THE DIVERSIFICATION EFFECTS ON THE FREIGHT

FORWARDING INDUSTRY

A Senior Scholars Thesis

by

BRITNEY GREER

Submitted to Honors and Undergraduate Research
Texas A&M University
in partial fulfillment of the requirements for the designation as

UNDERGRADUATE RESEARCH SCHOLAR

December 2011

Major: Maritime Administration

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ABSTRACT

The Diversification Effects on the Freight Forwarding Industry. (December 2011)

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In this thesis, I review and discuss empirical studies that examine how a firm's international and product diversification affects their performance. Many of the studies find inconsistent relationships. This is due to the variety of industries studied. Most studies were conducted with data from manufacturing firms. I will test a unique service sector, the freight forwarder. I hypothesize and confirm the relationship between a service firm's multinationality and performance is an inverted 'U' much like in manufacturing. The research provides an explanation that international and service expansion increases performance, but only to a certain point where the relationship reverses.

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This research project would not have been possible without the support of many people. My advisor, Dr. Mileski, without her knowledge and assistance this study, would not have been successful. I now have even greater respect for those who conduct research constantly.

Also, thanks to my family and friends for their support. Without their constant encouragement and endless love throughout the duration of this project, I could not have completed it.

NOMENCLATURE

NVOCC	Non-Vessel Operating/Owning Common Carrier
CHB	Custom House Brokerage
3PL	Third Party Logistics

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CHAPTER I

INTRODUCTION

Companies use the concept of diversification to expand their selection of services in order to reach new markets. By anticipating a positive influence on market power effects, risk reduction effects, and learning effects (Markides, & Holweg, 2006). Generally, the more diverse a company is, the better it will perform. This is until it over-diversifies which leads to the company's financial deterioration (Rogers, & Mendes, 2008). This generally is due to increased coordination costs (Chang, & Wang, 2007).

International diversification is defined as the number of markets a company participates in worldwide. Product/service mix diversification is the number of different products or services a company provides. Studies on international diversification and the effects on a company's performance have recorded conflicting results. There are three models that describe the relationship between diversification of businesses and corporate performance: the linear model, the curvilinear model ('inverted U' & 'U'), and the intermediate model ('S') (Rogers, & Mendes, 2008). The linear model is the most basic relationship when looking at performance and diversification, showing international growth is positive for a firm's performance. The inverted 'U' shows that international growth beyond a point will be negative on the firm's performance. The 'U' proposes that

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This thesis follows the style of *Journal of International Business Studies*.

a firm's international growth has an initial negative effect on their performance before positive returns are realized. The newest argument, the 'S' model, combies the two curvilinear models. It suggests that firms experience a negative effect in the beginning, but then see the benefits. The firm will continue to grow beyond the peak, resulting in reduced performance. These variations appear to result from differences in industries or lines of business.

Intermediaries in transportation, "entities that provide third party supply chain logistics services to achieve the desired goal of timely, safe and compliant delivery of the shipper's goods through the international supply chain at the lowest practical cost," are a necessity in today's economic globalization (United, 2005). "Freight intermediaries link the international supply chain by facilitating market access for exporters. The use of freight intermediaries allows a firm to enter foreign markets without specific operational knowledge or experience in those markets" (United, 2005). To remain competitive, these logistic providers are expanding their corporate scope by expanding the lines of services they provide and the geographic areas within which they operate.

By evaluating transportation in the maritime industry, the effects of both international diversity and service diversification on performance can be determined. We chose to look at ocean logistic providers because they represent a small service industry that handles eighty percent of the world's cargo (United, 2005). Transportation intermediaries, someone who helps schedule shipments to go from point A to B and

deals with the large number of details associated with international transportation in between, can be called many things. For the purposes of this thesis I am calling these transportation intermediaries who specialize with ocean cargo (rather than air, railroad, or truck), freight forwarders. Other names they are commonly called are 3PLs (third party logistics), forwarder, or logistics provider. Freight forwarders offer their customers services, intangible rather than tangible products. Service firms face differences like intense customer contact, extensive customization, and cultural adaptation needed to become successful (Capar, & Kotabe, 2003).

