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ABSTRACT

Firms have begun to look internally for ways to increase external service quality. ANOVA is used to examine the effect of interdepartmental customer orientation on time, inventory, and customer service-based performance variables in distribution centers. Findings indicate that high interdepartmental customer orientation positively affects distribution center performance in terms of time-based performance measures and customer satisfaction. Interdepartmental customer orientation was found to have only a marginal affect on inventory performance. Implications of the current research for distribution centers and transportation managers are discussed along with limitations and opportunities for future research.

INTRODUCTION

Transportation and distribution center managers must work together to meet their respective value propositions. Distribution center managers depend on transportation service providers to deliver freight undamaged and in accordance with agreed upon schedules. Transportation managers depend upon distribution center personnel to load the correct, undamaged freight on-time to facilitate this task. However, achieving perfect distribution center performance is difficult due to the many opportunities for late shipments, damaged product, stockouts, and other challenges. In the event of a missed shipping appointment, or loading of incorrect freight, carriers incur losses in the form of increased cost and decreased driver/asset productivity. Driving time is consumed while waiting on

product to be loaded or the correct product to be loaded. Increased asset idle time decreases equipment utilization. Transportation managers' time is consumed dealing with late deliveries, OS&D, or drivers who are upset because their on-duty hours are consumed by non-income generating activity. These are problematic issues for carriers in that cost control and asset utilization have been noted as keys to maintaining motor carrier profitability (Stephenson and Stank, 1994).

In light of this, Dobie (2005) draws a corollary to the core carrier concept and notes that it may behoove carriers to identify core shippers. Core shippers are preferred firms whose characteristics and capabilities most contribute to carrier profitability and performance. Among other shipper selection criteria, Dobie (2005) posits that carriers should examine shippers' timeliness (i.e., extent to which freight is loaded and unloaded in a timely manner, minimizing wait time) and the quality of front-line personnel. One method carriers may utilize to evaluate potential core shippers, and shippers may utilize to improve timeliness and perceived front-line personnel quality, is through assessment and provision of high levels of internal service quality inside distribution centers though interdepartmental customer orientation.

As a way to improve distribution center performance, some firms have begun to examine the integration of their internal functions to discover opportunities for quality improvements yet to be realized (Bowersox, Closs, and Stank, 1999). Conduit and Mavondo (2001) propose that to improve external performance, the quality of service delivered inside an organization must first be improved (see also, Berry, 1983; Grönroos, 1990; Lings, 1999). The importance of internal service quality can also be found in the Total Quality Management (TQM) literature (Finn et al., 1996), and within the Malcolm Baldridge Award criteria (Stauss, 1995).

Distribution center personnel in contact with products and services just prior to delivery to external customers directly affect customer perceptions. To achieve corporate value propositions, front-line personnel receive information from other departments within the organization (Lings, 1999). Departments serve as internal suppliers to other functions of the firm that consume the output of supplying departments (Berry, 1981; George, 1990; Grönroos, 1990). To deliver the greatest value, each department must perform its duties in a customer-oriented manner to other departments (Mohr-Jackson, 1992; Conduit and Mavondo, 2001). Ultimately, the service delivered internally culminates in the service level delivered by front-line employees to the external customer.

This work explores the effect of interdepartmental customer orientation on distribution center performance. Specifically, the research delineates the effects of interdepartmental customer orientation on distribution center efficiency (e.g., inventory turns) and effectiveness (e.g., external customer satisfaction) as well as the net effect of this performance for transportation service providers. Next, a discussion of internal service quality and interdepartmental customer orientation is presented. The method used to assess the relationship of interdepartmental customer orientation to distribution center performance is explained. Results, implications, and limitations conclude the discussion.

LITERATURE REVIEW

Hammer (2001, p. 52) defines a process as "an organized group of related activities that together create a result of value to customers." Internal service processes include simplified standard operations, procedures, and activities that support front-line business employees that interact with customers.

The concept of designing internal service systems was introduced in the 1960's (Davis, 1993) and has led to a concept called service blueprinting (Shostack, 1987). Service blueprinting graphically details internal service processes in flow charts depicting interrelated activities as those that are, and are not, visible to the external customer (Lings, 1999).

