The Interplay Between Competitive Drivers, Outsourcing and Supply Chain Performance: The Case of Middle East Supply Chains

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ABSTRACT

In order to survive and grow, Saudi Arabian supply chain operatives must be able to manage the dynamic market variables and meet their customers' demand by performing more effectively than their competitors. Competitive advantage can be attained by excelling at cost management, quality, speed, flexibility, reliability, innovativeness (Boyer and Lewis, 2002) and skilled workforce. Skills and capabilities are being tested in Saudi Arabia by higher volumes of business operations and increased diversity from oil-based activities. It appears that there is a heavy reliance by supply chain operatives on DIY strategies, which not only goes against the international trend, but also appears to be negatively impacting on service levels, competitive advantage and profitability. Therefore, this study attempts to gain information about these factors through observable variables and examines the influence of differing competitive drivers and outsourcing capabilities on the ability of a supply chain to excel in performance.

Keywords: Supply chain, reliability, quality, 3PL, performance.

1. INTRODUCTION

Saudi Arabian supply chain operatives are facing escalating challenges from both local and international competitors. Saudi supply chain operatives have been prompted to manage the dynamic market variables and meet their customers' demand by performing more effectively than their competitors (Al Falah, Zairi and Moneim, 2003). Current research looks at particular arrangements and practices to provide better advice on how these operatives should cope with marketplace challenges. Alternative ways to leverage supply chain operatives' ability to compete often include a capacity to develop relationship portfolios, a focus on core business, outsourcing non-core business activities to third party logistics service providers (3PL), and excelling in key competitive priorities to boost performance.

The concept of competitive priorities was initially studied by Skinner (1974) who posited that an organization cannot perform and excel in all dimensions and has to define priorities. Competitive advantage can be attained by excelling at cost management, quality, speed, flexibility, reliability, innovativeness (Boyer and Lewis, 2002) and skilled workforce. Skills and capabilities are being tested in Saudi Arabia by higher volumes of business operations and increased diversity from oil-based activities. A recent report suggests that a significant number of Saudi Arabian supply chain operatives have experienced low-levels of success when implementing their supply

chain operations in-house, mainly due to limitations in relevant skills and capabilities of the workforce. It appears that there is a heavy reliance by supply chain operatives on DIY strategies, which not only goes against the international trend, but also appears to be negatively impacting on service levels, competitive advantage and profitability.

Several studies conducted in developed economies assert that economic, social and cultural variables of each economy impact on the relationship between supply chain drivers, practices and performance. Thus, empirical research in settings such as emerging economies (e.g. the Kingdom of Saudi Arabia) is needed to generalize the suggested relationship. The question, 'Do competitive drivers and outsourcing 3PL positively impact the supply chain?' will be answered.

2. LITERATURE REVIEW

A firm's emphasis on building key capabilities has been a common theme in the supply chain management literature. The term competitive drivers has been often used to describe companies' choice of competitive capabilities (Boer and Gertesen, 2003). Other terms have been used to describe the same concept. For instance, manufacturing tasks (Skinner, 1969), external performance measures and dimensions of competition (Fitsimmons, Kouvelis and Malick, 1991). Despite the differences in terminology, there is a broad agreement that competitive drivers can be generally expressed as the strategic business objectives and goals of the manufacturing organization (Koufteros et al., 2002). Competitive drivers can be expressed in terms of low cost, flexibility, quality, delivery speed and reliability. These competitive drivers are closely related to the notion of generic strategies from the business strategy theory. A firm's competitive drivers may lead to the development of a supporting set of competencies and capabilities (Koufteros et al., 2002). The focus of this study is to evaluate how reliability and quality influence the outsourcing decisions and how they impact on supply chain performance.

