Influence of Supply Chain Scalability on Performance of Distribution Firms in Kenya

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Abstract
The main aim of the study was to determine influence of supply chain scalability on performance of distribution firms in Kenya using descriptive research design. Descriptive research design is used to describe characteristics of a population or phenomenon being studied. The study population consisted of 145 employees from clearing and forwarding firms. The stratified random sampling technique was appropriate for the study to come up with the sample size, because the target population is heterogeneous or of mixed sectors referred to as stratum. The stratified technique ensured that each sector in the target population has an equal chance of being selected. Data was collected using questionnaire. The process of data analysis involved several stages each response was analyzed and their frequency tabulated quantitatively to present a more detailed interpretation. The research thus performed a multiple regressions analysis on primary data to estimate the beta values of factors and t-test to determine the significance of the coefficients at 95% confidence level. Based on the study findings, the study found that performance of distribution firms in Kenya is affected by supply chain agility and supply chain integration being the major factors that mostly affected performance of distribution firms in Kenya. Thus, the study concludes that supply chain agility and supply chain integration, as central components of a firm’s competitive strategy. The study recommended that in order to improve the supply chain performance, organizations can focus to implement either or all of supply chain integration modes.

Keywords: Supply Chain Agility, Supply Chain Integration, Supply Chain Scalability, Performance, Distribution Firms

INTRODUCTION

To succeed in an uncertain and competitive environment, firms must respond to changing customer needs faster than before, and logistics flexibility is an important part of this response. Customer loyalty can be changed easily if the firms cannot satisfy any of their needs. Each customer is looking for special treatment in design, production, and delivery, which is the main reason for the firms, must view flexibility from a supply chain perspective instead of equipment or process perspective. (Johnston & Cheng, 2012). Logistics flexibility is the ability of a firm to respond quickly and efficiently to continuously changing customer needs in inbound and outbound delivery, support, and services. It enables firms to satisfy demand. As it occurs rather than forecast sales and react to future orders. Logistics flexibility includes many activities such as organizing inbound and outbound shipments, providing manufacturing support, and supplying information to coordinate these efforts. With logistics flexibility, a firm delay commitment, embrace change, and fine tune delivery to meet specific customer needs. Logistics flexibility is supported by a market oriented strategy where all parties work together to create a fast, efficient, and reliable supply chain (Kari, 2016).

Scalable supply chain is considered, consisting of a network of supply, production, and delivering firms. In this case, many sources of uncertainty have to be handled, such as market demand, supplier lead time, product quality, and information delay. Flexibility allows switching production among different plants and suppliers, so that management can cope with internal and external variability. In manufacturing, logistics is an important source of competitive advantage, since material flows strongly affect business performance (Hitt & Dacin, 2010). Different logistics channels of the supply chain are activated in order to face emergencies such as demand peaks. The production order assignments to the plants and the organization of transports are then critical decisional factors that can decrease the performance of a wide range of products. Flexibility seeks to
increase range/variety, improve mobility responsiveness, and achieve uniform performance. Range is the firm’s ability to design, make, and distribute different products. Range is high when the number of products is large and the degree of difference among the products is great (Potter & Christopher, 2015).

Scalability in supply chain process management is even greater when a firm can switch quickly among a large number of different products with the ability to maintain performance standards as a firm switches among products. With high uniformity implies the ability to maintain high quality as the product is changed (Sriram & Stump, 2012). The logistics performance of a supply chain is also affected by the supply strategy: for instance, components can be delivered to a production plant from a local and/or from a distant supplier as well as by single double, or multiple sourcing. The choice of a supply strategy depends, for instance, either on the critical role of the component or on the logistics complexity (for instance, commodity parts and big components are usually provided by local suppliers). Different distribution and procurement policies are considered in scalable supply chain particular, each assembler can purchase the needed (Tynjala, 2012).

