



EFFECT OF SUPPLY CHAIN AGILITY ON ORGANIZATION PERFORMANCE

A CASE OF EDCL

BY

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ABSTRACT

The study has sought to examine the effect of supply chain agility on organization performance and it was specifically conducted in EDCL (2018-2021); with the following specific objectives: to analyze the effect of product development flexibility on organization performance, to assess the effects of sourcing flexibility on organization performance, to identify the effects of manufacturing flexibility on organization performance, to establish the effect of logistics flexibility on organization performance. The resource-based view, the relational view, and the strategy-structure-performance theories are used to support the proposed research framework for a firm's supply chain agility, in this researcher A descriptive survey was used due to nature of study which requires an accurate portrayal of the characteristics without any intervention, the researcher was used study target population of 150 persons, to get

sample size, the researcher was used the formula of Talon Yamane, where the sample size was 109, to correct data, primary data technique through questionnaire was used, in data processing editing, coding, tabulation were used, to analyze the data, SPSS was used through descriptive and inferential statistic. This could lead to a more significant increase of organizational performance. Supply chain agility has a positive linear influence on the organizational performance of EDUCL with a beta coefficient 0.948, p value=.000 which is less than 0.05. The interpretation is that one-unit increase in implementation of supply chain agility will lead to 0. 190-unit increase in organizational performance of EDUCL. On the same line of thinking, the output of the linear regression analysis shows that lean supply chain agility also has a positive linear effect on the organizational performance of EDUCL. The lean supply

chain strategy has a beta coefficient of .824 with a significance level of .000 that is less than .05. This implies that one-unit increase in implementation of supply chain agility would result into a 0.664 increase on the organizational performance of EDUCL. Through the process of sourcing flexibility, there has been timely delivery of goods and services to user departments are statements regarding sourcing flexibility process and performance of EDCL. The findings show that it is evident that the p-values for Supply chain agility are Product development flexibility (0.000), Logistics flexibility (0.002), Manufacturing flexibility (0.001) and sourcing (0.013) are less than 0.05. $Y = 0.664 + 0.190X_1 + 0.929X_2 + 0.948X_3 + 0.601X_4 + 0$. The study recommends that EDCL should use a joint policy in the establishment of similar systems of selecting and issuing tenders as a standard procedure to ensure high levels of performance. EDCL should be encouraged to use electronic reverse Auctions as sourcing flexibility tool to achieve greater savings, and also the greater transparency. The study recommends that all EDCL should automate the practice of invoicing so as to promote transparency and record management since it will be easier to track records or identify payments to be made to suppliers. There is need to conduct a similar study in other organizations in an attempt to compare the findings. There is also need to conduct a study on the challenges facing

CHAPTER ONE

GENERAL INTRODUCTION

1.1 Background of the Study

Global perspective, today many of the small-scale manufacturing companies in United States are facing problems in order to become competitive in global market. One of the reasons is that the manufacturing activities are outsourced to low labor cost countries like India and China. (Khan, Z 2010) Now a Days Due to an increased competition, the companies are looking forward to reduce total cost, lead times and increasing the product quality. This has created a need to implement lean and six sigma strategies in manufacturing organizations.

Africa Perspective, according to the Automotive Industry Development Centre (in South Africa), increasing operational complexities within the automotive industry, rising fuel prices, higher manpower costs owing to higher living costs and growing

pressure from China and India to remain competitive have led to the industry's growing awareness of the impact that an efficient supply chains agility can have on business sustainability (Gabru, 2008).

Local Perspective, Rwanda is known as the land of a thousand hills, and our car seems to go over every one of them as we drive from the small towns to the even smaller town.

The drone is operated by Zipline, a California-based company focused on delivering medical supplies in areas with poor infrastructure. In a blink-and-you'll-miss-it moment, the drone descends, opens a set of doors in its belly, and drops a small package that parachutes to the ground. The drone immediately begins to climb and vanishes over the hills as a staff member crosses the hospital parking lot to pick up the package a shipment of blood ordered by WhatsApp less than half an hour earlier. After blood supply, the drone is flying

smoothly toward another hospital elsewhere in Rwanda, with a fresh package of blood in its belly.

Delivery by drone is a futuristic idea that has caught the public's imagination, and there are plenty of attempts to turn it into a commercial reality. Amazon, Google, and Domino's Pizza have all pulled off carefully controlled demonstrations and pilot projects, delivering items such as sunscreen, burritos, and (of course) pizza to backyards and fields. However, the world is waiting to see whether any company can find a business model that makes drone delivery a sustainable and profitable endeavor.