Service blueprinting implies that internal service systems are organized into a type of work-flow service (Davis, 1993) where each department is a sequential stage in the production of a product or service that is ultimately delivered to the end customer. In the absence of exceptional internal customer service between departments, the service delivered to external customers is likely to be less than optimal. However, departments are often encouraged, by the way they are evaluated within the firm, to view their function as merely a single activity in a process (Stauss, 1995). This results in a myopic view of the department's role in the service delivery process, leading to departments that focus solely on their *intra*-departmental activities and measures and giving little regard to how the output affects others downstream.

The existence of an interdepartmental customer orientation may help alleviate this problem through the delivery of exceptional service to each internal customer during each internal transaction (Conduit and Mavondo, 2001). Interdepartmental customer orientation is the organizational orientation that encourages departments to view their internal role as part of an entire process and to make the necessary efforts to increase service levels they provide to other departments downstream toward the external customer.

Interdepartmental customer orientation potentially improves distribution center efficiency and effectiveness by facilitating internal integration (Bowersox, Closs, and Stank, 1999; Conduit and Mavondo, 2001). Bowersox, Closs, and Stank (1999, p. 59) define internal integration as "the competency of linking internally performed work into a seamless process to support customer requirements" and find that internal integration is a significant indicator of supply chain performance as measured by supply chain efficiency and effectiveness metrics. Interdepartmental customer orientation is not only useful to support front-line employees but is applicable throughout the firm (Hartline and Ferrell, 1996). It is particularly effective in process-type operations, such as distribution center service operations, that are highly service- and process-based (Lings, 1999). Front-line distribution center employees are often the last touch-point of product inspect and verification just before customer delivery. Service is critical at this stage because it greatly influences external customer perception of the distribution center.

In light of this, the effect on carriers of improved distribution center interdepartmental customer orientation is likely to be pronounced. The presence of an interdepartmental customer orientation could be characterized as: 1) increasing the value one department provides to another, 2) improved collaboration to understand the requirements of a downstream department, and 3) ongoing interdepartmental performance appraisals, among other factors. Therefore, an interdepartmental customer orientation is likely to result in increased timeliness and accuracy of distribution center interdepartmental information exchange. This improvement in the speed and accuracy of information exchange would logically reduce the number of missed shipping dates while simultaneously reducing shipping errors. A reduction in late shipments lessens driver and asset wait time at distribution locations, therefore increasing driver and asset productivity. Further, receivers often contact carriers first upon discovery of OS&D and a reduction in distribution center shipping errors would reduce the amount of time

carriers' administrative personnel allocate to resolving these issues.

Seibert and Lingle (2007) support the notion that superior levels of internal service quality are associated with superior levels of business performance. Rodrigues, Stank, and Lynch (2004) utilize a structural equations method and find that integrated operations, conceptualized as a combination of external and internal integration, positively affect logistics performance. While Voss, Calantone, and Keller (2005) find that interdepartmental customer orientation positively influences supply chain efficiency and firm service performance, they did not examine its effects on firm efficiency. The present investigation seeks to fill this gap in the literature and investigate the effect of interdepartmental customer orientation on distribution center time-based, inventory, and customer service performance measures while illustrating the importance of these outcomes to transportation managers.

METHOD

A survey methodology was utilized to explore the specific effects of interdepartmental customer orientation on logistics performance. E-mails sent to distribution managers inviting them to complete an on-line questionnaire. Respondents accessed the survey via an established website provided by researchers. A random selection of managers from the leading association of warehousing and distribution, Warehousing Education and Research Council (WERC), constituted the sample.

A total of 365 useable questionnaires were received from 1,486 potential respondents (24.86% response rate). Data analysis began by formulating a multi-item summated scale consisting of 4 items used to measure the emphasis respondents placed on providing interdepartmental customer orientation. The utilization of summated scales is common in social science research to provide more reliable measurement of an underlying construct of interest (Yuan, Bentler, and Kano, 1997). Summated scales hold several advantages over the use of a single item concept measurement. Specifically, summated scales average out item specificity, allow researchers to make more granular distinctions among respondents, and increase reliability while simultaneously decreasing measurement error (Churchill, 1979). By utilizing summated scales, the researcher obtains a more 'well-rounded' perspective of the concept at hand (Hair et al., 1998).