The maritime industry is a unique niche in the service market since customers are sophisticated, ie. business to business, versus business to end user, who understand practices in the industry. This should reduce the learning curve generally experienced in the service industries, like retail/wholesale, utility, information technology (IT) services, and tourism (Capar, & Kotabe, 2003). Ocean freight forwarders have been trying to strengthen the one-stop service concept. Currently "the freight forwarding industry is experiencing significant volatility as a result of technological advances, regulatory changes, customer pressures, and increased competition" (Markides, & Holweg, 2006). Companies are counteracting these changes by expanding and specializing their service mixes and by consolidating companies. Possible service mixes include: companies with related versus unrelated services, and more specialized niches, like multi-modal, non-vessel operating common carriers (NVOCCs), and custom house brokers (CHBs). Because companies have merged and diversified, freight forwarders are "specialists who

can provide a variety of functions to facilitate the movement of… shipments" (Murphy et al., 1992). Some of the functions include: "booking vessel space, preparing relevant documentation, paying freight charges, and arranging inland transportation services" (Murphy, & Daley, 2001).

The remaining sections of this thesis are organized as follows: the literature review, followed by details of the data sample and the methodology. Ending with the results of the analysis and conclusions drawn from the findings.

CHAPTER II

LITERATURE REVIEW AND HYPOTHESES

There have been numerous studies examining the relationship between international

diversification and performance; however, the theories and empirical tests have

produced conflicting results. Table 1 from Contractor, Kundu, and Hsu (2003)

summarizes past studies on manufacturing firms. "It has been argued that theories

developed to explain the behavior of multinational manufacturing firms could be applied

to multinational service firms", even though there are difference between manufacturing

firms and service firms like intangibility, perishability, simultaneity of production and

consumption, and customization (Broddewyn et al., 1986).

Table I Previous literature on the link between performance and degree of multinationality

	Author(s) and year	Performance indicators
Linear	Han *et al.* (1998) (+)	ROE, asset turnover, profit margin
	Jung (1991) (+)	(After-tax net income)/(Total assets)
	Vernon (1971) (+)	ROI, ROS
	Kim and Lyn (1987) (+)	Excess market value; Tobin's Q
	Errunza and Senbet (1981) (+)	Excess return
	Grant (1987) (+)	ROA, ROE, ROS
	Grant *et al.* (1988) (+)	ROA, ROE, ROS
	Brewer (1981) (−)	Stock return
	Siddharthan and Lall (1982) (−)	Sales growth
	Michel and Shaked (1986) (−)	Risk-adjusted return
	Collins (1990) (−)	Total risk, Debt to equity ratio, Beta
	Buckley *et al.* (1977, 1984) (0)	ROA
	Kumar (1984) (0)	ROA, ROS
	Morck and Yeung (1991) (0)	Market value
U-shaped	Qian (1997)	ROE
	Ruigrok and Wagner (2002)	ROA
Inverted-U-shaped	Daniels and Bracker (1989)	ROA, ROS
	Geringer *et al.* (1989)	ROA, ROS
	Sullivan (1994a, b)	ROA, ROS
	Ramaswamy (1995)	ROA, ROS, ROVA
	Al-Obaidan and Scully (1995)	Frontier production function, Variance in technical efficiency
	Gomes and Ramaswamy (1999)	Cost of sales/total sales, ROA
	Hitt *et al.* (1994)	ROA, ROS

Findings: +, positive relationship; −, negative relationship; 0, no relationship.

Source "Table 1(Contractor et al., 2003)"

The basic functions found were linear, non-monotonic, both, or neither. More recent debates have been on a positive or negative non-monotonic function, 'U' or inverted 'U' shape. A 'U' shaped relationship suggests initially a negative effect of international expansion on performance, before the positive returns of international expansion are realized. Where an inverted 'U' suggests international expansion has a positive effect on a firm's performance until the peak, where performance begins to decrease as the costs of operations and management exceeds the advantages of further expansion. Contractor, Kundu, and Hsu (2003) have recently introduced a third three-stage theory which combines the previous research, producing an 'S' curve. In stage one, a firm experiences an initial negative effect due to costs and barriers to initial international expansion (negative slope); in stage two, the firm begins to see the benefits of international expansion (positive slope); and in stage three, the firm extends its international expansion beyond the optimal threshold (negative slope again). The linear relationship between international diversification and performance is presented as the null hypothesis and the alternative relationship is one of the non-monotonic functions.

The freight forwarding sector provides necessary knowledge to aid international shipments successfully. These services are vital and without them manufactured goods would not even make it to other markets. Even though services are the most important there have only been a few empirical studies on them (Capar, & Kotabe, 2003; Contractor et al., 2003). By diversifying internationally a company can increase their profitability because: " (1) it makes it possible to exploit scale economies; (2) it provides

better and more flexible access to resources; (3) it allows for more learning" (Hennart, 2007). Hitt, Hoskinson, and Kim (1997) argue that the third theory of international diversification provides "the opportunity for new and diverse ideas from a variety of markets and cultural perspectives. This suggests that internationally diversified firms have greater opportunities to learn (increasing organizational knowledge) than do purely domestic firms"; this increase of organizational learning increases profitability. In the beginning, a knowledge-based firm experiences an initial learning cost and insufficient economies of scale; then, as time and knowledge progresses, they gain access to lower cost resources and economies of scale and scope (Contractor et al., 2003). This cycle would produce an inverted "U" shaped relationship between the company's performance and international diversification.

