best" or matters "most" to respondents from the attribute group. For example, the top-scoring attribute was Reliable Performance (selected 333 times), followed by Delivery Speed (selected 211 times), through to Surcharge Option (selected only 12 times). The "worst" column shows the frequency with which respondents selected an attribute as the "least" important

Figure 5:

Best-Worst by Industry

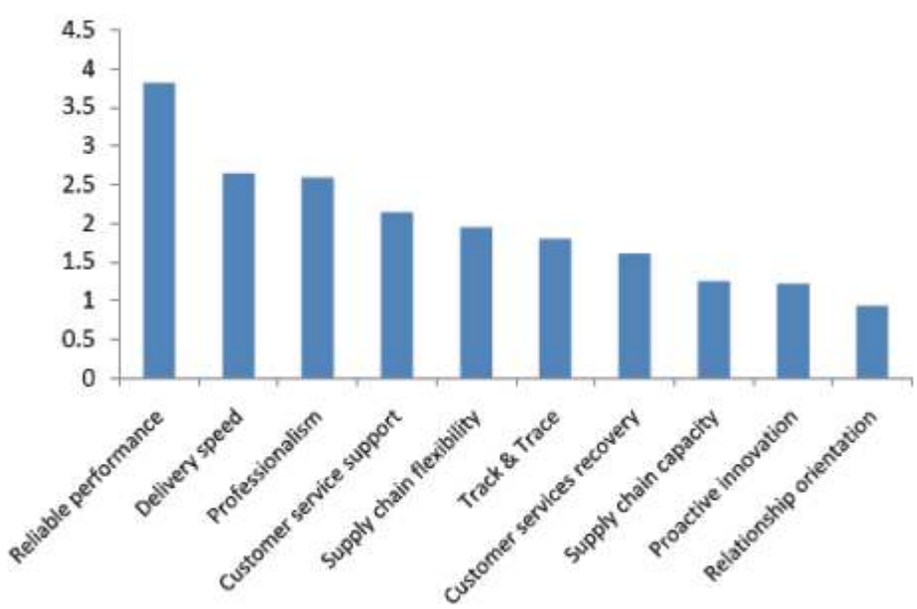
"We need information to be accurate... because we have customers and they rely on us" (Singaporean Customer)

feature. This column is read in the opposite way to the "best" column. The attribute selected the least number of times as "least important", was Reliable Performance (selected only twice). It is worth noting that the attributes in this column appear to be almost perfect reciprocals of the "best" column, implying consistency in the decisions (or selection of features as "most" or "least" important) made by the respondents.

The difference between the frequencies of the "best" and "worst" responses for each attribute provides a complete ordering from the highest to lowest ranked attribute. The relative preferences for each attribute were obtained by calculating a best-worst score. This is simply the square root of the "weighted best" divided by the "weighted worst" scores. In the case of a five attribute choice set, the weights for "best" and "worst" would be 16 and 1 respectfully. Figure 6 plots the "best-worst" ratio scale as an easy-to-interpret graphical representation for the top 10 attributes.

The interpretation of Figure 6 requires some discussion because the scores are on a relative scale. This means that Reliable Performance (3.82) is two times more important than Supply Chain Flexibility (1.95) and four times more important than Relationship Orientation (0.93). The next section will decompose the top ten mean best-worst scores using latent class segmentation.

Figure 6:
Relative importance of top 10 attributes



Stage 2: Latent class segmentation

Using the best-worst data, the first step required to formally identify the most appropriate number of segments is to inspect the information criterion scores. These scores assess the model fit by taking into account the complexity of what is being estimated. The second step is to examine the classification statistics for the preferred model. These statistics are examined to ensure that the model identified in step one does a good job of classifying firms. Lastly, the estimates for each segment in the preferred model are plotted against one another to ensure that the segment solution represents actual differences rather than systematic variance.

Based on this three-step procedure, a two-segment solution was identified as the best fit with the data. This model had the lowest information criteria and lowest classification errors relative to the other segment solutions.

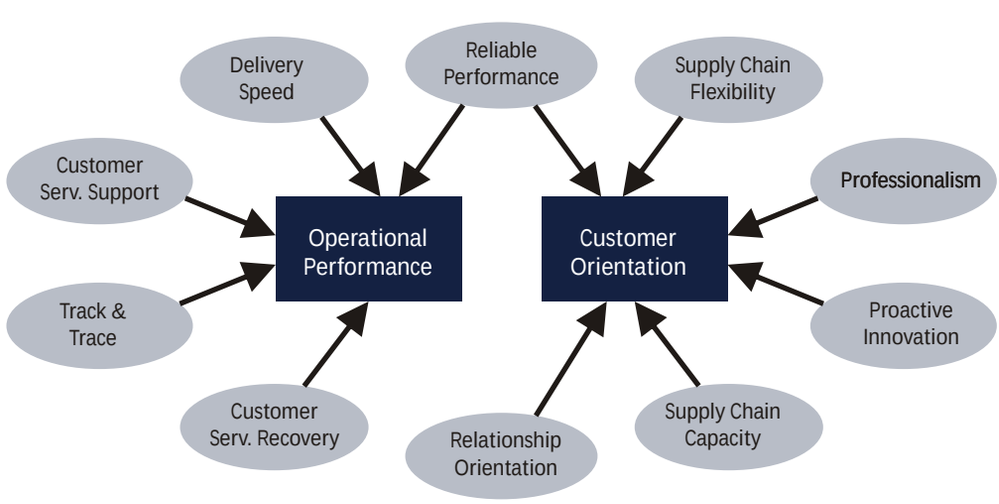
Figure 7 presents the attribute-segment associations based on the output from the analysis. These associations were derived from the mean best-worst scores for each segment weighted by the segment level probabilities (see Appendix 4). The segment level scores in Appendix 4 represent a decomposition of the original mean scores based on the probability that a particular firm will fit into a particular segment.

