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THE IMPORTANCE OF LOGISTICS CAPABILITY IN THE E-COMMERCE MARKET

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ABSTRACT

This research is focused on the importance of logistics capability and its effect on firm performance in the e-commerce market. Technology-based net companies are known to have poor business network and infrastructure compared to resource-based traditional non-net based companies. A multiple-item logistics capability measurement scale is used to measure logistics capability of the firm. Firm performance is also measured by multiple items. The results indicate that logistics capability has a positive relationship with firm performance and this relationship is stronger for net based firms than for non-net based firms. Logistics capability is perceived as the firm's critical capability in providing a competitive advantage in both traditional and e-commerce market environments.

INTRODUCTION

The study of firm performance is grounded in several disciplines including economics, sociology, and organizational behavior. Many researchers have attempted to explain why certain firms perform better than others do by linking various elements of the organization with performance measures. These studies include linking performance with strategy, structure, environment, organizational learning, market orientation, resources, and capability.

One of these areas, logistics capability, has been widely studied, and measurement scales have been developed to link to competitive advantage and superior firm performance (Ellinger et al., 2000; Lynch, 1998; Clinton and Closs, 1997; Eckert and Fawcett, 1996; Morash et al., 1996; Bowersox and Daugherty, 1995; Global Logistics Research Team at Michigan State University, 1995). These studies have found that logistics activities affect performance in terms of revenue enhancement as well as cost reduction. Other studies also found that many firms stress logistics capability as a means to create differentiation and a competitive advantage (Daugherty, Stank, and Ellinger, 1998; Anderson and Narus, 1995). It seems safe to say that logistics capability contributes to overall corporate strategy and performance and often provides the core competitive competence.

The Logistics Challenge in an E-commerce Market

There is a revolution in the marketplace brought on by information technology, exemplified by the rapid growth of electronic commerce or "e-commerce." The Internet has emerged now as a dynamic medium for channeling transactions between customers and firms in a virtual marketplace. E-commerce initiatives undertaken by firms reflect active engagement in order to build capability and compete in the e-business market. These moves allow firms to position themselves advantageously and to exploit the potential growth in online business, leading to benefits in future periods (Subramani and Waldon, 1999).

However, e-commerce requires a new logistics approach. Firms selling to businesses and consumers online must face the simple truth that they cannot send a product over the Internet. Launching e-business enterprises has forced conventional firms to become logistics companies. Small order size, increased daily order volumes, small parcel shipments, and same-day shipments become reality and are common. Getting goods delivered to a customer's doorstep in a timely manner is a much more complicated task. Now, the success of firms in the e-commerce markets depends on the efficiency of their distribution networks (Huppertz, 1999; Foster, 1999; Harrington, 2000; Hill, 1999). Jeff Bezos of Amazon.com notes,

> Logistics and ... customer service—the nonglamorous parts of the business—are the biggest problem with e-commerce. A lot of these companies that are coming online spend all their money and effort building a beautiful Web site and then they can't get the stuff to the customer (*U.S. News & World Report*, 1999).

Thus, the effective and efficient movement of goods is critical in the e-commerce logistics supply chain. Yet for many retailers and manufacturers, distribution historically has involved large shipments to distribution centers rather than small mixed lots in overnight packages to consumers, which results, in many instances, in an entirely new distribution infrastructure to handle online business. Often, these new fulfillment requirements are being outsourced and are creating opportunities for third-party logistics service providers (Deckmyn, 1999; Scheraga, 1999; Kroll, 1999). Thus, with the e-commerce revolution, the importance of logistics capability and logistics outsourcing using third-party providers will continue to increase.

Non-Net and Net-Based Firms

In the e-commerce market, firms can be divided into two categories: conventional 'brick and mortar' firms engaging in e-commerce and emerging firms for whom e-commerce is central to their business model. The first category comprises traditional firms with a history of competing in their traditional markets such as IBM or Ford Motors. These firms have extended their activities to include e-commerce operations as an extension of their conventional operations. For these firms, e-commerce initiatives offer strategic opportunities to redefine and extend their current activities. These firms are non-net based. The second category comprises newer dot com firms such as Amazon.com, Yahoo! and Ebay.com, whose operations are primarily enabled by Internet technologies. These are net based firms (Subramani and Waldon, 1999). This categorization parallels the distinction made by many investment analysts between e-commerce firms engaged primarily in e-commerce activities and conventional firms for whom e-commerce is an extension of their traditional activities (Burnham, 1998).

