Developing a logistics service quality scale
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In the pursuit of competitive advantage, it is increasingly important to identify the demands and values of current and potential customers.' Traditionally, logistics managers have done an excellent job of managing and moving inventory-the operational aspects of logistics. They often struggle to identify the perceptual impact of customer service activities associated with logistics-i.e., the marketing aspects of logistics.2

The preponderance of the marketing literature addressing customer service, or more specifically service quality, has been aimed at the end-use customer.3 Several authors, however, have attempted to expand the theoretical domain of service quality to a business-to-business context, specifically in the arena of logistics service quality. In particular, Bienstock, Mentzer, and Bird developed a valid, reliable scale of what they termed physical distribution service quality, or PDSQ, through surveying abroad range of purchasing managers.5 The process they followed was based upon the logistics research framework suggested by Mentzer and Kahn.6

It is the purpose of this paper to continue this expansion of the service quality domain into a logistics context. This research investigates a particular focal organization with multiple market segments to determine whether the general methodology used by Bienstock, Mentzer, and Bird results in a similarly valid, reliable scale of logistics service quality (LSQ). By doing so, the work begun by Brensinger and Lambert and Bienstock, Mentzer, and Bird in broad applications (i.e., across a number of firms) can be focused on the logistics customer service environment faced by one focal organization.7

To accomplish this purpose, the next two sections review the literature relevant to logistics service quality and service quality in general. This is followed by a description of a study undertaken to expand the application of a logistics service quality scale into a specific logistics context. This research is partially a response to recent calls for theoretically and methodologically rigorous, yet managerially relevant, research in logistics.8 Thus, in the last sections, the managerial and research implications of the development of this logistics service quality scale are discussed.

LOGISTICS SERVICE QUALITY

There are many definitions and descriptions of how logistics creates customer satisfaction. The most traditional are based on the creation of time and place utility.9 The so-called "Seven Rs" describe the attributes of the company's product/service offering that lead to utility creation through logistics service, i.e., part of a product's marketing offering is the company's ability to deliver the right amount of the right product at the right place at the right time in the right condition at the right price with the right information.'

This definition implies that part of the value of a product is created by logistics service. Examples of historical, operational measures of logistics customer service are percent of items in stock, percent of orders delivered on time, percent of delivered items undamaged, etc. (For a more complete list of these operational measures, see Mentzer, Gomes, and Krapfel"). These attributes are considered the "value" provided by the logistics service dimensions of availability, timeliness, and condition.'2

As the business environment has changed, the operations-based definitions of logistics service have evolved. The basic concept of utility creation became inadequate to fully express the value created by logistics. The idea of value has been broadened to include numerous value-added operational tasks, such as packaging, third-party inventory management, bar coding, and information systems.'3 The value-added concept expanded the traditional time and place utilities to include form utility,' but it was still an operations-based concept. LaLonde and Zinszer described customer service as possessing three components: (1) an activity to satisfy customers' needs, (2) performance measures to ensure customer satisfaction, and (3) a philosophy of firm-wide

commitment.'5

However, these components are all focused on the provider firm, not on the customer. Similarly, other research has developed a framework for quantifying the value created by logistics operations.'6 Although this research incorporates internal and external customers, it is also focused predominately on provider firms-that is, how logistics executives can quantify the value they create for customers. We still must develop an instrument to measure customer perceptions of the value created for them by logistics services.

Regarding customer service in the logistics service context, Mentzer, Gomes, and Krapfel argue there are two elements in service delivery: marketing customer service (MCS) and physical distribution service (PDS). They recognize the complementary nature of the two elements to satisfy the customer and propose an integrative framework of customer service."7 This view is shared by others,18 and it is regarded as an intellectual base for integrating marketing and logistics activities.

The service quality approach is an attempt to understand customer satisfaction from the perspective of the differences between customer perceptions and actual customer service on various attributes.'9 Researchers have begun to examine whether the service quality model can be used to measure logistics service. Modifications have been made to the original service quality model by developing logistics attributes that fit into the previously customer-defined dimensions and by identifying additional gaps that could be applied to the logistics service context.20 These views of logistics service provide the building blocks to create a customer-based foundation for better definitions and measures of logistics service quality.

This use of customer-based definitions of LSQ brings physical distribution research, which traditionally has focused on more physically observable operational attributes, more in line with marketing, which has devoted more attention to understanding such unobservables as customers' perceived value. By recognizing, tapping into, and measuring customer perceptions of LSQ service quality, logistics practitioners and researchers can add to the traditionally measured set of operational service attributes.

SERVICE QUALITY

A number of researchers have tried to empirically replicate the five dimensional structure (tangibles, responsiveness, empathy, reliability, and assurance) of the original Parasuraman, Zeithaml, and Berry service quality instrument, SERVQUAL.21 In developing it, Parasuraman, Zeithaml, and Berry followed a general procedure of qualitative research (interviews and focus groups) to develop the initial scale, followed by quantitative surveys to refine and verify the scale. These interviews and surveys included retail consumers of appliance repair or maintenance, retail banking, long-distance telephone service, securities brokers, and credit card services. Additional research has expanded the use of SERVQUAL to include retail consumers of health care, residential utilities, job placement, pest control, dry cleaning, financial services, and fast food services, with the resultant dimensions ranging from one to eight.22

Several researchers have argued for the addition of items and/or dimensions to SERVQUAL. Crosby defined quality as conformance to requirements and argued those requirements should be specifically defined to measure quality.3 In applying SERVQUAL to measure perceived quality of retail financial services, Brown, Churchill, and Peter noted the "omission of items we a priori thought would be critical to subjects' evaluation of...quality" (p. 138).24 Brensinger and Lambert, applying SERVQUAL to industrial purchasing of motor carrier transportation services, developed a fourfactor structure and recommended future research supplement SERVQUAL items with "service specific variables" (p. 289) to increase the validity of service quality measurement in an industrial service context.25

Bienstock, Mentzer, and Bird26 took note of these shortcomings in applying the concept of service quality to an industrial marketing context, and suggested a classification scheme based upon the work of Lovelock,n' Gronroos,28 and Parasuraman, Zeithaml, and Berry.29 Within this classification scheme, the consumer applications of SERVQUAL are in the context of people receiving intangible actions (services) that are not physically separated from the consumer. Bienstock, Mentzer, and Bird argue that business-to-business logistics services are offered in a context in which people are replaced with "things" (p. 34), and the customer and provider are physically separated. They maintain that the former is appropriate for the SERVQUAL "functional or process dimensions" (p. 33), but the latter logistics service context is composed more of "technical or

outcome dimensions" (p. 34). They conclude that an "alternative conceptualization" is necessary for logistics service quality.30 As did Parasuraman, Zeithaml, and Berry,3' Bienstock, Mentzer, and Bird followed a methodology of a qualitative phase to develop the scale, followed by a quantitative survey to refine and verify it.

RESEARCH PURPOSE AND SETTING

The purpose of this research is to continue the expansion of the service quality domain into a logistics context. This research investigates a particular focal organization with multiple market segments in order to determine whether the general methodology used by Bienstock, Mentzer, and Bird results in a similarly valid, reliable scale of logistics service quality, LSQ. Such an expansion takes more of a customer-based approach to logistics than the traditional operational-based approaches to logistics customer service. Thus, it enhances the knowledge logistics managers have about their customers. Since this enhancement provides additional information to logistics managers on what truly motivates their customers to use one supplier over another, it has considerable value as competitive advantage input to the strategic planning goal of achieving "logistics leverage."32

The organization selected, the Defense Logistics Agency (DLA), performs logistical functions for the military services, Department of Defense agencies, and allied foreign governments. Currently, DLA manages over $22 billion in sales and over 4.5 million items. Thus, DLA acts in the role of a supplier in an industrial marketing context. At the time of this study, DLA's environment was becoming increasingly competitive as customers were given expanded choices in logistics service providers. DLA commissioned a research team to help improve the measurement and management of its logistics customer service in order to compete more effectively.

METHODOLOGY

The methodology closely followed that of Parasuraman, Zeithaml, and Berry33 and Bienstock, Mentzer, and Bird34 to develop the Logistics Service Quality (LSQ) scale. The first step was a qualitative effort to understand the LSQ needs of DLA's customers. From this qualitative effort, dimensions of LSQ for this particular industrial marketing setting were developed, and survey instrument items were derived. The instrument was then tested with a broader array of DLA customers.

QUALITATIVE METHODOLOGY

This step involved thirteen focus group sessions, each lasting approximately two hours. The first author acted as the moderator for all the sessions. Since the goal was to have DLAcustomers express their own unfiltered views through the interaction of the group, the moderator provided only general topics to start the meeting. This unstructured technique is appropriate when the objective is to identify underlying themes."

The participants and topics varied across the focus groups, but all focused on assessments of logistics services. Each participant was identified with a particular market segment of DLA: medical supplies, fuels, electronics, clothing/textiles, construction, industrial supplies, subsistence, and general supplies. The individuals in each focus group were a mixture of DLA customers for that particular product category (for example, the fuels session included civilian and military personnel with fuel logistics responsibilities). The general topics covered four basic areas: (1) the nature of the participants' work in relation to DLA; (2) evaluation of the working relationship with DLA; (3) assessment of DLA performance; and (4) perceptions of what DLA does well or poorly.

Each focus group session was recorded on videotape for later analysis, and extensive notes were taken by the first author. The videotapes were reviewed by the entire research team. The researchers individually identified specific LSQ dimensions raised in the sessions, then met to discuss them and resolve any differences. From this stage emerged an initial set of eight LSQ dimensions specific to this industrial marketing setting: information quality, ordering procedures, timeliness, order accuracy, order quality, order condition, order discrepancy handling, and personal contact quality (Order accuracy here reflects product availability). From this analysis, specific items for each dimension were derived for the survey questionnaire. The intent was to develop items that would constitute a single scale for use across multiple market segments. Although different segments might place varying weight on each dimension (such as, timeliness over order accuracy in one

segment and vice versa in another segment), the items that comprised all the dimensions of LSQ were intended to apply across all segments.

QUANTITATIVE METHODOLOGY

DLA personnel distributed the questionnaire to 16,920 DLA customers. The 5,531 usable questionnaires returned represented a response rate of 32.7%. The response sample represented all eight DLA market segments. Demographic variations were similar to the population at large, lending support to a conclusion of lack of nonresponse bias. All items used a standard 5-point Likert-type scale ranging from strongly disagree (1) to strongly agree (5).

OVERVIEW OF SCALE DEVELOPMENT

The 5,531 respondents were divided into ten separate data sets, one for scale purification, eight for scale validation within each of the eight market segments, and one for respondents who failed to indicate the segment to which they belonged. The latter data set was excluded from all data analysis. The purification set consisted of a random sample of 550 from the entire data set. Table I presents a comparison of the percent represented by each market segment in both the total data set and the purification data set. All eight market segments were represented in the randomly selected purification data set, with each segment representing a nearly equivalent proportion (i.e., largest difference was 1.6 percent) compared to the validation data sets.

Scale purification was conducted with the first data set through confirmatory factor analyses (CFA), eliminating items based on substantive grounds in conjunction with examination of modification indices, standardized residuals, chi-square statistics in light of the number of degrees of freedom, and improvements in fit statistics. Upon developing unidimensional scales through CFA, reliability and validity (convergent and discriminant) were assessed.

The purified LSQ scale, a second-order construct comprised of nine sub-scales, was then further validated within each of the eight market segment data bases through CFA. Modifications were not made at this point. Results indicate that the LSQ scale may be applied across multiple market segments. The next section provides a detailed explanation of scale purification measures.

PURIFICATION

The primary approach for scale purification when a theoretical foundation drives survey development is to rely on CFA to ensure scale unidimensionality, followed by scale reliability and construct validity assessments. Although exploratory factor analysis (EFA) and item-to-total correlations (ITC) prior to CFA are helpful and often are used and/or recommended,3' Gerbing and Anderson argue that these procedures are most appropriate in the early stages of scale development, when the researcher is uncertain as to which items best belong together or how many dimensions underlie the data set of all items. They specifically demonstrate how developing scales through maximization of ITC and/or reliability prior to assessing construct unidimensionality can generate misleading results." Therefore, in this study, the primary means of scale purification consisted of CFA conducted with LISREL 8 to establish unidimensional scales, 39 followed by reliability assessments using Cronbach's alpha and ITC.

Following basic descriptive analyses of returned surveys, including examination for incorrect coding, item normality, skewness, kurtosis, means, standard deviations, non-response bias and outliers, the items were grouped into apriori conceptualizations (based upon the previous literature and the focus groups) of appropriate sub-scales. Eight sub-scales were analyzed for unidimensionality using CFA in LISREL 8. The measurement model proposed for these analyses conceptualized LSQ as a second-order construct comprised of information quality, ordering procedures, timeliness, order accuracy, order quality, order condition, order discrepancy handling, and personal contact quality.

Initially, a covariance matrix was created in SPSS using the items intended to tap each of these dimensions, and it was saved as an output file to be analyzed in LISREL 8. Multiple iterations of CFA were conducted. Based on the magnitude of modification indices, standardized residuals, observed improvements in model fit indices-comparative goodness of fit index (CFI), normed fit index (NFI), chi-square with corresponding degrees of freedom-as well as substantive considerations, 27 of an initial 52 items were dropped, resulting in nine

sub-scales comprised of 25 items in total (nine rather than eight, because the ordering procedures sub-scale was split into two, as explained later). This level of item deletion is not uncommon for scale development studies. When developing a scale, it is best to begin with a very large item pool. Upon completion, the final scale may contain one-fourth or even one-fifth of the original items."'

Items were deleted very selectively through eight CFA runs, each time identifying a few items for deletion. Candidates for possible deletion were initially identified through examination of modification indices. Modification indices are values provided by the LISREL program that identify items which appear to load poorly on the dimension chosen by the researcher. Through the use of these indices, the program suggests places where poorly fitting items might be better placed. For example, if the researcher specifically loads an item on a timeliness dimension but calculations indicate it might be better placed to tap order accuracy, then it may show up as a large (e.g., greater than a value of 10) modification index. These kinds of numerical "flags" were used to highlight potential problems. Final decisions to delete poor items were based on substantive grounds (see Appendix A).

Modification indices of 10 or greater were first used as indicators of potentially bad items. In subsequent iterations, acceptable modification index values became gradually more restrictive. Although the final scales possibly could have been developed in fewer runs, this would have required eliminating a larger number of items in each run. Each item deleted affects all other values. For example, deleting only one of two potentially poor items may result in the second item actually fitting the data. For this reason, a very cautious approach was taken, deleting only a few items per run, which resulted in a higher number of analysis runs. In summary, items were dropped when numerically "flagged" items were considered to be redundant or inadequate based on researcher examination. Items were "flagged" for examination by large modification indices (initially greater than 10), large standardized residuals (greater than 4), and overall poor fit statistics (CFI less than .90).

An unanticipated issue concerned the ordering procedures dimension. It immediately became apparent through examination of modification indices, standardized residuals, and substantive item analysis that the ordering procedures sub-scale consisted of two closely related scales, one on ordering procedures and the other on release quantities. Therefore, the original scale was split into two sub-scales. This raised the LSQ scale from eight dimensions to nine, as shown in Figure 1. Once the unidimensionality of each sub-scale was demonstrated by CFA, the reliability of each was evaluated by the determination of coefficient alpha. Table 2 provides the final LSQ scale with all nine sub-scales. Alpha values are provided next to each sub-scale name where appropriate. Note that two of the nine sub-scales contain only two items. Sub-scale parsimony was a primary objective. A balance must be struck between parsimony to facilitate survey administration and construct validity, such that necessary dimensions are tapped. The goal was to find the best three items per subscale that appeared to lie at the heart of each of the nine concepts. It became apparent that two of the sub-scales were best tapped with only two items from their initial item pool. Cronbach's alpha is a meaningless calculation with a two-item scale, since its purpose is to compare each item to the remaining items in the scale as a group. Therefore, Cronbach's alpha was not calculated for the subscales of information quality and ordering procedures. For these two-item dimensions, simple correlations are reported. Item-to-total correlations (ITC) were also evaluated for all other sub-scales and are provided next to each item. All reliabilities and ITC are acceptable.

Table 3 presents the results of the CFA for the LSQ scale, including second-order factor loadings. A summary of item deletion decisions, including the CFA run in which each item was deleted and substantive justification for each item deleted, can be found in Appendix A.

CONVERGENT AND DISCRIMINANT VALIDITY

Assessing construct validity, a term standardized by Cronbach and Meehl,42 is a complex process. An ideal form of evaluating whether items tap the constructs intended is through the multitrait-multimethod matrix.4" However, short of utilizing multiple methods to measure each construct of interest, an assessment can be gained of the validity of a construct's measurement, initially convergent and discriminant validity, through other means.

Evidence of convergent and discriminant validity can be assessed in multiple ways when one has not utilized multitrait-multimethod approaches. At the basic level, if item loading values within each construct from the

Lambda matrix are relatively high (i.e., greater than .50) and t values are significantly large (i.e., greater than 1.96), one has a basic comfort level for convergent validity. In actuality, because a comparison is not being made to another measure of the identical construct, this might be better termed "factorial validity."'

When assessing a second-order model, as is done here, a more rigorous analysis involves comparing fit statistics for multiple models, each one subsequently relaxing restrictive assumptions. This is accomplished through direct comparison of the chi-square values and degrees of freedom for three models.45 In this study, convergent validity was assessed through comparing an independence model with no traits and 25 unique factors (Model Oj with a model consisting of one trait (LSQ) and 25 unique factors (Model 1). Specifically, for Model 0, the LISREL program was run with all 25 items representing their own independent dimensions or factors (i.e., items were not loaded together on any of the LSQ dimensions). Model 1 was assessed by loading all 25 items on one latent variable-LSQ. Discriminant validity was assessed through comparison of Model I with a model proposing the structure that resulted from the CFA analysis with nine traits and 25 unique factors (Model 2). Here, Model 2 was assessed by loading appropriate items on appropriate dimensions of LSQ and then those dimensions on LSQ itself. Widaman and Bienstock, Mentzer and Bird contend that comparison of these models yields evidence of convergent (Model 0 with Model 1) and discriminant (Model 1 with Model 2) validity if the differences in chi-square values are significant.46

Table 4 demonstrates the calculations that provide evidence for convergent and discriminant validity. Model 2 provides the best overall fit in terms of chi-square. The difference in the chi-square statistics for Model 0 and Model I is significant at the a = .0001 level, thereby demonstrating evidence of convergent validity of the LSQ items. The difference in the chi-square statistics for Model 1 and Model 2 is also significant at the a = .0001 level, thereby demonstrating evidence of discriminant validity for the proposed LSQ dimensions of information quality, ordering procedures, order release quantities, timeliness, order accuracy, order quality, order condition, order discrepancy handling, and personnel contact quality.

VALIDATING LSQ ACROSS MARKET SEGMENTS

Following scale purification and tests for convergent and discriminant validity within the purification data set, the LSQ scale with nine sub-scales was further validated with the remainder of the database, which had been divided into eight distinct data sets based on market segment. For validation, the covariance matrix was created within SPSS for each of the data sets to be analyzed in LISREL 8. A single CFA run was conducted for each data set. The resulting statistics are in Tables 5, 6 and 7. The reliabilities of each sub-scale for the eight segments are presented in Table 8.

The developed LSQ scale fits the data for seven of the eight market segments (the exception is segment six, subsistence). In all seven segments, fit statistics are acceptable (refer to Table 5). CFIs are above .90, and NFIs are above .80. Chi-square values relative to degrees of freedom are best for segments one (construction - 1.8), two (electronics - 2.1), three (fuels - 2.0), and five (medical supplies - 2.1) because they are near or below a 2:1 ratio. Although chi-square values ideally should be lower for segments four (industrial supplies - 2.5) and seven (textiles - 2.3), they are acceptable. The chi-square value for segment eight (general - 5.5) is unacceptably high, due primarily to its sample size. Segment six (subsistence) has a marginally acceptable chi-square value, but unacceptable fit statistics (CFI=.874, NFI=.787). This might be due in part to the small sample size (Valid n = 157). Examination of Tables 6 and 7 reveal varying loading values by segment. This does not invalidate the scale for the segments. It merely indicates that fit is better in some segments than in others. However, close examination of Table 6 suggests various items with low loadings across multiple segments that might benefit from rewording or replacement in future research (such as, ORQ1, OQ1, OC3).

Convergent and discriminant validity were assessed in the same manner as in the purification data set, and all eight of the market segments were significant at the (a= .0001 level. Results are shown in Table 9. In each market segment, Model 2 is a better fit than Model 1 which is also a better fit than Model 0, providing evidence for convergent and discriminant validity. Thus, the developed logistics service quality scale, with its nine dimensions, withstood preliminary scrutiny with regard to validity and reliability across the purification data set and multiple market segments, providing confidence in its usefulness. Although clearly not perfect, the proposed LSQ scale offers another useful tool for quantifying customers* perceptions of logistics services.

LIMITATIONS

As with any study, this research has limitations. They concern the study sample, survey scale range, lack of scale perfection, and predictive validity.

The sample consisted of DLA customers. Although they represent various market segments for DLA, they do not represent all types of customers of logistics services. However, one purpose of this study was to begin applying the LSQ scale development process to specific logistics organizations. Such application should continue to be pursued in future research with other organizations.

As a component of sampling, sample size varied among segments, resulting in greater variance in findings. Some of the samples were potentially too large or too small. Future research should attempt to control for this.

The survey instrument utilized a 5-point Likert "agree/disagree" scale. Some have argued that attenuation due to range restriction makes a 7-point scale more optimal.47 Therefore, findings might be limited in that respondents were not afforded opportunities for a wider range of responses. Again, resolution of this issue is left to future research.