We can see that segment one includes those companies that place emphasis on attributes associated with an operational performance orientation: Reliable Performance, Delivery Speed, Customer Service Support, Track and Trace and Customer Service Recovery. Segment two best represents those firms that place more emphasis on customer orientation, and includes: Reliable Performance, Supply Chain Flexibility, Professionalism, Proactive Innovation, Supply Chain Capacity and Relationship Orientation. Reliable performance is common to both segments and reflects the general strategic priority attached to this attribute by all firms. In terms of its impact on 3PL selection, reliable performance could be considered as an order qualifier necessary requirement for all 3PL providers.

One of the more interesting aspects of the best-worst based segment solution is that it also shows quite clearly which attributes respondents are willing to abandon first. Hence, the segments can not only be described by the issues that

Figure 7:

Two-segment solution



customers favor, but also by the ones they are willing to sacrifice should they be forced to make a trade-off. For example, from Appendix 4 we see that respondents in segment one clearly favored Reliable Performance, Delivery Speed and Customer Service Support but were most likely to abandon customer Relationships, Supply Chain Capacity and Proactive Innovation. Similarly, respondents in segment two favored Supply Chain Flexibility and Professionalism but were most willing to abandon Customer Service Recovery when a choice had to be made. One possible reason for this is that customers in segment two have no desire to spend time and effort working through a track and trace system, but rather, they expect the parcel will arrive as scheduled, and if there is a delay, then it is the 3PL's role to notify them.

Stage 3: Stated choice experiment

One hundred and eighty seven 3PL customers completed the questionnaire, yielding a 25 percent response rate. The distribution of respondents covers most of the main segments of business activity (see Figure 8). The most represented industry classification were “manufacturing” (29%) followed by “wholesale and retail trade” (28%). Firm size was also well distributed, with 48 percent small-to-medium sized firms (200 employees or less) and 52 percent large firms (more than 200 employees). The mean and median sizes for the entire sample were 30,205 and 275 employees respectively. The results indicate that our sample is slightly skewed towards larger firms.

The first objective of this stage of the study deals with the trade-offs that customers make between operational features and relational features at the aggregate level (see Appendix 2). To get a quick snap shot of the output we generated a histogram for the relative impact of each attribute (see Figure 2). The bars in the graph represent the importance of each attribute with respect to all other attributes within the model. An advantage of this analysis is that it allows you to compare the relative importance of each attribute on a common scale (in this way it is similar to best-worst).

From the data presented in Figure 2, we see that customers attach higher weights to what we have classified as operational features than to relational features. The combined scores for operational features is 2.6 times higher than that for relational features. Figure 3 provides a similar snapshot of how customers vary across different groups. This information provides some understanding of the nature of customer preferences for different 3PL service features, but for more detail we need to consider the logit analyses for 3PL choice given in Appendices 5 and 6. The analysis here requires greater discussion and we provide a detailed commentary for each service attribute in order of priority.

Reliable Performance

This is a measure of delivery in full, on time, and error free. It is the core competence for logistics service providers and, not surprisingly, is the single attribute that has the greatest influence on choice. The results are monotonic with a clear linear increase in utility as the levels of reliability increase from a low of 89-91% to a high of 98-100%, of the time. This result is also relatively consistent across all breakdowns of the data.

This is a somewhat different result than has been found in previous studies, where satisfaction with operational performance is viewed primarily as an order qualifier for a 3PL and not a differentiator in the eyes of the customers. An order qualifier is a required capability to be considered as a logistics provider, but nevertheless excellence in this area may not be enough to win business.

Our results show that, at the point of choice between suppliers, and for the range of values considered here,

Figure 8:

Stated choice by industry

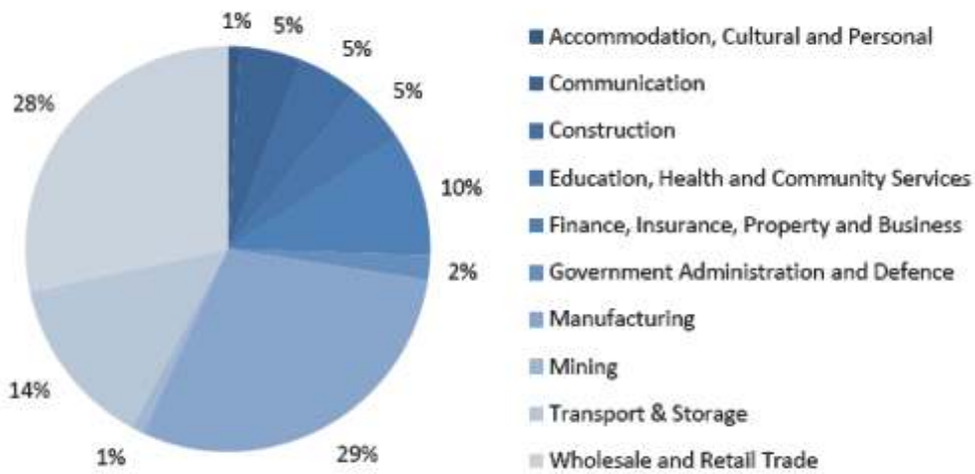
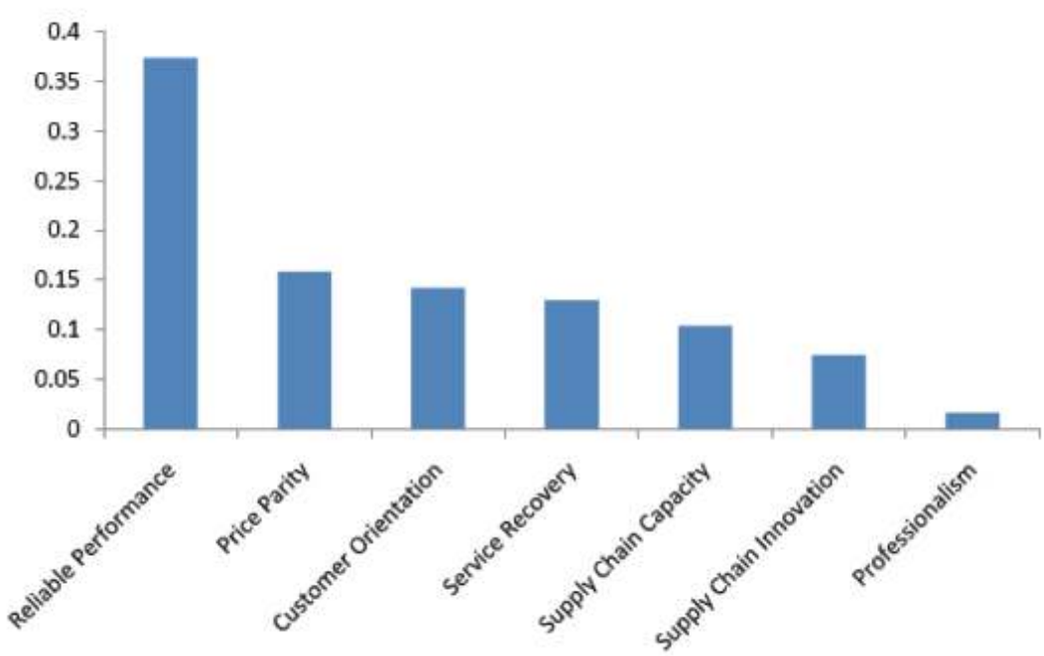


Figure 9:

Main effects for attributes



reliable delivery performance is an order winner: improvements in this characteristic, as measured by reliable performance, will always lead to a larger market share.

Price

It is clear that the importance of price as a determinant in choice will depend on the relative price levels: with a higher impact from relatively greater price differences. We have chosen to use specific levels of price measured as percentage differences from price parity. One striking fact about the utilities given in Table 6 is the fact that a price level "equivalent to now" has a higher value than a level of "0-4% less than now." That is, ceteris paribus, customers desire prices equivalent to competitors over low pricing. This is counter-intuitive. Why should a customer prefer to pay a higher price? The answer seems likely to be related to the signalling element of price, where the cheapest provider is consciously or subconsciously assessed as having a higher risk of things going wrong in some way.

When the figures are split according to the revenue of the customers, then it is clear that, as a group, the low yield customers are somewhat less price sensitive. These customers identified themselves as primarily interested in efficiency and low cost-to-serve, and showed less price sensitivity than the group as a whole. The customers who identified themselves as wanting a collaborative relationship were also somewhat less sensitive to price, giving the highest value to the lowest pricing option. It seems that this group might not find a low price suspicious. The results for this breakdown by exchange preference are less strong because only 111 customers are included (the other 69 either giving equal preference to collaborative and to efficiency aspects in their exchange choice, or to one of the other preference types). We can see that high pricing levels are an almost universal deterrent.

Customer interaction

This attribute picks up two slightly different aspects of the service concept. First, it relates to the ease with which business is conducted with the logistics service provider. Second, the effort that the provider makes in building the relationship with their customer through mechanisms such as loyalty schemes. Examination of the data shows that customers perceive these two issues quite differently. At the aggregate level this attribute is highly significant, but the question of rewarding customers in order to build a relationship with them is much less important than the issue of "ease of doing business".

As we might expect customers who are primarily interested in collaborative relationships are significantly influenced by variation in these attributes. Whereas, those interested in efficiency and low cost-to-serve do not place much importance on this characteristic. Another important observation is that the high yield customers are generally the customers who rate this issue as important. Low yield customers attach much less significance to it. There are several possible explanations for this, but it is important to note that a single customer may well deal with more than one global logistics service provider. Customers who value aspects of customer orientation may be those who have elected to deal primarily with DHL and hence deliver a high yield.

Supply chain capacity

The capacity issue relates to being able to meet unanticipated customer needs. There is a clear preference for a provider who is better than industry average in this area, but moving beyond this to being an industry leader is not seen as conferring significant additional benefits. However, the strongest evidence relates to the negative impact of below industry average performance.