From a resource based perspective (Conner and Prahalad, 1996), non-net based firms accumulate valuable experience and understanding of their market and their customers over years of operating in their chosen market. However, while non-net firms have significant experience in the business domain in comparison to net firms, they often are deficient in their understanding of the technology component required for e-commerce operations. In contrast,

net based firms tend to be technology driven and have significant capability related to Internet technologies. However, net firms are likely to face a challenge in creating an effective organizational structure and organizational process to exploit their technological advantages. While the ability to build an organization particularly suited to e-commerce operations is a major opportunity, the unfamiliarity of the business context and the lack of established industry relationships is a big handicap faced by net based firms. Thus, net based firms tend to be poor in logistics infrastructure and need to rely more on third-party logistics service providers than non-net based firms.

A general assertion of this research is that firms have a higher likelihood of creating a competitive advantage and better performance if they have strong logistics capability in the e-commerce market. The importance of logistics capability and the use of third-party logistics are further emphasized in net based firms because of their poor logistics infrastructure.

RESEARCH HYPOTHESES

The goal of this research is to explore the role of logistics capability in the performance of net and non-net based firms in an e-commerce market. Additionally, the contribution of third-party logistics to the performance of net based firms is also investigated.

The Effects of Logistics Capability on Firm Performance

The strategic use of logistics capability and distinctive competencies for competitive advantage are major concerns for many firms in a heavily competitive environment. As discussed, logistics capability can make major contributions in achieving superior performance and sustained competitive advantage over competitors. The Michigan State University study (Global Logistics Research Team, 1995) investigated how firms use logistics capability to achieve competitive superiority by consistently meeting customer expectations better than competitors.

The study model empirically demonstrated a positive association between superior logistics capability and performance improvements. Other studies also support the positive effect that logistics capability has on certain dimensions of a firm's performance explained by profitability and growth. These studies provide the framework for the current research, relating logistics capability of non-net and net based firms to firm performance in an e-commerce market.

Hypothesis 1: There is a positive relationship between logistics capability and firm performance in the e-commerce market.

Net based firms are characterized by the lack of organizational structure, equipment, experience, and logistics proficiency. The challenge for these firms is to create effective organizational structures and organizational processes to exploit their technological advantages in a product market that is novel to these firms. It is assumed, therefore, that logistics capability will play a more critical role in these firms than non-net based firms that have already built their logistics systems.

Hypothesis 2: The positive relationship between logistics capability and firm performance is stronger for net based firms than for non-net based firms.

As e-commerce continues its explosive growth, logistically challenged firms need help, and they are primarily looking at third-party logistics (3PL's) to solve the problem (Kroll, 1999; Karpinski, 1999; Harrington, 2000). There are already several examples of total outsourcing of logistics functions, where a 3PL or group of 3PL's handles a retailer's entire logistics operation in an e-commerce market. The 3PL receives the goods from vendors based on Internet orders. The 3PL then performs warehousing, order picking, assembly, packaging, and shipping, as well as the huge job of handling returns. Some firms outsource portions of the e-commerce supply chain, such as the warehousing and order

fulfillment, or the shipping and delivery. In most cases, however, the web-based net companies are poor in logistics infrastructure and eager to outsource as much of the logistics portion of the business as makes sense.

Hypothesis 3: Net based firms rely more on third-party logistics than nonnet based firms do.

METHOD

Scale Development

A fairly comprehensive set of items from prevalidated scales was used to measure the dependent variable (firm performance) and independent variable (logistics capability). All items were rated on a seven point Likert-type scale for which a score of 1 indicated 'poor,' or 'low,' and a score of 7 indicated 'excellent,' or 'high.' Intermediate scores represented ratings between these extremes.