Items were drawn and modified from previous works investigating interdepartmental customer orientation (Voss et al., 2004) with acceptable psychographic properties. Responses to the multi-item scale were gathered by asking respondents to indicate the frequency with which managers have performed the action in question (7 point scale with anchors of 1 = infrequently; 7 = frequently). Items were factor analyzed and fell into a single factor with factor loadings exceeding the required .70 cutoff (Nunnally and Bernstein 1994). A test for internal consistency yielded a Chronbach's alpha of .74, exceeding the .70 cutoff recommended by Churchill (1979). Items and scale properties are presented in Table 1.

Respondents were divided into high (HICO: High Interdepartmental Customer Orientation), medium, and low (LICO: Low Interdepartmental Customer Orientation) interdepartmental customer orientation groups. These three groups were formed by splitting the sample into groups of approximately equal size (~123) and adjusting the groups such that the same summated scale average was not divided into two separate groups (i.e., such that a summated scale average of 6.25 was not present in two different groups). This resulted in a sample of 126 respondents in the HICO Group and 97 in the LICO Group. In order to illuminate the effects of interdepartmental customer orientation,

TABLE 1
INTERDEPARTMENTAL CUSTOMER ORIENTATION MEASURES

	"Over the past month, how frequently have you done the following?" †	λ	Mean	s.d.	α/Deleted	Item/Total Correlation
ICO 1	Ensured that my department treated other departments as internal customers.	0.75	5.98	1.16	0.67	0.52
ICO 2	Consistently tried to increase the value of the output my department provided to other departments.	0.75	5.95	1.06	0.67	0.53
ICO 3	Collaborated with other departments to ensure that my department understood their on-going requirements.	0.80	5.53	1.25	0.62	0.60
ICO 4	Inquired on how my department's performance was appraised by other departments.	0.70	5.09	1.57	0.71	0.48

† $\alpha = 0.741$
KMO Sampling Adequacy = 0.882
Bartlett's Test of Sphericity: $\chi^{210}=486.218$, $p<0.01$
Scale Variance Extracted = 56.387%

subsequent discussion focuses on the differences between the HICO Group and LICO Group.

Demographic characteristics of the entire sample, HICO, and LICO groups are provided in Table 2. Statistical comparisons of demographic differences in the HICO and LICO groups are provided in Table 3. The only significant demographic difference between the HICO and LICO groups was in the number of years employed in the distribution industry with HICO respondents having spent an average of 17.76 years and LICO and average of 14.18 years ($t = 2.72$; $p < 0.05$).

ANOVA was utilized to determine significant performance differences between the HICO and LICO groups. Performance variables were recoded such that a higher response indicates better performance. Three general groups of performance variables were examined. First, time-based performance measures were conceptualized to be represented by 1) on-time delivery, 2) orders shipped on-time, and 3) order cycle time. Second, inventory performance measures were measured by 1) inventory turns, 2) inventory accuracy, and 3) inventory levels/number of days supply. Finally, customer service performance measures were measured by 1) customer satisfaction, 2) order fill rates, 3) shipping errors, and 4) customer complaints. These performance metrics were drawn from past works as indicated in Table 4.

TABLE 2
DEMOGRAPHICS

	Mean Responses		
	Entire Sample	**HICO†**	**LICO†**
Years in Industry	15.95	17.76	14.18
Years with Employer	9.25	8.90	9.66
Years in Current Job	5.59	5.74	5.45
Employees in Facility	246	276	233
Age	42.84	43.59	41.38
Position			
Warehouse/DC Operations	271	90	75
Inventory Control	17	8	3
Administration	13	3	3
Transportation	13	2	4
Customer Service	5	1	3
Other	46	22	11
Gender			
Male	315	105	88
Female	50	21	11
Education			
Some high school	5	1	4
Graduated from high school/G.E.D.	63	28	15
Some college/technical training	148	54	42
Graduated from college	94	28	25
Some graduate school	22	4	5
Graduate degree	33	11	8