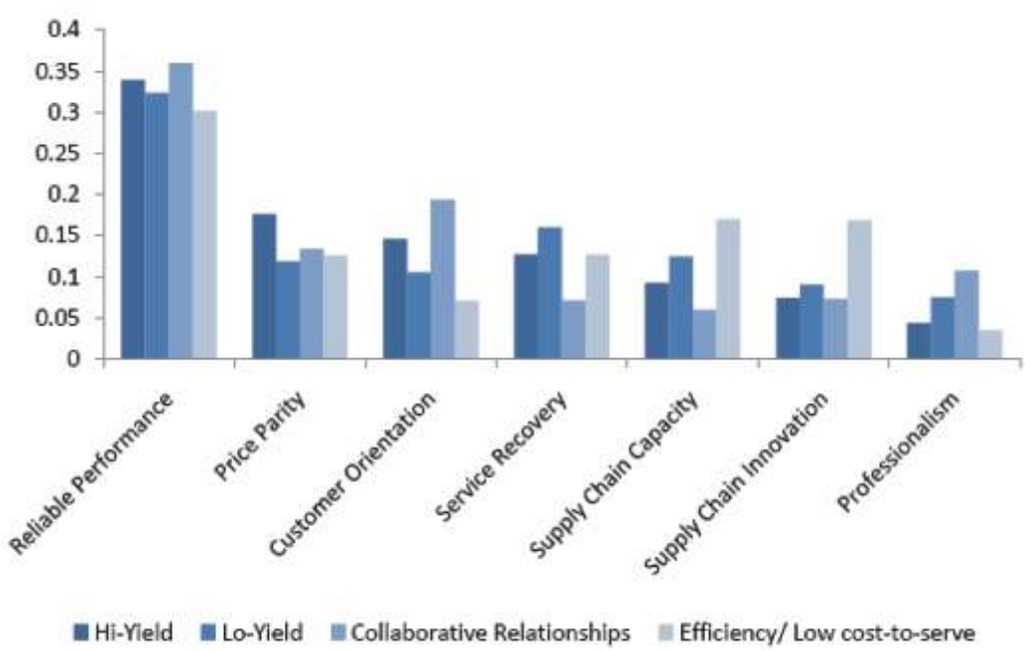
"We give them more information, as much as possible, to ensure they know what we want" (Hong Kong Customer)

This finding is seen in the majority of customer segments. It is only the customers who identify themselves as being primarily concerned with a collaborative relationship with their supplier where this negative effect weakens. Being an industry leader is important to the high yield segment whereas the low yield segment is less demanding and requires one to simply be better than the industry average. Overall we can see that this attribute also has some of the characteristics of an order qualifier.

Customer service recovery

The last of the operational characteristics is customer service recovery, which is defined here in a more expansive way than just finding missing packages. Apart from positioning in the industry, an important distinction made here is to separate proactive from reactive service recovery efforts. Traditionally, the industry has adopted a reactive approach to service recovery, where it is the customer's responsibility to contact the 3PL if they have concerns about delivery. Online track and trace capabilities are examples of sophisticated ways to automate this process. But providers can be proactive and take responsibility for notifying the customer of likely delays. For example, DHL has recently put in place mechanisms to allow staff to proactively identify parcels that are up to 15 minutes late and then contact customers to advise them of the reason for the delay.

Figure 10:
Main effects split
by revenue profile
and exchange preference



"It would be bad to focus too much on cost reduction...this would eliminate flexibility in response" (DHL Japan)

The general picture here is one where being the industry leader or better than the industry average is important at the aggregate level. The strongest effect is a negative one: customers do not want their logistics service provider to be poor at responding to service issues. At the aggregate level this result is not all that different to the supply chain capacity attribute and is consistent with this factor being primarily an order qualifier. But in this case there is a smaller but still significant benefit gained from a provider being an industry leader. This is particularly apparent in the high yield segment and suggests that being proactive in the detection of problems is valued highly.

Supply chain innovation

Some of the most unexpected results relate to the attribute of supply chain innovation. Whether or not this is an important attribute, one might expect to see it in the category of an "order winner", so that different levels of performance in this category make it more likely that this provider is chosen. However the experimental evidence is that it is perceived as more of an order qualifier, with poor innovation counting against a provider, whereas good innovation performance does not really help.

This is also a somewhat surprising result when the customers are split into segments. It is clear that the segment that is most concerned by poor innovation performance includes those customers who emphasize efficiency and low cost-to-serve. Whereas the customers who seek a collaborative relationship see some benefit in a logistics provider who is an industry leader in innovation, but are otherwise unconcerned.

Professionalism

This attribute is concerned with the knowledge of the service provider. It effectively combines two slightly different areas of knowledge that relate to the logistics industry and that relate to the customer's business. The results indicate that this is not, in general, an important characteristic. However, the exceptions to this occur with the low-yield customers and with the customers who seek collaborative relationships. For both of these groups there is some evidence that a deep knowledge of logistics issues helps, but there is no evidence that benefits accrue from deep knowledge of the customer's business.