There has been concern in the Distribution industry in Kenya faced by capacity shortage, Minimal resources to accommodate an increasing amount of volume of customer delivery due to market Uncertainty and unpredictability caused by customer changing demand pertains (Bernard, 2015). Distribution firms have expressed a reluctance to add capacity, put more trucks on the road, and hire back drivers, because of the economic outlook. Another factor at play is the increased price of fuel. While most fuel increases are passed along to consumers in the guise of fuel surcharges, smaller carriers find it increasingly difficult to keep up with the surging cost of operating their vehicles (Manyega, 2015).

With the distribution changing market condition in Kenya the total cost of a vehicle or a fleet is tremendously increasing, the cost of a vehicle-day is above manageable levels. In 2017 operating costs of transport freight forwarding and movement third part logistics carrier increases from 9% to 12.5% marginally, the cost of maintenance and operation of the warehouse for the distribution firms ranged between 150,000 to 1,100,000.00, with cost of hiring new trucks and space due to changed demand increasing and inefficient operation, administrative costs to 45-60% respectively. Review of supply chain processes and costs is an area of critical attention. Distribution firms spent more than 140,000,000 on logistics costs each year, a figure that accounted for 0.01 percent of GDP during 2017/2018 F/Y. With logistics costs typically accounting for between 5% and 8% percent of revenue, transportation managers are regularly pressed to cut costs and find efficiencies Minimal resources to accommodate an increasing amount of volume distribution deliveries (Johnston & Cheng, 2012).

According to Awino, (2011), provided that distribution firms should build a supply chain that allows scalability the right amount of logistics when you need them. The logistics carrier should have the resources to offer flexibility or to work with any business partner to develop a customized approach to handle specific needs. The logistics provider indicates it may have to alter its service preferences to meet customer requirement. Hence the study will fill this gap by establishing Influence of Supply Chain Scalability on Performance of Distribution Firms in Kenya.

**Theoretical Framework**

The adaptive structuration theory (AST) assisted the study in determining the influence of Supply chain agility on Performance of Distribution Firms in Kenya. Anthony Giddens first proposed the theory in his constitution of the society in 1984, which was an attempt to reconcile social systems and the micro/macro perspective of organizational structure. Desanctis and Poole borrowed from Giddens in order to propose AST and the rise of group decision support systems in 1996. AST provides the model whereby the interaction between advancing information technologies, social structures, and human interaction is described, and which social structures, rules, and resources provided logistics activities include inbound logistics to the sourcing, expediting and
receiving of goods, that is coming to the organization AST is a viable approach in studying how The current business environment is characterized by constant change, shorter product lifecycles, and increased demand uncertainty. As these conditions have become the norm, companies and researchers alike have turned to the concept of agility in their quest for a sustainable source of competitive advantage (Fayezi & O'Loughlin, 2016).

AST is relevant in today’s Inbound Logistics practice due to the expanding influence that advancing technologies have had with regard to the human interaction aspect of AST and its implication on socio-biologically inspired structuration in security software applications (Ramakrishna, 2011). The theory presents specific advances in inbound logistics are oriented towards utilisation of resources and raw materials, within the manufacturing or assembly plant. As against this, outbound logistics stresses on the outflow of finished goods or product from the firm to the final consumer show that AST is being used as a driving force of effective warehouse management within organizations.

The study will use the theory to investigate how complexity, which results in the timely delivery of the goods and materials to the final destination, aims at providing right goods, at given time, in desired quantity and condition, at proper place and price (Mwangi, 2016). In conclusion, the appropriation process of AST might be a good model to analyse the utilization and penetration and better visibility through an inbound logistics management program promotes better inventory management on performance of level four and five hospitals for five County governments in Kenya.

Empirical Review

Recent literature in the Supply Chain Scalability has an address and proposes that the key factor to surviving in these changing situations is through Supply Chain Scalability by the formation of the responsive supply chain. Researchers and scholars have advanced theories and concepts to demonstrate the importance of Supply Chain Scalability in any sector of an economy. Based on the study of the assessment and prioritizing of Supply Chain Scalability are considered as a key factor affecting the ability of distribution performance.