†HICO = High Interdepartmental Customer Orientation
LICO = Low Interdepartmental Customer Orientation

TABLE 3
DEMOGRAPHIC COMPARISONS: HICO AND LICO GROUPS

t-test	HICO†	LICO†	t	p-value
Years in Industry	17.76	14.18	2.72	0.01*
Years with Employer	8.90	9.66	-0.71	0.48
Years in Current Job	5.74	5.45	0.39	0.70
Employees in Facility	276	233	0.672	0.50
Age	43.59	41.38	1.561	0.12
Crosstab	**HICO†**	**LICO†**	**χ^2**	**p-value**
Position			5.81	0.33
Warehouse/DC Operations	90	75		
Inventory Control	8	3		
Administration	3	3		
Transportation	2	4		
Customer Service	1	3		
Other	22	11		
Gender			1.40	0.24
Male	105	88		
Female	21	11		
Education			4.81	0.44
Some high school	1	4		
Graduated from high school/G.E.D.	28	15		
Some college/technical training	54	42		
Graduated from college	28	25		
Some graduate school	4	5		
Graduate degree	11	8		

†HICO = High Interdepartmental Customer Orientation
LICO = Low Interdepartmental Customer Orientation
*Indicates significant mean difference between HICO and LICO groups at $p<.05$

TABLE 4
PERFORMANCE MEASURES

Performance Measure	Authors	Title/Outlet
Time-Based		
On-time delivery	Griffis et al., (2004)	"Performance Measurement: Measure Selection Based Upon Firm Goals and Information Reporting Needs," *Journal of Business Logistics*
Orders shipped on-time	Byrne and Markham (1991)	Improving Quality and Productivity in the Logistics Process, *Council of Supply Chain Management Professionals*
Order cycle time	Nyaga et al. (2007)	"The Impact of Demand Uncertainty and Configuration Capacity on Customer Service Performance in a Configure to Order Environment," *Journal of Business Logistics*
Inventory		
Inventory turns	Griffis et al., (2004)	"Performance Measurement: Measure Selection Based Upon Firm Goals and Information Reporting Needs," *Journal of Business Logistics*
Inventory accuracy	Byrne and Markham (1991)	Improving Quality and Productivity in the Logistics Process, *Council of Supply Chain Management Professionals*
Inventory levels (number of days supply)	Zinn et al. (2002)	"Customer-based Measures of Inventory Availability," *Journal of Business Logistics*
Customer Service		
Customer satisfaction	Tracey (1998)	"Importance of Logistics Efficiency to Customer Service and Firm Performance," *International Journal of Logistics Management*
Order fill rates	Zinn et al. (2002)	"Customer-based Measures of Inventory Availability," *Journal of Business Logistics*
Shipping errors	Byrne and Markham (1991)	Improving Quality and Productivity in the Logistics Process, *Council of Supply Chain Management Professionals*
Customer complaints	Bartlett et al. (2007)	"Improving Supply Chain Performance Through Improved Visibility," *International Journal of Logistics Management*

RESULTS AND DISCUSSION

ANOVA results presented in Table 5 indicate several differences between the performance means for HICO and LICO. Examination of the *time-based performance* measures indicate managers whose departments frequently perform the interdepartmental customer orientation items examined (HICO) report significantly higher performance in terms of on-time delivery ($F = 3.581$; $p<.05$) and orders shipped on-time ($F = 3.828$; $p<.10$). No significant difference was found between the groups in terms of order cycle time length ($F = 0.640$; $p = 0.424$).

The results for *inventory performance* are less slanted toward the HICO Group. HICO managers reported significantly higher inventory turns ($F = 2.865$; $p<.10$) but the difference was only marginally significant at the $p < 0.10$ level. No significant difference was found between the HICO and LICO groups in terms of inventory accuracy ($F = 0.447$; $p =0.504$) or inventory days of supply ($F = 0.515$; $p = 0.474$).