2.1 RELIABILITY

Reliability is a fundamental attribute closely related to perfect order fulfillment. Reliable and efficient materials supply involves having the right items, in the right quantity available at the right place at the right time at the expected cost (Jonsson, 2008). Chou (2004) asserts that reliability encompasses consistency of performance over time and includes measures such as the mean time of first failure, then mean time between failures, and the failure rate per unit time. This definition is based on the comparison in three groups of dimensions with similar characteristics for supply chain performance measurement in the retail industry: i) Customer services, ii) Operation efficiency, and iii) Cost/Assets. The reliability of a supply chain is very important for its effective operation. Supply chain, as an "expanded" enterprise, relies for its operation on each member's reliable work. Supply chain reliability often focuses on delivery reliability of the supplier, and inventory reliability. Proper supplier selection and management can be important in reducing uncertainty in mitigating supply chain issues such as unexpected supply disruption, incorrect shipment quantity, and transportation delays which can lead to undesired stockout situations(Hendricks and Singhal, 2005). For example, in situations where there is scarce supply of products or capacity, a supplier's allocation decision will affect his ability to meet an individual retailer's order, which in turn contributes to the retailer's uncertain supply. Understanding the adverse impact of unreliable supply on profitability helps a retailer select a more reliable supplier or provide proper incentives to the supplier in negotiating for an adequate allocation of scarce products. Reliable supply is especially important for products with a relatively short selling season such as fashion and high-tech products with short life-cycles and promotional products. For fashion goods, misplaced stock or late shipments that show up after the selling season are of little value due to the perishable nature of the goods. For promotional products, missing the promotional time window means that it will be harder to push these products to consumers. (Liard and Shah, 2007). Moreover, inventory reliability is an important factor in the management of inventory and warehouse systems. This knowledge provides the manager with a tool to estimate the efficiency of the information system and discover any defects. It can also be effectively used for the purposes of comparing different terms, units, or warehouses against each other. The manager can use the findings in order to analyze the proficiency of the system. Inventory reliability is critical in make-to-stock environments where the filling rate is used as the measure of the customer service.

2.2 QUALITY

Quality has always been one of the most important performance criteria, even with a conventional supplier management strategy. Dickson (2006) showed that the ability to meet quality is one of the three most critical determinants in choosing suppliers. Bessant et al. (2001) pointed out that buyer-supplier relationships that were once based on price have shifted to a number of non-price factors, with quality in first position. The goodness of both supplier's and manufacturer's quality systems can be determinant in order to deliver quality products/services to final customers. Indeed, an organization may have the best internal quality system but, without high-quality, defect-free raw materials, the process will be flawed. Recalls are costing businesses billions of dollars annually, and manufacturers can no longer afford to speculate with quality control. When manufacturers rely so heavily on the supply chain to deliver quality materials, measuring and controlling these products in real-time, before they are purchased and shipped, becomes imperative.

As the supply chain is playing an increasingly prominent role in business vitality, manufacturers have been incorporating supplier rating systems that provide greater transparency into their quality records. While some organizations rely strictly upon supplier certificates of analysis (COA's) or some internal supplier rating score to manage their suppliers, there is often a discrepancy with the actual findings at incoming inspection. While incoming inspections can usually detect problems before additional steps occur, they are time-consuming, costly, and performed after-the-fact. A much more efficient way of managing supplier quality is to do so while the products are being manufactured on the supplier's plant floor. Using collaborative technology to facilitate the communication and share data in real-time, manufacturers and their suppliers can work together to ensure that the products meet specifications prior to being purchased and delivered. Additionally, when working with multiple suppliers of the same product, manufacturers who have access to supplier quality data can evaluate the various vendors and can scientifically determine the highest quality suppliers.

2.3 OUTSOURCING

Outsourcing the operations of an organization benefits the firm in performance objectives such as cost, quality, and service improvement. There are major benefits in outsourcing processes such as production, logistics, product design, and procurement processes. Initially firms tend to outsource non-core activities, nowadays it has changed and there are core operations that are outsourced. Lin et al (2010) propose a multi criteria method for vendor selection in order to deal with the complexity of diverse factors as quality, agility and cost. Their hybrid method is successfully evaluated in a case study of a Taiwan semiconductor company.

Third Party logistic (3PL) companies are recognized by their expertise and experience in handling operations with agility, high quality and efficiency. Quality is a critical variable in 3PL selection because they face companies' main customers.

Kakabadse and Kakabadse (2003) discuss that outsourcing has increased its importance. This practice in the past was part of a tactical exercise but has evolved to become a strategic component of business strategy. The study identifies 5 outsourcing drivers that are related to firm competition priorities: cost, time, innovativeness, quality, and flexibility. Research concludes that supply chain performance will increase with outsourcing but there is higher performance if there is congruence between the firm's competitive priorities and the drivers used during the service provider selection. A key implication is that though managers traditionally decide to hire service providers mainly based on costs they will be able to work with higher cost service providers if they are aligned with company competitive strategy.