Supply chain agility

According to the studies by Fayezi & O'Loughlin (2016) on Understanding and Development of Supply Chain Agility and Flexibility this network includes 352 dealers and their workshops, 1545 authorized service centers covering 898 cities and towns. There are 12 joint ventures (production facilities) in the company network; each of the joint ventures has its own computer systems to cater for production planning, scheduling and material scheduling. The top management in the company network is committed to integration of production facilities in order to take advantage of supply chain efficiencies (Potter & Christopher, 2015). All the dealers in the supply chain are connected via extranet. These dealers provide real-time information about market conditions and demand. Based on the sales forecast and dealer orders, production plans are formulated. These plans percolate in the supply chain through communication to the suppliers to enable them to plan their production in advance. Latest IT tools such as extranet, EDI and e-mails are used to communicate these plans to the suppliers. In the proposed ISM, to identify supply chain agility variables, and to establish mutual relationship, brainstorming sessions were conducted with experts from the trading partners of the supply chain (Kebo & Svub, 2013).

The study concluded that has lean, responsive, and agile supply chains require satisfactory or high levels of perceived trust of companies towards suppliers and customers. Some of the factors critical for successful agile organizations in managing their supply chains are inventory and capacity in developing agile supply chain for an apparel manufacturer. Developed an infra-structural framework for the design and development of an agile supply chain system, which is characterized by its ability to cope with unpredictable changes related to the management of suppliers and flow of parts within the value chain of the entire production network. These are
cooperating to enhance competitiveness, enriching customer, mastering change and uncertainty, and leveraging the impact of people and information. Dehghan & Jalalian, (2013) has supported the role of real time and asynchronous collaboration technology for allowing manufacturers to increase their supply chain agility.

Supply Chain Integration

According to Sriram & Stump,(2012) studies on Information technology investments in purchasing: An empirical investigation of communications, relationships and performance outcomes," Omega, The International Journal of Management Science, the studies established that To succeed in the digital economy, organizations must manage the integration of business, technology, people, and processes not only within the enterprise but also across extended enterprises. Supply Chain Management (SCM) system facilitates inter-enterprise cooperation and collaboration with suppliers, customers, and business partners. Although this system can bring benefits and competitive advantage to organizations, the management and implementation of this system pose significant challenges to organizations. Process integration and redesign is important component SCM implementations. Integration involves not only implementing ERP systems and ensuring they communicate or interface with legacy systems, but it also involves integrating ERP and SCM systems with Customer Relationship Management (CRM), Product Lifecycle (Wong, & Wong, 2011).

The studies by Gichuru& Arani, (2015) on Collaborative Supply Chain Practices on Performance of Food and Beverages Companies: A Case Study of Del Monte Kenya Ltd. International Journal of Academic Research in Business and Social Sciences Management (PLM) concluded that e-procurement and e-marketplaces, as well as making them available over the Web to foster cooperation and collaboration across the entire value chain. In today’s dynamic business environment, many companies are expanding, merging, contracting, or otherwise redesigning their supply chain. Due to the rapid advancements of technology such as pervasive or ubiquitous wireless and internet networks, the basic supply chain is rapidly evolving into what is known as a Supply Chain Network (Dung, 2012). The supply chain network is a dynamic and integrated system in which all firms integrated to increase the value of every chain. Integration is a process of redefining and connecting parts of a whole in order to form a new one. In traditional supply chain integration, the definitions of parts are usually limited by the boundary of the enterprises: the integration emphasizes connecting each enterprise with logistics and information communications (Baloyi & Bekker, 2011).

Research Gaps

Chain practice, competitive objectives, impact of change drivers, and business performance. Literature on supply chain scalability describes the dependence of flexibility on the characteristics of some performance variables but influence of interrelationships among the variables on the supply chain scalability has been hardly taken into account in the literature. Therefore there is a need to identify variables influencing supply chain scalability and to develop generally applicable framework, which establishes interrelationships (Beers and Zand, 2014).