Geographic diversification shows a company expands its geographic range up to a point where the organizational rigidity increases the coordination costs beyond the economies of scale resulting in a decline in performance. Coordination costs are defined as "costs that arise from managing task interdependencies and organizational rigidity as the cost of reformulating (or failing to reformulate) previously institutionalized routines and practices in legacy businesses" (Rawley, 2010). This phenomenon is thought to occur due to corporate management's inability to accurately assess the business needs beyond a limited amount of countries.

Due to the nature of service versus product diversification, knowledge management and learning are high as a service organization diversifies in additional services and geographic regions. As a company geographically diversifies, their knowledge of the surrounding environments grow by understanding local markets and creating networks. As the number of geographic locations a firm is in increases, the knowledge begins to overlap in areas creating synergy groups. Thus, as a service organization diversifies performance initially it is low as the investment in knowledge consumes resources and therefore profit, but as knowledge is gained, synergy across services and geographic regions is obtained improving profit.

Freight forwarders, as service providers, provide their customers the information/knowledge to move cargo across geographic regions. As they increase services for their customers it is expected that their diversification in relation to performance would over come the initial cost associated with learning. As the regions that they service increase, so will the firms performance until they reach a point where the cost of coordination will cause a reduction. Service and geographic diversification in relation to performance would follow an inverted 'U'.

> H1:   The relationship between international diversification and performance in a service industry will be an inverted U-shaped curvilinear function.

> H2: The relationship between service diversification and performance in a service industry will be an inverted U-shaped curvilinear function.

This single industry is unique to other studies because the products are services verses manufactured goods. This historically small industry with sophisticated business-to-business customers varies from other service firms that were previously studied. Freight forwarders are a blend of the two service sectors Contractor, Kundu, and Hsu (2003) differentiates: knowledge based and capital intensive. In general, freight forwarders are considered non-asset based companies because they consolidate shipments via asset-based carriers by booking or otherwise arranging space for those shipments. Sometimes freight forwarders are NVOCCs where they function as a carrier by issuing their own bills of lading and assuming responsibility for the shipment. When working as a CHB freight forwarders act as an agent for merchants in the business of entering and clearing goods and vessels. Although the majority of freight forwarders are non-asset based since they do not own the actual vessel some do own warehousing or storage to hold shipments in between moves. This is where knowledge-based is blended with a small amount of assets, but not enough to be considered capital intensive.

CHAPTER III

MODEL AND VARIABLES

Data

As previously stated, a large portion of the freight forwarding industry is private and small. However, some data is available to the public. Hoovers is a ratings company where Dun & Bradstreet credit files are at the core of their database. These companies report their information to keep their credit file up to date. Before becoming a vendor with government agencies, the government requires each company to get a DUNS number, a 9-digit universal numbering system, through Dun & Bradstreet so that credit can be researched and tracked. Hoovers reaches out to these Agencies once a quarter to have their profile updated. Hoovers states the location type of each observation as headquarters encompassing the entire company or as a single location. Observations of a single location under a common company name, such as Fedex, could be due to franchisee opportunities. For geographical diversification I used this information on the type of location and referred to their company website to determine how many countries they were located in, locations were defined as having an office present. So companies that were listed as headquarters could have multiple locations where as a single location would be considered as having one geographical diversification.

The other two variables were collected from the company websites. These sources provided accurate information since this is the information the company wants to relay to the public. Service diversification was found by reviewing the company's website and

finding the various services they offered.

The magazine *Inbound Logistics*: *The 3PL Supper Issue* contained a list of the top 100 3PL providers of 2011. Companies that did not provide ocean transportation services were eliminated. The same concepts were applied to the top 100 3PL providers list and the number of geographic locations and services were counted. There were overlapping companies from our original Hoovers list. Since sources were combined there was a 92% correlation between common variables. Between the three sources there were a total of 88 observations.

Variables

Independent variables

International diversification

A firm's international diversification is measured by the number of countries in which a firm operates within (Hitt et al., 1994). In order to test for the presence of non-linear relationships the squared term of the number of countries was used.

Service diversification

The number of services a firm offers measures the business level of diversification. In order to test for the presence of non-linear relationships, the squared term of the number of services was used.