The proposed scale is not perfect. Fit statistics could be better, fitting the data more strongly across all segments. Additionally, two dimensions of the LSQ scale were tapped with only two items. Therefore, the scale is not yet the perfect instrument for measuring logistics service quality. Future research designed to refine the proposed scale in a variety of industries should reduce this limitation. The scale developed here is an initial step toward establishing a widely usable scale.

Finally, given the scaling issues just noted, predictive validity was not assessed in this study. As an on-going effort to examine the continuum of LSQ, customer satisfaction, and share of business, the LSQ scale should be refined further, followed by tests for predictive validity (i.e., the LSQ, customer satisfaction, and share of business linkage). Again, this on-going effort is the role of future research.

MANAGERIAL IMPLICATIONS

Despite the study's limitations, managers can use the findings to improve their measurement systems. This research reveals that business customer perceptions of LSQ are multidimensional. Specifically, logisticians need to be concerned with how customers perceive information quality, ordering procedures, ordering release quantities, timeliness, order accuracy, order quality, order condition, order discrepancy handling, and personnel contact quality. In order to consistently assess and quantify customer perceptions of these service aspects, logisticians can turn to the scale developed here.

Logistics managers must quantify both their performance with respect to internal operational specifications and their performance as seen by customers with respect to the issues they find critical. The scale developed here can be used to quantify the latter. When combined with other provider attributes (such as 19

price perceptions) and other provider-relevant outcome variables (e.g., customer satisfaction, share of business awarded, word of mouth, complaint behavior, loyalty, repurchase intentions), the LSQ scale becomes an important component in determining avenues for service improvement.

CONCLUSIONS

The LSQ scale developed in this study appears to adequately fit the data collected on seven of the eight market segments of the target organization (DLA). A systematic, scientific approach established the construct validity and reliability of the LSQ scale. Future studies will need to expand the two-item scales, attempting to identify items that tap these LSQ dimensions more precisely, thus improving model fit statistics. Future research can potentially improve on the exact items within the LSQ scale dimensions, thereby improving fit statistics. Finally, the LSQ scale developed here must be evaluated across multiple industries in addition to multiple market segments within an industry.

A final research implication relates to previous calls for theoretically and methodologically sound logistics research that has applicability to logistics practitioners.48 This study has attempted to follow processes called for by Mentzer and Kahn and Mentzer and Flint, namely, to build a theoretical model through antecedent literature and qualitative research, test the theoretical model via quantitative methods, and then link results to

managerial action. The theory tested here was the multidimensional logistics service quality construct developed through qualitative research and refined through initial purification analysis of the split sample survey.

Although not yet perfected, this LSQ scale is another step toward enhancing logisticians' efforts to measure the impact of their operations on customers. The scale is not an operational approach that attempts to measure, from the supplier's perspective, how well providers deliver what they promised. Rather, it is a measure of how the customer perceives this delivery. Several decades of customer satisfaction research have shown that these customer perceptions have a direct impact on customer satisfaction.49 Thus, logistics customer service managers should consider using the LSQ scale in their customer questionnaires to determine customer perceptions of logistics services.

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Logistics service quality as a segment-customized process
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Logistics excellence has become a powerful source of competitive differentiation within diverse marketing offerings of world-class firms. Although researchers have suggested that logistics competencies complement marketing efforts, empirical evidence is lacking on what logistics service quality means to customers and whether it has different meanings for separate customer segments. The authors present empirical support for nine related logistics service quality constructs; demonstrate their unidimensionality, validity, and reliability across four customer segments of a large logistics organization; and provide empirical support for a logistics service quality process. Although structural equation modeling offers support for the logistics service quality process across customer segments, the authors find that the relative parameter estimates differ for each segment, which suggests that firms ought to customize their logistics services by customer segments.

Both corporations and researchers are becoming increasingly aware of the strategic role of logistics services in a firm's overall success (Bienstock, Mentzer, and Bird 1997; Bowersox, Mentzer, and Speh 1995; Brensinger and Lambert 1990; Mentzer, Gomes, and Krapfel 1989). Anecdotal evidence from firms such as Dell Computer Corporation, Nabisco, and Federal Express suggest that logistics excellence has a significant impact on revenue and profitability (Mentzer and Williams 2001). Digging deeper, one finds a multibillion-dollar third-party logistics industry dedicated to improving manufacturers' logistics services. Businesses have moved beyond viewing logistics as merely an area for cost improvements to viewing logistics as a key source of competitive advantage within a firm's total market efforts (Novack, Rinehart, and Langley 1994). For example, customer service has been a key focal area of research in the logistics discipline for several years. Stemming from this stream of research, logistics service capabilities can be leveraged to create customer and supplier value through service performance (Novack, Rinehart, and Langley 1994); increase market share (Daugherty, Stank, and Ellinger 1998); enable mass customization (Gooley 1998); create effective customer response-based systems (Closs et al. 1998); positively affect customer satisfaction and, in turn, corporate performance (Dresner and Xu 1995); provide a differentiating competitive advantage (Bowersox, Mentzer, and Speh 1995; Kyj and Kyj 1994; Mentzer and Williams 2001); and segment customers (Gilmour et al. 1994).

The last area, customer segmentation, offers powerful possibilities. If customer segments indeed vary in their logistics desires, it should be possible to customize logistics programs to different customer segments, which would improve both effectiveness and efficiency. If, in contrast, customers view logistics services similarly across segments, and if that view consistently affects outcomes such as customer satisfaction in the same way across segments, suppliers should be able to create logistics services that appear identical across customer segments, enabling them to leverage economies of scale. Therefore, an important research question is, Do different customer segments value different aspects and levels of logistics service quality (LSQ)? Some research suggests that logistics services ought to be customized by market segments (Gilmour et al. 1994; Michigan State University 1995, 1999; Murphy and Daley 1994). However, the research is not yet conclusive, partially because of the conceptualization and operationalization of logistics services. More research is needed to determine if logistics services should be customized by market segment.

Before this research question can be answered, researchers need to know more about what components constitute the overall concept of LSQ from the perspective of the customer. It is essential first to know what LSQ means to customers if researchers expect to examine whether groups of customers place varying degrees of emphasis on specific aspects of this meaning. The purpose of this article is to describe a study in which we examine both of these issues. This study shows that (1) LSQ might best be conceptualized as a process of nine interrelated quality constructs, (2) these nine distinct constructs are reliable and valid across customer segments, and (3) the emphasis placed on each of the constructs differs across some customer segments, which suggests that suppliers should customize their logistics services to the desires of individual customer segments. In subsequent sections, we discuss the importance of resolving the research question, the gap in the general service quality literature in addressing LSQ, theoretical development and hypotheses, the methods used, analyses and results, and the implications of the study.

LSO

Logistics excellence has been recognized as an area in which firms can create competitive advantage (Bowersox, Mentzer, and Speh 1995; Kyj and Kyj 1994; Mentzer and Williams 2001; Morash, Droge, and Vickery 1996), in part because of its visible service impact on customers (Bienstock, Mentzer, and Bird 1997;

Pisharodi and Langley 1990; Sharma, Grewal, and Levy 1995). To successfully leverage logistics excellence as a competitive advantage to customers, logisticians must coordinate with marketing departmerits (Kahn 1996; Kahn and Mentzer 1996; Mentzer and Williams 2001; Murphy and Poist 1996; Williams et al. 1997). The quality of logistics service performance is a key marketing component that helps create customer satisfaction (Bienstock, Mentzer, and Bird 1997; Mentzer, Gomes, and Krapfel 1989) and has been recognized as such for some time (Perrault and Russ 1974).

There are many definitions and descriptions of how logistics creates customer satisfaction. The most traditional are based on the creation of time and place utility (Perreault and Russ 1974). The so-called seven Rs describe the attributes of the company's product/service offering that lead to utility creation through logistics service; that is, part of a product's marketing offering is the company's ability to deliver the right amount of the right product at the right place at the right time in the right condition at the right price with the right information (Coyle, Bardi, and Langley 1992; Shapiro and Heskett 1985; Stock and Lambert 1987). This conceptualization implies that part of the value of a product is created by logistics service.

As the business environment has changed, the operationsbased definitions of logistics service have evolved. As such, the idea of value has been broadened to include several valueadded operational logistics tasks, such as packaging, thirdparty inventory management, bar coding, and information systems (Ackerman 1989; Mentzer 1993; Mentzer and Firman 1994; Witt 1991). The value-added concept expanded the traditional time and place utilities to include form utility (Ackerman 1991) but was still an operations-based concept. LaLonde and Zinszer (1976) describe customer service as possessing three components: (1) an activity to satisfy customers' needs, (2) performance measures to ensure customer satisfaction, and (3) a philosophy of firmwide commitment. However, these components all focus on the provider firm, not on the customer. Similarly, other research has developed a framework for quantifying the value created by logistics operations that is heavily focused on the service provider (Novack, Langley, and Rinehart 1995). Although this research incorporates internal and external customers, it predominantly involves provider firms-that is, how logistics executives can quantify the value they create for customers. A process is needed to measure customers' perceptions of the value created for them by logistics services, because it is the customers' perspective of service quality that determines their satisfaction level.

Mentzer, Gomes, and Krapfel (1989) argue that two elements exist in service delivery: marketing customer service and physical distribution service (PDS). They recognize the complementary nature of the two elements to satisfy the customer and propose an integrative framework of customer service. This view is shared by others (Rinehart, Cooper, and Wagenheim 1989) and is regarded as an intellectual base for integrating marketing and logistics activities. Here, PDS is composed of three crucial components: availability, timeliness, and quality. We view PDS as a component of LSQ. An approach to investigate LSQ further is to build on the service quality literature prevalent in marketing. The service quality approach, in general, is an attempt to understand customer satisfaction from the perspective of the differences between customer perceptions and actual customer service on various attributes (Parasuraman, Zeithaml, and Berry 1985). Researchers have begun to examine whether the service quality model can be used to measure logistics service (Brensinger and Lambert 1990). They have modified the original service quality model by developing logistics attributes that fit into the previously customer-defined dimensions and identifying additional gaps that could be applied to the logistics service context (Lambert, Stock, and Sterling 1990). These views of logistics service provide the building blocks to create a customer-based foundation for better definitions and measures of LSQ.

The use of customer-based definitions of LSQ brings physical distribution research, which traditionally has focused on physically observable operational attributes, more in line with marketing, which has devoted attention to understanding such unobservables as customers' perceived value. By recognizing, tapping into, and measuring customer perceptions of LSQ, logistics practitioners and researchers can add to the traditionally measured set of operational service attributes.

Service Quality

Many researchers have tried to replicate empirically the fivedimensional structure (tangibles, responsiveness, empathy, reliability, and assurance) of Parasuraman, Zeithaml, and Berry's (1985) original service quality instrument, SERVQUAL. In developing SERVQUAL, Parasuraman, Zeithaml, and Berry followed a general procedure of qualitative research (interviews and focus groups) to develop the initial scale and then performed

quantitative surveys to refine and empirically test the scale. These interviews and surveys included retail consumers of appliance repair or maintenance, retail banking, long-distance telephone service, securities brokers, and credit card services. Additional research has expanded the use of SERVQUAL to include retail consumers of health care, residential utilities, job placement, pest control, dry cleaning, financial services, and fast-food services, and the resultant dimensions have ranged from one to eight (e.g., Babakus and Boiler 1992; Babakus and Inhofe 1993; Babakus and Mangold 1992; Babakus, Pedrick, and Inhofe 1993; Brown, Churchill, and Peter 1993; Carmen 1990; Cronin and Taylor 1992; Finn and Lamb 1990; Mishra, Singh, and Wood 1991; Parasuraman, Zeithaml, and Berry 1985, 1988, 1991, 1993, 1994; Spreng and Singh 1993).

Several researchers have argued for the addition of items and/or dimensions to SERVQUAL. For example, from a less sociological and more operational perspective, Crosby (1979) defines quality as conformance to requirements and argues that those requirements should be specifically defined to measure quality. From Crosby's (1979) view and the general total quality management perspective, certain aspects of quality (of services or otherwise) intuitively ought to be incorporated. Along these lines, in applying SERVQUAL to measure perceived quality of retail financial services, Brown, Churchill, and Peter (1993, p. 138) note the "omission of items we a priori thought would be critical to subjects' evaluation of ... quality." Similarly, Brensinger and Lambert (1990, p. 289), applying SERVQUAL to industrial purchasing of motor carrier transportation services, developed a four-factor structure and recommended that further research should supplement SERVQUAL items with "service specific variables" to increase the validity of service quality measurement in an industrial service context.

Bienstock, Mentzer, and Bird (1997) took note of these shortcomings in applying the concept of service quality to an industrial marketing context and suggest a classification scheme based on the work of Lovelock (1983), Gronroos (1984), and Parasuraman, Zeithaml, and Berry (1985). Within this classification scheme, the consumer applications of SERVQUAL are in the context of people receiving intangible actions (services) that are not physically separated from the consumer. Bienstock, Mentzer, and Bird (1997, p. 34) argue that business-to-business logistics services are offered in a context in which people are replaced with "things" and the customer and provider are physically separated. They maintain that the former is appropriate for the SERVQUAL "functional or process dimensions" (p. 33), but the latter logistics service context is composed more of "technical or outcome dimensions" (p. 34). They conclude that an "alternative conceptualization" is necessary for LSQ. As do Parasuraman, Zeithaml, and Berry (1985), Bienstock, Mentzer, and Bird (1997) follow a methodology of a qualitative phase to develop the scale and then perform a quantitative survey to refine and test it. They conceptualize physical distribution service quality (PDSQ) as a second-order construct composed of three first-order dimensions: timeliness, availability, and condition.

We view PDSQ as a component of the broader concept of LSQ. Timeliness, availability, and order condition are critical aspects of the customer's perception of LSQ. However, there are other components as well. In line with traditional service quality research in marketing, logistics services involve people who often take orders and deliver products and procedures for placing orders and handling discrepancies. On the basis of the service quality literature, interactions customers have with these people and procedures should affect their perceptions of overall logistics services.

In conceptualizing PDS, Mentzer, Gomes, and Krapfel (1989) synthesize 26 elements of physical distribution and customer service reported in the logistics literature over more than two decades to arrive at a parsimonious threedimensional construct composed of availability, timeliness, and quality. This structure was supported by later empirical evidence, with slight reconceptualizations based on additional extensive qualitative research (Bienstock, Mentzer, and Bird 1997). Although the contribution of these studies lies in their parsimonious operational ization of critical aspects of service quality, other aspects that are traditionally mentioned in the literature should be part of a broader concept of LSQ. Specifically, order processing (Byrne and Markham 1991; Langley and Holcomb 1991); quality of contact personnel (Innis and LaLonde 1994); information at order placement (Byrne and Markham 1991; Innis and LaLonde 1994); order accuracy (Byrne and Markham 1991); order completeness, including accuracy, condition, and quality (Byrne and Markham 1991; Sterling and Lambert 1987); and the procedures for handling damaged, inaccurate, or return shipments (i.e., aside from the product condition itself) (Innis and LaLonde 1994; Sterling and Lambert 1987) ought to be incorporated. In short, we found several aspects of customer service that should be combined with PDSQ to conceptualize LSQ. Together with findings of significant situational limitations to the SERVQUAL approach both inside and outside logistics contexts (e.g., Van Dyke, Prybutok, and Kappelman 1999), we thought it best to engage in

new qualitative research to complement the aforementioned literature and develop a more comprehensive conceptualization of LSQ.

Following the precedent of the literature, we conducted qualitative research to develop constructs and item pools related to LSQ. For this qualitative exploration, 15 managers within the Defense Logistics Agency (DLA) and 12 DLA customers were interviewed one-on-one to develop preliminary concepts. For this study, DLA was appropriate because its markets are large and diverse and the customers addressed in this study have a choice as to whether they use DLA as a logistics service provider. Following initial depth interviews, 13 focus group sessions were held with key buyers of logistics services for organizations in each DLA customer segment. Each focus group session lasted approximately two hours and was videotaped. Videotapes were combined with extensive notes for content analyses. These focus group sessions addressed the nature of the participant's work with DLA, evaluations of their relationship with DLA, and assessments of critical areas of importance for working with DLA. The qualitative research facilitated the development of a survey designed to measure LSQ. Specifically, the qualitative research revealed that participants representing multiple DLA customer segments were concerned about nine concepts:

*Personnel contact quality,

*Order release quantities,

*information quality,

*Ordering procedures,

*Order accuracy,

*Order condition,

*Order quality,

*Order discrepancy handling, and

* Timeliness.

Personnel contact quality refers to the customer orientation of the supplier's logistics contact people. Specifically, customers care about whether customer service personnel are knowledgeable, empathize with their situation, and help them resolve their problems (Bitner 1990; Bitner, Booms, and Mohr 1994; Bitner, Booms, and Tetreault 1990; DeCarlo and Leigh 1996; Gronroos 1982; Hartline and Ferrell 1996; Parasuraman, Zeithaml, and Berry 1985). Parasuraman, Zeithaml, and Berry (1985) argue that in most service encounters, quality perceptions are formed during the service delivery. Similarly, Surprenant and Solomon (1987) suggest that service quality perceptions are tied more to the service process, which involves personnel contact, than to the resulting service outcome. As such, personnel contact quality is an important aspect of the employee-customer interface (Hartline and Ferrell 1996; Hartline, Maxham, and McKee 2000).

Order release quantities are related to the concept of product availability. On the basis of several criteria, DLA can release certain order sizes. The organization can challenge customers' requests to ascertain the need behind their volume requests. Customers should be the most satisfied when they are able to obtain the quantities they desire. The importance of product availability has long been realized as a key component of logistics excellence (Mentzer, Gomes, and Krapfel 1989; Novack, Rinehart, and Langley 1994; Perreault and Russ 1974). Although stockouts are believed to have significant impact on customer satisfaction and loyalty, it is difficult to quantify the financial impact of these lost sales (Keebler et al. 1999).

Information quality refers to customers' perceptions of the information provided by the supplier regarding products from which customers may choose (Mentzer, Flint, and Kent 1999; Mentzer, Rutner, and Matsuno 1997; Novack, Rinehart, and Langley 1994; Rinehart, Cooper, and Wagenheim 1989). This information is contained in DLA's catalogs. If the information is available and of adequate quality, customers should be able to use the information to make decisions.

Ordering procedures refer to the efficiency and effectiveness of the procedures followed by the supplier (Bienstock, Mentzer, and Bird 1997; Mentzer, Flint, and Kent 1999; Mentzer, Gomes, and Krapfel 1989; Mentzer, Rutner, and Matsuno 1997; Rinehart, Cooper, and Wagenheim 1989). In particular, focus group participants indicated that it was important for DLA's order placement procedures to be both effective and easy to use.

Order accuracy refers to how closely shipments match customers' orders upon arrival (Bienstock, Mentzer, and Bird 1997; Mentzer, Flint, and Kent 1999; Mentzer, Gomes, and Krapfel 1989; Mentzer, Rutner, and Matsuno 1997; Novack, Rinehart, and Langley 1994; Rinehart, Cooper, and Wagenheim 1989). This includes having the right items in the order, the correct number of items, and no substitutions for items ordered.

Order condition refers to the lack of damage to orders (Bienstock, Mentzer, and Bird 1997; Mentzer, Flint, and Kent 1999; Mentzer, Gomes, and Krapfel 1989; Mentzer, Rutner, and Matsuno 1997; Rinehart, Cooper, and Wagenheim 1989). If products are damaged, customers cannot use them and must engage in correction procedures with DLA and/or other vendors, depending on the source of the damage.

Order quality refers to how well products work (Novack, Rinehart, and Langley 1994). This includes how well they conform to product specifications and customers' needs. Whereas order accuracy addresses the complete set of products in the order (i.e., the accuracy of the kinds and quantities of the products in the order) and order condition addresses damage levels of those items due to handling, order quality addresses manufacturing of products. The focus group participants attributed a portion of their perceptions of the quality of DLA's logistics services to the quality of the products being delivered. Because DLA serves as a general purchasing organization for its customers, this attribution was not surprising.

Order discrepancy handling refers to how well DLA addresses any discrepancies in orders after the orders arrive (Novack, Rinehart, and Langley 1994; Rinehart, Cooper, and Wagenheim 1989). If customers receive orders that are not accurate, in poor condition, or of poor quality, they seek corrections from DLA. How well DLA handles these issues contributes to customers' perceptions of the quality of their services.

Timeliness refers to whether orders arrive at the customer location when promised. More broadly, timeliness also refers to the length of time between order placement and receipt (Hult 1998; Hult et al. 2000). This delivery time can be affected by transportation time, as well as back-order time when products are unavailable (Bienstock, Mentzer, and Bird 1997; Mentzer, Flint, and Kent 1999, Mentzer, Gomes, and Krapfel 1989; Mentzer, Rutner, and Matsuno 1997; Novack, Rinehart, and Langley 1994; Rinehart, Cooper, and Wagenheim 1989).

As is evident, these nine dimensions capture previously supported aspects of PDSQ-namely, availability (in terms of order release quantities), timeliness, and condition-but also capture other aspects of logistics services covered in the literature and discussed previously (e.g., personnel quality, information quality, discrepancy handling). In addition, order completeness is conceptualized as three distinct components-that is, order accuracy, order condition, and order quality-because qualitative research suggests that they differ yet are all considered when customers evaluate whether received orders are complete.