Logistics capability. Measurements for logistics capability in this study particularly focused on the capability required to perform the key activities in the critical loop of business logistics (Ballou, 1999). Logistics capability in the critical loop is well represented by Morash et al. (1996) in their study to relate strategic logistics capability to competitive advantage and firm success. After the comprehensive review of the logistics capability literature, including the MSU study, Morash et al. (1996) selected eight logistics capability variables, which include pre and post-sale customer service, delivery speed, delivery reliability, responsiveness to target market, widespread distribution coverage (availability), selective distribution coverage and low total cost distribution. Thus, measures of logistics capability used in this study are based on those of Morash et al. (1996).

In addition to the eight logistics capability measures used by Morash et al. (1996), several e-commerce specific logistics capability items were included for possible modification and addition. The e-commerce logistics literature identified

logistics capabilities that need close attention in an e-commerce market environment. These are the ability to handle small, frequent orders, the ability to deliver correct orders on time, the ability to communicate with customers for shipping information, the ability to handle and fill the order using a Web-based order handling system, the need for information technology to share logistics information with other channel members, the ability to handle return products, and the ability to handle global distribution. After discussion with a panel of experts and careful comparison with definitions of strategic logistics capability used by Morash et al. (1996), the eleven logistics capability items were finalized.

Firm performance. Since data are rarely published for individual business units or for privately held companies, empirical studies that deal with firm performance face a serious challenge in obtaining accurate and reliable objective performance data. Fortunately, recent research has shown that certain perceptual measures (such as managerial perceptions of market share, profit margin, etc.) correlate closely with objective financial and marketing information (such as percentage in market share, return on assets, and return on equity) (Fawcett et al., 1997; Vickery et al., 1993). Thus, this research uses perceptual performance measures related to financial and marketing issues: profitability, sales growth, and overall performance. In addition to three performance measures, customer satisfaction was added simply because previous studies indicated that customer satisfaction was directly related to firm performance and logistics managers were well aware of the overall customer satisfaction level (Ellinger et al., 2000; Lynch, 1998; Thomas, 1998).

Firm performance was measured by asking respondents to self-evaluate their firm in comparison with their perceptions of the performance of their largest competitor. The scales were based on those used by Ellinger et al. (2000), Lynch (1998), and Thomas (1998). However, actual performance measures, such as

sales growth, gross profit margin, and net profit margin, were also analyzed to identify any deviations from perceptual performance measures.

Control variables. A number of control variables deemed to be important determinants of performance have been included in the analysis. The majority of these measures (market growth, buyer power, supplier power, seller concentration, ease of entry, and technological change) were taken from Narver and Slater (1990) who included them as control variables in their assessment of the relationship between market orientation and performance. The other control variables (competitive intensity, market dynamism, and government regulation) were taken from Baker and Sinkula (1999) who used them in addition to previous control variables to assess the relationship between market orientation, learning orientation and firm performance.

The Sample

The setting for the study is the computer and consumer electronic retailing industry. This industry was selected for a number of reasons. First, computer-related products, consumer electronics, books, clothing and video/recorded music are the products that are most frequently purchased online (Ernst & Young, 1999; McQuivey et al., 1998). Secondly, the computer and consumer electronics retailers are the most affected by the e-commerce revolution because they directly deal with the ultimate customers who shop online. It is widely accepted that studying one industry allows more control of extraneous variables and thus controls cross-industry variance and provides robust results for theory testing (Morash et al., 1996; Innis and La Londe, 1994). Third, this retail industry yields a large enough sample to provide a reasonable assessment of the hypothesized model. Finally, in the computer and consumer electronics retail industry, logistics is of paramount importance due to frequent transactions, customer interactions, and inventory turnover.

A preliminary survey instrument was pretested by six logistics managers and six academic researchers who are familiar with the areas of logistics. Pretest participants were asked to comment on the wording, presentation, and face validity of items in the instrument. Suggestions for rewording and repositioning the items were incorporated into the final survey instrument.