Stage 4: Brand association task

Using the same respondents as the stated choice experiment, the brand association task asked respondents to rate each 3PL provider on the attributes and their levels. These raw frequencies were then used to calculate a weighted average for each attribute for each provider. The minimum and maximum values for the weighted average scale corresponded with the lowest and highest levels for each of the attributes (see Appendix 2). The weighted scores (see Appendix 7) and plotted in Figure 11 for reference. We can see that the weighted averages for DHL exceeded those of UPS and FedEx for all seven attributes. Interestingly,

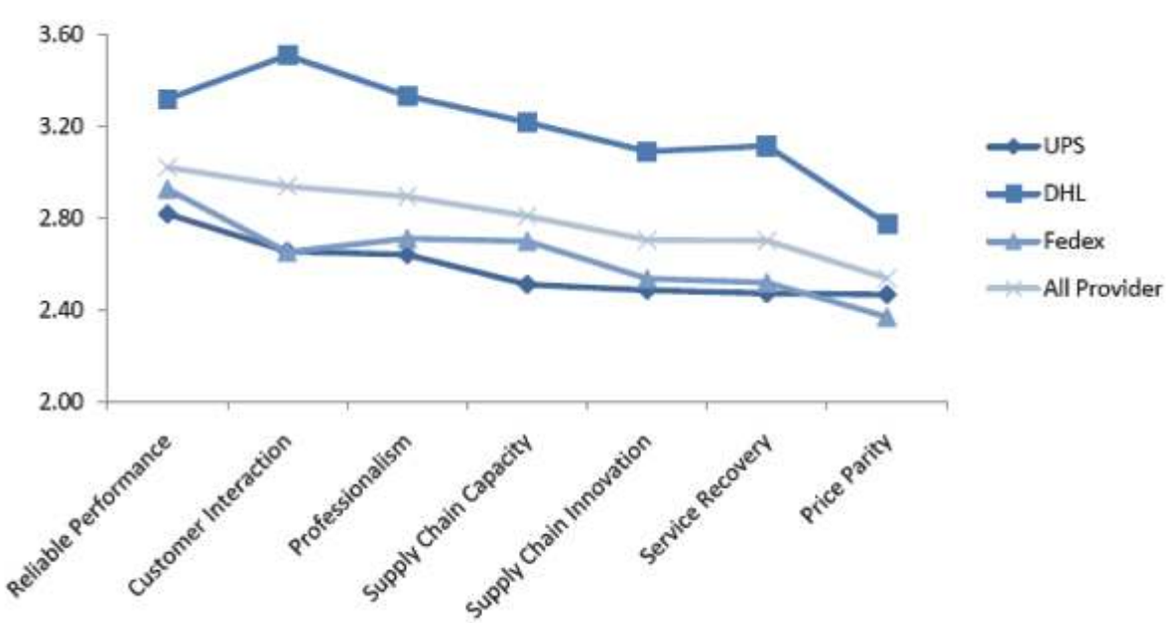
"Our logistics customers expect us to understand their business" (DHL China)

the curves for each provider are quite similar. This indicates that while the respondents perceived an overall difference between the providers, they were consistent in their perception of the relative importance of each attribute between providers.

Overall, the providers exhibited the smallest differences in the areas of price, reliable performance and supply chain capacity. The greatest observed differences were in terms of the relational attributes of customer interaction and professionalism. In both of these areas, DHL was found to enjoy a significant relative advantage over FedEx and UPS.

Another interesting aspect of this analysis is that it can be used to illustrate how customer perceptions change when they are forced to make trade-offs. For instance, the brand association data shows that customers rate Professionalism as the third most important attribute and Parity Price as the least important attribute. However, from the stated choice data we see that when forced to make trade-offs, customers would willingly forego Professionalism but not Price.

Figure 11:
Brand-attribute associations



Section 4: Discussion

What service attributes do customers prefer from a 3PL provider?
From the best-worst findings presented in this report we were able to identify the key service attributes that influence a customer's selection of a 3PL provider. The findings indicated that while reliable performance and delivery speed were the most important attributes, 3PL customers desired a mix of operational performance and customer oriented service attributes at the aggregate level.

Observation 1: Providers need to offer a range of performance and customer oriented service attributes.

Although 3PL provider choice was influenced by all 20 attributes, the top 10 attributes accounted for most of the variation in provider selection. Some of the factors that appear to be of lesser importance include the option to add surcharges, the perception of the provider's brand, participation in a quality certification program, access to top management, and tailored reporting options.

Observation 2: The top identified attributes accounted for 78% of the variation in the 3PL choice.

To what extent are these preferences segment specific?
When these preferences were decomposed using latent class segmentation a very different picture emerged. The preferred two-segment model revealed two very different groups of customers. One group was driven by a preference for operational performance, and the other group favored a 3PL provider that was customer oriented.

Observation 3: Service offerings should reflect the divergent needs of the operational performance and customer oriented segments.

The results highlight that the importance of reliable performance is common to both segments, suggesting that there is a fundamental requirement for all 3PL providers to perform reliably. In effect, the presence of this attribute in both segments suggests that this attribute is a basic qualifier for a provider to enter the consideration set of a potential customer.

Observation 4: Reliable performance is a standard requirement of all customers irrespective of their segment preferences.