These nine dimensions of LSQ have been proposed as first-order dimensions of a second-order LSQ construct (Mentzer, Flint, and Kent 1999). However, this operationalization has two limitations. First, in a second-order construct, all dimensions are given equal weight and treated as if they occur simultaneously. This is a consistent limitation in the logistics literature. Researchers often provide a laundry list of activities and/or components of logistics services of which customers form perceptions. These operationalizations ignore the processes, that is, the temporal ordering of the components/dimensions being tested. Some components are not just correlated with but dependent on other components. Thus, the process by which perceptions of logistics service components affect one another, and eventually satisfaction, is lost. This omission is surprising considering the general attention given to logistics operations as a set of processes within supply chain management that are aimed at increasing customer satisfaction and reducing costs (e.g., Beinstock, Mentzer, and Bird 1997; Handheld and Nichols 1999; Michigan State University 1995, 1999; Persson 1995). The study of total quality management has long focused on processes, and quality initiatives continue to emphasize operations (e.g., Li and Rajagopalan 1999). Moreover, organizational science researchers have modified their scientific inquiry approach away from variables and toward processes (Mackenzie 2000). Therefore, it is odd

that we see little empirical evidence of logistics processes being modeled as the processes perceived by customers.

The second shortcoming of Mentzer, Flint, and Kent's (1999) work is the lack of comparison across market segments. Reported results suggest that market segments place varying degrees of importance on each dimension of LSQ. However, Mentzer, Flint, and Kent did not conduct comparison analysis. The purpose of our article is to improve on the LSQ conceptualization by addressing these two shortcomings. First, we conceptualize the nine components of LSQ in terms of a logical process. After confirming the validity and reliability of these nine dimensions, we empirically test a process model of LSQ and compare the process across market segments.

Although we could not find any articles in the logistics literature that offered a process conceptualization that includes all the dimensions tested here, we did find general presentations of the process that helped us establish a framework within which we could develop our model. Specifically, it is generally understood that customers place orders, orders are processed, orders are shipped, and orders are received (e.g., Byrne and Markham 1991; Mentzer, Gomes, and Krapfel 1989; Persson 1995). Customers have contact with this process when placing and receiving orders. When order receipt is not as expected, customers stay engaged in the logistics process through discrepancy handling. This general framework is presented in Figure 1. This framework helps us begin to place the nine components of LSQ in temporal order (Figure 2).

First, order placement components include perceptions of interactions with DLA personnel when customers place orders (i.e., personnel contact quality), order release quantities, ordering information quality, and ordering procedures. This stage includes what is traditionally referred to as availability (e.g., Bienstock, Mentzer, and Bird 1997; Mentzer, Gomes, and Krapfel 1989). Until the order receipt stage, customers do not have any perceptions of the tangible products that are delivered. At the order receipt stage of LSQ, we place order accuracy, order condition, and order quality. These three components compose what is traditionally referred to as order condition or order fulfillment (e.g., Beinstock, Mentzer, and Bird 1997; Handfield and Nichols 1999). However, timeliness is also part of order receipt. This is the first time customers can really assess the timeliness of the logistics process. Did the product arrive on time as ordered? Thus, perceptions of timeliness fit within the order receipt stage. Perceptions of these four order receipt components (i.e., order accuracy, order condition, order quality, and timeliness) are driven by the order placement components. However, customers sometimes do not receive orders as expected (Bienstock, Mentzer, and Bird 1997; Handheld and Nichols 1999; Langley and Holcomb 1991; Mentzer, Gomes, and Krapfel 1989). In this situation, customers ask the service provider to correct the mistake. Thus, dealing with service providers about orders not received as expected (i.e., discrepancy handling) is still part of order receipt activities but follows an evaluation of the accuracy, condition, and quality of the order. When discrepancies need to be addressed, timeliness is affected. Orders are not considered on time until they are received as ordered. Thus, timeliness is driven by the process of placing orders (i.e., personnel contact quality, order release quantities, information quality, and ordering procedures), the receipt of accurate orders in good condition and of good quality, and the handling of discrepancies.

Finally, satisfaction should be driven by the timeliness of orders received and the manner in which discrepancies are handled. We expect order accuracy, order condition, and order quality to operate through timeliness and through order discrepancy handling to influence satisfaction. This relatively straightforward process is logical, but we drew on an analysis of the qualitative phase of this research and general discussions about logistics services in the logistics literature that heretofore have not specifically modeled all these components of LSQ as a process. However, we also know from the service quality literature that interactions with the service provider are crucial to customer satisfaction (Bitner 1990; Bitner, Booms, and Mohr 1994; Bitner, Booms, and Tetreault 1990; DeCarlo and Leigh 1996; Gronroos 1982; Hartline and Ferrell 1996; Hartline, Maxham, and McKee 2000; Parasuraman, Zeithaml, and Berry 1985; Surprenant and Solomon 1987). This personal interaction reflects both the quality of the personnel and the ease with which customers can interact with the service provider. Incorporating these aspects of service quality into our process model of LSQ adds a direct link between personnel contact quality and customer satisfaction and another between ordering procedures (our construct that addresses ease of interaction) and satisfaction. The reason information quality and order release quantities (the two remaining order placement dimensions) do not operate directly on satisfaction is that they both address issues whose effects should be adequately explained by operating through order receipt dimensions alone.

This logic leads us to the hypothesized model presented in Figure 2. The specific hypotheses that emerge directly from this previous discussion of construct relationships, represented in Figure 2, are discussed next.

Hypothesized Relationships

We hypothesize that ordering-related constructs affect perceptions of the order when it arrives. Specifically, personnel contact quality, order release quantities, information quality, and ordering procedures all involve interactions customers have with their suppliers when they place orders. Each of these constructs should positively affect perceptions of order accuracy, order condition, order quality, and timeliness. This is reflected in H1 and specifically in 16 distinct subhypotheses:

H1: Perceptions of ordering-related constructs positively affect order receipt perceptions: (a) personnel contact quality positively affects order accuracy, (b) personnel contact quality positively affects order condition, (c) personnel contact quality positively affects order quality, (d) personnel contact quality positively affects timeliness, (e) order release quantities positively affects order accuracy, (f) order release quantities positively affects order condition, (g) order release quantities positively affects order quality, (h) order release quantities positively affects timeliness, (i) information quality positively affects order accuracy, fi) information quality positively affects order condition, (k) information quality positively affects order quality, (1) information quality positively affects timeliness, (m) ordering procedures positively affects order accuracy, (n) ordering procedures positively affects order condition, (o) ordering procedures positively affects order quality, and (p) information quality positively affects timeliness.

As previously discussed, we hypothesized that three of the order receipt constructs have an effect on perceptions of how DLA handles order discrepancies. If orders are inaccurate, of low quality, or in poor condition, customers are forced to interact with DLA to handle the discrepancies. If discrepancies are handled well, such that orders are eventually accurate, of acceptable quality, and in proper condition, customers should have positive perceptions of the supplier's order discrepancy procedures. H2 addresses this issue and is reflected in three subhypotheses:

H2: Perceptions of order receipt positively affects perceptions of order discrepancy handling procedures: (a) order accuracy positively affects order discrepancy handling, (b) order condition positively affects order discrepancy handling, and (c) order quality positively affects order discrepancy handling.

Timeliness has long been discussed as an important component of logistics services. In addition to the hypothesized positive effects of the four order placement constructs on timeliness, we hypothesize that an order would be considered on time when the order was considered accurate, in good condition, and of acceptable quality. If these three criteria are not met, timeliness is also affected by when the discrepancies are handled adequately. Thus, we hypothesize that perceptions of order accuracy, order condition, order quality, and order discrepancy handling affect perceptions of timeliness.

H3: Perceptions of order accuracy positively affects perceptions of timeliness.

H4: Perceptions of order condition positively affects perceptions of timeliness.

H5: Perceptions of order quality positively affects perceptions of timeliness.

H6: Perceptions of order discrepancy handling positively affects perceptions of timeliness.

Finally, on the basis of the literature, order timeliness and the handling of order discrepancies should have strong effects on satisfaction. However, as previously explained, two constructs, ordering procedures and personnel contact quality, tie in the broader service quality literature and model direct effects on satisfaction because they involve the ease-of-use aspects of the service and the interpersonal interactions that affect satisfaction. H7 through Hip reflect these concepts:

H7: Perceptions of timeliness positively affects satisfaction.

H8: Perceptions of order discrepancy handling positively affects satisfaction.

H9: Perceptions of ordering procedures positively affects satisfaction.

H10: Perceptions of personnel contact quality positively affects satisfaction.

Methods

Samples and Data Collection

To examine the constructs and process model of LSQ, we collected samples from customer segments of the DLA. We sent customers in the DLA segments chosen for this study a survey packet including a cover letter, questionnaire, and return envelope. Survey respondents were responsible for logistics ordering from and coordination with DLA but are free to order from other suppliers besides DLA if they are not satisfied with DLA's performance. The total mailing included 5000 to general merchandise customers (n = 2008), 1500 to textiles and clothing customers (n = 505), 1500 to electronics customers (n = 608), and 500 to construction supplies customers (n = 250). The DLA provided the contact names at customer organizations. These numbers of returned, acceptable surveys reflect a 39.66% response rate.

We assessed nonresponse bias by contacting a random sample of 30 nonrespondents from each segment (i.e., general merchandise, textiles and clothing, electronics, and construction supplies customers) by telephone and asking them to answer the three satisfaction questions (SAI, SA2, and SA3). The t-tests of group means revealed no significant differences between respondents and nonrespondents on any of the questions in any of the segments. Thus, nonresponse bias was not considered a problem.

Scale Development

We previously discussed the qualitative research and literature that helped us develop the nine LSQ constructs. We then developed, on the basis of the qualitative analysis, multiitem scales to tap into each of the nine constructs, plus satisfaction. The survey instrument was pretested for readability on a random sample of 200 DLA customers. Analysis of this pretest found that only four items required minor revision of wording for readability. We then mailed the refined instrument to the final sample of 8500 DLA customers in the four segments selected for the study.

Before hypothesis testing, we also engaged in scale purification. We extracted a random sample of 415 surveys from the responses from the four market segments (243 from general merchandise, 59 from textiles and clothing, 78 from electronics, and 35 from construction supplies). Each market segment represented approximately the same percentage of the purification sample as it did in the final analysis sample. Following basic descriptive analyses, including examination for coding errors, normality, skewness, kurtosis, means, and standard deviations, we subjected the purification data set to confirmatory factor analyses (CFA) by means of LISREL (Joreskog and Sorbom 1996; Joreskog et al. 1999). In these analyses, items were grouped into a priori conceptualized scales. Modification indices (i.e., initially any greater than 10), standardized residuals (i.e., greater than 4), and fit statistics (i.e., comparative fit index [CFI], DELTA2, relative noncentrality index [RNI], and X2 with corresponding degrees of freedom [d.f.]) flagged potentially problematic items (Anderson and Gerbing 1988; MacCullum 1986).

We then examined these items within the theoretical context of each scale and deleted items on substantive and statistical grounds, if appropriate (Anderson and Gerbing 1988; MacCullum 1986). As a result, we eliminated 27 items from an initial pool of 52 designed to tap the nine LSQ scales, which resulted in 25 items to tap the nine LSQ scales and three items to tap satisfaction. Composite reliability and the average variance extracted compared with the highest variance shared with any other construct were both acceptable for each construct. In addition, the 28 purified items were found to be reliable and valid when evaluated on the basis of each item's error variance, modification index, and residual covariation. The refined scales are provided in Table 1. After the measurement analyses (described in more detail for the samples included in the study in the "Measurement Analysis" section), we proceeded to the hypothesis testing using the refined scales for each of the four final samples (which now had final sample sizes of 1765 for general merchandise, 446 for textiles and clothing, 530 for electronics, and 215 for construction supplies after the pretest responses were removed).

Analyses and Results

Using the refined scales in each of the four market segment data sets, we subjected the hypothesized constructs of LSQ to a series of CFAs to assess unidimensionality, reliability, and validity and then tested the effects of the nine LSQ constructs on one another and on satisfaction. The results are presented in Tables 2 through 6. Table 2 reports the means and standard deviations of all items for all four segments. Table 3 presents the results of the multisample CFA in which the focus was on testing the invariance of the measurement model across the four DLA segments. Table 3 also reports the testing of all possible pairs of customer segment samples. Table 4 summarizes additional measurement model test results, including parameter estimates, composite reliabilities, average variances extracted, and highest shared variances. Table 5 presents the CFA fit statistics for each DLA customer segment. Table 6 presents the results of all hypothesis tests. Correlation matrices for all four customer samples are provided in the Appendix. We next provide details of the analyses leading to these tables.

Measurement Model

To confirm construct unidmensionality, validity, and reliability, we evaluated the psychometric properties of the nine LSQ and one satisfaction constructs by using the method of CFA by means of LISREL (Joreskog and Sorbom 1996; Joreskog et al. 1999). Within this analysis, we incorporated both theoretical and statistical consideration in developing the scales (Anderson and Gerbing 1988). As such, our goal was to achieve a high level of scale reliability and validity and ensure that we had measured each theoretical facet of the intended construct. We evaluated the scales using CFA analyses for each of the four customer segment samplesgeneral merchandise (n = 1765), textiles and clothing (n = 446), electronics (n = 530), and construction equipment and supplies (n = 215). We evaluated the model fits using the DELTA2 index, the RNI, and the CFI. These have been shown to be the most stable fit indices by Gerbing and Anderson (1992). The chi^sup 2^ statistics with corresponding degrees of freedom are included for comparison purposes (Joreskog and Sorbom 1996).

Using these criteria, a multisample test of the four segments, in which the parameter estimates were constrained to be the same across the four segments (Model I) (i.e., loadings, factor correlations, and error variances), resulted in acceptable fits to the data (Table 3). Allowing the loadings to be estimated independently from one another in the four segments resulted in similar fit statistics (Model 2). On the basis of the chi^sup 2^ difference test suggested by Anderson and Gerbing (1988), the constrained and unconstrained measurement models were found not to differ significantly. As a further examinination of the potential for differences, multisample tests were conducted on all possible pairs of the customer segment samples. As with the four-sample test, fit indices were acceptable, and no significant differences were found between Models I and 2 (Table 3). Similarly, no differences were found between the models when the error variances were allowed to be estimated freely in addition to the loadings (Model 3) or when the loadings were allowed to be invariant but the error variances were allowed to differ (Model 4).

Next we assessed the reliability of the measures. Within the CFA setting, composite reliability is calculated using the procedures outlined by Fornell and Larcker (1981) and based on the work by Werts, Linn, and Joreskog (1974). The formula specifies that CRS = (Xy),y)2/[(Ey,)2+(EE;)], where CR Ti = composite reliability for scale TI, Xy; = standardized loading for scale item yi, and ei = measurement error for scale item yi. We also examined the parameter estimates and their associated t-values and assessed the average variance extracted for each construct (Anderson and Gerbing 1988). As is shown in Table 4, the reliabilities for the ten constructs ranged between .76 (order quality for construction segment) and .95 (personnel contact quality for general, textiles, and electronics segments), indicating acceptable levels of reliability for the constructs (Fornell and Larcker 1981). The order quality scale is the only scale below a composite reliability of .79, suggesting that all other scale reliabilities are excellent (Gerbing and Anderson 1992).

We established discriminant validity by calculating the shared variance between all possible pairs of constructs and verifying that they were lower than the average variance extracted for the individual constructs (Fornell and Larcker 1981; Joreskog et al. 1999). The shared variance was calculated as gamma^sup 2^ = 1 - psi, where gamma2 = shared variance between constructs and the diagonal element of psi indicates the amount of unexplained variance. Because TI and E are standardized, gamma2 is equal to the r2 between the two constructs. We calculated average variance extracted using the following formula: V^sub eta^ = Epsilon lamda gamma/(epsilon lamda gamma+ delta epsilon ^^sub i^) where V^sub eta^ = average variance and epsilon^sub i^ = measurement error for scale item gamma^sub i^. The shared variances between pairs of all possible scale combinations ranged from a low of 8% to a high of 59% between the various scale combinations (Table 4). The

average variances extracted ranged between 52% and 85%, all having higher average variances extracted than the shared variances among all applicable pairs of scales (Table 4). To assess discriminant validity further, in line with suggestions by Anderson (1987) and Bagozzi and Phillips (1982), we assessed pairs of scales in a series of two-factor confirmatory models using LISREL. We ran each model twice-once constraining the phi coefficient (theta) to unity and once freeing the parameter. We then used a chi^sup 2^ test to test for differences between models. In all cases, the chi^sup 2^ results were higher in the constrained models, thereby indicating discriminant validity between the constructs. These results, in combination with fit indices for each customer segment sample (i.e., in Table 5, DELTA2, RNI, and CFI exceed .90 for all four segments), suggest that the measurement scales are reliable and valid in all four customer segments in this study.

Finally, we examined the validity of each of the 28 individual items in the analysis. First, we maintained our predetermined criteria of modification indices (< 10) and residuals (<4). Second, we tested the potential differences among each item (28 items) across the four samples relative to its theoretical construct (10 constructs). This test involved constraining appropriate sets of P estimates, one parameter estimate at a time, to be equal and different across the four samples (general, textiles, electronics, and construction) and then evaluating whether the resulting change in the chi^sup 2^ value was significant with the appropriate difference in degrees of freedom (Bagozzi and Heatherton 1994). The results indicated that all 28 items were robust across the four samples. The chi^sup 2^-delta s ranged from .21 to 6.47 with a d.f. delta = 3, which was lower than the chi^sup 2^ value of 11.34 to be significant at the p < .01 level. As such, the ten scales and their 28 items were considered reliable and valid in the context of this study.

Hypothesis Testing

The results of the hypothesis tests are provided in Table 6, including the parameter estimates, their corresponding t-values, and the fit statistics. We tested the hypothesized model in Figure 2 using LISREL (Joreskog and Sorbom 1996; Joreskog et al. 1999). All scale items were used in the analysis to represent the ten latent constructs. We used the correlation matrix for each segment as input to the SEM analyses (see the Appendix). In testing the hypotheses, we centered our attention on examining the relative emphasis placed on each construct within each segment as opposed to comparing paths across samples.

The main objective of the hypothesis testing was to examine the relative importance of each service quality construct in each of the four distinct DLA customer segments. Initially, however, we examined the implicit proposition that the four DLA segments are different in terms of the service quality process. As such, we conducted a multisample analysis involving all four DLA segments to assess the possible invariance of the model relationships across the segment samples (using procedures similar to the ones employed to assess the individual items in the measurement analysis). The multisample analysis indicated that the models involving constrained (chi^sup 2^ = 22082.65, d.f. = 1761) and unconstrained (chi^sup 2^ = 14811.08, d.f. = 1602) loadings are statistically different (delta chi^sup 2^ = 7271.57, d.f. = 159, p <.01). Thus, these results support our contention that the developed service quality process model (Figure 2) should be examined independently in the four DLA samples.

The fit statistics indicate that in all four segments, the hypothesized model achieves acceptable fit (Table 6). However, a different number of hypotheses was supported in each segment. Within the general customer segment, 23 of the 27 hypotheses were supported at the p < .01 level (Figure 3). In the textiles segment, 15 of the 27 hypotheses were supported at the p < .01 level (Figure 4). In the electronics segment, 12 of the 27 hypotheses were supported at the p < .01 level (Figure 5). In the construction segment, I I of the 27 hypotheses were supported at the p < .01 level (Figure 6).

The finding that the model generally fits the data for each customer segment (on the basis of fit indices) but that some paths are not significant in certain segments and that the significant paths differ across segments, suggests that customer segments place different levels of emphasis on certain components of LSQ. As such, we find support for the differences across the four DLA segments at the path level (hypothesis) in addition to the explanatory level (as tested in the multisample analysis).

In the general segment, three of four order placement constructs (i.e., personnel contact quality, order release quantities, ordering procedures), order accuracy, and order discrepancy handling drove perceptions of timeliness. Order condition and order quality seemed to work through order discrepancy handling. In the textiles

segment, only personnel contact quality and order quality drove perceptions of timeliness. In the electronics segment, timeliness perceptions were driven entirely by order placement constructs (i.e., personnel contact quality, order release quantities, ordering procedures) and not by the order receipt constructs of accuracy, condition, and quality or the handling of discrepancies. Similarly, in the construction segment, only two order placement constructs (i.e., personnel contact quality, order release quantities) drove timeliness perceptions. Thus, customers' perceptions of timeliness are driven by different constructs depending on the market segment in which they exist. Similar comparisons can be made for each of the hypotheses by examining the tables and figures. However, a few intriguing findings are worth mentioning.

The first relates to drivers of satisfaction for each segment. The constructs that drive satisfaction are the ones we might conclude are the most important to the sample. For the construction and textiles segments, only ordering procedures seemed to drive satisfaction, although we also note that for the textiles segment, timeliness and personnel contact quality were significant drivers of satisfaction at $p < .05$. However, this is interesting given all the emphasis logistics places on receiving the right order at the right time in the right condition. This finding indicates that these customers care most about the ease and effectiveness of the ordering process itself and not necessarily about timeliness. In contrast, both ordering procedures and order discrepancy handling seemed to drive satisfaction for the electronics segment. For the general segment, order discrepancy handling, ordering procedures, and personnel contact quality drove satisfaction. Timeliness drove satisfaction at the $p < .05$ significance level for the general segment. Thus, for these four segments, there were factors that drove perceptions of timeliness, yet timeliness was not a major factor in satisfaction levels. The question then becomes, Why? Follow-up research with these segments is needed to uncover that answer. We can speculate that there is something similar across these DLA customer segments that reduces the importance of timeliness; however, customer segments of other logistics service providers may place a much higher value on timeliness, as the literature suggests. Again, this finding and others like it suggest that customers' perceptions about various aspects of LSQ and the relative importance they play in determining customer satisfaction differ by market segment.

Conclusions

The purpose of this study was to identify potential components of LSQ that apply across multiple customer segments and examine whether different customer segments place different weights on the components. We know of no other studies that have conceptualized LSQ as a process and then examined it in this way. Examination of these issues should contribute to firms' efforts at using logistics services to differentiate themselves in the marketplace. The results from our study have specific implications for both marketing management and further research.