Gotzamani et al. (2010) investigate the outsourcing of logistics services and the decision to select 3PL based on quality and financial performance. This research implemented a survey to a sample of 66 manufacturing and 3PL companies in Greece. It evaluated the managerial quality tools implemented by 3PLs during their operations and the study concludes that logistic service providers have better quality culture and levels in comparison with manufacturing companies. It also demonstrated a significant positive relation between financial performance and quality performance in 3PL providers.

2.4 SUPPLY CHAIN PERFORMANCE

Supply chain operatives measure performance of their business for a myriad of reasons such as reporting the health of the firm to stakeholders, starting improvement activities to outperform competitors, and understanding customers' reading of the services and products offered by the firm. The literature acknowledged two decades ago that traditional financial measures such as return on investment (ROI) and return on assets (ROA) were not enough to inform continuous improvement and innovation efforts because of the past historical data focus and their inability to reflect contemporary value-creating actions (Kaplan and Norton, 1992). Researchers have since developed measurement systems that account for non-financial metrics, such as response time to customer query, capacity utilization, inventory carrying costs and transportation costs) and lead-time performance (Bhagwat and Sharma, 2007). Kroes (2012), maintain that outsourcing will increase the supply chain performance. However, Kroes (2012) also stressed that there is higher performance if congruence exists between the firm's competitive priorities and the drivers used during the service provider selection. Some of the implications of this approach are that managers need to align the outsourcing with the company's competitive strategy instead of deciding to hire services based mainly on cost. In this way organizations might work with higher cost service providers as long they are meeting competitive strategic standards.

Therefore, this study attempts to gain information about these factors through observable variables and examines the influence of differing competitive drivers and outsourcing capabilities on the ability of a supply chain to excel in performance. Consequently, three hypotheses are tested as follows:

- H1: There is a direct impact of competitive drivers (reliability & quality) on supply chain performance
- H2: There is a direct impact of competitive drivers (reliability & quality) on 3PL outsourcing decisions
- H3: There is a direct impact of 3PL outsourcing on supply chain performance

3. METHODOLOGY

In order to test the proposed hypotheses in the selected research setting - Saudi Arabian supply chain operatives - a questionnaire was sent to a sample of 500 multi-sectoral firms, selected from the population of Saudi Arabian organizations. The sample represents supply chain operatives with more than 50 employees from mostly privately dominated branches in Saudi Arabia that were retrieved from the top 1,000 Saudi companies list. Of the supply chain operatives that took part in the survey, 322 responded, which makes the response rate 64.4 percent. The research aimed to identify the criticality of competitive priorities, the importance of inhibiting factors in outsourcing, and the supply chain and business achievements. The survey also investigated the awareness of relationship types and practices as essential for the firm function in supply chains at present.

Returned surveys were coded and entered into the SPSS statistical software package (version 19) to organize and analyze the data. Analysis then progressed in two stages, firstly, descriptive data using non-parametric techniques (including the chi-square test for relatedness) was undertaken to determine whether any of the categorical variables were related and to provide a profile of the respondents across the three firms. This included business longevity, annual turnover, demographic considerations, such as age, gender, highest qualification, and employment industry. These tests enhance understanding of the sample through examination of the distributions of behavioural and demographic variables.

SPSS was also used to test the reliability of the scales. Cronbach's (1951) Alpha values for the scales were higher than 0.7 which is the acceptable threshold (Hair et al., 2010). In addition, the scales were factor analyzed to examine unidimensionality. The scales' items loaded onto one factor only. This suggested that the scales measures exhibit unidimensionality.

Second, Amos (version 18) was used to obtain the property of the measures. The fit indices for the scales' regression model as indicated by the CFI, TLI and RMSEA were acceptable and confirmed unimensionality of each scale. The standardized loadings and the R-square obtained for each item were examined to further test the reliability of the scale via CFA. The standardized loading values of most of the scales' items were higher than 0.5. Similarly, and R-square values were higher than 0.2, demonstrating high reliability of the scales. With the scales refined and the measurement models well structured, further testing can be done. SEM was used to analyze if there is a predictive relationship between one independent variable and a criterion dependent variable (Ho, 2006). SEM is a multivariate statistical technique used to examine the relationship between a dependent variable and

several predictors (Hair et al., 2010). Hair et al. (2010) stated that SME analysis provides a means of objectively assessing the magnitude and direction of each predictor's relationship to its dependent variable. Three hypotheses put forward in the literature review section were tested using the SEM model which were generated at the $p<0.05$ level.