Interestingly, the results also highlight possible concerns regarding the typical one-size-fits-all approach of 3PL providers. The results indicate that customers who preferred operational performance actually perceived the customer oriented attributes negatively.

Observation 5: Providers should be careful not to adopt a relational strategy with performance oriented customers.

"The important thing is service. This includes speed and safety at a reasonable price" (Japanese Customer)

How are the preferences affected when customers are forced to trade-off across the levels of the service attributes?

The normative implications of our results can also be used to answer the question of how a 3PL logistics business should compete. Based on this research, the four key factors are: (a) reliable delivery performance; (b) price parity with other providers; (c) not being poor in customer recovery; and (d) not being difficult to deal with. These are the most critical issues for customers. Important factors, but at a slightly lower level are: (e) going beyond price parity, to a price discount; (f) the capacity to respond to unanticipated customer needs; (g) good performance in service recovery; (h) being easy to deal with; and (i) not being regarded as unlikely to provide innovative supply chain solutions.

Observation 6: Aggregate data indicates that providers need to offer reliable performance at a competitive price.

Although this is the picture in aggregate, managers will also be interested in a more detailed profile that looks at different customer groups. It is natural to concentrate on the customers with whom a logistics provider does most of their business, and so this is one of the breakdowns that we consider. We have shown that support for reliable performance is evident across both the high yield and low yield groups, eclipsing the relative importance of all of the other features. However, of the remaining features the high yield segment indicated a relative preference for providers who have a customer orientation while the low yield segment demonstrated a preference for providers with good service recovery. It is interesting that, while both groups desired operational service features, the high yield group also demonstrated a strong preference for relational features.

Observation 7: Revenue profile appears to be an effective proxy for understanding the exchange preferences of customers.

The other segmentation breakdown that we considered was in terms of stated exchange preference. Again reliable performance is the most important attribute in both the collaborative relationship and efficiency/low-cost groups. In addition, the collaborative relationship group favored the relational service features of customer orientation and professionalism, whereas the efficiency/low-cost group favored the operational features of supply chain capacity and service recovery. However, a notable deviation was the strong preference for supply chain innovation by the efficiency/low-cost group over the collaborative relationship group. Price parity was only moderately important to both groups within the exchange preference segment model.

Observation 8: Supply chain innovation is a requirement for providing efficient and low-cost services.

Across all models virtually none of the attributes were found to display a linear relationship in their effects (the notable exception being reliable performance). In general, a modest improvement in the chance of being selected as a 3PL provider can be expected when above average performance is observed on most operational and relational service areas. More importantly, the greatest effects are observed at the lower levels, indicating that poor performance on these service areas will result in a significant and negative impact on customer preferences and the likelihood of choice.

Observation 9: The penalties for poor performance will generally be greater than the rewards for good performance.

How do these preferences vary for different 3PL providers? Third party logistics providers who desire to emulate the leading 3PL brands will excel in the provision of a range of performance and customer oriented service attributes.

However, the leading provider (DHL) exhibited a clear advantage over the other providers in the relational service areas.

Observation 10: Customer orientation seems to represent a distinct competitive advantage for the lead provider (DHL).

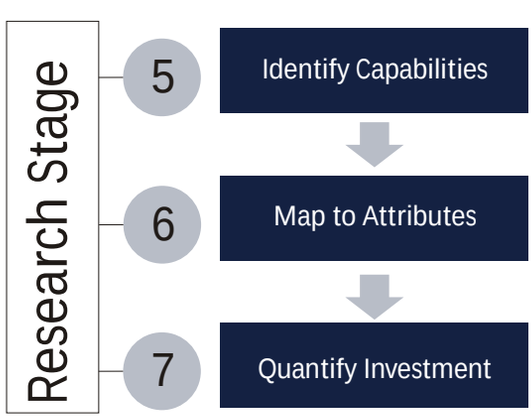
Interestingly, customers seemed to exhibit a form of social desirability bias when allocating their overall preferences for service attributes among the 3PL providers. Customers tended to understate the importance of Price and overstate the importance of Professionalism when asked directly. This finding highlights a major limitation of typical survey-based research.

Observation 11: Providers need to exhibit caution when responding to explicit customer demands.

Where to from here?

Future stages of this research project will identify the capabilities required to deliver superior performance and to build on the above observations.

Work on the final three stages of the research commenced in mid-2007 and are planned for completion by the end of 2008. Key findings from this work will be released in the second industry report which is planned for release in early 2009.



Appendices

Appendix 1: Best-worst attribute definitions

Account Representative Presence – refers to the level of contact provided by the Account Representative. A high presence Account Representative would call you, make a presentation, or address your concerns many times a month.

Billing Service – accuracy, flexibility and currency of billing service.

Brand – reflects overall competence that the supplier will deliver. In a supply chain context we can distinguish between a market leader and a new player in the market.

Culture – includes the unwritten rules that guide appropriate "norms" of behaviour. In other words, it is the "way we do things around here" and can either be similar to your own company or not.

Customer Service Support – prompt and effective handling of customer requests and questions.

Customer Service Recovery – prompt and empathetic recovery and resolution of errors or problems concerning customers.

Delivery Speed – amount of time from pickup to delivery.

Management Reporting – report customizability, range and flexibility. Highly customized reports can be delivered at a frequency determined by the customer.