In terms of *customer service performance* measures, HICO managers indicate their firms achieve significantly better performance in terms of customer satisfaction ($F = 13.204$; $p<.05$), order fill rates ($F = 7.240$; $p<.05$), and shipping errors ($F = 4.320$; $p<.05$). No significant difference was found between the groups in terms of customer complaints ($F = 2.520$; $p = 0.114$).

Clearly, not all elements of logistical performance were impacted by interdepartmental customer orientation, although some meaningful differences were found. Firms exhibiting higher levels of interdepartmental customer orientation are able to ship and deliver orders on-time more reliably than their counterparts in the LICO Group. This increase in reliability likely results from efforts to understand the needs of other departments and meet these needs through provision of accurate information. Distribution environments are characterized by the need to process orders in an effective manner in order to allow shipments to depart on-time. This requires error free information exchange to prevent undue and unpredictable shipping delays. The HICO Group also achieved significantly higher performance in terms of on-time delivery. This result implies the natural relationship between on-time shipping and on-time delivery.

Interestingly, no difference was found between the groups in terms of order cycle time. It would be logical to assume that interdepartmental customer orientation would speed up information exchange and therefore lower order cycle time. Results do not support this assumption and indicate that interdepartmental customer orientation primarily affects time-based performance in terms of shipment and delivery reliability but does not affect the total time it takes to perform logistical activities.

The difference between reliability and speed is well-known to transportation managers. Given the choice, receivers would rather have their product delivered reliably as opposed to faster but less reliably. The same could be said for transportation managers preference for shipping date reliability versus speed characterized by order cycle time. Given the choice, transportation managers would rather an order be processed slower but shipped on-time in a reliable manner. This prevents drivers and transportation assets from waiting for product to be loaded.

The relationship between distribution center reliability (e.g., on-time shipping) and speed (e.g., order cycle time) is illustrated in figures 1 and 2. Figures 1 and 2 depict a normal distribution illustrating the difference in speed and reliability. LICO firms are represented by Figure 1 and HICO firms are represented by Figure 2. By definition, shipment occurs at the completion of an order cycle. The mean order

TABLE 5
GROUP PERFORMANCE DIFFERENCES

Time-Based Performance Measures				
Performance Item	**Group†**	**Mean**	**F-ratio**	**p-value**
On-time delivery	**HICO**	**5.09**	**3.58**	**0.06****
	LICO	4.73		
Orders shipped on-time	**HICO**	**5.20**	**3.83**	**0.05****
	LICO	4.83		
Order cycle time	HICO	3.83	0.64	0.42
	LICO	3.99		
Inventory Performance Measures				
Performance Item	**Group†**	**Mean**	**F-ratio**	**p-value**
Inventory turns	**HICO**	**4.35**	**2.87**	**0.09****
	LICO	4.05		
Inventory accuracy	HICO	4.84	0.45	0.50
	LICO	4.70		
Inventory levels (number of days supply)	HICO	3.90	0.52	0.47
	LICO	3.76		
Customer Service Performance Measures				
Performance Item	**Group†**	**Mean**	**F-ratio**	**p-value**
Customer Satisfaction	**HICO**	**5.33**	**13.20**	**0.00***
	LICO	4.72		
Order fill rates	**HICO**	**4.98**	**7.24**	**0.01****
	LICO	4.46		
Shipping errors	**HICO**	**4.80**	**4.32**	**0.04***
	LICO	4.38		
Customer complaints	HICO	4.82	2.52	0.11
	LICO	4.53		

†HICO = High Interdepartmental Customer Orientation
LICO= Low Interdepartmental Customer Orientation
*Indicates significant mean difference between HICO and LICO groups at $p<.05$
**Indicates significant mean difference between HICO and LICO groups at $p<.10$