The mailing list was obtained from the Computer & Consumer Electronics Retailers Directory published by Chain Store Guide. The sampling frame of 1,232 companies was selected from the Directory. A questionnaire was mailed either to the president or logistics managers of each firm. Of the 126 total questionnaires returned, six were dropped because of missing data points. The final analysis was performed with the remaining 120 surveys. Table 1 provides descriptive statistics of the sample. On average, firms in the sample earned $45 million in sales revenue per year, grew about 21% in sales, and employed 140 employees (14 in logistics area). Their average gross profit margin was about 21% and net profit margin was 7.8%.

DATA ANALYSIS

The assertions about relationships between constructs represented by the measures can be made only after reliability and validity are demonstrated. In accordance with accepted practice (Churchill, 1979; Gerbing and Anderson, 1988), the properties of measurement scales for reliability, unidimensionality, and construct validity were assessed.

Reliability Assessment

Reliability analysis was first performed using SPSS 10.0 and the results were confirmed using LISREL (Joreskog and Sorbom, 1996). The results of this analysis are shown in Table 2. The eleven items in logistics capability and four items in firm performance measurement were subjected to an analysis extracting one principal component. From the one factor solution, the scale was further refined based on retaining factor loadings greater than 0.6. The scale refinement process was repeated until all the item-to-total correlations of retained items were

TABLE 1
SURVEY RESPONDENTS CHARACTERISTICS

Annual Sales Revenues ($)
Minimum	2.6 million
Maximum	312 million
Median	21 million
Mean	45 million

Average Growth in Sales (%)
Minimum	-20
Maximum	250
Median	15
Mean	20.7

Gross Profit Margin (%)
Minimum	4
Maximum	50
Median	20
Mean	20.9

Net Profit Margin (%)
Minimum	-10
Maximum	35
Median	5
Mean	7.8

Number of Full-Time Employees
Minimum	5
Maximum	2,200
Median	50
Mean	140

Number of Employees in Logistics Division
Minimum	0
Maximum	200
Median	7
Mean	14

TABLE 2
RELIABILITIES AND FACTOR LOADINGS

Constructs/ Items	Factor Loadings	Item-To-Total Correlation	Alpha If Item Deleted	Cronbach Alpha
Logistics Capability/				.80
LC 6	.65	.48	.79	
LC 7	.86	.75	.70	
LC 8	.81	.66	.74	
LC 9	.74	.58	.77	
LC 10	.65	.48	.79	
Firm Performance/				.75
FP 1	.84	.66	.63	
FP 2	.76	.55	.71	
FP 3	.68	.47	.74	
FP 4	.77	.55	.70	

over 0.5 (with the exception of three items in the 0.47 range). The results of this scale refinement process yielded the following results for two measurement constructs.

The two constructs, logistics capability and firm performance, had Cronbach alphas of 0.80 and 0.75, respectively. The logistics capability construct resulted in five items being retained with factor loadings ranging from 0.65 to 0.86. The item-to-total correlations for the construct ranged from 0.48 to 0.74. It is interesting to note that three new logistics capability measures that were developed to count the e-commerce specific logistics challenges were all highly loaded on the logistics capability measurement construct during the scale refinement process. The firm performance construct resulted in four items being retained with factor loadings and item-to-total correlations ranging from 0.68 to 0.84 and 0.47 to 0.66, respectively. The customer satisfaction item (FP 3) was retained for further analysis because of its high factor loading although its item-to-total correlation was marginally acceptable.

Unidimensionality and Construct Validity

To ascertain the validity of the scales utilized in this research, confirmatory factor analysis (CFA) via LISREL 8.50 was conducted to assess uni-dimensionality following suggestions of Gerbing and Anderson (1988). They suggested that CFA affords a stricter interpretation of unidimensionality than can be provided by traditional methods, such as item-to-total correlations or exploratory factor analysis. The results of this test are presented in Table 3. The confirmatory factor analyses for both measurement constructs established that each construct had unidimensionality (low chi-square, high P-value, and high fit indexes). Convergent validity was also established as all items for each scale loaded significantly (t values > 1.96).