The answer may be here in Rwanda, where Zipline is delivering blood to 25 hospitals and clinics across the country every day. Zipline is betting that transporting lifesaving medical supplies, which are often

lightweight and urgently needed, will be the killer app for delivery drone.

In Rwanda supply chain agility is applicable but not limited to health sector, for instance in infrastructure sector such as in energy supply where government Increase investment in development of new energy generation projects in a timely and cost-efficient manner to expand supply in line with EDPRS and other national targets; Develop appropriate transmission infrastructure to evacuate new plants and deliver energy to relevant distribution nodes; Plan and execute energy access projects to meet the national access targets through the Energy Development Corporation Limited (EDCL).

1.2 Statement of the Problem

Rwanda is a land locked country from the heart of Africa. Its economy is largely dominated by agriculture and livestock.

According to Rwanda's Vision 2020 (MINECOFIN, 2000), one of the

Government of Rwanda's goal is to transform the subsistence economy into a market-based economy. For these goals to be achieved, the poverty reduction strategy of the Government of Rwanda focuses on the intensification, diversification and transformation of the manufacturing sector. UDCL fits within that vision and it was created from this perspective. Despite the national shortage in skilled human capital, leading to constant sourcing of skilled labor, UDCL kept growing, both in size and in wealth. It is therefore very important to understand such a "paradox" for a manufacturing industry in Rwanda; Supply chain agility is all about operations management. It concerns the supply, manufacture, service, transport and delivery. In managing supply chain, matching demand and supply is difficult. However, both qualitative and quantitative forecasting helps the management in dealing with that constant challenge. Qualitative forecasts are

very subjective and quantitative forecasts are scientific and objective. Every organization has a social corporate responsibility, thus the imperative of using both forecasting methods, which is a challenge for all business companies, including UDCL.

The company has been investing in supporting construction companies with hope to get better quality of electricity supply as raw material. It has been established that, "the local market is dominated by unprocessed electricity consumption due to low income constraints but gradual eradication of poverty is going to increase electricity demand" (UDCL, 2010). Supply chain agility can have a positive or negative impact on organizational performance, which will ultimately lead to increased customer satisfaction, reputation of the organization and revenues and profits of the organization as well.

1.3 Objectives of the study

This study was focused on both general objectives and specific objectives.

1.3.1 General Objective

The study was focused on Supply Chain agility and organization performance using UDCL Head offices as a case study.

1.3.2 Specific Objectives

- i. To analyze the effect of product development flexibility on organization performance
- ii. To assess the effects of sourcing flexibility on organization performance
- iii. To identify the effects of manufacturing flexibility on organization performance
- iv. To establish the effect of logistics flexibility on organization performance

1.4 Research Questions

- i. How can product development flexibility affects organization performance?
- ii. Does sourcing flexibility affect organization performance?

- iii. To which extent manufacturing flexibility affect organization performance?
- iv. Is logistics flexibility affect organization performance?

CHAPTER TWO

2.1. Conceptual Review

This section was presented the review related to the specific objectives such as, Effect of product development flexibility on organization performance, effects of sourcing flexibility on organization performance, effects of manufacturing flexibility on organization performance and effect of logistics flexibility on organization performance.

2.1.1. Organization Performance

In the literature review it is considered that “traditionally most of the managerial performance measures have been based on financial measures of performance” (Eccles, 1991; Nanni et al., 1992; in Mishra and Mohanty, 2014, p.265). Also, it is mentioned that “these measures include return on assets (ROA), return on equity, and return on sales” (Mishra and Mohanty, 2014). In In the literature review it is considered that “traditionally most of the managerial performance measures have been based on financial measures of performance” (Eccles, 1991; Nanni et al., 1992; in Mishra and Mohanty, 2014, p.265). Also, it is mentioned that “these measures include return on assets (ROA), return on equity, and return on sales” (Mishra and Mohanty, 2014).

2.1.2. Supply chain agility

Agility can be defined as the continual readiness of an entity to rapidly or inherently, proactively or reactively,

embrace change, through high quality, simplistic, economic components and relationships with its environment (Conboy and Fitzgerald, 2004). In fact, the need for agility in supply chains and manufacturing systems comes from the inability to predict the future and its changes. Despite the progress in forecasting and business intelligence, companies still suffer from internal and external sudden events that can harm their productivity and their position in market if they don't react rapidly and effectively.

2.1.2.1. Situations Needing Agility

To prepare a list of common situations requiring agility in the supply chain context, we conducted a research on situations mentioned in works on supply chain agility, supply chain risk papers and industrial reports.(Sharifi and Zhang, 1999) recognize that, due to the complexity of the manufacturing environment, an exhaustive general list could not be easily determined

and every manufacturing system has his challenges, risks and opportunities that push to adopt agile capabilities.