FIGURE 1
LICO ORDER CYCLE

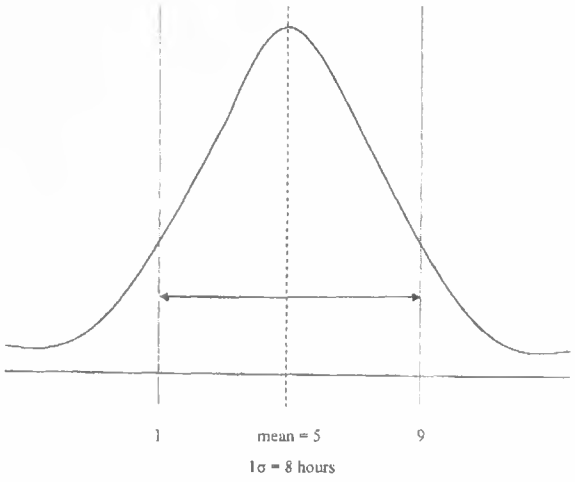
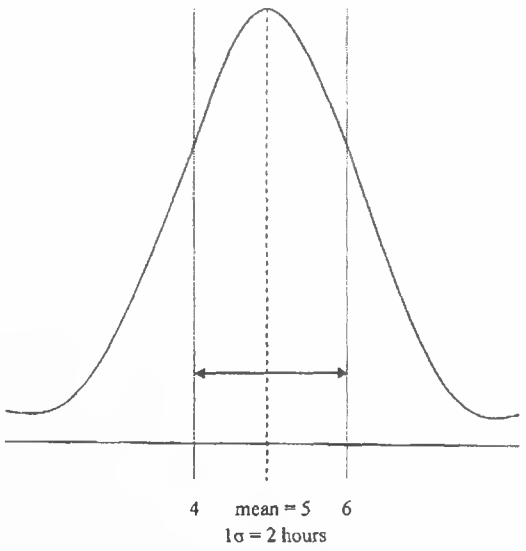


FIGURE 2
HICO ORDER CYCLE



cycle time is 5 days for both LICO and HICO firms. However, there is greater variance in the order cycle time for LICO firms (1σ = 8 hours) than for HICO firms (1σ = 2 hours), implying that HICO distribution centers are more likely to ship product on-time than LICO distribution centers. Consequently, carriers serving HICO distribution centers will incur fewer hours of driver and asset downtime as a result of late shipments.

Among the three performance measure groups, interdepartmental customer orientation has the most profound effect on customer service. The HICO Group achieved significantly fewer shipping errors and higher order fill rates, which results in improved customer satisfaction. Higher customer satisfaction is likely to also be derived from improvements in on-time delivery as discussed previously. Kent, Parker, and Luke (2001) find that delivery reliability is among the most important attributes determining shippers' preference for carriers. Delivery reliability is also ranked among the most important attributes determining firms' supplier preference (Braglia and Petroni, 2000). Therefore, HICO firms are likely to improve customer satisfaction as it is indirectly affected by a decrease in shipping errors and an increase in delivery reliability.

Despite increased performance in certain time-based logistical measures and an increase in customer satisfaction, it is surprising that there was not a difference in customer complaints. Logically, one would expect an inverse relationship between the number of customer complaints and customer satisfaction but this was not the case. This may be attributed to a possible tendency of LICO Group customers to switch logistics service providers without voicing their concerns. For the HICO Group, this finding may be attributed to high levels of overall satisfaction, which may override customers' tendency to voice problems they encounter.

Interdepartmental customer orientation has the least effect on inventory-based performance measures. While the HICO Group achieved marginally superior performance in terms of inventory turns, no significant difference was found with respect to inventory accuracy. These results may be a function of the primary role played by the materials handling department in determining inventory accuracy. In distribution centers, the materials handling department is responsible for product put-away and handling. Therefore, materials handling plays a primary role in determining inventory accuracy. Interactions between departments are less valuable when a single department is the primary driver of a given performance measure. Further, employing adequate information technology (e.g., WMS or RFID) stands to improve inventory accuracy. It is beyond the scope of this work to assess information technology adoption but interdepartmental customer orientation would have little effect on whether the firm employs said technology or whether the technology is sufficient to improve inventory accuracy of the materials handling function.

The HICO Group also failed to outperform the LICO Group in terms of inventory reduction. This result indicates that management inventory decisions primarily determine inventory levels and increased inter-departmental customer orientation plays little role in determining stock keeping policies.

CONCLUSIONS AND LIMITATIONS

These findings detail the relationships between the perceived level of interdepartmental customer orientation and logistics performance within a distribution center setting. Results contribute to the existing literature and further emphasize the importance of cooperation, collaboration, and inter-departmental service levels in increasing firm performance and customer satisfaction levels.

