Effect of Supply Chain Strategy and Product Characteristics on Nigerian Manufacturing Firm’s Operational Performance

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Abstract
Supply chain strategies and practices depend not only on the nature of the business, the competitive environment, and technological intensity of the product, but also on product and market characteristics. The paper examines supply chain strategies and evaluates the impact of the supply chain strategy model on firm’s performance viz customer service and operating cost using t-test and based on the data collected from 76 manufacturing firms in South-western Nigeria. The result showed that the firms were using a variation of the agile, lean and lean/agile supply chain strategies. Also the result revealed the lean/agile supply chain strategy as being the best amongst all the identified supply chain strategies having contributed significantly to better customer service and operating cost. However, it was recommended that supply chain managers make tactical supply chain decisions that will help maximize the benefits offered by SCM.

Key words: Supply Chain Strategy, Product Characteristics, Competition, Performance, Manufacturing

1.0 Introduction
Supply Chain Management (SCM) has been a melting pot of various disciplines, with influences from logistics and transportation, operation management and material and distribution management, marketing, as well as purchasing and information technology. Ideally, the all-encompassing philosophy of SCM embraces each of these functions to produce an overall supply chain strategy that ultimately enhances firm performance (Giunipero, Hooker, Joseph-Mathews, Yoon, & Brudvig, 2008).

SCM involves the management and integration of a set of selected key business processes from the end users through original suppliers that provide products, services and information that add value for customers and other stakeholders through the collaborative efforts of supply chain members. Having recognized these benefits of SCM, many successful firms are implementing SCM principles to create and sustain their competitive advantage.

Competitive advantage in a market is attained through the demanding task of providing the right product, in the right package, at the right location, at the right time. Companies have invested significant resources to improve supply chain performance. New concepts such as lean manufacturing, agile manufacturing, six sigma, theory of constraints, mass customization, and postponement have been tried to improve performance, often without significant results. Supply chain strategies based on a 'one-size-fits-all' approach have not proven effective. Most supply chains have not been able to achieve the desired level of success using traditional supply chain techniques (Harris, 2007) with reduced prices, superior product quality, excellent customer service, expanded variety, and exceptional value being some of the examples of the ever-increasing demands being placed on businesses by their customers.

In today’s market competition, there are two major challenges to firms; Individual businesses no longer compete as solely autonomous entities, but rather supply chains (Lambert & Cooper, 2000) therefore making SCM gain popularity. Following the introduction of SCM, another challenge to firms appears: How to effectively manage the flow of materials from supply resources to the customer (Mabert
The firms require a clear strategic thinking when they intend to effectively organize such complicated activities, resources, communications and processes. The challenge is to take supply chain management to a more strategic level within the firm. It therefore becomes imperative in this study to know if distinct supply chain types exist in the study area, what characteristics contribute mostly to supply chain determination and finally determine the impact of the identified supply chain strategies on the manufacturing firm’s performance.

The hypothesis formulated for the study is that supply chain strategy does not have a significant impact on firm’s performance.

2.0 Literature Review

2.1 Supply chain strategies

Maximizing the benefits offered by SCM lies in choosing the appropriate supply chain strategy. The appropriate supply chain strategy should match the corporate strategy in order to “fit” within the company. There are many reasons as to why a company might fail. One important reason according Chopra and Meindl (2001) is: “A company may fail either because of a lack of strategic fit or because its processes and resources do not provide the capabilities to support the desired strategic fit.

“Strategic fit means that both the competitive and supply chain strategies have the same goal. It refers to consistency between the customer priorities that competitive strategy is designed to satisfy and the supply chain capabilities that the supply chain strategy aims to build.”

Thus, a lack of strategic fit can mean that a company wastes time and valuable resources developing capabilities that will not satisfy current customers nor win new customers.

Before choosing what type of supply chain strategy to pursue, a firm must first evaluate the type of supply chain(s) in which it participates. One paradigm that has evolved over the years consists of two types of supply chains: the lean and the agile.

2.2. Product Characteristics and Supply Chain Strategies

There is a common understanding that the nature of products and product demand are related to operational processes and supply chains (Skinner, 1969; Utterback & Abernathy, 1975). From a supply chain perspective and based on characteristics such as product life-cycle, margin, product variety, forecasting error, stock-out rate, markdown or distribution intensity, products can be characterized as being either certain/predictable (also called ‘functional’) or uncertain/unpredictable (also called ‘innovative’) (Fisher, 1997; Qi, Boyer & Zhao, 2009; Selldin & Olhager, 2007).

When selecting an appropriate supply chain strategy, the first step for manufacturers is to consider the characteristics of end-products, including product life cycle length, predictability of demand, product variety, and market standards for lead times and service (Fisher, 1997). Similarly, Huang, Uppal, and Shi (2002) also argue that the primary factor associated with supply chain strategy selection is the product characteristics of a particular supply chain. Bruce, Daly and Towers (2004) analyzed different supply chain strategies, including lean, agile, and lean/agile, in the textiles and clothing industry. According to the authors this industry manufactures primarily innovative products because its products tend to have short product life cycles, high volatility, and low predictability. By examining four case studies, the authors argue that the lean/agile approach is most appropriate for the textiles and clothing industry. Companies in this industry require a quick response to customer demands and strong strategic alliances and sourcing relationships with their suppliers in order to gain a sustainable competitive edge.