2.1.3.1. Product Technology Flexibility

Manufacturers of new products are required to produce at low cost, to ensure rapid and fast-moving items, and to be flexible with extensive and changing product diversity. The production technology and the process should have flexibility that can satisfy the demand for responsiveness in the dynamic market environment (Collins and Schmenner, 1993). New product development projects using flexible design technologies out-perform the projects using in-flexible technologies (Thomke, 1997).

2.1.3.2. Product and Process Flexibility

For high project success, it is necessary to incorporate adequate product configuration flexibility in the development cycle (Calontone et al, 1995). Modular design architecture and commonality of parts in

finished products help in reducing the overall cost of design changes in the product system (Ulrich, 1995 and Fouque,1999).

2.1.3.3. Managerial Flexibility

New product-development needs high degree of flexibility in financial delegation and decision-making (Zirger and Hartley, 1996). Decision-making levels need to be pushed downwards in the organization and adequate financial authority has to be provided to project persons working at various levels. Managerial flexibility in terms of decentralization, financial delegation, and non-rigid HR practices facilitate smooth and quick flow of product and project information among team members and therefore enhances the efficiency of the development process leading to higher level of project success (Haddad, 1996).

2.1.4. Sourcing flexibility

Sourcing flexibility is an increasingly important building block of supply chain flexibility. Sourcing flexibility, in turn, is curvilinear related to delivery performance. Finally, delivery performance positively influences the product's financial performance. The strong associations between sourcing flexibility, delivery performance, and product financial performance underscore that sourcing flexibility merits the attention of supply chain managers during supplier selection and purchasing decisions.

2.1.5. Manufacturing Flexibility

Manufacturing flexibility is one of the most difficult goals for organizations to achieve. Concomitantly, evidence suggests that the focus of competition in global markets is shifting from quality and service toward flexibility (Ferdows and De Meyer 1999). In Europe, for example, extensive programs are being initiated to enhance manufacturing flexibility. These include implementation of

advanced manufacturing technology, decrease of cycle times through lead time and setup time reductions (Giffi, Roth, and Seal 1999).

2.1.6. Logistics Flexibility

Logistics flexibility is the ability of the organization to respond quickly to customer needs in delivery, support, and service (Zhang et al., 2002). To make such adjustments requires a sufficient quantity and quality of information as a resource. Transporting is required in the whole production procedures, from manufacturing to delivery to the final consumers and returns.

2.2. Theoretical Review

Several theoretical frameworks are used in this Dissertation to guide the development of a research model and its subsequent empirical investigation. The resource-based view, the relational view, and the strategy-structure-performance theories are used to support the proposed research framework

for a firm's supply chain agility. The selected theoretical approaches are discussed in the following sections.

2.2.1. Resource-Based View Theory

The origins of the Resource Based View (RBV) theory can be traced to strategic management. The premise of RBV is that firms that are able to accumulate resources and capabilities that are rare, valuable, non-substitutable, and difficult to imitate, will achieve a competitive advantage over competing firms.

2.2.2. The Relational View Theory

(Wernerfelt 1984; Barney 1991), the relational view (RV) theory suggests that a firm's sources of competitive advantage may extend beyond firm boundaries. Studies show that partners who are willing to make relation-specific investments and combine resources in unique ways can achieve superior levels of performance (Asanuma 1989; Dyer 1996).

2.2.3. The Strategy-Structure-Performance Paradigm theory

According to the SSP paradigm, a firm's strategy, created in consideration of external environmental factors, drives the development of organization structure and processes (Galbraith and Nathanson 1978; Miles and Snow 1978). Firms that have properly aligned strategy with structure are expected to perform better than competitors that lack the same degree of strategic fit (Child 1972; Miles and Snow 1978; Galbraith and Kanzanjian 1986; Hoskisson 1987; Wolf and Egelhoff 2002; Stank et al. 2005). According to SSP, the firm's strategic orientation predicts the structure the firm will develop.

2.3. Empirical Review

This section was presented the empirical related to the specific objectives such as effect of product development flexibility on organization performance, effects of sourcing flexibility on organization

performance, effect of sourcing flexibility on organization performance, effect of manufacturing flexibility on organization performance and effect of logistics flexibility on organization performance.