While not all performance measures were impacted by interdepartmental customer orientation, results substantiate the impact of interdepartmental customer orientation on distribution center performance.

Managers should endeavor to support a firm culture that engenders interdepartmental cooperation, collaboration, and communication in order to achieve customer oriented internal transactions to subsequently improve external service quality. Supporting a more integrative environment, compared to the typical "silo" culture, can help increase the quality of output both between departments and to the external customer.

From a supply chain perspective, results indicate that it is not only the interaction between departments that affect distribution performance, but also the interaction between firms. Distribution center managers must take care to employ carriers that deliver loads in a timely manner or lose some of the benefits derived through an interdepartmental customer orientation. Had respondents' firms employed carriers that fail to deliver loads reliably, any efforts to improve on-time shipping and delivery through inter-departmental customer orientation would be nullified. Therefore, an integrated supply chain should stress both intra- and inter-firm customer orientations.

Results have further implications for transportation managers. The current transportation business environment is characterized by increased pressure to reduce costs, increase asset utilization, and decrease customer turnover. As mentioned previously, one method of accomplishing these goals may be to select core shippers whose characteristics and capabilities most contribute to carrier profitability and performance. As Dobie (2005) implies, one challenge to implementing a core shipper strategy is determining the characteristics that make a shipper worthy of being part of this core group. One implication of this research is that carriers should assess potential core shippers' level of interdepartmental customer orientation. Results indicate that HICO firms are significantly more likely to ship orders on-time and reduce shipping errors. This increased performance is likely to pay positive dividends to carriers on several fronts. First, increased on-time shipping performance increases asset utilization by decreasing the amount of time transportation assets sit idle at distribution centers. Second, reliable shipping performance reduces the amount of time drivers spend waiting for loads thereby increasing driving time, subsequent job satisfaction, and decreasing driver turnover. Decreasing on-duty hours spent waiting on loads is especially critical in today's environment of fluctuating hours of service regulations. Third, reduced shipping errors curtail the number of OS&D claims handled by carriers, thereby allowing managers to reallocate their time to revenue generating activities.

As part of a broader effort to determine appropriate core shippers and their characteristics, carriers are encouraged to utilize the interdepartmental customer orientation questions presented in Table 1. Carriers may utilize these questions as part of a formal survey or ask shippers in a more casual manner the extent to which their firm is characterized by these items.

This study focused on distribution centers, and it is possible that the effects of interdepartmental customer orientation could be more or less prominent in other settings. To improve upon the current study, research should be performed outside of a distribution center environment. This would add further generalizability to the current findings.

Another limitation found in this work is the reliance upon respondent perceptions. Responses could have been influenced by perceptional and attributional biases. Further research should utilize a simulation

methodology to further substantiate the effect of interdepartmental customer orientation on distribution performance.

Interdepartmental customer orientation has come to the forefront in recent years as a means of increasing service and performance levels. Results indicate interdepartmental customer orientation affects distribution center efficiency and effectiveness. Firms should view the internal customer on equal footing with the external customer and endeavor to create a culture that emphasizes interdepartmental customer orientation as a necessary strategy to increase internal service quality, external service quality, customer satisfaction, and logistical performance.

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APPENDIX
DESCRIPTION OF ANOVA

ANOVA (Analysis of Variance) is a dependence technique used to assess the difference of one metric dependent variable (e.g., inventory turns) based on a set of non-metric independent variables (e.g., HICO and LICO interdepartmental customer orientation groups). ANOVA can be stated in the following general form:

$$Y_1 = X_1 + X_2 + X_3 + \ldots + X_n$$

(metric) (non-metric)

In essence, ANOVA assesses significant and non-significant differences between mean responses provided by groups of respondents. ANOVA is analogous to performing simultaneous t-tests, but is preferable because it allows for greater control of Type 1 errors. Type 1 errors are defined as the probability of finding a significant difference between mean responses when none actually exists (Hair et al. 1998). Presently, a Type 1 error would occur if a significant difference was found between mean responses of the HICO and LICO groups when, in fact, none actually existed.

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