A final measurement analysis to establish discriminant validity was conducted following the procedures outlined by Fornell and Larcker (1981). The average variances extracted were 0.47 and 0.44, which were close to 0.5, and they were all greater than the squared correlations of the items. The correlations within construct measures were significantly larger than correlations between measures of different constructs (Table 4). Thus, the conditions for discriminant validity were met for all measurement constructs. Therefore, validity was established for all the measurement scales. Based upon previous discussions and analyses, reliability and validity of measurement scales were established.

TABLE 3
CONFIRMATORY FACTOR ANALYSIS MAXIMUM LIKELIHOOD ESTIMATES

Constructs/ Items	Lambda-X (T value)	Chi-X^2 (P, df)	RMSEA	GFI (AGFI)	NFI (NNFI)	CFI
Logistics Capability/		5.63	.041	.97	.95	.99
LC 6	.53 (4.60)	(.34, 5)		(.91)	(.98)	
LC 7	.89 (8.86)					
LC 8	.76 (7.18)					
LC 9	.67 (6.15)					
LC 10	.50 (4.28)					
Firm Performance/		1.89	0.0	.99	.97	1.00
FP 1	.75 (6.38)	(.39, 2)		(.94)	(1.01)	
FP 2	.66 (5.51)					
FP 3	.55 (4.46)					
FP 4	.67 (5.66)					

TABLE 4
CORRELATIONS BETWEEN/WITHIN MEASUREMENT CONSTRUCTS

	LC6	LC7	LC8	LC9	LC10	FP1	FP2	FP3	FP4
LC6	1.00								
LC7	.489**	1.00							
LC8	.324**	.676**	1.00						
LC9	.337**	.603**	.506**	1.00					
LC10	.369**	.397**	.451**	.307**	1.00				
FP1	.242*	.144	.291**	.218*	.410**	1.00			
FP2	.186	.186	.393**	.169	.473**	.527**	1.00		
FP3	.315**	.305**	.401**	.157	.531**	.381**	.329**	1.00	
FP4	.486**	.358**	.477**	.309**	.307**	.494**	.414**	.437**	1.00
Mean	5.55	4.83	5.18	3.76	5.39	4.71	4.87	5.79	5.46
STD	1.41	1.61	1.35	1.80	1.19	1.22	1.35	.96	1.06

NOTE: LC: Logistics Capability, FP: Firm Performance $*p < .05$, $**p < .01$.

RESULTS

The ordinary least square regression was mainly employed to test the hypotheses, and independent sample T-tests were conducted to support the test results. The control variables described earlier were included in all regression models to control for compelling alternative explanations of performance. The results of the tests are presented in Table 5. In all cases, the models that include main effects of logistics capability, firm performance, and control variables were highly significant.

The first model involving firm performance explains a significant amount of variance (adjusted R square = .511, F = 8.139, p<.001). All other models that include each firm performance measure in Table 5 also explain significant amounts of variance. While specific hypotheses were not offered in regards to the control variables, it is notable that controlling for buyer

power (b = -.408, p < .001), supplier power (b = .300, p <.01), seller concentration (b = .209, p < .01), technology change (b = .200, p < .05), and market dynamism (b = -.479, p < .001) would appear to be important when interpreting the regression involving firm performance.

Hypothesis 1:   Positive association between logistics capability and firm performance

The first hypothesis investigates the relationship between logistics capability and firm performance. It stated that logistics capability would positively affect firm performance. The results of regression analyses are presented in Table 5. The logistics capability measure shows a significant positive relationship with the aggregated firm performance measurement (b = .636, p < .001). Logistics capability also evidenced significant positive relationships with each of the performance measures: profitability (b = .366, p < .01), sales growth (b = .499, p < .01), customer satisfaction (b = .613, p < .001), and overall performance (b = .681, p < .001). These findings support the first hypothesis.

Hypothesis 2:   Stronger and positive association between logistics capability and firm performance for net based companies

The second hypothesis investigates whether net based firms have a stronger positive relationship between logistics capability and firm performance than non-net based firms. The results of the regression analyses are also presented in Table 5. The regression coefficients for net based firms support this hypothesis. Net based companies have consistently higher regression coefficients in all of the firm performance measures (b = .279 versus .177 for profitability; b = .266 versus .178 for sales growth; b = .609 versus .446 for customer satisfaction; b = .676 versus .446 for overall performance; b = .759 versus .351 for aggregated firm performance measure). Thus hypothesis 2 is supported.