Managerial Implications

In this study, we presented nine potentially important components of LSQ. The items we generated to tap these components were found to be valid and reliable measures across four customer segments of the DLA. This means that marketing managers, in coordination with their firms' logisticians, can focus on developing services that address these nine components. We found, at least for one organization, that all nine components are important for at least one customer segment. These nine components reveal that LSQ is a complex concept demanding a great deal of attention from supplying firms.

This study also found that LSQ should be conceptualized as a process, rather than merely as a single concept or second-order construct. When viewed as a process, suppliers can identify the drivers of various LSQ perceptions. Our study suggests that customers' perceptions of suppliers' LSQ begin to form as soon as customers try to place orders, and the perceptions develop until customers receive complete and accurate orders, in good condition, with all discrepancies addressed. The process view enables marketers to see the interrelationships among LSQ components.

Finally, we found that customer segments place their emphasis on different components of LSQ, and we believe that this initial evidence will be corroborated by other studies; however, we also found strong similarities across segments. These similarities suggest that in some areas, managers may be able to develop processes that apply to all customer segments. Specifically, personnel contact quality had a positive effect on perceptions of timeliness in all four segments. Perceptions of the effectiveness and ease of use for ordering procedures had

the most consistent positive effect on satisfaction. This indicates that the process of placing orders may be more important than order receipt in creating satisfied customers-how the job is done more than what gets done.

Thus, we suggest that managers make their own assessments of the relative weight their customer segments place on each of the constructs developed in this study. If results from their customer segments reveal similar relative emphases, logistics services can be designed to address all these segments similarly, enabling suppliers to take advantage of scale efficiencies. If, conversely, results from suppliers' customer segments reveal marked differences in the LSQ components that customers value, suppliers ought to customize their services to cater to specific customer segment desires.

This kind of thinking enables logistics services to be seen as a differential competitive weapon that can not only improve efficiencies by reducing costs but also improve marketing effectiveness by contributing to customization processes that generate greater revenue for supplier firms.

Research Implications

This study also has implications for further research on LSQ. Although we expand beyond the PDS constructs to include additional constructs in the broader concept of LSQ, the nine constructs identified and tested in this study may not be the only components of LSQ. Although we aimed at being comprehensive in our examination of LSQ issues, further research ought to explore other possibilities. Indeed, such research may lead to the uncovering of omissions and misrepresentations of the relationships tested in the current study and possibly to further conceptual refinement and extension. For example, there may be other logical structures of the interrelationships among the LSQ constructs, especially in contexts other than the ones studied in this research. Finally, we need to improve the operational ization of the constructs. Our reliability and validity assessments showed strong support for the constructs in this study, but two constructs were operationalized with only two items.

As operationalized in this study, LSQ focuses primarily on attributes of the supplier organization. This conceptualization needs to be placed into context with related constructs, such as customers' perceived benefits, sacrifices, and value and their effects on customer satisfaction-concepts all presented in the customer value literature (e.g., Woodruff 1997). Along these lines, LSQ must be linked to other customer outcome measures, such as loyalty, word of mouth, and price sensitivity, as well as supplier outcome measures, such as revenues, market share, and profitability.

Although this study contributes to both business practice and scholastic research, it is limited by several factors. First, the study's reliance on survey methodology as its primary means of data collection may limit the results because of common method bias. Replication studies, as well as studies using maximally dissimilar methods in similar and dissimilar samples over a period of time would lend support to the contention that the concepts measured in this study indeed exist and are stable. A second limitation is that the survey was administered to customer segments of only one organization and this survey was developed on the basis of focus groups and interviews within these same customer segments. Although the samples for each segment were of adequate size, they were from segments of the same supplier organization. Therefore, conclusions from this study may not transfer to customer segments of other firms. Items used to operationalize constructs in this study were worded to be relevant to DLA customers. Other suppliers of logistics services will need to modify the wording of individual items such that they are relevant to their customers yet still maintain the reliability and validity of the constructs they are designed to measure.

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Certifying Supply-Chain Managers.(Brief Article)
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Traffic World
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The term supply-chain management has risen to amazing prominence over the past 10 years. At the 1995 conference of the Council of Logistics Management, 13.5 percent of the concurrent session titles contained the words "supply chain." At the 1997 conference, just two years later, the number of sessions containing the term rose to 22.4 percent. In fact, when I chaired the 1997 conference, I joked with the conference committee that one of my goals was to have at least one track at the conference that did NOT contain the term supply-chain management.

There are many reasons for the popularity of the concept. Trends in global sourcing and an emphasis on time and quality-based competition and their respective contributions to greater environmental uncertainty all have raised the importance of SCM on the executive's radar screen. Globalization of supply has forced companies to look for more effective ways to coordinate the flow of materials into and out of the company. Key to such coordination is an orientation toward closer relationships with suppliers.

Further, companies in particular and supply chains in general compete more today on the basis of time and quality. Getting a defect-free product to the customer faster and more reliably than the competition is no longer seen as a competitive advantage but simply a requirement to be in the market -- what I call the "cost of being in the game." Customers are demanding products consistently delivered faster, exactly on time and with no damage.

Each of these necessitates closer coordination with suppliers and distributors. This global orientation and increased performance-based competition, combined with rapidly changing technology and economic conditions, all contribute to marketplace uncertainty. This uncertainty requires greater flexibility on the part of individual companies and supply chains, which in turn demands more flexibility in supply-chain relationships.

Supply-chain management is defined in many different ways. Some define SCM in operational terms involving the flow of materials and products. Some view it as a management philosophy and some view it in terms of a management process. Some have even defined SCM differently in a single article: as an of integrated system between vertical integration and separate identities on one hand, and as a management philosophy on the other.

To clear up such ambiguity, our research team, associated with the Supply Chain Management Forum at the University of Tennessee, undertook a project to develop a uniform definition of SCM. This project involved reviewing all that had been written on SCM, a monumental task requiring the reviewing of over 450 articles and books, as well as interviewing the chief supply-chain officers of 20 major corporations. The result was an all-encompassing definition: Supply-chain management is the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole.

This definition means that SCM is an extremely complex concept that involves all the traditional business functions (finance, marketing, sales, logistics, production, etc.) in a coordinated effort within the company and across companies in the supply chain. So complex, in fact, that our group wrote an entire book ("Supply Chain Management," Sage Publications Inc., 2001) to describe its inter-workings. So complex, in fact, that we had to rethink how to teach SCM to business people.

To answer the question of how to teach supply-chain management, we again turned to the business world. We held a day-long meeting at the University of Tennessee with the chief supply-chain officers of 10 major corporations to explain our concept of SCM and ask for their suggestions on how we should incorporate this concept into classes we teach.

The result was: a completely renovated MBA with a required concentration in SCM; a completely renovated undergraduate program, where all students learn the rudiments of SCM; and a program aimed at executive education to obtain a certification in SCM.

Supply Chain Management Certification is aimed at executives and managers who have experience in the traditional business functions but want to add to their knowledge of how these functions work together within the company and across companies in the supply chain. Our Integrated Supply Chain Management Certification program is composed of six-, two- and one-half-day courses.

Experienced managers and executives (even within logistics) with or without a graduate business degree should consider adding expertise in supply-chain management to their personal and professional education. We took the broad definition of SCM presented earlier and realized that certification in SCM means an executive should be able to demonstrate competency in each of the component areas of demand management, logistics, operations and resource management and be able to demonstrate competency in integrating these across the supply chain.

The Certified Supply Chain Manager is positioned to manage the supply-chain operations for a corporation, dealing with the systemwide, strategic issues of managing the traditional business functions within their own company and across the companies in their supply chains. With the global, supply-chain direction of business

today, this is truly training and career-positioning for the environment of the future.

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The Nature of Interfirm Partnering in Supply Chain Management.(Brief Article)
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This paper conceptually integrates the antecedents and consequences of strategic and operational partnering. We suggest a continuum exists from strategic to operational partnering depending on the level of antecedents, orientation, and implementation. This paper, thus, expands the theory of partnering by providing an inclusive picture of the "partnering" phenomenon with the environmental pressures, antecedents, orientation, implementation, and consequences of strategic and operational partnering for vertical relationships within retail supply chains.

Partnering between firms is an increasingly common way for firms to find and maintain competitive advantage (Mentzer, 1999; Mohr and Spekman, 1994). Wal-Mart has successfully pursued this strategy by forming partnerships with such vendors as Procter and Gamble, 3M, and Philips Consumer Electronics to reduce inventory and other logistics costs for both the retailer and the vendor. A partnership occurs through extensive social, economic, service, and technical ties over time (Stern, El-Ansary, and Coughlan, 1996), but requires mutual commitment, trust, and common goals (Dwyer and Tanner, 1999; Morgan and Hunt, 1994), as well as communication and cooperation (Morgan and Hunt, 1994). While most partnerships share some common elements and characteristics, there is no "ideal" relationship that is appropriate in all situations (Ellram and Cooper, 1990; Lambert, Emmelhainz, and Gardner, 1996). In fact, many relationships in retail supply chains are simply transactional, implying a tactical buyer-seller relationship, with little of the aspects of partnering discussed in this paper. Partnerships are reserved for retailer-vendor relationships where some degree of continuity is expected, and the focus of the relationship goes beyond price (Frazier, Spekman, and O'Neal, 1988).

A partnership is an interorganizational entity developed between two independent organizations in a vertical relationship within a supply chain. A supply chain consists of multiple partnerships (Gentry, 1996) and, therefore, partnering is important for successful retail supply chain relationships. Supply chain management research has traditionally focused on the operational aspects of the supply chain, that is, the efficient flow of products and services, but there is a benefit in considering retail supply chain strategy in terms of relationship building among retailers and their key supply chain members.

Mentzer et al. (1999) define Supply Chain Management as "the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain (that consists of multiple firms), for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole" (parentheses and emphasis added). This suggests supply chain management is the management of close interfirm relationships,

so understanding partnering is important to develop successful retail supply chain relationships.

Webster (1992) proposed a continuum from interdependent partnerships to strategic partnerships, based upon the degree of interdependence of the partners, the exclusivity of the relationship, and the strategic goals of the relationship. Johnson (1999) defined strategic integration (i.e., a strategic partnership) as one where firms have a strategic mind-set toward the interfirm relationship. Frazier, Spekman, and O'Neal (1988) distinguished relationships from one-time supply chain transactions. However, no single, clear set of criteria exists that differentiates the nature of strategic partnering from other types of partnering. Furthermore, Achrol (1991), Johnson (1999), Thorelli (1986), Varadarajan and Cunningham (1995), and Webster (1992) emphasized strategic partnering but ignored other types of partnering. Thus, although examinations of transactional relationships exist in the marketing channels literature, and examinations of the formation process and characteristics of strategic partnerships have been ab undant, explanations of why some interfirm relationships become strategic and others do not and how strategic partnering differs from other types of partnering are lacking.

Only by deciding on the type of partnering a retailer wants to accomplish with other firms and, accordingly, combining a partnering orientation and its implementation at an appropriate level, will retailers gain the full benefits of partnering. Further, researchers should not assume all partnering relationships are strategic and ignore the operational aspects of partnering. Therefore, in this paper, we suggest a continuum of strategic and operational partnering based upon (1) the orientation of the partners and (2) the degree of implementation of partnering between two independent firms. Strategic partnering is an on-going, long-term interfirm relationship for achieving strategic goals, which delivers value to customers and profitability to partners. For example, many retailers have realized the need for strategic integration with offshore suppliers after witnessing the strategic advantage attained by such brands as Tommy Hilfiger and Ralph Lauren/Polo, and such stores as Federated Department Stores and May Department Stores. Operational partnering is an as-needed, shorter-term relationship for obtaining parity with competitors.

Operational partnering is found in such apparel retailers as The Gap that exclusively sells its own brands. This type of retailer may switch offshore suppliers based on the suppliers' availability and other purchase terms and, thus, obtains operational efficiency.

The purpose of this paper is, thus, to provide an integrated view of partnering by showing the similarities and differences between strategic and operational partnering in terms of environmental pressures, antecedents, orientation, implementation characteristics, and consequences. Figure 1 provides the conceptual framework of these relationships. To accomplish this purpose, we first examine in more depth the concepts of strategic and operational partnering and then follow the flow of Figure 1 throughout the rest of the paper. This flow first examines the environmental pressures that have led to an increase in supply chain partnering. The phenomena surrounding the formation of partnerships is then examined, including the antecedents to an orientation toward strategic or operational partnering, the implementation of strategic versus operational partnerships, and the consequences of each in terms of competitive attainment and performance. Throughout this discussion, propositions are offered where appropriate. T he paper concludes with a discussion of the managerial and research implications of this differentiation between strategic and operational partnering.

PARTNERING ORIENTATION

Retailers do not pursue partnering relationships with all their vendors. The implementation costs (in terms of capital, technology, processes, risk, and people) are too great. Thus, even retailers that do engage in partnering do so only with a select group of vendors that have a similar orientation toward partnering. An orientation toward partnering is the partners' patterns of shared values and beliefs that help individuals in the partner firms understand the functioning of the partnership and, thus, provide partnership behavioral norms (cf., Deshpande and Webster, 1989). This partnering orientation exists on a continuum from strategic to operational.

Strategic Partnering Orientation

Strategic partnering is a relationship designed to achieve long-term strategic objectives and, thus, improve or dramatically change a company's competitive position (Hitt, Ireland, and Hoskisson, 1999; Webster, 1992) through the development of new technology, new products, and new markets (Webster, 1992). Johnson (1999)

proposed strategic partnering exists when a firm perceives: (1) its long-term strategy depends on maintaining a good, healthy relationship with its partner, (2) the relationship with its partner is important, and (3) a strong cooperative relationship with its partner is necessary to be competitive in the industry. Ganesan (1994) suggested retailers with a long-term orientation are concerned with both current benefits (i.e., operational efficiency and effectiveness) and future outcomes (i.e., competitive advantage). A strategic partnering orientation includes exclusivity and nonimitability (Lambert, Emmelhainz, and Gardner, 1996; Varadarajan and Cunningham, 1995). If the competitors of either firm replicate the relationship or similar cooperative arrangements are made between a partner and the major competitor of the other partner, the relationship cannot be strategic.

Partners in a strategic partnering relationship recognize each other as an extension of their own firm (Lambert, Emmelhainz, and Gardner, 1996). Johnson (1999) suggested a firm's perceptions of strategic partnering include (1) considering its partner a large part of the picture, (2) not thinking of its own long-term strategy when it makes plans with its partner, and (3) if its partner went out of business, the firm would have to change its competitive strategy. For example, the trading company, Li & Fung, performs integrated product development, sourcing, financing, shipping, handling, and logistics for The Limited (Magretta, 1998a). This strategic partnership would not survive if both the trading company and the retailer were not achieving short-term operational advantages, and long-term strategic goals. Further, both partners perceive the partnership as exclusive and not easily imitated by the competition.

Operational Partnering Orientation

An operational partnering orientation seeks improvements in operational efficiency and effectiveness. Efficiency minimizes resource use to accomplish specific outcomes, whereas effectiveness is the ability of channels to deliver products or services in a manner that is acceptable to end users (Stem, El--Ansary, and Coughian, 1996). Operational objectives specify expected performance in terms of delivery speed and consistency, flexibility to handle extraordinary customer service requests, and recognition of malfunctions and recovery from them to serve customers (Bowersox and Gloss, 1996). Efficiency is measured by delivery time, product quality, number of short orders, and inventory levels. Effectiveness is measured by service quality and the service needs of the focal firm and the focal firm's customers (Mentzer, 1999).

Operational decisions involve shorter time spans (Ganesan, 1994; Lambert and Stock, 1993), fewer organizational resources, and are easier to implement and reverse (Hitt, Ireland, and Hoskisson, 1999) than strategic decisions. Thus, competitors are more able and likely to match operational actions than strategic actions (Grimm and Smith, 1997). Finally, each partner does not perceive the other as an extension of its own firm.

Strategic and operational partnering are distinguished from transactional buyer-seller relationships by degree (Frazier, Spekman, and O'Neal, 1988). Strategic partnering includes an orientation to view the partner as an extension of their own firm, involving the partner in long term strategic initiatives. Operational partnering views the partner as a close associate in improving supply chains efficiency and effectiveness in the short term. Strategic initiatives are not shared with operational partners, but considerable operational coordination still occurs. Transactional relationships are treated on a purchase-by-purchase basis (Frazier, Spekman, and O'Neal, 1988). The relationship between the buyer and the seller does not look beyond the scope of the individual purchase and, thus, does not address the level of operational coordination of operational partnering or the strategic coordination of strategic partnering.

ENVIRONMENTAL PARTNERING PRESSURE

Regardless of whether strategic or operational, what has led to the increase in partnering in retail supply chains? The primary reasons derive from markets becoming more international, dynamic, and customer driven. Customers are demanding more variety, better quality, and greater service. Product life cycles are shortening and product proliferation is expanding (Fliedner and Vokurka, 1997). Retailers are at the center of these dynamic market changes, their costs often dramatically affected by rapidly shifting consumer tastes. Relationship marketing, born amid such market turbulence, aims at developing lasting relationships based on long-term benefits and mutual affinity between buyers and sellers (Achrol, 1997). Three environmental pressures encourage the formation of partnerships: environmental uncertainty, global competition, and time

and quality based competition.

Uncertain industry structure and market environment encourages the formation of partnerships (Lambe and Spekman, 1997). This is illustrated in Figure 1 by the direct effect of Environmental Partnering Pressure on the Formation of Partnerships (contained within the dashed box). Relationships between firms offer higher levels of interfirm coordination, greater stability, and flexibility (Achrol, 1997; Fliedner and Vokurka, 1997). In highly uncertain environments with changing markets, firms internalize fewer resources and capabilities than in stable markets (Osborn and Baughn, 1990; Sanchez, 1993). Instead, firms apply resources and capabilities (the retailer's and its partner's) to transforming perceived possibilities into new products (Sanchez, 1993) and retail market offerings. Ellram and Krause (1994) found the top reason for entering partnerships was to secure reliable supply sources. In addition, because technological changes are largely uncontrollable by individual firms, firms form partnerships to deve lop new technologies or products, or to borrow cutting-edge technologies developed by their partners to satisfy customer needs. The recent innovation of vendor managed inventory is an example of retailers applying their suppliers' capabilities and technologies to managing retail store inventories (all in the face of increased retail market uncertainty).

[P.sub.1]: Environmental uncertainty is positively related to the formation of partnerships within supply chains.

Globalization increases the range of opportunities to compete (Hitt, Ireland, and Hoskisson, 1999). For example, in the last five years, Wal-Mart has expanded from a solely U.S. based retailer into Canada and much of Latin America. Much of Wal-Mart's future growth is expected to come from global markets. As firms globalize, regardless of their size, they lack the total resources required for success and, thus, recognize the necessity of partnering with other firms (Kotler, 1997). Firms that focus on domestic markets must also be able to understand foreign rivals that penetrate their markets (Fawcett, Calantone, and Smith, 1996). As such, firms have no choice but to develop a global perspective or risk competitive extinction (Hamel and Prahalad, 1985). Often, this global perspective is not developed internally, but rather obtained through partnerships.

[P.sub.2]: Degree of global competition is positively related to the formation of partnerships within supply chains.

With product life cycles shortening and product proliferation expanding (Fliedner and Vokurka, 1997), firms are forced to compete based on quality products, consistent product availability, and faster product delivery. Time and quality-based competition eliminates wasted time, effort, defective units, and inventory (Larsen and Lusch, 1990; Schonberger and El-Ansary, 1984; Schultz, 1985). Companies that compete effectively on time tend to be good at such things as quality, insight into evolving Customer needs, ability to exploit emerging markets and enter new businesses, and generating new ideas and incorporating them into innovations (Stalk, Evans, and Shulman, 1992).

The most popular time and quality-based concepts (facilitated by partnering) are just in time (JIT), quick response (QR), and vendor managed inventory (VMI) (Mentzer, 1999). JIT requires a significant amount of cooperation between partners, and partnership development can reduce the costs for both parties and increase relationship solidarity between partners (Hitt, Ireland, and Hoskisson, 1999). QR and VMI are similar to JIT but deal with the distribution of finished products from manufacturers and wholesalers to retailers (Larsen and Lusch, 1990). JiT, QR, and VMI require firms to implement partnering to respond to customers quickly and flexibly.

[P.sub.3]: Increased time and quality based competition is positively related to the formation of partnerships within supply chains.

ANTECEDENTS OF A PARTNERING ORIENTATION

Achrol, Scheer, and Stem (1990) identified commitment, trust, group cohesiveness, and motivation of alliance participants as critical to interfirm strategic alliances. Smith and Barclay (1997) and Bucklin and Sengupta (1993) found the key predictors of effective alliances are power imbalance or dependence, managerial imbalance, dysfunctional conflict resolution, organizational compatibility, prior history of the business relationship, and rate of technological change. In addition, Mentzer (1999) and Day (1995) suggested top management vision as a partnering antecedent. Coalescing these factors, we propose that, once the

environmental pressure to form partnerships exists in the macro environment, interdependence, conflict, trust, commitment, organizational compatibility, and top management vision of the firms within a particular supply chain are antecedents of the partnering orientation type (strategic versus operational) that results (Figure 1).