4. RESULTS DISCUSSION

As the main purpose of the study was to examine the relationship between competitive drivers (reliability and quality) and outsourcing and their influence on supply chain performance, the next step in the data analysis was to perform a confirmatory factor analysis (CFA). Confirmatory factor analysis was chosen instead of other classical validation techniques such as exploratory factor analysis (EFA) as EFA has a number of significant shortcomings. Among other issues, EFA can produce distorted factor loadings and incorrect conclusions regarding the number of factors. Also the solution obtained is only one of an infinite number of solutions (Segars and Grover, 1993).

Confirmatory factor analysis was used to study the relationships between the set of observed variables and the set of continuous latent variables. The overall fit of a measurement model is determined by a CFA (Cooksey, 2007; Hair et al., 2010). In the CFA, all factor loadings are freed (i.e. estimated), items are allowed to load on only one construct (i.e. no cross loading), and latent constructs are allowed to correlate (equivalent to oblique rotation in exploratory factor analysis). The input covariance matrix generated from the model's 12 measurement variables contains 45 sample moments. There are six regression weights, three covariances and 12 variances, for a total of 21 parameters to be estimated. The model therefore has 24 degrees of freedom. The chi-square goodness-of-fit test shows that the model did not fit the data well, $X2$ ($N = 138$, $df = 24$) = 80.29, $p < .05$. Although the model did not fit well by the chi-square test, the baseline comparisons fit indices of the NFI, RFI, IFI, TLI and CFI are close to or exceed 0.90 (Table1). This suggests that the hypothesised model fits the observed variance-covariance matrix well relative to null or independence model. The only possible improvement in fit for these two models ranges from 0.053 to 0.109.

Table 1: Baseline Comparison Indexes

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.937	.911	.958	.931	.957
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

The estimates were analysed for the measurement model. The unstandardised regression weights were all significant by the critical ratio test ($> \pm 1.96$, $p < .05$). The standardised regression weights range from 0.918 to 0.943. These values indicate that the nine measurement variables are significantly represented by their respective latent constructs. Explained variances (Squared Multiple Correlations) and residual variances for correlations ranged from 0.616 to 0.915. The residual (unexplained) variances were from 8.5% to 39.4%.

The study now turns to examining the hypothesised structure model. The chi-square value for the models (Figure 1) was $X2$ ($N = 138$, $df = 24$) = 80.29, $p < .05$. The chi-square per degree of freedom was 3.34. The baseline comparisons fit indices of NFI, RFI, IFI, TLI and CFI for the model were close to the suggested cut off value 0.90. This suggests that the hypothesised model fit the observed variance-covariance matrix reasonably well relative to null or independence model.