2.3. Impact of Supply Chain Strategy on Performance

The characteristics of three types of supply chain strategies (lean, agile, and lean/agile) are different. The lean supply chain strategy requires that manufacturers make cost reduction their first priority. Adopters of lean strategy may implement practices such as mass production, just-in-time, and long-term
supplier relationships to eliminate waste and achieve a lower cost. On the other hand, the agile supply chain strategy underscores flexibility and responsiveness. Hence, adopters of agile strategy need more capacity buffers to handle the market volatility. In the short run, there are likely to be trade-offs between the two kinds of strategies. However, over time, companies may develop innovative ways to improve both leanness and agility. One way to do this is to combine the lean and agile approaches at a decoupling point to form the lean/agile supply chain by operating cost-effectively in the upstream supply chain and responsively to volatility in the market downstream as observed by Bruce et al. Firms may also use other ways to develop both the lean and agile capabilities in their supply chain. In particular, the successful implementation of a lean/agile strategy seems to be a more challenging hurdle than implementing either a lean or agile strategy due to the need to master two sets of guiding principles.

Since Porter (1986) proposed the well-known typology of competitive strategies, many studies have examined the firm’s strategic behaviour and their impacts on performance. Several studies found that the firm’s performance would deteriorate if it does not have a clear strategic thinking (Dess & Davis, 1984). However, the strategic management literature strongly emphasizes that strategy involves careful matches between internal strategy, organization and structure, and external environment (Bozart, Warsing, Flynn, & Flynn, 2009).

3.0 Research Methodology

The study covered only one hundred and fifty (150) manufacturing companies in the south-western region of Nigeria. A total of one hundred and fifty questionnaires were then administered on the managers whom were perceived to have adequate knowledge about the questions being asked. Only 76 completed the questionnaires indicating a response rate of about 50.67%. The questions as contained in the research instrument were based on the construct developed by Qi, Boyer and Zhao (2009). Data analysis was carried out using both descriptive statistics (tables and percentages) and inferential statistics (t-test analysis).

Table 1: Industrial Composition of the Respondent Companies

<table>
<thead>
<tr>
<th>Industry type</th>
<th>Number of respondent companies</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food and Beverages</td>
<td>31</td>
<td>40.79</td>
</tr>
<tr>
<td>Chemicals</td>
<td>15</td>
<td>19.74</td>
</tr>
<tr>
<td>Textile</td>
<td>3</td>
<td>3.95</td>
</tr>
<tr>
<td>Electrical and Electronics equipment</td>
<td>9</td>
<td>11.84</td>
</tr>
<tr>
<td>Plastic</td>
<td>11</td>
<td>14.47</td>
</tr>
<tr>
<td>Others</td>
<td>7</td>
<td>9.21</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Field Survey (2012).

4.0 Results and Discussion

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Table 2: T - test of Operational Performance by Supply Chain Strategies

<table>
<thead>
<tr>
<th>Supply chain strategy</th>
<th>Customer service</th>
<th>Operating cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agile</td>
<td>-0.552** (0.089)</td>
<td>-0.519** (0.081)</td>
</tr>
<tr>
<td>Lean/Agile</td>
<td>0.756*** (0.16)</td>
<td>-0.696*** (0.14)</td>
</tr>
<tr>
<td>Lean</td>
<td>0.633*** (0.122)</td>
<td>-0.595*** (0.132)</td>
</tr>
</tbody>
</table>

*** Significant at P < 0.01, **Significant at p < 0.05, * Significant at p < 0.10
Numbers in the parentheses are Eta square values.

Source: Field Survey (2012).

The result from table 2 showed that the lean/agile supply chain strategy is the best amongst all the identified supply chain strategies having contributed significantly to better customer service (16% of the variance) and operating cost (14%). However, the lean group has significantly better operating cost than the agile group. This supports the concept that a lean strategy should improve operating costs better than an agile strategy. Interestingly, the agile group does not have better customer service than the lean group. Overall, the result of the analysis provides good support for the hypothesis tested. This is in conformity with Qi et al.

5.0 Conclusion and Recommendation

The findings of these research shows that Nigerian Manufacturers can be classified into three different groups namely agile, lean/agile and lean. This analysis thus offers several important management implications. Supply chain strategies produce benefits but managers cannot the fact that in the short run, there are likely to be trade-offs between these kinds of strategies. Therefore, tactical supply chain decisions that take the strategic message and focus on creating real benefits for the company needs to be made. Also, supply chain managers should ensure their supply chain strategies are well aligned with their product characteristics in order to maximize the benefits offered by SCM.

References