Bahinipati and Deshmukh, (2012) Vertical collaboration in the semiconductor industry: A decision framework for supply chain relationships. This research is a humble scientific attempt to shed more on the challenges and the obstacles that those companies faced during their successful implementation of supply chain scalability strategies journey stand behind finding integration in their supply chain. By reviewing the available literature about the supply chain integration challenges there was no a single source able to present all these challenges that may face the organization during its implementation of supply chain scalability strategies. The main contributions for this paper are integrating all the of supply chain integration challenges in one source. These contributions was very helpful for the organizations that establish the integration in their supply chain.
Johnston & Cheng, (2012), Determinants of joint action in international channels of distribution: The moderating role of psychic distance. In the 21st century, there have been a few changes in business environment that have contributed to the development of supply chain scalability networks. First, as an outcome of globalization and the proliferation of multi-national companies, joint ventures, strategic alliances and business partnerships, there were found to be significant success factors, following the earlier Just-In-Time, Lean Management and Agile Manufacturing, practices. Second, technological changes, particularly the dramatic fall in information communication costs, which are a paramount component of transaction costs, have led to changes in coordination among the members of the supply chain network.

**METHODOLOGY**

This study used descriptive research design. The study described the role of Supply Chain Scalability and Performance of Distribution Firms in Kenya. The study population consist of 143 Clearing And Forwarding Firms, Third Party Logistics Firms, Warehousing And Distribution Firms. Primary data was obtained by the use of structured questionnaires. In this research therefore a reliability coefficient of 0.70 and above was accepted. This method was used to save on time. The results of this reliability test was analyzed and used to improve the instrument. With the aid of Statistical Package for Social Sciences SPSS v 23.0, the research thus performed a multiple regressions analysis on primary data to estimate the beta values of factors and t-test to determine the significance of the coefficients at 95% confidence level. F–test statistics was used to determine the overall significance of the model at a confidence level of 95%. The results of analysed data were presented using tables and charts with a brief description thereafter. The multiple regression equations of the study are shown below:

\[ Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + e \]

Where:
- \( Y \) = Performance of Distribution Firms in Kenya
- \( \alpha \) = Constant
- \( \beta_1 \ldots \beta_4 \) = the slope representing the degree of change independent variable due to a unit change in an independent variable.
- \( X_1 \) = Supply chain agility
- \( X_2 \) = Supply chain integration
- \( e \) = error

**RESULTS AND DISCUSSIONS**

This section presents the findings and discussions of the data that was collected from the field based on specific objectives of the study presented in chapter one. This is done through the use of frequencies, correlation and regression. Results have been presented in such a way that they answer the research questions. A total of one hundred and nineteen (119) questionnaires were distributed to the Heads of Department of which one hundred and two (102) were returned. The response rate for the distributed questionnaires was therefore 85.7%. The high response rates facilitated gathering sufficient data that could be generalized to determine the effect of strategic change on performance of Commercial Firms in Nairobi Central business district.

**Supply chain agility**

The study sought to establish the influence of Supply Chain agility on Performance of Distribution Firms in Kenya. Table illustrates the results. The results on Supply chain agility summed up to a mean of 3.411 and a standard deviation of 0.477. This is an indication that the respondents were in complete agreement that supply chain agility positively affects overall performance of a firm. Thompson, Strickland & Gamble (2007) postulate that the essence of Supply chain agility is to build a market position strong enough and an organization capable
enough to produce successful performance despite unforeseeable events, potent competition, and internal difficulties

Table 1  Supply Chain Agility

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Dev</th>
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<tbody>
<tr>
<td>Setting target for lead times and then working towards reducing those lead times specially</td>
<td>2.85</td>
<td>1.066</td>
</tr>
<tr>
<td>“Order to Fulfillment” lead time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizations achieve the velocity that is needed to be Agile in today's competitive and</td>
<td>3.13</td>
<td>0.829</td>
</tr>
<tr>
<td>changing business environment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ability of an organization to respond rapidly to changes in demand, both in terms of volume</td>
<td>3.46</td>
<td>0.84</td>
</tr>
<tr>
<td>and variety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The firm chain of command is flexible</td>
<td>3.86</td>
<td>1.015</td>
</tr>
<tr>
<td>it is closely connected to end-user trends</td>
<td>3.95</td>
<td>0.937</td>
</tr>
<tr>
<td>Innovative products and unstable demand typify agile supply drivers.</td>
<td>3.21</td>
<td>1.41</td>
</tr>
<tr>
<td>Delivering value to customers, Being ready for change, valuing human knowledge And skills, and forming virtual partnership</td>
<td>3.86</td>
<td>1.015</td>
</tr>
<tr>
<td>Composite Mean of Supply Chain Agility</td>
<td>3.411</td>
<td>0.477</td>
</tr>
</tbody>
</table>