Interdependence

Interdependence encompasses "each channel member's dependence, the magnitude of the firms' total interdependence, and the degree of interdependence asymmetry between the firms" (Kumar, Scheer, and Steenkamp, 1995). Relative dependence is the difference between the firm's dependence on its partner and the partner's dependence on the firm (Anderson and Narus, 1990). Total interdependence is the sum of both firms' dependence (Emerson, 1962; Lawler and Bacharach, 1987). Symmetric relative dependence exists when both partners are equally dependent on each other. Channel relationships that are asymmetric in relative dependence are more dysfunctional, less stable, and less trusting than symmetric relationships (Anderson and Weitz, 1989; Stem and Reve, 1980). Regardless of whether the firm is in a position of relative power or relative dependence, increasing asymmetry in relative dependence and decreasing total interdependence generates greater conflict, lower trust, and lower commitment. Conversely, commonality of interests is strongest in symmetric relationships (Kumar, Scheer, and Steenkamp, 1995). Furthermore, increasing total interdependence in symmetric relationships enhances performance (Buchanan, 1992). Sears and Whirlpool, for example, have enjoyed a long and mutually beneficial strategic partnership in the manufacture and distribution of Kenmore appliances, due in large part to the fact that both companies depend upon the size and capabilities of the other (i.e., large total interdependence and symmetric relative dependence). Thus, the greater the interdependence, the stronger is the motivation to form a long-term, strategic partnership.

[P.sub.4]: Interdependence is positively related to a strategic partnering orientation.

a: The level of total interdependence in symmetric relative dependence is positively related to a strategic partnering orientation.

b: The level of asymmetric, relative dependence is inversely related to a strategic partnering orientation.

Conflict

Conflict is behavior that impedes, blocks, or frustrates another firm's goal pursuit (Thomas, 1976). Jaworski and Kohli (1993) measured interfunctional conflict as tensions between members of several departments, and turf battles to protect departmental interests. By the same token, tensions between partners and turf battles are critical barriers to partnering, forming interfirm interface teams, and establishing interfirm reporting. Large U.S. retailers have often been criticized by their suppliers for using harsh negotiating tactics that restrict the supplier's ability to make a reasonable profit margin. Such transactional tactics that impede the supplier's profit goals--although they may meet the short-term procurement goals of the retailer--lead to long-term conflict, which limits the vendor's willingness to enter into long-term-strategic partnerships with the retailer.

[P.sub.5]: Conflict is negatively related to a strategic partnering orientation.

Trust

Parties who trust one another can find ways to work out difficulties such as power, conflict, and lower profitability (Sullivan and Peterson, 1982), and trust stimulates favorable attitudes and behaviors (Schurr and Ozanne, 1985). Trust is an essential antecedent to strategic partnership investment because either tangible (e.g., communication and manufacturing/retailing technology investment) or intangible (e.g., most favorable transaction contract and sharing critical retail market information) trust requires partners perceive each other as trustworthy in terms of character, motives, role competence, and judgment (Wilson and Mummalaneni, 1988).

[P.sub.6]: Trust is positively related to a strategic partnering orientation.

Commitment

Commitment is an enduring desire to maintain a valued relationship (Moorman, Deshpande, and Zaltman, 1993), and incorporates intention and expectation of continuity, and willingness to invest resources in the

partnership (Anderson and Weitz, 1992; Dwyer, Schurr, and Oh, 1987; Mohr and Nevin, 1990). Commitment (1) is a critical success factor for long-term, strategic partnerships because firms sacrifice short-term benefits to realize long-term benefits (Dwyer, Schurr, and Oh, 1987); (2) shows an intention to become more deeply involved in the partnership through investments that entail risks (Kumar, Scheer, and Steenkamp, 1995); and (3) implies the importance of the relationship to the partners (Wilson, 1995).

[P.sub.7]: Commitment is positively related to a strategic partnering orientation.

Organizational Compatibility

Organizational incompatibilities between allied firms, in terms of reputations, job stability, strategic horizons, control systems, and goals, lead to less strategic (i.e., more operational) partnerships (Smith and Barclay, 1997). Bowersox (1990), Bucklin and Sengupta (1993), Kanter (1991), Lambert, Emmelhainz, and Gardner (1996), Main (1990), Rukert and Walker (1987), Smith and Barclay (1997), and Van De Ven and Ferry (1980) all found compatible corporate culture essential in long-term buyer-seller relationships.

[P.sub.8]: Organizational compatibility is positively related to a strategic partnering orientation.

Top Management Vision

Top management vision plays a critical role in shaping an organization's values and orientation (e.g., Felton, 1959; Hambrick and Mason, 1984; Kotter, 1990; Tosti and Jackson, 1994; Webster, 1989). Andraski (1998) argued the ability to accept a new paradigm of collaboration (i.e., partnering) requires a new breed of leadership from senior management. Top management must understand and embrace the significant operational and market impacts of partnering (Mentzer, 1999), and develop a good understanding of their potential partner and their top management (Hitt, Ireland, and Hoskisson, 1999; Mentzer, 1999), to achieve a strategic partnering orientation.

[P.sub.9]: Top management's vision of partnering is positively related to a strategic partnering orientation.

Without the synergy of a strong combination of trust, commitment, interdependence, organizational compatibility, top management vision toward strategic partnering, and little conflict between the partners, a strategic partnering orientation will not develop. Lower levels of these antecedents may lead to an operational partnering orientation. This suggests operational partnering and strategic partnering are each appropriate in particular situations, depending on the combination of these antecedents. For example, Wal-Mart has developed long-term strategic partnerships with certain key vendors, while maintaining operational partnerships with some other vendors, while keeping a purely transactional relationship with vendors where the primary focus is on using a number of competing vendors to obtain short-term, negotiated low prices.

The antecedents in Figure 1 may facilitate a partnering orientation, but they are not sufficient. Complementarities across the two partners must exist that provide the synergy to yield desired benefits. When these antecedents and complementarities exist, the parties with a partnering orientation will move to implement a partnership.

PARTNERING IMPLEMENTATION

Partnering orientation (strategic or operational) is implemented by information sharing, technology utilization, strategic interface teams, organizational issues, joint programs, asset specificity, and establishing joint performance measures (Figure 1).

Information Sharing

The collection, creation, management, and communication of information are critical to the efficiency, effectiveness, and competitive advantage of any supply chain (e.g., Global Logistics Research Team, 1995; Novack, Langley, and Rinehart, 1995; Stern, El-Ansary, and Coughlan, 1996). By providing the supplier with information on the retail firm's customer demand far in advance of when the product is needed, a lower cost of providing the product and lower incidence of customer service failure due to stockouts results (Mentzer, 1999). The combination of advance shipping notices with point of sales (POS) customer information, connected across

retail supply chain partners through electronic data interchange (EDI), provides the ability for vendors to coordinate their shipments with retailer demand and plans and reduce supply chain inventories by as much as 40% (Kahn and Mentzer, 1996). Savings of this magnitude have led the Food Marketing Institute (FMI) to advocate efficient consumer response (ECR) systems among its members' supply chains. However, ECR requires considerable information sharing both about the final consumers and about plans to meet demand throughout the retail supply chain.

With the advent of the Internet, this level of information coordination--and its benefits--has increased, especially in the area of collaborative forecasting, planning and replenishment (CPFR). For example, Nabisco and Wegmans increased category sales by 13%, increased service levels from 93 to 97%, and decreased inventory days by 18% through a CPFR initiative; Kimberly Clark and Kmart increased in-stock rate from 86.5% to 93.4%, and increased retail sales 14% through CPFR; and Wal-Mart and Sara Lee Apparel reduced store-level inventory 14%, increased sales 32%, and increased retail turns 17% through CPFR (VICS, 1998).

Shared information varies from strategic to tactical in nature and from information about logistics activities to general market and customer information (Global Logistics Research Team, 1995). For example, Philips Consumer Electronics experiences different types of shared information in its different partnerships: a major department store shares long-term marketing and logistics strategies as well as short-term plans with Philips, whereas a super appliance store provides only short-term demand forecasts with short notice. In the latter case, Philips has difficulty developing a long-term marketing and production plan for the partner. Thus, the nature of information shared differs with the orientation of the partners: partners with a strategic partnership orientation share information that is both strategic and operational, whereas partners with an operational partnership orientation share only operational information.

Day (1995) indicated multilevel information sharing between partner firms is useful because employees of both firms realize the benefits of partnering and develop linkages at different levels to ensure smooth operations. Cooper and Ellram (1993) argued firms in an operational partnership maintain a single contact for the transaction, whereas strategic supply chains have multiple communication levels. In short, partners in a strategic partnership practice multilevel information sharing, whereas firms in an operational partnership practice single or limited multilevel information sharing.

Technology Utilization

Strategic partnership success is often based on improving supply chain performance through such technology as EDI, bar coding, scanning, advance shipment notices, and sales forecasting (Mentzer, 1999). Information technology leads to more strategic partnering and greater reliance on time-based strategies, along with more transparent logistics organizational structures, and increased emphasis on performance measurement (Bower-sox and Daugherty, 1995). Thus, partnering technology highlights the growing importance of channel communication and information dissemination (Stern, E1-Ansary, and Coughlan, 1996). Strategic partnering utilizes more information technology than operational partnering in terms of the variety of technologies/databases that link the partners. More importantly, technology is more standardized and integrated in strategic partnering. Operational partnering requires technology for more tactical applications that are limited in scope and, thus, does not address the breadth of supply chain issues required to implement technology to realize a more strategic orientation.

Strategic Interface Teams

A team approach has been argued as the standard means of making strategic decisions that are complex or large-scale (Monczka, Trent, and Handfield, 1998). In implementing a strategic partnering orientation, a firm is so dependent on the partnership that it cannot think of developing strategy without its partner (Johnson, 1999). Therefore, strategic partnering requires each partner to participate in interfirm strategic interface teams.

Partners in operational partnering will need similar teams for specific tactical issues, but they will not be as encompassing of the entire supply chain.

Organizational Issues

If functional silos with internal organizational barriers exist within both the buyer and supplier, it is unlikely

organizational issues in a partnership will be solved. Thus, partners in a strategic partnership establish hierarchies and reporting relationships across partners that address a multitude of supply chain-wide issues. Partners in an operational partnership depend more upon their own hierarchy and reporting relationships while pursuing joint reporting relationships only for a more limited set of tactical goals.

Joint Programs

Joint programs include reducing supply chain inventories (Cooper, Ellram, Gardner, and Hanks, 1997; Dowst, 1988), new product development and product portfolio management (Cooper, Lambert, and Pagh, 1997; Drozdowski, 1986; Wasti and Liker, 1997), and design of quality control and delivery systems (Treleven, 1987). In strategic partnering, partners pursue strategic goals through on-going, long-term joint programs (Dyer and Ouchi, 1993) that depend upon each partner's unique skills (Wasti and Liker, 1997). For example, Dell Computer treats its suppliers as if they were part of the company and, thus, suppliers assign engineers to Dell's design team to launch Dell's new products and fix problems in real time when a customer calls with a problem (Magretta, 1998b). Operational partners expect joint actions only in limited, operational, short-term areas.

Asset Specificity

Many technology-based partnering assets are idiosyncratic (i.e., little value in other partnerships) and nonfungible (i.e., cannot be sold at any appreciable price) (Mentzer, 1999). The major risk carried by the investing company is the need to recoup its investment, which might lead to opportunistic behavior that ultimately threatens the partnership (Gundlach, Achrol, and Mentzer, 1995). Reciprocal obligations balance risks between buyer and supplier, and act as deterrents of opportunistic behavior (Pfeffer and Salancik, 1978). In operational partnering, asset specificity is relatively limited because partners need few organizational resources to take tactical actions that are easy to implement (Hitt, freland, and Hoskisson, 1999), and those actions are short-term (Ganesan, 1994; Lambert and Stock, 1993).

The potential exists for retailer opportunistic behavior when a vendor tells the retailer how to handle other vendor's (potential competitors of the developing vendor) products based on a planogram the vendor supplied. The long-term, strategic orientation of strategic partnering (and all the trust and commitment that implies) would have to exist before the vendor would take the risk of providing such a system to their partner retailer. With the short-term orientation of operational partnering, the vendor would not be willing to take this risk.

Establish Joint Performance Measures

Because partners in a strategic partnership utilize more joint planning and control through a strategic interface team, it is easier for partners to establish joint objectives and performance measures. Because partnering ties the collaborating companies' forecasting and materials management activities closer together, total system inventories can often be rationalized, improving return on working capital for both partners. This is contrary to traditional agreements where buyers and sellers focus on the effects of agreements on their own operating revenues, expenses, profits, and growth (Magrath and Hardy, 1994). Thus, partners in a strategic partnership reach agreement on broader performance measures than those in an operational partnership. These performance measures in a strategic partnership include measures of the total system, whereas those in operational partnering are more focused on the impact on each firm's performance.

COMPETITIVE ATTAINMENT

Competitive attainment is a continuum from competitive advantage through competitive parity to competitive disadvantage (Figure 1). Each of the positions along the continuum is relative to other competing supply chain partnerships. For example, a retailer might not consider partnering with a certain vendor, currently carrying only token components of the vendor's product line on a transactional basis, because competing retailers offered no better assortments. This would avoid incurring the implementation costs of partnering, but still offer an assortment that provided value in attracting customers. In this case, competitive parity is achieved without partnering.

However, Varadarajan and Cunningham (1995) argued strategic partnerships could achieve competitive advantage through the pooling of skills and resources. They classified the advantages into cost leadership and differentiation. Cost leadership entails being able to perform supply chain activities at a lower cost than

competitors while offering a parity product (Day and Wensley, 1988; Porter, 1980, 1985). Differentiation entails being able to offer a product or service that customers perceive as having consistently different and important attributes relative to competitors' offerings (Day and Wensley, 1988; Porter, 1980, 1985).

Competitive advantage from strategic partnering cannot be sustained automatically (Barney, 1991; Day and Wensley, 1988), but must be: (1) valuable to customers (Barney, 1991; Day and Wensley, 1988), (2) not perfectly imitable by competition (Barney, 1991; Day and Wensley, 1988), (3) rare among a firm's competitors (Barney, 1991), (4) with no strategically equivalent substitute for the resource (Barney, 1991), (5) hard for the competition to find out how it works (Day and Wensley, 1988), (6) durable and not vulnerable to rapid depreciation or obsolescence competition (Day and Wensley, 1988), and (7) early movers have the power to deter competitors from imiating them (Day and Wensley, 1988). Competitive parity exists when the resource or capability is (1) valuable but not rare, (2) not costly to imitate, and (3) substitutable (Hitt, Ireland, and Hoskisson, 1999). Competitive parity brings short-term market position advantage, whereas competitive advantage provides long-term advantage because it is difficult fo r competitors to imitate. Thus, retailers who pursue operational efficiency and effectiveness will achieve only competitive parity because competitors can easily imitate them. Because manufacturers and retailers traditionally have seen each other as adversaries, it has been hard for manufacturer-retailer partnering to become strategically oriented (Hitt, Ireland, and Hoskisson, 1999).

Companies not capable of technology or product leadership, or who are unwilling to incur the implementation costs (in terms of capital, technology, processes, risk, and people) of such relationships, are unlikely to form the close interfirm involvement that is essential in strategic partnering. Since firms in a strategic partnership are interested in accomplishing both current and future goals (Ganesan, 1994), there is a higher chance that strategic partnering creates a relationship that is not easily imitated and, thus, enables each partner to obtain competitive advantage. Firms in an operational partnership, however, at most achieve competitive parity because they do not pursue long term, strategic goals that lead to competitive advantage. In the case of strategic partnering, the implementation costs are incurred in the hopes of obtaining a superior position over the competition. In the case of operational partnering, the lesser implementation costs are incurred as a defensive move--to obtain or maintain c ompetitive parity, rather then slip into competitive disadvantage.

A competitive disadvantage may occur when a firm chooses not to enter partnerships with other firms in their supply chain while their competitors form partnerships, obtaining lower costs and/or differentiation. For example, small retailers in the Netherlands in strategic partnerships performed better and realized a higher profit than retailers with no partnerships (Reijnders and Verhallen, 1996).

[P.sub.10]: Strategic partnering leads to higher levels of competitive attainment than operational partnering.

BUSINESS PERFORMANCE

The level of competitive attainment affects both partners' business performance (Figure 1). Interfirm relationship performance is complex, multidimensional, and includes affective, behavioral, and economic aspects (Johnson and Raven, 1996). The highest level of competitive attainment (competitive advantage) leads to higher levels of partner economic performance, customer satisfaction and loyalty, and relationship effectiveness. Brands with high consumer loyalty face less competitive switching in their target segments, which can lead to higher prices and profitability (Moran, 1984). The same can be said of retailer customer loyalty. Relationship effectiveness is the extent to which both firms are committed to the partnership and find it productive and worthwhile (Bucklin and Sengupta, 1993; Rukert and Walker, 1987; Van De Ven and Ferry, 1980), the extent to which each partner carries out its responsibilities and commitments, the time and effort to build and maintain the relationship, and satisfaction with the relationship (Anderson and Narus, 1990; Rukert and Walker, 1987; Van De Ven and Ferry, 1980).

CONCLUSIONS

We have argued that implementation of strategic partnering leads to sustainable competitive advantage, whereas operational partnering leads to competitive parity. Competitive attainment (advantage, parity, or disadvantage) leads each partner to pursue efficiency, effectiveness, creation of value added services, higher levels of customer satisfaction, and superior relationship performance. We do not, however, propose either

operational or strategic partnering as the ideal interfirm relationship. Strategic partnering requires much time and effort to maintain a higher level of cooperation, and the investment in nonfungible assets may be difficult to recover. Operational partnering may be more appropriate and more likely to succeed between firms that are pursuing the maintenance of competitive parity. Transactional retailer-vendor relationships will continue to be more common in number than partnerships because they represent product assortments for retailers that incur little or no relationship implementation co sts and the retailer does not see the assortment as a potential threat of competitive disadvantage. Operational partnering will, in turn, remain a far more common type of partnership, again because it is easier to achieve. Retailers that pursue partnerships should decide which type of partnering they will try to accomplish and, accordingly, combine a partnering orientation and its implementation at an appropriate level. We have tried in Figure 1 to present the key factors that affect the types of partnerships formed. However, we acknowledge this is a "first look" at this phenomenon-it is left to future empirical research to determine the viability of each of these factors, the synergistic nature of these factors, and any other factors that future research may uncover.

This article contributes to an enhanced understanding of the "partnering" phenomenon for both researchers and practitioners. We examined the often forgotten end of the partnering continuum (i.e., operational partnering), and suggested a set of criteria that explains the continuum from strategic to operational partnering. We suggest that researchers should not assume partnering relationships are strategic and ignore the operational aspects of partnering. By presenting an inclusive view of partnering, researchers should be able to better position their research on the continuum from strategic to operational partnering and, as a result, eliminate a possible confound from their research.

Construct measurement and empirical testing of the relationships in Figure 1 are left to future research. Further analysis of the types of market environments most appropriate for strategic versus operational partnering would be very useful. Although suggested by the relationships, the temporal aspects of strategic partnering are not fully explored in this study. Future longitudinal research should examine the evolutionary and interactive aspects of partnering orientation, implementation, and its consequences.

Practitioners should acknowledge the fact that not all partnerships are strategic or necessarily need to be. Some partnerships are more appropriate as operational partnerships, especially in the short-term, possessing less trust and interfunctional coordination and, as a result, will not yield the same performance as strategic partnerships. A true strategic partnership cannot be achieved without a shared strategic orientation and a high level of partnering implementation. Finally, practitioners should be able to utilize the framework in Figure 1 to diagnose their current partnerships and arrive at prescriptions to redesign/reinforce their partnering relationships.

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Salesperson logistics expertise: A proposed contingency framework
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To leverage logistics as a competitive weapon, world-class companies are continuing to adopt a process management orientation.' They are tearing down functional silos and replacing them with well-defined processes and systems. As companies continue to move in this direction, the interface between logistics and other functional areas becomes critical.2 Given various trends in logistics, the logistics-sales interface is becoming increasingly important.

In the field of logistics, many important changes are taking place. For example, researchers are exploring buyer-seller relationships.' Both researchers and practitioners are becoming increasingly concerned with the nature of these relationships, how to influence them, and the important outcomes of such relationships.' Supply chain management is being widely accepted and implemented by practitioners and is receiving much research attention.' There is a focus on supply chain activities, roles, and partnerships 6 Furthermore, logistics is becoming more externally oriented, examining customer requirements, segmenting customers accordingly, and measuring logistics performance from an external (customer) perspective.' Given these trends, the logistics-sales interface is increasingly important. ,

Exploring buyer-seller relationships is a research priority in the fields of both logistics and marketing.a In logistics, strong buyer-seller relationships are critical in implementing supply chain management. From a

marketing perspective, good customer relationships are thought to be a strong predictor of improved profits, market share, and competitive advantage. As a result, the nature of buyerseller relationships and how to influence them positively have gained the interest of both researchers and practitioners.9

Logistics services are becoming more important to the formation, development, and maintenance of buyer-seller relationships.In many cases, these services are the foundation upon which customer relationships are built and maintained. For example, many just-in-time partnerships are based on past logistics performance and the logistics capabilities of the selling firm." Logistics is a key service component that creates and delivers value to the customer, which in turn influences the buyer-seller relationship.12

At the same time, the role of the contemporary salesperson is changing dramatically." Traditionally viewed primarily as a communication tool and a means to obtain initial orders, the salesperson today is perceived as a relationship manager, primarily responsible for establishing, developing, and maintaining customer relationships.' This is not to say that the buyer-salesperson relationship is the only contact between organizations. Often, relationships exist at many different levels and across many different positions. In some situations, however, the salesperson is the primary contact point, responsible for managing customer relationships before, during, and after the initial order." In many industries, firms are differentiating themselves based on logistics, and the salesperson may be using logistics services as a tool to gain new business and retain customers. Furthermore, customer evaluations of salespeople often coincide with the customer's overall evaluation of the firm.'6 Although the sales department is not responsible for logistics, salespeople often are responsible for managing the customer relationship, which often centers on logistics. As the role of sales increasingly shifts toward relationship management, the interface between sales and logistics becomes critical.