Parity Price – this is what the customer pays for the service or product. A parity price is one that matches (or is very close to) that of the competition.

Proactive Innovation – proactive activity aimed at providing new solutions to improve the customers business and address any potential problems and challenges.

Professionalism – Employees exhibit sound knowledge of products and services in the industry and display punctuality and courtesy in the way they interact and present to the customer.

Quality Certification – such as ISO certification, TAPA (Technology Asset Protection Association) and Corrective Action Process etc. This certification would also cover associated third parties (where relevant).

Relationship Orientation – characterised by sharing of information and trust in the exchange partner.

Reliable Performance – consistent "on time" delivery without loss or damage of shipment.

Risk Management – this relates to the security of supply chain systems. It could include, for example correct levels of insurance for the company and third parties, capability to ensure packages are as stated using X-ray equipment, or other audit trail systems.

Supply Chain Capacity – the ability to cope with significant changes in volumes e.g., demand surges and deliver through multi-modal transport services including: international express and domestic, by air; ocean; and land.

Supply Chain Flexibility – ability to meet unanticipated customer needs e.g., conduct special pickups, seasonal warehousing

Surcharge Option in Contract – the contract includes the right to add surcharges due to unanticipated costs e.g., fuel, unusual fluctuations in levels of currency exchange rate, security surcharges.

Track & Trace – transparency and "up to the minute" data about the location of shipments end-to-end.

Top Management Team Availability – the frequency and quality of involvement by the "top management team" with your management team during the exchange relationship.

Appendix 2: Stated choice attributes

Attribute	Definition
Price Parity	Is what the customer pays for the service and/or product provided by the logistics service provider.
Reliable Performance (O)	Delivery in full, on time and error free. Complete delivery of product (or service) at the specified time agreed with the customer, and correspondingly accurate documentation.
Supply Chain Capacity (O)	The capability to meet unanticipated customer needs. This includes conducting special pickups, seasonal warehousing etc. The supplier can vary from industry leader to below industry average.
Customer Service Recovery (O)	Activity aimed at identifying and resolving unexpected service delivery problems. The supplier response can vary from being very proactive towards the detection of problems and recovery; to very reactive (i.e., unlikely to propose solutions on their own).
Customer Interaction (R)	Relates to the customer's perception of the ease with which business is conducted with the logistics provider and the extent to which they desire to reward and build mutual trust with their customers. The supplier can be easy or difficult to deal with; and frequently or rarely provide rewards such as loyalty schemes etc.
Supply Chain Innovation (R)	This activity refers to the provision of supply chain services aimed at providing new solutions for the customer. For example, the innovativeness of a supplier can be considered in terms of their ability to suggest new ways to deploy inventory etc.
Professionalism (R)	Relates to the logistics service provider's knowledge of the logistics industry AND the customer's business. For example, logistics industry level professionalism would include knowledge of how to handle customs, transportation, warehousing and any other required logistics activities. Customer level knowledge refers to the depth of understanding about that customer's business.

Note: O = operational features, R = relational features.

Appendix 3: Results from best-worst experiment

Attribute Name	"Best" (freq)	"Worst" (freq)	Best-Worst	Mean Best-Worst	SQRT (Best/Worst weighted)	Rank
Reliable performance	333	2	331	3.45	3.82	1
Delivery speed	211	17	194	2.02	2.65	2
Professionalism	138	12	126	1.31	2.59	3
Customer service support	151	24	127	1.32	2.14	4
Supply chain flexibility	162	33	129	1.34	1.95	5
Track & Trace	143	36	107	1.11	1.80	6
Customer services recovery	97	32	65	0.68	1.61	7
Supply chain capacity	88	53	35	0.36	1.25	8
Proactive innovation	119	75	44	0.46	1.22	9
Relationship orientation	80	95	-15	-0.16	0.93	10
Parity price	77	114	-37	-0.39	0.84	11
Risk management	42	67	-25	-0.26	0.81	12
Account representative presence	47	91	-44	-0.46	0.75	13
Culture	45	108	-63	-0.66	0.68	14
Billing service	33	138	-105	-1.09	0.54	15
Management reporting	34	153	-119	-1.24	0.53	16
Top management team availability	30	183	-153	-1.59	0.47	17
Quality certification	22	171	-149	-1.55	0.44	18
Brand	14	236	-222	-2.31	0.35	19
Surcharge option	12	245	-233	-2.43	0.33	20

Appendix 4: Segment level means

	Null Model (n=96)	Segment 1 (n=50)	Segment 2 (n=46)
Reliable performance	3.45	3.57	3.29
Delivery speed	2.02	2.57	1.31
Customer service support	1.32	2.00	0.45
Track and trace	1.11	1.96	0.04
Customer services recovery	0.68	1.60	-0.50
Supply chain flexibility	1.34	0.79	2.05
Professionalism	1.31	0.85	1.90
Proactive innovation	0.46	-0.36	1.51
Supply chain capacity	0.36	-0.19	1.07
Relationship orientation	-0.16	-0.69	0.53