This section of the analysis illustrates the results on supply chain integration. The results are as presented in table 2. Results on supply chain integration summed up to a mean of 3.16 and a standard deviation of 0.567. The results suggest that it is defined that firms have created cohesion and increasing connectivity throughout the entire value chain, each department in the same company works together to reduce costs, each department is now connected via the same IT infrastructure to increase efficiency, each company in the same supply chain joins hands and work together to achieve the same goal to satisfy the customer's requirements, firms have developed a better understanding of and response to the market and competitive environment and that resource sharing is the process of leveraging capabilities and assets and investing in capabilities and assets with supply chain partners.

Table 2  Supply Chain Integration

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Dev</th>
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<tbody>
<tr>
<td>The firm has created cohesion and increasing connectivity throughout the entire value chain, each department in the same company works together to reduce costs.</td>
<td>2.73</td>
<td>0.924</td>
</tr>
<tr>
<td>each department is now connected via the same IT infrastructure to increase efficiency.</td>
<td>2.92</td>
<td>1.078</td>
</tr>
<tr>
<td>each company in the same supply chain joins hands and work together to achieve the same goal to satisfy the customer's requirements.</td>
<td>3.44</td>
<td>1.165</td>
</tr>
<tr>
<td>The firm has developed a better understanding of and response to the market and competitive environment</td>
<td>3.21</td>
<td>1.146</td>
</tr>
<tr>
<td>Resource sharing is the process of leveraging capabilities and assets and investing in capabilities and assets with supply chain partners.</td>
<td>3.49</td>
<td>0.805</td>
</tr>
<tr>
<td>Composite Mean of Supply Chain Integration</td>
<td>3.16</td>
<td>0.567</td>
</tr>
</tbody>
</table>

The study sought to establish the performance of the commercial firms. The results are as presented in table 3. From the above results, respondents agreed that growth in income is relation to their expectations (69.2%) and that growth in income is relation to their competitors (74.8%). They further agreed that growth in profitability is also relation to their expectations (59.4%). Growth in profitability level is relation to their Competitors as agreed by majority of respondents (60.4%). Majority of the respondents agreed that increased market size in new markets is relation to their competitors (53.8%), and finally the respondents agreed that there is growth in capital from operations (79.2%)

Table 3  Firm Performance
Correlation and Regression Results

Findings revealed that Supply chain agility was positively and significantly associated with firm performance ($r = 0.319$, $p < 0.01$). Further, supply chain integration was positively and significantly correlated to firm performance ($r = 0.667$, $p < 0.01$). This implies that Supply chain agility and supply chain integration are expected to influence distribution firms performance. According to table 4, the R value indicates a relatively strong correlation between predictor variables and the consequent variable (firm performance). This is because the R value is positive (.812). This means that firm performance that the studied distribution firms recorded was attributed to a certain percentage of predictor variables. According to the value of the R-Square, 65.9% of the firm performance could be explained by independent variables. Therefore independent variables would have a 65.9% influence on the performance of the studied distribution firms while the remaining 34.1% could be attributed to other factors other than predictor variables.