Hypothesis 3:   Net based firms rely on third-parties more than non-net based firms

To investigate the association between the type of firm and its dependence on third-party logistics providers, data on sales generated by the use of third-party partners were analyzed. Independent samples T-tests demonstrate that net based firms depend on third-parties more to generate sales volume than non-net based firms (mean value of 4.8 versus 1.8 with p = .003). Thus, Hypothesis 3 is also supported.

Other Findings

In addition to hypotheses testing, independent samples T-tests were conducted to investigate the difference between net based and non-net based firm's performance. T-tests revealed no significant difference in logistics capability between these two types of firms even though net based firms indicated higher dependence on third parties for sales support. In terms of firm performance, net based firms reported higher performance than non-net based firm's. In profitability, no significant differences were found. For sales growth and customer satisfaction, net based firms performed better than non-net based firms. Non-net based firms had much higher revenue. However, net based firms reported higher growth rates and net profit margin. Finally, gross profit margin was not significantly different between the two types of respondents.

DISCUSSIONS AND IMPLICATIONS

The focus of this research was to explore the role of logistics capability and logistics outsourcing in the performance of net and non-net based firms in the e-commerce market environment. For this purpose, an e-commerce specific logistics capability measurement was developed together with firm performance measurement constructs. Hypotheses were examined by regressing performances of net and non-net based firms

TABLE 5
ESTIMATES OF RELATIONSHIPS BETWEEN
LOGISTICS CAPABILITY AND FIRM PERFORMANCE

Predictor and Control Variable/ Statistics	*Firm Performance*	*Dependent* Variables *Profitability*	*Sales Growth*	*Customer Satisfaction*	*Overall Performance*
H_1: *Logistics Capability/* Unstandardized Coefficient	.636*** (.097)	.366** (.135)	.499** (.164)	.613*** (.102)	.681*** (.101)
H_2: *Net and Non-net/* Unstandardized Coefficient	.759*** and .351**	.279 and .177	.266 and .178	.609** and .446**	.676*** and .446***
Control Variable/					
Market Growth	.132 (.088)	.102 (.123)	.131 (.150)	.119 (.093)	.105 (.093)
Buyer Power	-.408*** (.085)	-.455***(.119)	-.252 (.144)	-.410***(.090)	-.275** (.089)
Supplier Power	.300** (.086)	.346** (.119)	.305* (.145)	.118 (.090)	.283** (.090)
Seller Concent.	.209** (.067)	.236* (.094)	.277* (.115)	.008 (.071)	.148* (.071)
Ease of Entry	-.001 (.073)	-.009 (.102)	-.007 (.124)	.128 (.077)	-.003 (.076)
Techno. Change	.200* (.098)	.399** (.137)	.166 (.167)	.139 (.104)	.0005 (.103)
Compet. Intensity	-.004 (077)	-.005 (.108)	-.299* (.132)	.164* (.082)	-.0006 (.081)
Market	-.479*** (.110)	-.379* (.153)	-.379* (.186)	-.616** (.116)	-.265* (.115)
Dynamism	-.123 (.074)	-.227* (.104)	-.115 (.126)	.001 (.079)	-.009 (.078)
Gov. Regulation					
	2.27** (.796)	6.06** (1.112)	6.51** (1.354)	8.27** (.842)	7.672** (.834)
Constant	.511	.360	.226	.403	.526
Adjusted R^2	8.139***	4.831***	2.987**	5.601***	8.571***
F statistic					

NOTE: Tests of hypotheses are one-tailed tests. Numbers in parentheses are standard errors.
 $*p < .05$, $**p < .01$, $***p < .001$. Statistic for control variables is unstandardized coefficient.

against logistics capability and the control variables.