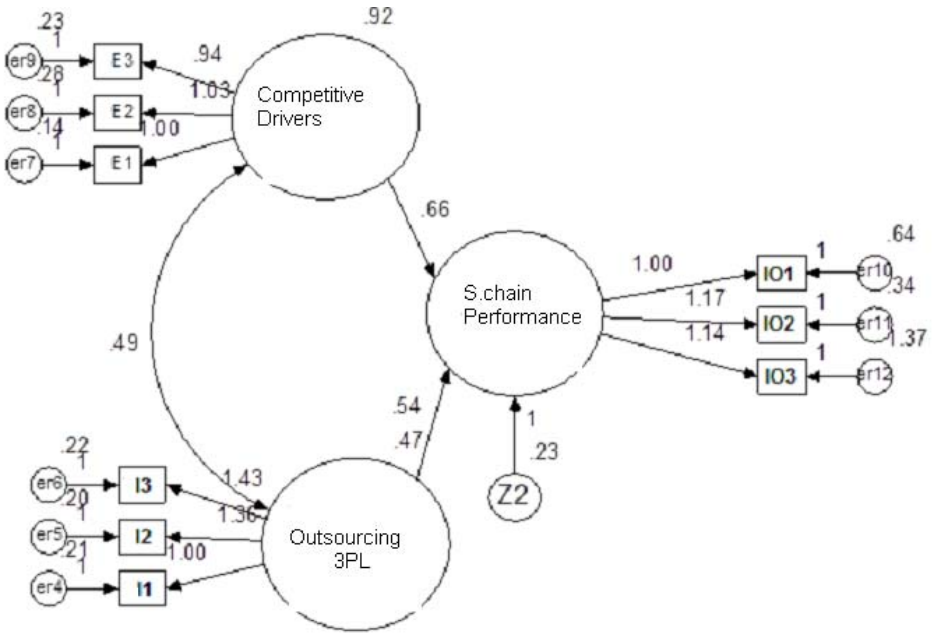

Figure 1: Hypothesized Structured Model

Regression weights (Table 2), Standardised regression weights, and Squared Multiple Correlations: Of the coefficients associated with the paths linking the model's exogenous and endogenous variables, four are significant by the critical ratio test (± 1.96, $p < .05$). Support was found for the three hypotheses. These significance levels show that there is a relationship between competitive priorities, 3PL outsourcing and supply chain performance. The significance levels support hypothesis 2, that an alignment between competitive drivers and 3PL outsourcing is necessary to improve supply chain performance. The impact of competitive drivers and 3PL outsourcing are related directly and significantly to the improved supply chain performance. The greater the perception on the increase of competitive drivers the greater the improved supply chain performance ($b = 0.66$). Likewise, the greater the perception on the increase need of outsourcing 3PL the greater the improved operational performance ($b = 0.54$).

The unidirectional arrows (without origin) pointing to the latent factor of improved supply chain performance represent unexplained (residual) variance for this factor. Thus, using the squared multiple correlation table, 21.2% of the variation in improved operational performance is unexplained. Alternatively, 79.8% of the variance is accounted for by the joint influence of the competitive drivers and 3PL outsourcing decisions. This finding confirms that it is not possible for the studied organisations to gain supply chain performance improvements without considering the competitive drivers obtained through 3PL outsourcing.

Table 1: Regression weights

			Estimate	P	Label
S.chain performance	**<--**	**Competitive Drivers**	.658	***	par_8
S.chain performance	**<--**	**Outsourcing 3PL**	.544	***	par_9
I1	**<--**	**Outsourcing 3PL**	1.000		
I2	**<--**	**Outsourcing 3PL**	1.360	***	par_1
I3	**<--**	**Outsourcing 3PL**	1.426	***	par_2
E1	**<--**	**Competitive Drivers**	1.000		
E2	**<--**	**Competitive Drivers**	1.032	***	par_3
E3	**<--**	**Competitive Drivers**	.937	***	par_4
IO2	**<--**	**S.chain performance**	1.169	***	par_5
IO3	**<--**	**S.chain performance**	1.144	***	par_6
IO1	**<--**	**S.chain perfomance**	1.000		

5. CONCLUSIONS

The research question 'Does competitive drivers and outsourcing 3PL positively impact the supply chain?' has been confirmed by this study. This research also found that the three drivers stemming from competitive drivers, quality, inventory reliability and supplier reliability, and the three dimensions stemming from outsourcing 3PL, lack of skilled workers, flexibility and costs, are important when trying to achieve improvements in supply chain performance. It is expected that giving priority to these dimensions in the outsourcing 3PL decision-making process will assist organizations to enhance supply chain performance.

The three competitive priorities - quality, inventory reliability and supplier reliability - identified in the CFA analysis of this study demonstrated that in the quest for improved supply chain performance through the outsourcing of 3PL, it is essential that these 3PL encourage the delivery of value-adding products or services of exceptional quality, with flexibility and at a competitive cost, as stated by Slack et al. (2009).

In testing hypothesis 1, this research has demonstrated that the linkages between competitive drivers and supply chain performance are strongly and significantly correlated. In our opinion, the high positive correlations of competitive drivers and supply chain performance are strongly and significantly correlated provide strong empirical support to include the stated competitive drivers dimensions in the measurement of improved supply chain performance. Furthermore, these specific dimensions will assist organizations to more accurately measure the impact of the 3PL outsourcing on the supply chain performance. Likewise, in testing hypothesis 2, the SEM results demonstrated that there is a predictive relationship between outsourcing 3PL and supply chain performance. This predictive relationship will lead supply chain operatives to improve their performance and gain

a competitive advantage. In addition, for academics this predictive relationship is important because the literature has not discussed it in a comprehensive way.

This research addressed issues that are currently problematic to many Saudi supply chain operatives. Similarly, the work addressed the links between key competitive drivers, outsourcing 3PL dimensions and supply chain management improvement. Therefore supply chain operatives must be more conscious about the practical implications of undertaking in-house logistics activities on the overall performance of their supply chain.

Our results confirmed that supply chain operatives that need to boost supply chain performance will outsource 3PL that are able to provide flexible services at the right costs with efficient value adding talented workers.

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