2.3.1. Effects of product development flexibility on organization performance

This flexibility dimension represents the amount of adaptability or responsiveness for making any future changes in the existing product design, including new products or derivatives of existing ones. Some researchers have also defined it as the ability to changeover to produce a new set of products economically and quickly (Browne et al. 1984; Sethi and Sethi 1990; Koste and Malhotra 1999). Product flexibility is the combination of new product flexibility and modification flexibility (Dixon 1992). Defender-type organizations produce products, characterized by fixed design features and functional characteristics targeted to serve a narrow market segment.

The product design is not easily modifiable and remains in the market for a considerable amount of time.

Contrary to this, prospector-type organizations emphasize making frequent and continuous changes in product design as per customers changing tastes and fluctuating market conditions.

2.3.2. Effects of sourcing flexibility on organization performance

Sourcing is a management strategy by which a company assigns an experienced and efficient service provider to perform their non-core functions, by doing so they can save time and money (Stroh and Treehuboff, 2003). In other words, is a technique of acquiring goods and services by contract from an external supplier.

2.3.3. Effects of manufacturing flexibility on organization performance

Manufacturing flexibility or operations/supply chain flexibility are the

alternative names with which it is termed, has become a vital element in the field of operations management owing to the competitive environmental conditions and the pressure to perform better to deliver value to the customers.

2.3.4. Effects of Logistics flexibility on organization performance

Logistics flexibility is the planning, controlling and decision making on operational area of logistics that geographically moved and positioned inventory (Bowersox, Closs, & Cooper, 2010). Logistics is generally the detailed organization and implementation of a complex operation.

2.3.4. The Relationship between Supply Chain Agility and organization Performance

In another study related to agility, Swafford et al. (2008) have stated the importance of supply chain agility in organizational structures of the companies. They have also

stated that the flexibility of the supply chain and the use of information technologies have a positive effect on achieving supply chain agility in their research. They have further shown that the relationship between these three concepts has a supportive effect on firm performance.

2.5. Research Gap

Although a number of studies have been conducted to determine the effect and relationship between supply chain agility and organization performance, primary and secondary data has been the choice of many researchers where they analyze the data. This method faces challenges of failing to obtain sufficient data that could allow generalization of the findings. The current study was relied on primary and secondary data, which was allowed the research to get the current situation and effect of the supply chain agility on organization performance.

In this study, the researcher found Gap analysis that UDCL should provide a foundation for measuring investment of time, money and human resources required to achieve a particular outcome in order to fulfill its supply chain agility effectively and efficiently.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research design

The study adopted quantitative approach which involved the collection of data so that information can be quantified and subjected to statistical treatment in order to support or refute “alternate knowledge claims” (Creswell, 2003), whereby descriptive survey was used. A descriptive survey was used due to nature of study which requires an accurate portrayal of the characteristics without any intervention.

This study was designed as a case study of EDCL using the survey method. According to Odoh and Chinedum (2014), a case study was described and analyses the impact of supply chain agility on EDCL, assuming that the researcher can acquire knowledge regarding the subject under review from in-depth exploration of a single case. It is a qualitative analysis that involves careful observation of a situation.

3.2 Target Population

This case, the researcher put all these factors into consideration during choosing of a study population in which these aspects were represented. The study population was mainly of EDCL staff. The researcher was used study target population of 150 persons.

3.3 Sampling techniques and Procedures

Sampling is a procedure that a researcher uses to select a number of individuals or objects from a population to be the subject of study (Kombo, 2008). She wrote that the selected group should contain representative characteristics of the entire group. So the researcher was selected

3.3.1 Sample Size

Martins (2009) note that the correct sample size in a study is dependent on the nature of the population and the purpose of the study. The sample size usually depends on the population to be

Total population sampling has a wide coverage of the population of interest

reducing risk of missing potential insights from members that are not included. Thus, the researcher was used the formula of (Yamane, 1967) and we got 109

3.3.2. Sampling Techniques

This study was a simple random sampling of the probability sampling design was utilized for the selection of respondents within EDCL.

3.4. Data Collection Methods

In this research one types of data were designed, that is to say primary data

3.4.1. Primary data

Primary data is the data collected specifically for the purpose of investigation at hand. Primary data of this research was collected directly from the staff of EDCL. The researcher was obtained this data through primary sources like: Questionnaires, in data collection.

3.4.1.1. Questionnaires

According to Kakooza (1996), questionnaire is an instrument, which composes set

questions to which the respondents give answers.