The interface between logistics and sales is crucial to effective supply chain management." Research indicates that integrated behaviors, 11 shared information, 11 and cooperation" are essential. These are boundary spanning activities aimed at improving working relationships among supply chain partners. The contemporary sales force is a boundary spanning agent that engages in these activities daily. Similar to supply chain management research, the personal selling literature is focusing on these types of behaviors (problem solving, strategic planning, information sharing, and cooperation) and their effect on relational development.21

Among many leading-edge companies, logistics is used as a tool to maintain a competitive advantage. They continually focus externally, identifying customer requirements and monitoring logistics performance from the customer's perspective.zz In world-class logistics companies, managers are creating and delivering superior customer value and satisfaction through superior customer service. Sales can play an integral part in helping logistics become more externally focused. Effective salespeople have an in-depth knowledge of customers, their requirements, and their perceptions of the firm's relative performance. Salespeople can help bring the "voice of the customer" inside the organization.

The logistics-sales interface is particularly important when firms are trying to improve relational development, implement supply chain management, and become more customer focused. Yet, little research attention has been devoted to exploring this interface. The purpose of this article is to examine the logistics-sales interface and develop a theoretical framework of salesperson logistics expertise along with a proposed contingency framework. As suggested by Mentzer and Kahn, both the literature and qualitative research can be used to develop a theoretical framework grounded in reality." We explore the logistics-sales interface and the concept of salesperson logistics expertise by integrating the results of a qualitative study with findings from the appropriate literature. A theoretical framework will be developed within a contingency framework to identify specific situations in which it is important for the salesperson to possess logistics expertise.

The following section will describe the methods used in the qualitative study. The next section will examine the logistics-sales interface, followed by the concept of salesperson-logistics expertise, a conceptualization that will employ a 2x2 matrix. A proposed contingency framework will then be developed for salesperson logistics expertise, revealing factors that influence the customer's need for salesperson logistics expertise. Finally, managerial and research implications will be drawn.

QUALITATIVE MEASURES

Our qualitative study explored buyer-salesperson relationships from the customer's perspective. It consisted of

unstructured, in-depth interviews with hospital purchasing agents, which were later analyzed with grounded theory data analysis techniques. Many important concepts, theoretical relationships, and themes were discovered, but here we will only present findings relevant to salesperson logistics expertise. It is significant that the concept of salesperson logistics expertise was not an a priori theme but emerged from qualitative data analysis.

The sample was comprised of ten purchasing agents, five females and five males, from seven different hospitals in Michigan, predominately in the Detroit metropolitan area. The number of interviews exceeded eight; the guideline recommended by McCracken.' The interviewer continued to interview participants until distinct patterns of regularity became evident. Participants were chosen for their extensive purchasing experience, ability to articulate their experiences, and willingness to take part in the study. Each had between 10 and 30 years of experience in purchasing. Respondents represented small, medium, and large hospitals, ranging from 150 to 1000 beds.

Purchasing agents are primarily responsible for buying medical-surgical products from distributors and manufacturers. They purchase a wide variety of items that amount to large dollar expenditures. In this environment, the salesperson has a tremendous opportunity to establish a strong, ongoing customer relationship with the purchasing agent.

In-depth interviews are a powerful technique for exploring the participant's perspective in an open ended manner." Once rapport was developed, grand tour questions were posed to the buyers, to encourage the interviewee to talk about a particular story.,, Responses were often probed for clarification to understand the participant's perspective. Non-directive probes (such as "can you tell me more about that?" or "what exactly do you mean by that?") were often used to avoid leading the participants. The interviews were held at the place of employment to maintain the context of a natural environment.' The interviews lasted from 45 to 90 minutes. With the participant's permission, each interview was audio taped and then transcribed for data analysis purposes.

Grounded theory techniques were used to analyze the qualitative data. Such techniques allow the researcher to uncover and develop theory that emerges from the data. This is often called a "constant comparative method" because it closely examines concepts and scrutinizes relationships between them. During analysis, working hypotheses are developed and then provisionally tested within and across different interviews. The researcher moves back and forth between deductive and inductive modes of analysis in a systematic fashion. The result is a tightly woven theory that emerges from and is "grounded" in the data.' Throughout the process, the principal researcher immersed himself in the transcripts. At the beginning, each transcript was read/analyzed numerous times to become familiar with the phenomena discussed. Grounded theory techniques - including open, axial, and selective coding - were employed.

Testing for validity and reliability is important in any research study. We applied a framework proposed by Lincoln and Guba and later extended by Wallendorf and Belk, 31 which requires multiple tests of trustworthiness: safeguards to protect the participants' identity, triangulation across sources, negative case analysis, confirmability audits, and member checks.

The interviewer promised anonymity so those participants would feel free to discuss openly their perspective. Triangulation across sources was used to search for redundancy among interviews. The findings presented here emerged in almost every interview. Negative case analysis whereby the researcher provisionally tests and challenges working hypotheses was used throughout the data analysis.

Once preliminary findings were generated, a confirmability audit was conducted. Two independent auditors were given several transcripts and the preliminary findings from data analysis. One auditor is a respected academic researcher in the topic area, and the other is an acknowledged qualitative research expert. Each assessed the reported findings and the linkage to the transcripts. Overall, they confirmed the findings presented in this article. Finally, member checks were conducted with a sample of participants, who confirmed the findings and theoretical conclusions. These various techniques ensure our confidence in the validity and reliability of the findings.

THEORY DEVELOPMENT

Findings from qualitative research and the literature were integrated to drive theory development. This section will discuss: (1) the logistics-sales interface, (2) salesperson expertise, (3) salesperson logistics expertise, (4) the salesperson logistics expertise matrix, and (5) a proposed contingency framework of situations in the customer needs salesperson logistics expertise.

The Logistic-Sales Interface

Throughout the interviews, buyers noted they want to work with salespeople who have expertise in many different areas including the seller's product line, logistics systems, and the market overall in order to build effective relationships. As revealed in passage 1, expertise about product and logistics is extremely important to the development and maintenance of the buyer-seller relationship.

Passage 1

I want to work with an expert! They (salespeople) need to know their products as well as anyone within their company and know how all the (logistics) systems and processes work together.

The study found a clear and important link between salespeople and logistics issues. Participants often discussed their interactions with salespeople in this regard. Although not responsible for logistics in his/her organization, the salesperson was the primary relationship manager from the selling firm, and s/he often interacted with buyers concerning the following logistics matters:

communicating product availability, back orders, and product substitution;

arranging delivery schedules and on-time delivery of products;

expediting and handling emergency shipments;

solving logistics problems and ensuring satisfaction of customer logistics needs;

assisting in the implementation of logistics strategies (i.e., stockless programs);

understanding the customer's logistics needs, requirements, and goals and communicating these needs back to the selling organization.

For example, when certain products were back ordered, the buyer and salesperson met to arrange product substitutions and/or expedite orders. In the case of an emergency, the salesperson was the primary person who solved the customer's logistics problems. Passage 2 shows how a salesperson must intervene in a crisis and do whatever is necessary to solve the buyer's logistics problems. In this example, because the salesperson understands the intricacies of his company's logistics operations, he can "push the right buttons" and solve the problem. Most emergencies discussed by buyers focused on logistics.

Passage 2

I need it, and I don't want the sales rep to let me down so that I took horrible to my customers. My patients need the product in here. I have to have that product in here. If they [salespeople] don't have it, they need tofind out what is an acceptable substitute. They need to find out how to get it in here, whether they have to have it direct shipped from the manufacturer or whatever They need to know what buttons to push inside their company to get my customer's needs [product avaiability met. Now my needs are my customer needs. That is the most important thing they can do!

For the buyers in this study, logistics strategies often were a means of obtaining/maintaining competitive advantage. For example, many hospitals are developing "stockless" orjust-in-time replenishment programs, and the salesperson plays a critical role in helping the buyers plan, implement, and monitor this strategy. A salesperson that understands the interface with logistics and has logistics expertise is perceived as a valuable resource.

Salesperson Expertise

Given the importance of the logistics-sales interface, the construct of salesperson expertise needs to be explored. Past research has examined the salesperson's level of expertise and its influence on selling performance and relational development." The literature has found evidence that the level of expertise is a key salesperson attribute/behavior that leads to improved relationship quality.1

In the personal selling literature, Crosby, Evans, and Cowles define expertise as "A customer's perception of a salesperson's expertise reflects the identification of relevant competencies associated with the goods or service transaction (e.g., product, market, or logistics knowledge) most often exhibited in the form of information provided by the salesperson."" Expertise is defined from the customer's perspective and is broad enough to include the domain of logistics, yet salesperson expertise is operationalized often solely as product expertise. Although different dimensions of salesperson expertise (market, logistics, etc.) are mentioned in passing, the most common is product expertise. Lagace, Dahlstrom, and Gassenheimer define expertise as "the extent to which a source possesses the knowledge, experience, or skills relevant to a particular topic." 11 This definition is broad enough to include logistics and in the current age of partnerships and supply chain management, salesperson expertise needs to be expanded beyond product knowledge to include the domain of logistics.

Salesperson Logistics Expertise

Integrating findings from the literature and our study, we develop a broader and more encompassing definition of salesperson logistics expertise, namely, a customer's perception of a salesperson's knowledge, experience, or skills in logistics. The salesperson must have mastery of the customer's logistics operations (external) and the seller's logistics systems and processes (internal) at both tactical and strategic levels. This definition explicitly adds the logistics technical area as well as an internal/external dimension and a tactical/strategic dimension to previous salesperson expertise conceptualizations.

Internal (Company) Logistics Expertise

We discovered that buyers want to interact with salespeople who are knowledgeable about the selling firm's logistics systems, processes, and capabilities. Buyers want salespeople to have such expertise so they can resolve problems efficiently and effectively. For example, can the salesperson expedite orders in case of an emergency? If the buyer is exploring new ideas, could the salesperson discuss the logistics capabilities (i.e., EDI, stockless inventory programs) of the selling firm? If the buyer needs to reduce inventory levels or order cycle time, can the salesperson explain the seller's relevant logistics capabilities? In short, buyers need salespeople who know their own firm's internal logistics systems, processes, and capabilities.

In passage 3, the buyer is discussing how a salesperson with internal logistics expertise can manage his company's internal logistics processes and systems to satisfy the customer. He is able to get his firm's logistics process working for the buyer.

Passage 3

He knows how to push the buttons back at the home office and say, "Okay, this is what I need to do," and his home office says, "Okay." He knows he is pushing the right buttons, doing the right sequence, he can go ahead and get the [logistics] process done and working for me.

As noted earlier, most research views salesperson expertise as product knowledge. No empirical study has explicitly conceptualized nor measured salesperson logistics expertise as a construct leading to improved relationship quality. This dimension of logistics expertise refers explicitly to expertise about a component of the seller's offering, the seller's internal logistics systems and processes.

External (Customer) Logistics Expertise

Buyers in our study perceive salesperson logistics expertise as including a deep understanding of the customer's logistics processes and needs. The salesperson must have expertise in acquiring customer knowledge, as well as in-depth knowledge of the buyer's logistics operations and requirements. How do the customer's operations work? How much inventory does the customer hold, and what are the inventory goals and objectives? What is the current state of logistics operations, and where does the customer want to go with these processes in the future?

Consistent with consultative selling, if salespeople understand the customer's logistics needs, then they can better coordinate company resources to meet and exceed those needs. In passage 4, the buyer is discussing a salesperson that fully understands the customer's logistics processes. Because of this, the salesperson can better serve the customer account and make better logistics-related decisions on behalf of the buyer. As a result, the salesperson positions his company to be the buyer's primary supplier.

Passage 4

He understands my [logistics] needs and processes. He knows whether or not I really need this now [delivery of product] or can wait. That's one of the reasons he is in the position ofbeing the sole supplier That understanding just helps the sales reps facilitate their accounts better To meet the needs ofthe customer quicker and more efficiently.

Research has shown that successful salespeople have numerous, in-depth knowledge structures with regard to understanding customer needs, requirements, and processes. 11 An understanding of the customer is key to many personal selling theories, including adaptive selling, customeroriented selling, and consultative selling." When salespeople have customer expertise, they can better tailor the seller's offering to meet the needs of the customer.

Strategic Logistics Expertise

Buyers also discussed their need for salespeople with long term, strategic expertise, which can be the key differentiator in developing a relationship. Strategic logistics planning is often defined as long-term (1 -5 years) logistics goals and the means/process for achieving them." The salesperson must have knowledge of where customers want to go and how to help them get there. Salespeople with strategic logistics expertise also can help their company direct resources toward achieving buyers' strategic goals.

In passage 5, the buyer is discussing logistics strategies (stockless inventory and just-in-time programs) as a means to reach their strategic goals, and the need for someone who will help accomlish them. In this case, the salesperson with strategic logistics expertise was a valuable resource to the buyer and later was awarded the prime vendor contract.

Passage 5

"When we started looking at the prime vendor agreement, we were looking to expand it because things were changing so drastically in the way we do things. We needed more ofa partnership. So when we started looking at product lines and pricing, things were pretty similar I mean there is not much difference there, and everything is on contract. We started looking at what did we want to accomplish over the next five years [strategic goals] and in the system as a whole, and how we were going to do that [strategic plans]? What did we need that prime vendor to do for us, or with us? We started looking at stockless programs, just-in-time programs [logistics strategies]. So I needed someone [salesperson] that was going to be able to respond quickly and work with us [to reach strategic goals]. "

Traditionally, salespeople have been implementers of strategy, but in the era of partnerships and supply chain management they need to be more strategically oriented?l They need to become boundary spanning agents who assist in planning, designing, and implementing both strategies and tactics. Today, salespeople must do more than just understand their firm's product lines and logistics. They need skills in strategic thinking, so they can understand the customer's strategic direction.' They must be knowledgeable about the customer's strategy and the strategy of the supply chain in order to help customers achieve their long-term goals."

Tactical Logistics Expertise

Our research revealed that buyers need salespeople with tactical logistics expertise, which is defined as implementation of strategic plans through day-to-day logistics operations. The salesperson often is called upon to put out fires that arise on a daily basis, and many of these problems are logistics related. Examples are emergency deliveries, expedited orders, substitution of available product, and/or invoice tracking.

Passage 1 referred to the need for a salesperson that can tactically solve the customer's logistics problems, that is, how to work the intricacies of the logistics system and processes in order to meet the customer's short-term logistics needs. Although the role of the sales force is becoming more strata gic, a primary task of the personal selling function is still daily operations within both the selling and customer organization.

Salesperson Logistics Expertise Matrix

The matrix in Figure I helps conceptualize the entire domain of salesperson logistics expertise. At the top of the matrix, the internal/external dimension is represented. It incorporates the need for expertise about the selling organization's logistics systems, processes, and capabilities (internal), as well as with the customer's logistics needs and requirements (external). The left-hand side of the matrix incorporates the tactical and strategic dimensions. Each cell indicates specific logistics activities or areas of expertise that may be required of the salesperson.

The matrix is presented here for a number reasons. It shows at a glance the domain of salesperson logistics expertise. For researchers, it provides a theoretical foundation for examining and operationalizing the construct of salesperson logistics expertise. For practitioners, it spells out the roles and responsibilities of the sales force in the era of partnerships and supply chain management. The matrix also guides sales managers concerned with training, hiring, and evaluation. Finally, the matrix indicates the interaction between or among different dimensions of salesperson logistics expertise and allows researchers to classify salesperson expertise using more than one dimension. The various cells are described below.

External/Tactical Dimension of Salesperson-Logistics Expertise

Salespeople need a full understanding of the day-to-day intricacies of the customer's logistics operations at a tactical level. For example, what are the customer's current requirements for on-time delivery, inventory staging, packaging, fill rates, and order cycle times? In case of a stock-out or other emergency, what the customer expects? In case of a problem, does the salesperson know the customer's system well enough to intervene in a timely fashion and/or recommend specific actions tailored to the customer's operations? Affirmative answers to these questions give the selling company a clear advantage over competitors whose salespeople do not possess such expertise.

Internal/Tactical Dimension of Salesperson-Logistics Expertise

Salespeople must have operational knowledge of their company's internal logistics systems and processes at a tactical level. For example, do they fully understand the intricacies of order processing, packaging, inventory policies, and delivery of the firm's product lines? Do they understand how the various components of the internal logistics process work together to deliver value to the customer?

When firms are trying to gain competitive advantage through superior logistics services, the sales force must be able to explain fully how their firm is differentiated from competitors. They also need to understand their company's internal logistics systems so they can recommend a plan of action that will meet customer requirements. For example, in the case of an emergency (back order), do salespeople understand their firm's logistics processes well enough to recommend the most effective plan of action to deliver product to the customer?

External/Strategic Dimension of Salesperson-Logistics Expertise

The salesperson must have knowledge of the customer's strategic initiatives. For example, what is the overall logistics system design that customers want to realize eventually? Are they considering out-sourcing certain logistics activities? What are they willing to pay to have these activities taken over by a service provider? What is the current state of the customer's logistics systems? What is the best way to bridge the gap between existing and desired systems? What logistics services does the customer want to deliver to its customers? Perhaps the customer wants to provide overnight order fulfillment to its customers without any increase in inventory. This would require inventory management and staging, plus cross-docking services, from the supplier. The sales force cannot offer this service (which has little to do with product knowledge) unless they are aware of this strategic initiative by customers.

Internal/Strategic Expertise Dimension of Salesperson-Logistics Expertise

The salesperson must have a full understanding of the strategic logistics capabilities of his/her firm. What are the potential capabilities and/or limitations of the selling firm? Does the sales force fully understand their company's logistics strategies? Does it have EDI capabilities? Can they effectively and efficiently assist in implementing JIT or vendor-managed inventory programs? As noted by Ingram, the salesperson needs to be able to recommend strategic possibilities to customers.'Z Only then can the salesperson truly be a "consultant" to the customer. If salespeople cannot help customers reach their strategic goals, then they are not viewed as a valuable asset to customers.

The Contingency Framework

Looking across different types of personal selling positions, firms, and industries, it is difficult to generalize that all salespeople need to have logistics expertise. In our study, which sampled the hospital industry, purchasing agents overwhelmingly discussed the importance of prime vendor salespeople with logistics expertise. In other contexts, this may not be the case. Even within the same industry, for example, doctors and nurses may need salesperson with product expertise, but little if any need for logistics expertise. In short, the need for logistics expertise is contingent upon many situational factors. In this section, we look beyond the qualitative findings from a single industry to identify factors that influence the customer's need for a salesperson with logistics expertise.

A contingency framework is presented in Figure 2, which identifies five situational variables: (1) type of market, (2) nature of the product, (3) strategic focus, (4) nature of the buyer-seller relationship, and (5) customer role. Each will be discussed separately, but all are highly interdependent.

Type of Market

As compared to consumer markets, logistics tends to be more important in business-to-business relationships." Salespeople may spend much time with retail consumers selecting the right product at the right price, but very little time is devoted to logistics issues. In business-to-business markets, logistics is crucial to the customer's performance, so salespeople must have expertise in this area.

Nature of Product

Customers who purchase products with a high dollar value and high stock-out costs will require the salesperson to possess a higher level of logistics expertise. Products of high dollar value represent a substantial inventory investment, and they tend to place higher priority on these products.44 They give them more logistics management attention, and they require a higher level of logistics expertise from salespeople.

If the product has high stock-out costs, customers also want a higher level of salesperson logistics expertise. For example, in the hospital industry, products used in open-heart surgery have a much higher stock-out cost as compared to amenity items given to patients during admission. One buyer stated that his salesperson is on call 24 hours a day to ensure product availability and on-time delivery. When stock-out costs are high, the buyer must be able to rely on the salesperson's logistics expertise.

Strategic Focus

In today's competitive environment, many companies use logistics strategies to gain a sustainable, competitive advantage in the marketplace." If the customer is implementing such strategies as JIT and vendor-managed inventory, or cross-docking, then the salesperson needs considerable logistics expertise. Also, if the customer's strategic initiative is to decrease costs through more efficient and effective logistics services, then the customer will expect the salesperson to have logistics expertise. This may not be as important if the customer's strategic initiatives do not include superior logistics performance. Many companies pursue competitive advantage through innovative technology and products, I in which case product and market expertise may play a more dominant role than logistics expertise. This may be especially true for high technology companies, such as computer software, hardware, and telecommunications firms.

The strategic focus of the seller may also be a factor if that focus is logistics differentiation. Obviously,

salesperson logistics expertise is particularly relevant for third-party logistics companies. The marketing of such services continues to be a hot topic and salespeople with logistics expertise are essential in acquiring and retaining customers. Examining salesperson logistics expertise with thirdparty logistics companies is a fruitful direction for future research.

Nature of Buyer-Seller Relationships

Buyer-seller relationships vary from transactional exchanges to close partnerships. Because involvement, coordination, and interaction between parties is low in transactional exchanges4l the need for salesperson logistics expertise also may be relatively low. In these relationships, the interaction between the salesperson and customer may be limited to price quoting and communication of ship dates. In close partnerships, interaction is intense and frequent." Both parties work closely to reduce costs and improve performance, and logistics services often play an important role. In this situation, a salesperson with logistics expertise in this situation can have a strong positive effect on the buyer-seller relationship.

The magnitude of the business relationship to the customer, in terms of dollar volume, number of items shipped, and percentage of business with a given supplier also may require a salesperson with greater logistics expertise. When the magnitude of business is great, the customer potentially can obtain either large cost savings or superior service levels through increased logistics performance. For example, a customer may not implement an EDI system with an insignificant vendor, but is willing to do so with a vendor that represents a substantial amount of their business. When the potential payoff is substantial, customers will want a salesperson with logistics expertise, so they can better reach their logistics goals and objectives. Furthermore, a substantial amount of business often brings many more logistics problems (i.e., back orders) and thus requires a salesperson who can solve these problems and spot opportunities.