Dependent variable

Performance is represented as the log of sales. "Logarithmic transformation is justified when values of one variable are highly skewed-as is often the case with size-because the extreme values can strongly affect correlation with other variables" (Hoskinsson, 1987).

Control variable

Size has been found to have an impact on the performance of the firm. The logarithm of the number of employees of the company was used as a control variable to manage the effects of size on performance (Gooding, 1985).

Model

The hypothesis was tested using an OLS model.

The model is as follows:

Y=alpha + Bi(area) + Bi(area)^2 + Bi(service) + Bi(service)^2 + C + E

Where Y is the firm's financial performance, performance is measured by log of sales, Bi(area) is the number of countries the firm is located in, Bi(area)^2 is the number of locations squared, Bi(service) is the number of services a firm offers, Bi(service)^2 is the square of the number of services available, C is the control, and E is the error term.

Data analysis

The data was run using SAS a statistical analysis program. The OLS model, ordinary least squared regression, was used as a primary study. To prove non-linearity square

terms were added with each independent variable (international and service diversification). Log of sales was used as the dependent performance variable (Hoskinsson, 1987). I also took the log of the size variable employees. This allowed all the variables to be compared on the same scale. If the log of the variable employee was not taken the regression result would be biased (Gooding, 1985).

CHAPTER IV

SUMMARY AND CONCLUSIONS

Results

Table 2 reports the results of the model. Both hypotheses are confirmed. The impact of area and performance of a firm is statistically significant in the expected positive sign, but it is not a linear relationship between performance and area of a firm. Since the coefficient of the variable area squared is negative, I proved the quadratic relationship. This means that when a firm expands into more countries (geographic areas) the higher the firm's performance (sales) is. The impact of services and performance of a firm is statistically significant with the expected positive sign. Since service squared is negative it was found that the relationship is quadratic. This shows that as a firm adds services their performance (sales) will expand. All of the variables were significant. The most significant was area squared and services, which had a critical value of .05. Service squared had a critical value of .01and area was significant with a .1 critical value. The model's r-squared value was .9188 and the adjusted r-squared was .9139. These show the robustness of the model. Table 3 reports the correlation matrix.

Conclusion

When looking at all four variables both relationships followed an inverted 'U'. The results of the study show that even though the freight forwarding industry is considered a service sector the impact of international and service diversification on performance

follows that of a manufacturing firm. I examined these relationships using a sample of

freight forwarders.

Table 2: Results of the model

Log of Employees	0.92124	<.0001
Independent Variables		
Areas	0.43599	0.0094***
Area Squared	-0.02972	0.0115**
Service Squared	-0.48532	0.0556*
Service	0.06077	0.0160**
Control Variable		
Log of Employees	0.92124	<.0001

* Significant at the .1 level
**Significant at the .05 level
***Significant at the .01 level

R-Square	0.9188
Adjusted R-Square	0.9139

Table 3: Correlation matrix

	Employee	Areas	Services	Sales	LogEmployee	AreaSq	ServiceSq	LogSales
Employee	1.00000	0.26289	0.19791	0.97670	0.38529	0.27270	0.22201	0.34717
	0.00000	0.01330	0.06460	<.0001	0.00020	0.01020	0.03760	0.00090
Areas	0.26290	1.00000	0.51488	0.36019	0.79833	0.98448	0.52032	0.78871
	0.01330	0.00000	<.0001	0.00060	<.0001	<.0001	<.0001	<.0001
Services	0.19791	0.51488	1.00000	0.25280	0.48327	0.49068	0.97307	0.51785
	0.06460	<.0001	0.00000	0.01750	<.0001	<.0001	<.0001	<.0001
Sales	0.97670	0.36019	0.25280	1.00000	0.46827	0.37343	0.28194	0.44831
	<.0001	0.00060	0.01750	0.00000	<.0001	0.00030	0.00780	<.0001
LogEmployee	0.38529	0.79833	0.48327	0.46827	1.00000	0.74820	0.45644	0.94963
	0.00020	<.0001	<.0001	<.0001	0.00000	<.0001	<.0001	<.0001
AreaSq	0.27270	0.98448	0.49068	0.37343	0.74820	1.00000	0.50396	0.73072
	0.01020	<.0001	<.0001	0.00030	<.0001	0.00000	<.0001	<.0001
ServiceSq	0.22201	0.52032	0.97307	0.28194	0.45644	0.50396	1.00000	0.50836
	0.37600	<.0001	<.0001	0.00780	<.0001	<.0001	0.00000	<.0001
LogSales	0.34717	0.78871	0.51785	0.44831	0.94963	0.73072	0.50836	1.00000
	0.00090	<.0001	<.0001	<.0001	<0.0001	<.0001	<.0001	0.00000

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