The positive relationship between logistics capability and firm performance is consistent with other research findings on the subject (Ellinger et al., 2000; Lynch, 1998; Morash et al., 1996; Global Logistics Research Team, 1995). The study supports that firms need strong logistics capability to perform well in both traditional and e-commerce markets. The importance of logistics capability and third parties is emphasized more for net based firms. It can be interpreted that logistics capability plays a more important role in net based firms than in non-net based firms. Thus, net based firms need to focus more attention on developing their logistics capability. In addition, net based firms responded with a stronger dependence on third parties than non-net based firms do in generating sales. This finding suggests that the efficient management of third-party relationships is critical in sales generation and firm performance for net based firms.

LIMITATIONS AND FUTURE RESEARCH

This study was conducted in the context of the computer and consumer electronics retailing industry that sells the products most often traded on-line. Therefore, any generalization to other industries must be made with caution. In addition, a single key informant was used to obtain the perceptual information on logistics capability and firm performance. This may cast some degree of doubt regarding the validity of the information obtained. However, the president or logistics manager of the firm should have adequate knowledge about firm capability and performance. The responses were assumed to be valid and reliable.

Another limitation is that firm performance may be affected not only by logistics capability but also by various other extraneous variables not measured in this study. Logistics capability needs to be integrated with other functional areas of the firm such as marketing, finance, and operations to better support firm performance (Ellinger et al., 2000). Projecting firm performance based solely on logistics capability may not be valid.

A major objective of this study was to investigate the relationship between logistics capability and net and non-net based firm's performance in the e-commerce market. Upon the completion of this study, several related avenues of future research can be outlined. This study was conducted in one industry and there exist obvious generalization issues due to this limitation. Logistics capability, especially, may be the most critical issue to some industries and may not be that critical in other industries. It would be beneficial to examine the role of logistics capability and links to performance in other industries.

Although logistics capability was successfully linked to firm performance in this study, future research needs to examine other types of capability or functions and links to firm performance. In this new context, the role of logistics capability and links to firm performance may become clearer. Future research should also include an extensive investigation of the role of logistics outsourcing in firm performance. This study may be best conducted by a longitudinal study of the same firms comparing the differences in firm performance before and after logistics outsourcing.

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APPENDIX
MEASURES AND ITEMS

Logistics Capability (Coefficient Alpha = .80)
(7-point scale, in which 7 = excellent and 1 = poor. Five items were retained for this construct)

My firm has the ability to:
LC1. Pre-Sale Customer Service:
The ability to service the customer during the purchase decision process (i.e., provide product information before the customer buys the products).

LC2. Post-Sale Customer Service:
The ability to service the customer after the sale of the product to ensure continuing customer satisfaction (i.e., efficient return product handling).

LC3. Delivery Speed:
The ability to reduce the time between order taking and customer delivery.

LC4. Delivery Reliability:
The ability to exactly meet quoted or anticipated delivery dates and quantities (i.e., deliver correct orders on time).

LC5. Responsiveness to Target Markets:
The ability to respond to the needs and wants of the firm's target market(s) (i.e., handle small and frequent orders).

LC6. Delivery Information:
The ability to communicate shipping and delivery information to customers.

LC7. Web-based Order Handling:
The ability to handle and fill orders using a Web-based order handling system. It also includes the ability for logistics information sharing with other channel members.

LC8. Widespread Distribution Coverage:
The ability to effectively provide widespread and/or intensive distribution coverage (global coverage is not included).

LC9. Global Distribution Coverage:
The ability to effectively provide global distribution coverage.

LC10. Selective Distribution Coverage:
The ability to effectively target selective or exclusive distribution outlets.

LC11. Low Total Cost Distribution:
The ability to minimize the total cost of distribution.

Firm Performance (Coefficient Alpha = .75)
(7-point scale, in which 7 = excellent and 1 = poor. Four items construct)

Relative to your largest competitors, how well does your company perform in the following areas?

FP1. Profitability

FP2. Sales Growth

FP3. Customer Satisfaction

FP4. Overall Performance

Contribution by Third-Parties
(7-point scale, in which 7 = high and 1 = low)

How much of your sales volume is generated through the use of third-party logistics providers?

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