Customer Role

Relevant customer roles for this discussion are purchasing agents and end-users. Because industrial purchasing managers have many logistics-related responsibilities, salesperson logistics expertise is very important to them.49 Anderson and Chambers examine industrial buying behavior as a form of work behavior.' In their model, the evaluation of purchasing managers and the associated extrinsic and intrinsic rewards play a major role in shaping buying behaviors. Industrial purchasing managers are often evaluated in term of logistics management objectives, 11 such as total inventory levels, inventory turns, and stock-outs. To perform well, they need the cooperation and expertise of their suppliers. Salespeople with logistics expertise will be seen as a valuable resource by industrial purchasing managers.

In contrast, end-users most likely will not need a salesperson with much logistics expertise. Instead, product expertise is more important. The end-user role tends to let purchasing agents handle operational and logistics issues.

IMPLICATIONS FOR MANAGERS

In certain buyer-seller relationships, salesperson logistics expertise can have a dramatic effect on relationship development. For those selling firms in which salesperson logistics expertise is important to relational development, the matrix in Figure I can guide the creation of new or improved sales training programs.

Company (Internal) Logistics Expertise Training

Salespeople who are knowledgeable about their firm's logistics activities most likely obtained this expertise through experience, and not by design. Sales managers should incorporate logistics management education at both tactical and strategic levels to help salespeople develop the appropriate skills. Specifically, salespeople need firsthand experience with their firm's internal logistics processes, systems, and capabilities. A full understanding of the logistics operations will enhance interfunctional coordination and the salesperson's level of logistics expertise. From a tactical perspective, salespeople will be better able to manage logistics processes and systems to meet the needs of their customers. From a strategic perspective, a better understanding of logistics capabilities will enable them to meet the strategic goals of the customer.

To accomplish this task, training should include traditional lectures as well as experience in different logistics

positions (i.e., shipping, inventory management, materials handling) to help salespeople fully grasp the firm's internal processes from both a tactical and strategic perspective. First-hand experience will lead to a better understanding of the intricacies of logistics processes.

Customer (External) Logistics Expertise Training

Marketers recognize the importance of understanding customer needs and requirements, yet empirical evidence suggests that salespeople have limited knowledge in this area." Lambert, Marmorstein, and Sharma reported that salesperson perceptions and knowledge of customers' desired performance levels concerning the customer's logistics needs and requirements are not particularly accurate." Acomparison of buyer and salesperson responses on many logistics issues, including average lead time for stock and custom items, acceptable delays for stock and custom items, minimum acceptable fill rate for stock items, and inventory control policies, revealed a wide gap.

Salespeople should be trained to gather information about their customers' logistics processes and systems. For example, what are the logistics trends within their customer base and within their industry? What logistics goals might their customers try to accomplish? What are typical logistics problems, issues, and opportunities that their customers face on a daily basis? Training seminars led by logistics experts within the industry may help the sales force learn how to know their customer at a deeper level. Traditional lectures in combination with visits to cutting-edge customers can give them an in-depth perspective on their customers' logistics operations.

Sales training programs should continue to teach salespeople how to uncover, identify, and understand the customer's needs and requirements. Sales trainers may take a lesson from qualitative researchers, since they are experts in gaining an in-depth understanding of certain phenomenon (i.e. customer logistics processes). For example, qualitative researchers are experts in interviewing participants and probing deep into participants' experiences. Qualitative interviewing techniques, procedures, and mindsets may help salespeople gain a better understanding of their customers. Interviewing skills are best developed in an interactive format, which may include role-playing conducted with people from the logistics function.

In addition, participant observation may be a helpful technique in overcoming the limitations of interviewing customers. If properly trained, salespeople can look beyond the customer's verbal reports to identify potential logistics problems and opportunities. Training programs could teach salespeople how to observe logistics operations and to identify potential problems and opportunities. Training videos or other multimedia tools could be developed to "walk" sales trainees through different logistics facilities, and show them what can be discovered (problems and opportunities) solely through observation. Trainees then could be asked to solve logistics problems and discuss how to seize opportunities based on their newly acquired customer knowledge.

Research Implications

This article integrates results from a qualitative study with findings from the literature to argue that salespeople need logistics expertise in order to improve their relationship with customers. The concept as defined here goes beyond current conceptualizations of salesperson expertise to include both an internal/external and a tactical/strategic dimension in the technical area of logistics. A contingency framework was developed to help identify situations in which customers will desire and/or need salespeople with logistics expertise. From a managerial perspective, salesperson training in this regard is critically important. Therefore, future research should address new theories of organizational learning and their effect on sales force logistics training. Although that was beyond the scope of this article, such theories may help managers improve training and learning effectiveness.

An examination of salesperson logistics expertise in the context of third-party logistics relationships is an ideal context for future research. Are there other dimensions of salesperson logistics expertise that are especially relevant to customers? Can additional situational factors be identified? To answer these and other research questions, further qualitative research could be undertaken as an exploratory tool to develop a more detailed theoretical framework of salesperson logistics expertise.

Quantitative research also is needed to examine how salesperson logistics expertise affects customer retention. To accomplish this, measurement scales need to be developed and validated for salesperson

logistics expertise. Once this is accomplished, structural equation modeling would be ideal for testing a theoretical model exploring salesperson logistics expertise and its impact on relationship quality and other relationship variables.

Future research also could investigate the contingency framework suggested in Figure 2. Specifically, surveys distributed over a broad sample of companies could provide empirical evidence as to which of these situational variables has the greatest impact upon the need for salesperson logistics expertise. Scale development research is required to develop valid and reliable measures for each situational factor. The results would establish the role of salesperson logistics expertise across a broader base of companies than the present study.

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Logiticians as marketers: Their role when customers' desired value changes
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It is crucial for suppliers in competitively dynamic industries to find ways to retain strategically important business customers. Recent research suggests that this can be facilitated by a focus on customer value strategies, which involves anticipating and responding to changes in customers' desired value - what customers want from suppliers.1 Anticipating and responding to such changes require a deep understanding of how and why changes occur, an area that has not been explored. We address this research gap by using the inductive methods of grounded theory.2 Although an extensive logistics literature, primarily within the customer service area,3 suggests that logistics plays a role in creating value for business customers, we did not set out to look specifically for this value-added component or its role in changes in customers' desired value. Rather, we merely wanted to understand why and how changes in what customers value from suppliers occur in a specific context. This study is an exploratory, theory-building project. Along the way, we discovered that logistics has a key role. Our findings suggest that suppliers need to leverage their logistical expertise in order to respond to these changing desires. Consequently, supplier logisticians will want to adopt the role of "marketing" to both internal and external customers from the very initial stages of supplier-customer relationships. This is due to their unique ability to understand, anticipate, and design solutions for logisticsrelevant customer changes that traditional marketers and sales professionals may not recognize.

Although the value-added role of logistics and thus the necessity to market logistics expertise are not new concepts in the literature, the findings regarding how and why customers' desired value may change are new. Because some of these changes appear to require logistics competencies, supplier logisticians may have an even more powerful role than creating current value for customers, that of helping marketers understand, anticipate, and respond to important shifts in customers' desires. Without continuous response to changing customer needs, businesses have little hope of long-term customer retention.

The purpose of this article is to present findings concerning changes in customers' desired value and their implications for the logistician as marketer role. After establishing the need for our research, we provide an overview of the study, findings, and implications for both logistics managers and future research. We address some literature toward the end of the article as well, because our initial review revealed the lack of work on the process of changes in what business customers desire, and only after the exploratory study did we discover issues relevant to specific areas of logistics. Thus, we went back to the literature to compare what we had

found with previous research. We could not have known what previous research was relevant until we made our discoveries with real companies in the field first.

RESEARCH JUSTIFICATION

Customer value has emerged as a crucial concept in business. The business press of the 1990s is replete with advice on how to create customer value.4 Similarly, the marketing literature contains a growing body of research on customer value.5 Likewise, the logistics literature offers arguments for how and why logistics expertise helps create competitive advantages by influencing customer satisfaction and customer value 6 It is widely recognized that business is dynamic and customers' desires change, but trying to predict how those changes may occur for specific customers is often considered as nearly impossible. Three primary ways are suggested for dealing with changing customer desires: (1) become extremely flexible such that responses to change can be rapid,7 (2) track macroeconomic and other trends over time,8 or (3) drive changes in what customers desire oneself.9 The first and the third approaches essentially abandon prediction attempts. The second approach waits for changes to become trends. A few academics, in an attempt to improve these approaches, identified specific forces that may drive changes in what customers value and offer such tactics as executive market-based scenario exercises to help visualize what customers may value in the future.10 All these approaches lack an empirically backed understanding of how customers' desires actually change. We must know how customers' desires change if we are going to anticipate what those desires will be in the future. Until we know this, it seems premature to abandon attempts at prediction and current prediction efforts will continue to be relatively ineffective. Our research sets out to address this knowledge gap.

OVERVIEW OF THE STUDY

We set out to investigate why and how business customers change what they value from their supplier relationships. We currently know very little about changes in customers' desired value, aside from the very basic fact that they occur. Thus, our research objective was to build a broad, customeroriented, theoretical understanding of the process of changes in what key individuals within customer organizations seek from their supplier relationships.

METHODS

Due to the lack of research on this issue, we needed a qualitative theory-building approach. We chose the grounded theory method to study changes in customers' desired value.11 Grounded theory is a qualitative, interpretive, discovery-oriented method similar to ethnography, which is designed to facilitate theory construction from field data. To our knowledge, this is the first grounded theory study reported in the logistics literature, and its introduction may be a contribution in and of itself, as another potential theory-building tool in logistics research. The context we chose was businessto-business relationships in the U.S. automobile industry because of the changing nature of supply chain relationships and the importance of the industry as both a business trend setter and a significant contributor to GNP.

Although many qualitative methods can be used in grounded theory, we relied primarily on unstructured depth interviews and secondarily on document analysis and observation. Grounded theory has its roots in social science, specifically symbolic interactionism, and is focused on understanding how people perceive and interact within a dynamic world. More specifically, grounded theory examines situations in which a core phenomenon challenges people (i.e., makes life difficult) and there is little theory regarding the phenomenon. Its guidelines help researchers categorize realworld experiences into the more abstract, generalizable concepts used in theoretical descriptions.

We chose key individuals within business firms as the unit of analysis due to our assumption that they make important supply decisions, even when these are made within buying centers. Retaining customer organizations requires meeting the needs of those key individuals. These individuals can also speak to organizational issues. As such, we wanted to understand why they change what they value. We suspected that firm desires would be reflected in their stories. In 1997, twenty-two purchasing-related professionals in nine firms in the U.S. automobile industry were interviewed. Twenty-two interviews may seem like a small sample, but in theory building one seeks comprehensive concepts, and it is common to rely on the deep understanding of a few key informants, sometimes as few as eight or even one.12 The objective is to dig very deeply into

individual s' knowledge. Generalization is reserved for future theory-testing research, although the more thorough the grounded theory study, the higher is the likelihood of generalizable findings in future testing.

The professionals in this study varied by job position (e.g., purchasing manager, design engineer, materials manager, production manager), management level (e.g., junior manager, senior manager), and gender. The nine companies varied in size (from $100 million in revenues to more than $100 billion), position within supply chains (e,g., original equipment manufacturers, first-tier and second-tier suppliers), and products (e.g., automobiles, bearings, wiring harnesses, alternators). Participants were chosen based on theoretical sampling guidelines, which stipulate that they be selected as the study progresses based on the need for further understanding of certain aspects of the emergent theory. Sampling ceased when it was felt that enough data had been collected, as indicated by the complexity and comprehensiveness of the emergent theory and the realization that increasingly redundant information would be obtained. Theoretical sampling differs from statistical random sampling because the objectives differ.

When building theory, one seeks to explore all possible dimensions of key concepts that emerge. The design must be flexible. Data analysis and data collection are interwoven, and insights from the first few interviews help direct who the next participants ought to be. For example, we discovered certain issues that we suspected might only apply to large organizations, such as the one for which an initial participant worked. To examine this, we interviewed people in similar positions at much smaller companies. Similarly, we moved from purchasing managers to design engineers and production managers to examine the extent to which initial findings were limited to purchasing managers: These theoretical sampling techniques, known in grounded theory as open, relational, variational, and discriminate sampling, facilitate comprehensive construct development. One ceases to collect data when redundant information suggests that the full complexity of concepts has been captured.

One-on-one depth interviews were conducted with participants at their work location. Interviews lasted approximately 90 minutes and were audiotaped. They were guided by general topics of interest but were very open and completely unstructured. The focus was on participants' personal experiences with change and on digging deeply into those experiences in a phenomenological tradition." The focus on actual experiences helped create vivid images of change and what participants did to respond to as well as create it. Conversations eventually led to discussions of the value participants desired from suppliers. We were looking for evidence of changes in that value as well as what led to the changes and what happened as a result of the changes. The interviewer was well trained and experienced in using qualitative methods, including depth interviews and interpretive analyses. The interviews were propelled primarily by open-ended probes, such as "tell me more about that" and "what happened next?" This openness facilitates new discoveries.

Each interview was transcribed verbatim and analyzed using the NUD*IST4(TM) (Non-numerical Unstructured Data * Indexing Searching and Theorizing) software package. Each interview was read many times to capture the holistic meaning of participants' stories and then interpreted in coherent parts. Hundreds of concepts were named and constantly compared to previous analyses within and across transcripts. Similar concepts were combined into categories that eventually became constructs in the final theory. Thus, the emergent theory is grounded in real-world experiences of those whose lives we were trying to understand. On average, more than 47 hours were spent interpreting each of the 22 transcripts. This depth of analysis is one reason 22 are both enough to generate extensive insight and at the same time at the limits of manageability. In addition, the principal researcher observed a number of meetings with participants and reviewed corporate documents. Notes from these activities complemented the interview analyses.

The trustworthiness of the research process and the findings were enhanced through the exhaustive application of procedures recommended by interpretive researchers and grounded theorists." These procedures are described in Table 1.

FLINT AND MENTZER

FINDINGS

Five dimensions of value change and drivers of those changes are described in this section, Although the primary focus of the study was on the broad issue of business customer desires, we discovered a number of logistics issues that are related to the general marketing findings, and it is these logistics issues with which we

are concerned here. The first relevant finding is that customers do change what they value from suppliers, and some recent changes are strongly linked to supplier logistics capabilities.

Changes Occur and May Involve Logistics

The first important finding is that customers, as reflected by the study participants, do change what they value from suppliers. At a general level, Table 2 presents some of the logistics-related changes. At a more specific level, many participants described supplier services they desire that are relatively recent developments for them. In other words, these kinds of services are changes in what they value from their supplier relationships. Some of the logistics-related service desires are listed in Table 3. Although the content of Tables 2 and 3 may not appear insightful in and of itself, the fact that these issues emerged was crucial to our study. That is, a finding that changes have occurred in customer desires (i.e., our focal phenomenon) is critical to evaluating how and why changes occur. Also, these services do not necessarily need to be "new" to the suppliers. The important point is that customers had changed what they valued from suppliers, and to them the services were new.

The specific desires in Table 3 can be linked to desired consequences participants sought. Multiple attributes can lead to a single consequence, and vice versa. In addition, many of the desired consequences can be grouped into one of three categories: (1) people learn, (2) systems and products are improved, and (3) customers gain or relinquish control. Trying to learn, improve, and control emerged as crucial components of our theory. The connection between supplier attribute and customer consequence is critical to understanding customer-supplier relationships. It is referred to as part of a value hierarchy." Understanding how both the attributes and the consequences customers desire change is crucial to understanding changing value perceptions.

Passages from the transcripts illustrate how desired attributes were new for participants. Although literally hundreds of passages could be presented, only a few are included here to demonstrate the logic behind some of the analyses. For each concept discussed in this article, we have numerous supporting passages and interpretations. As one example, Zach (all names are pseudonyms) described his desire to begin to gain leverage from his supplier's expertise.

"So the thought was, let's start to leverage the supplier's expertise and bring them into the design process earlier. And to do that you need someone to interface with them on the design side. And we also need buyers who are involved much earlier in the design process so they know which suppliers to pick two years earlier in the process (emphasis added)."

The suppliers who recognize this emerging need early are poised to take advantage of the opportunity by offering to become involved in product, system, and distribution design early. As a result, suppliers can influence product and logistics service specifications, and purchasing managers are able to influence supplier selection. However, suppliers must be committed to this involvement. Some participants described suppliers who promised to be deeply involved but could not deliver on that promise. The change in desired attributes (e.g., suppliers involved two years earlier in design processes) was driven by changes in desired consequences (e.g., learn more and faster about how suppliers' products and services can enhance customers' processes).

Similarly, Ken discussed how bringing suppliers in earlier "opens the door for discussing changes and modifications that are required much earlier on" (a desired consequence), which resulted in the reduction of "bogus" parts being produced when it was too late to make changes (the elimination of an undesired consequence). Supplier logisticians play a key role in helping customers obtain accurate information on supplier capabilities with respect to product availability, service level commitments, and so forth, that if offered early enough help eliminate some of the issues to which Ken referred.

Steve, a purchasing manager, discussed how he was trying to change his suppliers' thinking. In particular, he wanted them to work more closely with his company's engineers on prototypes and develop relationships throughout the organization to look for new ways to differentiate customers' products and services. Supplier logisticians, as well as marketers, clearly were expected to adopt this responsive, continuous improvement attitude.

"Too many times the production houses (suppliers) just want the print and they want to run a million pieces. They may have all this production business, but sometimes it goes away. So you have to continue to cultivate new business that may mean making prototypes that your plant is not efficient to make right now, but you have to grow in that direction. You have to set yourself up, set up machines to make prototypes and work with the engineers on an experimental basis.... And we're trying to change our suppliers to do that (emphasis added)."

Changes in desired value were implied by the way participants described their desires - the words they used implied something new was being asked of suppliers. For example: "We're requesting that all of our suppliers be able to meet QS9000 requirements" (Vicky); "you start to compete on value instead of price, value for the end customer. ... So we're clearly going to ask suppliers to understand our end customers much more than we do today" (Greg); "We were just transitioning into that... and they (suppliers) are now being asked, `You do the complete design work in addition to being the part manufacturer'" (Paul); "you (supplier) go design the wiring harness, so that being the case is a big shift in mentality (for suppliers)" (Ted); "We are now asking suppliers to self-certify," and "we have pretty much told the supply base, you have to develop a relationship with the using customer now, which is not purchasing anymore, it's engineers" (Ted).

From these findings, we can make an initial proposition about how early logisticians from product supply organizations ought to be involved in customer programs. In essence, customers have moved from merely sending out RFPs to building strategic relationships with key suppliers, who become extensions of their business and codesign solutions to their problems throughout the life of the supplier-customer relationship.

Pl: Business customers expect supplier logisticians to be involved much earlier in programs with their marketing/sales counterparts now than in the past so that logistics services can be designed in unison with product attributes to best meet customers' changing consequence desires.

A corollary is that logisticians who work closely with their marketing/sales counterparts early in customer programs are more likely to create greater customer value than those who do not.

Some participants referred directly to logistics competencies, as in the case of Mark (an engineer):

"The main thing we want suppliers to do now is perform faster. Cycle times are shortening up. We're trying to bring vehicles to market much faster. We're down to maybe thirty months now, where before we were quite a bit longer. You know we think we're in the lead right now. Maybe the Japanese are a little bit ahead, maybe about the same. . . . But you know, things are moving faster and faster and faster. As far as suppliers go, we want them to respond faster."

Here, Mark refers to decreasing cycle times as a benefit that he and his company want (a desired consequence), partially as a result of the pressure being put on them by competitors, such as the Japanese auto makers. He wants suppliers to respond faster as well (a change in desired attribute). Logisticians clearly have a role to play in helping suppliers meet this desire by increasing the efficiency and effectiveness of the flow of products and information. Note that this is an example of how changes in desired value reflect things that people must do, not necessarily product characteristics or quality levels. This hints at logistics opportunity.

Ursa and Vicky offered more examples of changes in desired logistics value.

"We used to have a window (for product delivery) ... and as a group, they all decided we shouldn't have a window, it should be a date."

. . .making sure your parts are here on time when they're due, not two days early or two days late. And we've changed our rating effective in May, before they got up to 72 hours, now they have 24 hours. . . .We sent out a letter in April telling them that effective May 1st, all parts must be delivered within a 24 hour window. . .. With our customers now, they don't give you that window, so we're being a little lenient with our suppliers and that will change as time comes. We'll get tougher."

Vicky's comment is particularly interesting. Not only has her desired logistics value in terms of a delivery window changed, but also she gave suppliers little warning of the change (less than one month). Those suppliers who stayed close to Vicky and understood her world were prepared to implement such a change. Supplier logisticians aware of such changes throughout the industry might have been able to forewarn their

marketing counterparts of the expected change. But Vicky's passage goes farther. She states that she is being driven to this change because of her customers. Those suppliers who understand the ripple effect from customers will be looking far down the supply chain in order to anticipate changes. Although not quoted in this passage, Vicky also discussed such changes in desires as bar coding and material packaging to which she expected suppliers to respond.

A substantial change in customer desired value is a desire for suppliers to deliver systems, not merely products. This means a key supplier must coordinate production and logistics among a number of other suppliers on behalf of the customer. This key supplier assembles systems that involve its own products as well as those of other suppliers and then delivers the completed system to the customer (usually an automobile manufacturer) for immediate installation into their products. The largest hurdle in creating this value is the logistics coordination required.

Customers want these and other supplier attributes because they create certain consequences. As we stated, three broad consequences are that customers learn, customers are able to make process improvements, and customers are able to gain or relinquish control over certain focal processes. within these categories are many more specific consequences, such as easier interactions, quicker decisions, more time for other issues, lower customer costs, avoidance of price increases, and more effective and more rapid response to the customer's own customers. At the highest consequence level, as a result of suppliers delivering new attributes, customer organizations survive, grow, and thrive. In order to retain critical customers, suppliers must deliver new attributes, many of which possess logistics opportunities that help customers realize their new desired consequences.