Appendix 5: Stated choice output

	Betas	Relative Main Effects
Reliable Performance		
98-100% of the time	0.518***	0.373
95-97% of the time	0.325***	
92-94% of the time	-0.280***	
89-91% of the time	-0.563***	
Price		
0-4% less than now	0.127**	0.159
Equivalent to now	0.224***	
0-4% more to now	-0.115*	
5-8% more to now	-0.236***	
Customer Interaction		
Easy to deal with, frequently rewards	0.175***	0.142
Easy to deal with, rarely rewards	0.189***	
Difficult to deal with, frequently rewards	-0.224***	
Difficult to deal with, rarely rewards	-0.140***	
Customer Service Recovery		
Excellent: industry leader	0.107**	0.130
Better than industry average	0.131*	
Equal to industry average	0.008	
Slow to respond	-0.245***	
Supply Chain Capacity		
Excellent: industry leader	0.044	0.104
Better than industry average	0.119*	
Equal to industry average	0.021	
Below industry average	-0.184***	
Supply Chain Innovation		
Very innovative: an industry leader	0.061	0.074
Better than industry average	0.043	
Equal to industry average	0.050	
Poor innovation, no solutions	-0.154***	
Professionalism		
Deep logistics and customer	0.016	0.017
Deep logistics, acceptable customer	0.006	
Acceptable logistics, deep customer	0.011	
Acceptable logistics and customer	-0.033	
-2LL	3394.662	
$R(0)^2$	0.211	

*p<0.05, **p<0.01, ***p<0.001.

Appendix 6: Stated choice by revenue profile and exchange preference

	Customer revenue		Exchange preference	
	High yield	Low yield	Collaborative relationship	Efficiency/ low-cost
Reliable Performance				
98-100% of the time	0.592***	0.408**	0.519***	0.517***
95-97% of the time	0.400***	0.242	0.397***	0.272**
92-94% of the time	-0.324***	-0.222*	-0.317**	-0.335**
89-91% of the time	-0.668***	-0.428***	-0.599***	-0.454***
Price				
0-4% less than now	0.144**	0.130*	0.223**	0.003
Equivalent to now	0.300***	0.112	0.138	0.234*
0-4% more to now	-0.088	-0.177*	-0.169	-0.066
5-8% more to now	-0.355***	-0.065	-0.192**	-0.170*
Customer Interaction				
Easy to deal with, frequently rewards	0.203***	0.145*	0.195**	0.107
Easy to deal with, rarely rewards	0.253***	0.084	0.249*	0.103
Difficult to deal with, frequently rewards	-0.288***	-0.128	-0.354**	-0.090
Difficult to deal with, rarely rewards	-0.168**	-0.101	-0.091	-0.121
Customer Service Recovery				
Excellent: industry leader	0.177***	0.019	0.042	0.081
Better than industry average	0.105	0.213*	0.096	0.102
Equal to industry average	0.013	-0.030	-0.014	0.112
Slow to respond	-0.295***	-0.201**	-0.125	-0.295***
Supply Chain Capacity				
Excellent: industry leader	0.103	-0.059	0.086	-0.017
Better than industry average	0.115	0.160*	-0.026	0.278*
Equal to industry average	0.012	0.062	0.040	0.008
Below industry average	-0.230***	-0.163**	-0.100	-0.269***
Supply Chain Innovation				
Very innovative: an industry leader	0.108*	-0.005	0.145*	0.008
Better than industry average	0.008	0.092	-0.043	0.004
Equal to industry average	0.052	0.057	-0.020	0.265*
Poor innovation, no solutions	-0.168**	-0.143*	-0.082	-0.278***
Professionalism				
Deep logistics and customer	0.089	-0.075	-0.084	0.010
Deep logistics, acceptable customer	-0.075	0.120	0.238*	-0.007
Acceptable logistics, deep customer	0.027	-0.018	-0.058	0.055
Acceptable logistics and customer	-0.041	-0.026	-0.096	-0.058
-2LL	1961.571	1343.174	1095.043	962.578
$R(0)^2$	0.265	0.145	0.230	0.196

*p<0.05, **p<0.01, ***p<0.001.

Appendix 7: Brand-attribute frequencies and weighted averages

Attribute	Levels/weights	UPS	DHL	FedEx	All Provider
Reliable	4	40	80	42	162
Performance	3	39	74	40	153
	2	18	15	23	56
	1	22	5	14	41
	Weighted average	2.82	3.32	2.92	3.02
Price Parity	4	23	11	10	48
	3	35	113	47	198
	2	47	30	40	119
	1	22	9	23	55
	Weighted average	2.46	2.77	2.37	2.53
Customer	4	16	88	16	120
Interaction	3	72	83	70	225
	2	8	1	10	19
	1	25	0	24	49
	Weighted average	2.65	3.51	2.65	2.94
Supply Chain	4	16	68	21	105
Capacity	3	43	76	49	168
	2	50	25	46	121
	1	13	3	6	22
	Weighted average	2.51	3.22	2.70	2.81
Customer Service	4	18	64	14	96
Recovery	3	34	68	43	145
	2	47	31	48	126
	1	16	7	11	34
	Weighted average	2.47	3.11	2.52	2.71
Supply Chain	4	12	55	14	81
Innovation	3	40	78	42	160
	2	56	34	55	145
	1	8	3	7	18
	Weighted average	2.48	3.09	2.53	2.70
Professionalism	4	23	84	26	133
	3	49	71	50	170
	2	28	9	27	64
	1	19	9	17	45
	Weighted average	2.64	3.33	2.71	2.89

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