Findings in table 4 showed that Supply chain agility had coefficients of estimate which was significant basing on $\beta_1 = 0.179$ ($p$-value = 0.001 which is less than $\alpha = 0.05$) thus we conclude that Supply chain agility has a positive and significant effect on Performance of Distribution Firms in Kenya. This suggests that there is up to 0.179 unit increase in firm performance for each unit increase in Supply chain agility. The effect of Supply chain agility is more than the effect attributed to the error, this is indicated by the t-test value = 1.486. Consistent with the results, Thompson et al., (2007) posit that Supply chain agility helps in building a market position strong enough to produce successful performance despite potent competition, unforeseeable events and internal difficulties. This implies that those firms that have made use of Supply chain agility are likely to outperform those with no strategic change on all the performance measures. The results are also in line with that of Johnson, Scholes & Whittington (2005) elucidating that companies with strategic change outperformed companies with little strategic change. In a similar vein, Johnson et al., (2005) in their meta-analytic approach concluded that strategic change positively influences firm performance. Further support to the study findings is by Rukunga (2003) who postulates that organization structural change at the Nairobi Bottlers Ltd positively affected their operations and improved their overall performance. The results are also in line with that of Balkin (2000) asserting that structural change within an organization is inevitable if great performance is to be achieved.

Table 4: Correlation and Regression Results

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>correlation results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>(Constant)</td>
<td>-1.048</td>
<td>0.444</td>
<td>-2.362</td>
</tr>
<tr>
<td>Supply chain agility</td>
<td>0.179</td>
<td>0.121</td>
<td>0.097</td>
</tr>
<tr>
<td>Supply chain integration</td>
<td>0.329</td>
<td>0.115</td>
<td>0.237</td>
</tr>
<tr>
<td>Model Summary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>0.812</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R Square</td>
<td>0.659</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R Square</td>
<td>0.645</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std. Error of the Estimate</td>
<td>0.61941</td>
<td></td>
<td></td>
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</tbody>
</table>
Conclusion and Recommendation

Based on the study findings, the study concluded that performance of distribution firms in Kenya is affected by supply chain agility, supply chain integration, value chain mapping and supply chain automation, being the major factors that mostly affected Performance of Distribution Firms in Kenya.

In conclusion the research has highlighted the key role of supply chain scalability for achieving competitive advantage. We addressed this issue, and studied the importance of supply chain specific precursors. We provided a finer-grained understanding of the role of supply chain scalability as a dynamic capability, and highlighted its relationship between supply chain scalability and the overall performance of distribution firms in Kenya. As such, we provided insight to an issue that had not been addressed in extant supply chain management research. Overall, by increasing our understanding of emerging models of supply chain scalability, its role as a dynamic capability, its antecedents, its performance implications, and its performance enhancers, this study makes worthwhile contributions to production and supply chain management of distribution firms in Kenya.

The study concluded that Supply chain agility is one of the most important factors affecting the firm performance in the case of challenging market competition for companies. Agility provides companies with maneuverability against their competitors and enables companies to gain a competitive advantage. Moreover, agility has been considered as the ability to eliminate risks that have not been encountered before and to turn changes into opportunities. Creating a good perception of supply chain management is only possible by understanding customer demands. Controlling all operational performances by the company, understanding the customer demands, analyzing their competitors in the market and using all information within its own capabilities will only be possible with agile supply chain structure.

The study recommended that in order to improve the supply chain performance, organizations can focus to implement either or all of supply chain integration modes; internal cross-functional process integration; backward integration with key first-tier suppliers, or a natural extension of this integration would involve second-tier suppliers; forward integration with key first-tier customers, or with the customers’ customers and complete forward and backward integration, or expressed as integration from “suppliers’ supplier to the customers’ customer.

The study further recommended that practicing managers in production and supply chain management to ensure their processes are well-developed, in line with the expectations, and directly supporting overall firm strategy. This further underlines the concept of supply chain management as a process. Regular process mapping exercises should thus be conducted to assess the quality of procedures and workflows, in order to have the most streamlined and effective infrastructure to affect supply chain scalability. Future research could examine issues such as customer perceptions of effective supply chain performance. The impact of other contingency variables on the supply chain management performance relationship should also be considered, given the findings of this study. Identifying the circumstances or variables that have an intervening effect on the effective Supply chain performance relationship could provide both the academic and practitioner communities with potentially compelling answers to the question of why SCP programs sometimes fail.

REFERENCES