The Dimensions of Changes in Customers' Desired Value

The kinds of changes described above emerged in complex ways. Grounded theory coding techniques allowed us gradually to group specific comments into more general concepts. What we call customers' desired value change (CVQ appears to have at least five aspects. We call these dimensions of CVC: (1) value hierarchy levels, (2) form, (3) rate, (4) magnitude, and (5) volatility, as shown in Figure 1. Extensive discussion of the supporting data is not possible here, but we will describe what the dimensions mean in a logistics context.

Changes in value hierarchy level refer to the finding that customers may change the attributes they desire from suppliers and/or the resulting consequences. For example, participants described changes in the logistics attributes they desire such as different pallet sizes, different delivery times, and reduced cycle time. Changes in consequence desires included lower inventory costs and improved service to their customers. Clearly, supplier logisticians (whether part of a production supplier firm or a third-party firm providing logistics services) ought to be aware of the changes in both desired attributes and desired consequences. Merely responding to a requested attribute change may not effectively address the related desired consequence or broader customer objectives. A number of participants commented freely about the reactiveness of their suppliers, who only respond to requests when forced and then only minimally. It seems that few suppliers are actively learning about the broader goals and objectives of these customers. It is at the consequence level that creative opportunities exist for suppliers. Once customer objectives are understood, the benefits they seek as a result of working with suppliers, suppliers can customize solutions that include specific logistics attributes likely to be most effective at creating value. Unless suppliers dig deeply enough, they may waste resources on logistics attribute changes that are sub-optimal and/or fail to meet the customer's desires.

P2: Supplier logisticians who are aware of changes in customers' desired logistics attributes as well as changes in desired consequences Will be better positioned to create greater customer value than those who only focus on changes in customers' desired logistics attributes.

The second dimension refers to the finding that changes in what customers desire may take several forms. One is simply a change in existence. That is, the desire is added or eliminated. For example, a customer may now want the supplier to hold inventory. A second form is a change in priority. For example, a customer may now desire on-time delivery as much as order accuracy. In short, relative priorities have changed, This emergent desire may be driven by a customer shift to just-intime production processes and a resulting reduction of inventory. A third form is performance level, described by participants as "raising of the bar" or "increasing expectations of suppliers." Here, customers want to see continuous improvement, such as the shift described

earlier from a 72-hour to a 24-hour delivery window. Changes of this third form are likely to be the easiest to anticipate because standards are almost always rising.

Each of the three forms may have different resource implications for supplier logisticians. Changes in existence may require extensive creativity to design a solution that has not been used before. If added to previous desires, it may require additional investment as opposed to a shift in investment. Changes in priority may require a shift in resource allocation from continuous improvement efforts in one area to improvements in a previously neglected area. Finally, changes in performance level may require extensive investment in an area previously thought to be adequate. Although possibly the easiest to spot, performance change may be the most costly, as it becomes more and more difficult to make incremental improvements in well-performing systems.

P3: Supplier logisticians who are aware of the forms that changes in customers' logistics desires are taking (Le., existence, priority, performance level) will be better positioned to use service development/improvement resources effectively than those who are not.

The third CVC dimension is rate, which refers to how quickly changes occur in what customers desire. Some participants described an "evolutionary" pace; suppliers and customers gradually become more involved in each other's operations and along the way increase their expectations of the other. For example, several participants explained that they gradually have moved toward expecting key suppliers to have warehouse facilities literally across the street from their operations around the globe or to coordinate the delivery of systems of complementary components from several suppliers rather than merely deliver their own components. Suppliers become key suppliers when they infiltrate customer operations with people from all areas of functional expertise, including logistics, and are willing to respond to evolutionary changes on a regular basis. They develop the competency to respond to or influence often resource-intensive desire changes.

Other participants described changes as revolutionary. They seem to occur overnight and to suppliers, appear "out of the blue." This may result from a major internal customer change, such as a new executive whose philosophy differs from that of the previous executive. A number of participants from one company described how a new purchasing executive changed the driving supplier selection criterion from long-term relationships to price "almost at the flip of a switch." Suppliers were forced to find ways to cut costs to meet price targets very rapidly. Logisticians had a role to play here, but cost savings opportunities needed to be identified and implemented very quickly. Suppliers able to react most effectively and rapidly were the ones who had been developing a complex relationship with customers for a long period. In fact, participants felt loyal to, and were impressed by, the suppliers who could respond to revolutionary changes in desires. Supplier logisticians need to be involved continuously in the customer relationship in order to recognize quickly even subtle changes in customers' logistics-related desires. It is not enough to only be involved up front, in the design of customer logistics service specifications, or later on, when distribution problems arise.

P4: Although customers' desires may change both gradually and rapidly, supplier logisticians who actively try to build long-term, continuous relationships with key customer contacts will be better positioned to react to changes than those who do not. By extension, the ability to respond effectively to revolutionary logistics changes may differentiate suppliers more than the ability to react only to gradual changes.

The fourth dimension of CVC, magnitude, refers to how large the difference is between what was expected and what is expected now. One participant described how he wanted his suppliers to coordinate product delivery to new plants in Mexico and to ensure flawless delivery by contracting for/building warehousing very near the plants. At least one supplier saw this as a very large shift in desires and was unwilling to go along. The desire for delivery of ready-to-install systems as opposed to individual components is another example of a large change. Participants also described small changes in logistics desires, such as pallet size, delivery times, and transportation modes. Yet, these "small" changes were considered crucial to their success, and they felt loyal to suppliers who cooperated.

Sometimes it is difficult to determine whether a change is small or large. One participant had only recently begun to examine the logistics costs related to supplier selection. When he became aware of the transportation costs for various suppliers, he decided that the added value of other competencies offered by a distant supplier did not outweigh the transport costs and ended the relationship. This change in customer procedure (i.e., cost accounting) resulted in a change in desired value (supplier cost competitiveness includes logistics costs). Was

the change in procedures small or large? Was the focus on transport costs a small or large shift? The answers most likely depend on the customer and suppliers involved and on the extent to which suppliers can address the change. For example, if the supplier moved a production facility to overcome the distance issue, that would be a large change, whereas offering to cover transportation costs (FOB customer location) would be a relatively small change. The magnitude of the change may be relative to the supplier's perspective of his options. Logisticians might be able to suggest low-cost options that marketing and sales professionals may not automatically see.

Participants generally discussed how most suppliers have demonstrated the ability to respond to small changes, but have greater difficulty responding to large changes.

P5: Those logisticians who can respond effectively to both small and large changes in customers' logistics desires are more likely to help their companies retain customers than those who cannot. Logisticians ought to be able to assist marketers and sales professionals in fording ways to respond to both.

The fifth dimension of CVC is volatility, which refers to how many desired logistics attributes and/or consequences are changing at once. The more changes that take place simultaneously, the more volatile is the situation. One customer may ask for a vendor-managed inventory program; another may ask for that as well as EDI systems, forecasting assistance, point-of-purchase data tracking assistance, changes in transport modes and packaging, and self-certification because they now must comply with IS0900Q requirements. A response to multiple changes in logistics desires simultaneously requires far greater resources and expertise than responding to one or two at a time. One participant stated he was much more loyal to suppliers who realized their limitations and did something about them before taking on new business than he was to suppliers who promised all things and delivered on few. In the latter case, the participant suspected that sales representatives were unaware of exactly what could and could not be done, partly from a logistics perspective. In the former case, supplier representatives from multiple functional areas were involved in the customer relationship. One supplier became aware of many changing customer needs that the company simply was not prepared to handle; the firm actually stopped taking new orders for two years until it could build the infrastructure and competencies necessary to meet customers' changing desires. The participant places as much business as he can with that supplier.

P& Supplier logisticians who are regularly involved with sales and marketing representatives inside customer organizations are more likely to recognize and respond appropriately to the fit (or lack of it) between the supplier's logistics competencies and the customer's changing logistics needs, thus eliminating unrealistic customer expectations.

As a corollary, supplier logisticians ought to be able to assist supplier marketers in segmenting customers into groups so there is a strong fit between logistics capabilities and the volatility of changing customer logistics desires.

In addition to examining the nature of changes in customers' desired value, we discovered a process within which these changes occur. Particularly relevant here are a number of change drivers that logisticians might help marketers interpret.

Drivers of Changes in Customers' Desired Value

Where do changes in customers' desired logistics value come from? We found that they are related to the effect of environmental changes on participants. Specifically, events in the customer's world create great tension for purchasing managers. In attempts to reduce this tension, customers recognize the role suppliers play and alter what they value from them. An understanding of change drivers offers some insight into how logisticians may assist marketers.

The view that customers primarily change what they value by being exposed to competing products and services is an attitude that has driven marketing strategy to focus on competitors almost to the exclusion of customers for at least 20 years.16 Our findings suggest that customers may alter what they value as a result of many forces, only one of which falls in the category of supplier changes. Specifically, we found that shifts in at least five areas may drive changes in customers' desired value, as shown in Figure 2. These areas are

changes in: (1) their own customers' demands, (2) the customer's organization, (3) competitor moves, (4) supplier offerings, demands, and/or performance, and (5) the macroenvironment.

In general, most of the stories that revealed change drivers focused on changes internal to the organization and changes in their customers' desires. Very rarely did participants discuss suppliers who came to them with new services that caused them to change what they wanted from their other suppliers, as the traditional marketing view suggests. It is very important to note that the majority of participants differed in the specific details about drivers for change in desired value. These findings suggest that (1) supplier logisticians need to know each customer well and (2) probably should begin by focusing on what the customer's customers value from a logistics perspective and on logistics-related changes occurring within their customer's organization.

P7: Supplier logisticians who uncover the unique ways in which their customers view their world and the specific change forces on which they are focusing (i.e., those that make them tense) are more likely to be able to design logistics solutions that best meet the customer's changing desires than those who develop one-size-fits-all logistics solutions.

P8: Supplier logisticians who focus on understanding how a customer's customers are changing what they value and on changes internal to a customer's organization are more likely to develop effective logistics solutions to customers' changing desires than those who focus exclusively on competitors' logistics service offerings.

Some participants noted that a change viewed as an improvement from the supplier logistician's perspective may in fact create tension for customers because it induces variation, which may force customers to make changes that disrupt their systems. Suppliers ought to remain sensitive to the potential negative effect of their process changes on customers even if these changes appear to offer competitive or cost savings opportunities.

Overall, supplier logisticians may best help their organization retain customers by becoming deeply involved with their firm's sales and marketing personnel at customer locations. There does not yet appear to be a straightforward way to "predict" what business customers will want in the future. Even if further research supports the customer value change concepts (i.e., its nature and drivers) presented here, customers still interpret their dynamic worlds uniquely. Customers' desired value might change in any number of ways (recall the five dimensions) and due to any number of forces (change drivers), and business directions are set by key individuals within customer organizations. Therefore, developing the most effective logistics package to address customers' changing desires may be a process that is both idiosyncratic and continuous. In order to learn the details of what customers are trying to achieve and how logistics competencies can play a role in helping them achieve it, it seems that logisticians need to he part of the marketing team throughout the life of the customer relationship, constantly attempting to see the dynamic world through customers' eyes. In short, propositions one through eight suggest that supplier logisticians may be able to create significant value for their organization by helping it understand and anticipate the changing logistics needs of customers.

Reducing Environmental Uncertainty

The propositions we present contribute to a number of literature areas, but of particular relevance here is the concept of environmental uncertainty and its effects on logistics, management, and marketing strategies. In general, environmental uncertainty is treated as an overall factor that affects business strategies and tactics. Included in this uncertainty is the dynamic nature of customer desires. Clearly, the more uncertain one's market, the more flexible one must be. Recent logistics research supports this notion by empirically showing that supply chain flexibility (i.e., volume and launch flexibility) are key responses to product and other marketing uncertainties."This approach fits with our earlier discussion of rapid response systems as a way to deal with uncertain customer desires. Similarly, environmental uncertainty seems to predict a firm's reliance on expensive and radical logistics process innovation"s as well as JTT selling approaches.19 Our study begins to help reduce this uncertainty by offering a deeper understanding of how some changes may unfold. The earlier suppliers can recognize or anticipate market change, the greater lead time they have, which in turn increases response time, reduces the need for extreme flexibility, and limits the need for radical, expensive logistics solutions.

The greater the market uncertainty, the more businesses need to adopt comprehensive (as opposed to

simplistic) strategies that are facilitated by market scanning.22 The propositions presented here are components of a market scanning strategy. In addition, research suggests that smaller companies may be more negatively affected by environmental uncertainty than larger ones.2' By extension, logisticians in smaller supplier firms as well as smaller third-party logistics firms may have a stronger need than larger firms to be engaged in the activities we propose. Finally, environmental uncertainty relates to time horizon expectations for supplier-customer relationships in terms of trust and mutual dependence.22 Reducing the level of market uncertainty, as our study begins to facilitate, may enable longer relationship time horizons in some cases.

Reducing environmental uncertainty does not affect all strategies, however. For example, environmental uncertainty appears to have little effect on the relationship between firm structure and product customization or on the use of JIT techniques in large firms and their adoption of EDI 23' Using this study's insights, however, businesses may be better equipped to determine in what ways and with whom products and services ought to be customized in the first place.

To reduce environmental uncertainty, logisticians may want to consider adopting a "marketer" role that translates traditional marketing concepts into logistics marketing aimed at internal and external customers.

Supplier Logisticians as Marketers

If marketing is conceived as understanding, creating, delivering, and communicating customer value, then our propositions suggest logisticians can play a marketer role by helping to understand, create, deliver, and communicate logistics value to customers alongside marketers and sales professionals in their own organization. This implies a team approach to selling. The inter-functional coordination research reported in the marketing, management, and logistics literature suggests that this is easier said than done. We believe there is a marketer role for supplier logisticians within their own firm-to market themselves to marketers and sales professionals in their own organization. The idea that logisticians can create value for their organization by becoming part of its marketing teams and that they might want to market their value to key people within their own organization is not new.

It has been argued that logistics executives must market themselves to upper management by using the 5 P's (product, price, place, promotion, and people), the first four of which are the traditional concepts taught in introductory marketing courses, if they are to position logistics in its "proper role" within the organization as a value-adding component."' Our research supports the contention that this may be crucial, but we focus attention on different audiences to whom logisticians might want to market themselves (i.e., marketers and customers).

Along similar lines, authors have argued that in order to market the strategic importance of logistics, logisticians must be aware of the value multiple customer groups, both internal and external, place on logistics competencies.25 In particular, it has been shown that senior executives, as one internal customer group, must perceive logistics as a competitive weapon in order for it to be leveraged as such. Marketing the competitive advantage potential of logistics rests on the logic that creating logistics value can have a significant positive effect on customer service and customer satisfaction as well as on the profitability and cost structure of one's own organization.26 In particular, it has been argued that monitoring customer expectations and improving customer satisfaction should be essential goals of logistics management,27 This has long been seen as a key component of marketing as well, which suggests mutual goals for both functional areas. In addition, given the strategic importance of logistics to customer satisfaction and firm profitability, some have called for greater coordination, collaboration, and integration of logistics within the firm and among channel members at the strategic level.28 Marketing is one critical functional area with which to coordinate.

Finally, extensive customer service research positions logistics as a value-adding business component. For example, it has been argued that logistics service capabilities can be leveraged to:

increase market share,29

enable mass customization,30

create effective customer response-based systems that may out perform anticipatory systems,31

* create value through service performance,32

* complement marketing's design of customer services,32

* positively affect customer satisfaction and, in turn, corporate performance,33

* provide a differentiating competitive advantage,35 and

* segment customers.36

Our contribution to this literature is to propose that logisticians themselves (as contrasted with logistics services) can help create value by helping marketers unravel and respond to changing customer logistical desires. They can partially do this by adopting traditional marketing concepts and skills concerned with ways to uncover needs, translate those needs into their own organization, create solutions to those needs, deliver valued solutions, and communicate the value delivered.

P9: Supplier logisticians who continuously market their expertise and competencies to Internal constituencies as well as to customers by adopting traditional marketing and sales skills will contribute more toward suppliers' understanding of and responses to changes in customers' desired value than those who do not.

IMPLICATIONS FOR LOGISTICS MANAGERS

Even though it is exploratory, this study has implications for logistics managers. One implication is our diagnostic tool for examining customers' changing needs. Our description of how and why logistical needs may change for some business customers ought to help supplier logisticians decipher changes with their specific customers. Our breakdown of the kinds of changes that may take place referred to, as dimensions of changes in CVC, can be very useful. Resource allocation, service specifics, and customer segmentation at a minimum may depend on knowing at what level, in what form, at what rate, at what magnitude, and in what quantity changes are occurring with specific customers. Our discussion of potential drivers of change suggest that logisticians may need to hone in on the specific kinds of issues that make key customers tense and help them address those issues. For one customer it may be regulatory (macroenvironmental) issues. For others it may be changing needs of their own customers and internal reorganization. The key for each business customer may be his/her idiosyncratic views of a dynamic world and this inevitably will lead to customized logistics solutions. Yet, customers trying to respond to similar change drivers may fall into like categories that require similar logistics services, enabling efficient resource allocation.

Our study suggests that customer needs may be changing in so many ways that uncovering these needs cannot be left only to marketers and sales professionals. Logisticians ought to be involved from the beginning of a customer relationship and throughout. In this way, they can help their marketing and sales partners see relevant changes that may manifest themselves as threats or opportunities. With their greater knowledge of customers' changing logistics needs, logisticians can decide whether to be proactive and actively influence what customers may need or reactive, prepared to respond when certain value desires are expressed.

A broad implication for logistics managers is that change appears to take many forms and be driven by many forces acting independently and simultaneously. Thus, the need for extreme flexibility may never go away. Nevertheless, different customer segments are likely to reflect varying levels of change. Logisticians may be able to increase their organization's effectiveness by analyzing the fit between its flexibility and the extent of change in various customer markets, strategically choosing segments where the fit is best.

Finally, our study implies that logisticians will need to market their expertise to internal constituents, specifically marketers and sales professionals, in order to work alongside them in marketing to external customers as shown in Figure 3. Logisticians would begin by understanding the needs of internal marketers as well as external paying customers. Adopting traditional sales techniques, they could schedule meetings with these two customer groups, ask detailed and open-ended questions about those needs and the forces driving them, and find ways their expertise can best create value. In terms of the four P's of marketing, the logistician's "product" can be viewed as a complex set of multicompany and functionally integrative skills, relationships with third-party service providers, knowledge of and access to powerful logistics software packages, knowledge of capital equipment and infrastructure options, and extensive experience in cost cutting, to name a few. The "price"

component can be viewed as (1) what the logistician wants in return from the marketer (e.g., recognition, resources) and (2) the dollar value placed on providing this expertise to the external customer. The "place" component may refer to the logistician him/herself being in the right place at the right time. This may mean attending internal sales and marketing meetings in order to influence decisions. This also clearly means spending a great deal of time with external customers. If the "product" is partially logistics expertise, then the individuals with that expertise ought to be "delivered" to the customer in question. Finally, "promotion" would mean either advertising or selling in a traditional marketing sense. In our example, it may mean that logisticians actively sell their value to internal and external customers in person and/or ensure that their expertise and capabilities are represented in internal documents as well as external promotional campaigns.

FUTURE RESEARCH

The findings presented here need to be examined with much larger samples across multiple contexts. First, the five dimensions of change in customers' desired value, as well as the drivers need to be tested. One way to accomplish this is through surveys with multiple-item scales. Because the CVC construct is new, scale development is needed. Respondents ought to be both purchasing managers and logistics managers to determine whether the needs of customer logisticians change in the same way as do those of purchasing managers. Second, the nine propositions presented here need to be examined. Again, surveys may accommodate this. In a less quantitative approach, additional qualitative research can be conducted in the form of long-term case studies and ethnographies. On an anecdotal level, we find that scanning news reports regularly reveals supporting evidence for the concepts presented here.

We also need to understand more about the roles logisticians play as key boundary-spanners in organizations and supply chains. Future inductive research should seek to understand the various roles they play and the effect of playing those roles on organizational variables, such as customer value, customer satisfaction, and customer retention, as well as on social psychological variables such as the image of logisticians held by marketers and key executives, and personal job satisfaction.

The logistician as marketer role in particular should positively affect the supplier-customer relationship. We need to know whether adopting a marketer role improves the longevity of that relationship. Testing this proposition may be accomplished with quantitative techniques, such as a survey of logisticians, marketers, purchasing managers, and directors of logistics. Similarly, we need to know which logisticians in what companies are best at adopting the marketer role and how they execute it. Clearly, third-party logistics providers should be some of the most marketing oriented logisticians. Benchmarking research on best practices for logisticians as marketers should include these organizations. These benchmarking studies could use case studies, grounded theory, and survey research methods.

From a methodological standpoint, this is the first known grounded theory study in the logistics literature. Although the use of depth interviews and case studies is common in logistics, the grounded theory approach is new to the field. It offers significant opportunities for future logistics theory development. For example, grounded theory could be used to investigate how logisticians deal with conflicting demands from external and internal customers, how customers respond to different levels of logistics service quality, and which aspects of logistics service quality are important in repeat purchase behavior.

In conclusion, we feel that understanding how customers' logistical needs change over time is a key component to predicting what customers may value in the future. Prediction requires knowledge of how change occurs in addition to knowledge of what customers currently value and creative innovation. Currently, the best prediction techniques we know of are based on detection of early warning signs of change. Understanding how change occurs will help to improve our detection skills. Improving customer value prediction will likely directly and positively affect the success rate of key business strategies, such as new product/service development, market segmentation, market entry/exit, and resource allocation. This study is an initial step toward expanding our understanding of how changes of this kind occur and ought to stimulate a robust and diverse research program.

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