β_0 =Constant

$\beta_1 - \beta_4$ =Coefficient of estimates

e=Error term

3.7. Data analysis

3.7.1. Descriptive Statistics

Descriptive techniques often include constructing tables of means and standard deviation, measures of dispersion such as variance or standard deviation, and cross-tabulations or "crosstabs" that can be used to examine many disparate hypotheses

3.7.2.2. Regression model

In statistical modeling, regression analysis is a set of statistical processes for estimating the relationships between a dependent variable and one or more independent variables.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Where:

Y=Organization Performance

X1= Product development flexibility

X2=Sourcing flexibility

X3=Manufacturing flexibility

X4= Logistics flexibility

CHAPTER FOUR
RESEARCH FINDINGS AND
INTERPRETATIONS

Regression Coefficient

Model	Unstandardized	Standardized	t	Sig.
	B	Beta		
(Constant)	.664		10.510	.000
Product development flexibility	.190	.824	7.645	.000
Logistics flexibility	.929	.009	.090	.002
Manufacturing flexibility	.948	.007	.066	.001
Sourcing flexibility	.601	.069	.528	.013

Table 4.8: Regression Coefficient

a. Dependent Variable: Supply chain agility

Therefore, the regression model is as follows:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$$

Where: Y = Performance of EDUCL.

β_0 = Constant Term $\beta_1, 2,3,4$ =Beta coefficients

X1=Product development flexibility

X2= Logistics flexibility

X3=Manufacturing flexibility process

X4= Sourcing flexibility process ϵ = Error term

Therefore, this translates to

$$Y = 0.664 + 0.190X_1 + 0.929X_2 + 0.948X_3 + 0.601X_4$$

The value at the intercept of vertical axis is 0.664, which implies that the point at which the independent variables is zero, the organizational performance will still be positive. The organizational performance of EDUCL will still have values despite no effort to implement either supply chain agility.

This is because organizational performance of EDUCL is a composite of many other factors that if executed, the performance will still have a value. The coefficients of both

the two independent variables are positive at significance level of 0.05. This means that increase in the implementation of the lean and agile supply chain strategies would lead to increase in organizational performance of EDUCL. From the coefficient values, it can be deduced that most critical strategy of supply chain that EDUCL should ensure that is effectively and efficiently implemented is lean supply strategy with a coefficient value of 0.190 compared to 0.929, the coefficient of agile supply chain strategy. This could lead to a more significant increase of organizational performance. supply chain agility has a positive linear influence on the organizational performance of EDUCL with a beta coefficient 0.948, p value=.000 which is less than 0.05. The interpretation is that one unit increase in implementation of supply chain agility will lead to 0.190 unit increase in organizational performance of EDUCL. On the same line of thinking, the output of the linear regression analysis

shows that lean supply chain agility also has a positive linear effect on the organizational performance of EDUCL. The lean supply chain strategy has a beta coefficient of .824 with a significance level of .000 that is less than .05. This implies that one unit increase in implementation of supply chain agility would result into a 0.664 increase on the organizational performance of EDUCL.

This finding is supported by the findings of Kariuki & Ismael (2017) that also produced a model fit while studying the role of strategic supply chain practices on performance of EDUCL.

5.2 Summary of findings

5.2.1. Effect of product development flexibility on organization performance

The study findings reveal that majority of the procurement officers are female and have worked in the organization for 5-10 years. The study findings reveal that majority of the respondents have attained

bachelors level of education. The study findings also reveal that majority of the respondents have been in the current position for less than 5 years. Majority of the EDUCL (79.5%) have adopted Supply chain agility for 1-5 years.

5.2.2. Effects of sourcing flexibility on organization performance

The study findings reveal that majority of the respondents were neutral as to whether E- auctioning process influences performance of procurement function in the organization.

5.2.3. Effects of manufacturing flexibility on organization performance

The study findings reveal that majority of the respondents agreed to a great extent that manufacturing flexibility process influences performance of procurement function in the organization.

5.2.4. Effect of logistics flexibility on organization performance

The results were analyzed using both descriptive and inferential statistics. It is concluded that using supply chain agility in EDUCL has a positive and significant effect on the performance of the agencies. It is also noted that e sourcing influences the performance agencies as it enhances effective selection of suppliers from a wider region and hence enhancing effective competitiveness in the process.

5.4. Recommendations

The study recommends that EDUCL should use a joint policy in the establishment of similar systems of selecting and issuing tenders as a standard procedure to ensure high levels of performance. EDUCL should be to enhance the quality of service delivery to stakeholders by providing timely, transparent and accurate financial information to all users.

The study recommends that all EDUCL should automate the practice of invoicing so as to promote transparency and record management since it will be easier to track records or identify payments to be made to suppliers.

It is also recommended that EDUCL should adopt the use of Sourcing flexibility to enable them expand sourcing scope and hence attract more competent people to offer them effective, efficient and competitive services.

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