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Abstract

The purpose of the study was to evaluate the effects of resilience building on performance of pharmaceutical firms in Kenya. The research adopted a descriptive research design. The target population included 171 (22 local pharmaceutical manufacturing and 149 importing firms). The study adopted a census sampling technique. The data was analyzed using SPSS 22 version. The study made use of multiple regressions analysis which helped to generate a weighted estimation equation (OLS) that was used to predict values for dependent variable from the values of the independent variable. The regression results revealed that resilience building had a positive and significant relationship with the performance of pharmaceutical firms. It was found that resilience building is satisfactory in explaining the performance of pharmaceutical firms which was supported by a coefficient of determination also known as the R2 of 57.5%. The null hypothesis was rejected which indicated there is no significant relationship between resilience building and performance of pharmaceutical firms in Kenya. Thus, there is a significant relationship between resilience building and performance of pharmaceutical firms in Kenya. The study recommended that pharmaceutical firms should develop and implement the resilience building practices to increase reliability, visibility, adaptability and build reputable brands. Among the practices which are of great significance are those to do with timely and effective response on new customer customers preferences, stable and assured supply, innovativeness to new preferences and preparedness to deal with supply disruptions. The study also recommended that management in pharmaceutical firms should implement the aforementioned practices since they lead to an improved firm performance in terms of sales, customer service and efficiency

Keywords: *Resilience building, performance, pharmaceutical firms, Kenya*

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1.0 Introduction

The effectiveness of supply chain (SC) relationship is influenced by the ability of the focal organization and its supply chain partners to effectively configure their integration mechanisms (Tsanos & Carlos, 2015). Supply chains are built through interpersonal relationships (IPRs) such as affection, personal communication and credibility that in turn influence inter-firm relationships (Barnes *et al.*, 2015, Bill *et al.*, 2016). Personal affection is human feelings, sentiments, and emotion that reflect closeness of the relationship between individuals. The value created in the relationship is a construct embracing customer concepts, interaction response capacity, customer empowerment and customer value management (Song et al., 2016). Once the other party responds and the interaction commences, both firms gradually make commitments based on the trust that develops (Hastings *et al.*, 2016; Ying-Pin, 2016). It may improve a firm's performance and its customer-based relational performance. Its objectives are to increase profitability, revenue, and customer satisfaction (Sweeney Group, 2012). Customer relationship management (CRM) involves all of the corporate functions such as marketing, manufacturing, customer services, field sales, and field service required to contact customers directly or indirectly (Paul & Jongbok, 2012).

The three commonly used measures of corporate performance range from financial, productivity, profitability and market share (Firer & Mitchell, 2013). The Pharmaceutical supply chains (PSC) represents the path through which essential pharmaceutical products are distributed to the end users (Ying & Liz, 2012), with the right quality, at the right place and at the right time (Shabaninejad *et al.*, 2014). Products are delivered to company's warehouses, wholesale distributors, retail pharmacies, hospital pharmacy and finally to the end users (Mehralian *et al.*, 2012). It also includes expenditure of high cost and time in conducting clinical trials with low success rate in product discovery and clinical development, generic competition at the end of product patent life followed by high uncertainties in demands and capacity planning (Lainez *et al.*, 2012). In the Indian context, Mahajan et al. (2015) observed that the pharmaceutical industry has largely capitalized on its low-cost production of generic drugs. It includes the internal chain such as patient care units, hospital storage and the external chain such as producers, purchasers and distributors (Mehralian *et al.*, 2012).

1.1 Statement of the Problem

Many concerns exist regarding the ability of the supply chain to respond to the changing market requirements. While robust growth is forecast for pharmaceutical industry in Kenya, significant concerns exist with regard to pharmaceutical supply chain relationship management with Anti-Counterfeiting and Product Protection Program (A-CAPPP, 2012) and Business Monitor International (BMI,2016) estimating losses encountered amounting to 30% of pharmaceutical products sold and as much as Ksh 22 billion losses annually. With the changing customer behaviors, increased competition, shorter product life cycles, fragmented supply chains in the pharmaceutical industry remain an obstacle to achieving the desired levels of performance (Gholamhossein,2015).The net results of these are high costs of operation, reduced market share, reduced sales volumes, low returns on investments, high inventory costs, poor forecasting and increased lead times that have impacted performance of pharmaceutical firms in Kenya (Thani *et al*.,2011).

In United Kingdom, Wieland and Wallenburg (2013) investigated the influence of relational competencies on supply chain resilience with the objective of exploring resilience domain in

supply chain management while Carla *et al.,* (2014) studied the role of procurement in Supply Chain Management with the objective of understanding the role of procurement in identifying and managing the intra and inter-organizational issues which impact organizational performance. In Kenya, Kenneth and Muli (2012) conducted a study on the factors influencing the influx of counterfeit medicines in Kenya among small and medium enterprises. Muthoni (2015) studied the supply chain integration and performance of pharmaceutical firms in Kenya. Ochieng (2018) researched on supply chain resilience and organizational performance of pharmaceutical manufacturing companies in Nairobi. Based on these and other previous studies, there was need to carry out further studies on the effect of resilience building on performance of pharmaceutical firms in Kenya.

1.2 Research Objective

To evaluate the effects of resilience building on performance of pharmaceutical firms in Kenya

2.0 Literature Review

2.1 Theoretical Review

The study was anchored on dynamic capabilities theory. This theory was developed by Teece (1997). The theory emerged as both an extension to and a reaction against the inability of the resource-based view (RBV) to interpret the development and redevelopment of resources and capabilities to address rapidly changing environments. The theory of dynamic capabilities proposes that the greater the investment in organization practices or routines required for cultivating dynamic capabilities, the greater the potential were for firms to sustain wealth creation in a rapidly changing environment (Eisenhardt & Martin, 2000; Teece *et al.,* 1997). Dynamic capability as defined by Teece (1997) is the firm's capacity to assimilate, build and reconfigure internal and external competencies to counter the consistently changing environment. The main assumption of this framework is that an organization's basic competencies should be used to create short-term competitive positions that can be developed into longer-term competitive advantage.

Teece's notion of dynamic capability fundamentally saw corporate agility as paramount for survival of any business. For instance, organizations must understand opportunities and threats to seize the opportunities whilst maintaining competence through enhancing, merging, shielding and if required reconfiguring the organization's tangible and intangible assets (Hammervoll, Jensen & Beske 2017). The prerequisite of learning is shared codes of communication and synchronized search procedures. The organizational knowledge produced exists in new patterns of action, in routines or a new logic of organization. This theory provides researchers with a solid theoretical foundation to concentrate on identifying unique sets of organizational practices or routines that form distinct resilience capabilities/dimensions (Pettit *et al.,* 2010) and explain the heterogeneity in firms' competitive financial performance levels (Li *et al.,* 2015). This theory supports resilience building variable by showing how dimensions of supply chain resilience relate to performance. Through preparedness, alertness and agility, firms combine, transform or renew firm-level and supply chain-level resources to endure and respond to changes, thereby maintaining a firm's wealth creation capability.

2.2 Empirical review

Wieland and Wallenburg (2013) investigated the influence of relational competencies on supply chain resilience with the objective of exploring resilience domain in supply chain management. Survey data collection was utilized from manufacturing firms from three countries, which was analyzed using structural equation modeling (SEM). The findings indicated that communicative and cooperative relationships have a positive effect on resilience, which positively influenced firm performance. The study, however, collected data from only three countries which are quite few for an empirical study. Likewise, Li *et al.,* (2017) conducted an empirical examination of firm financial performance along supply chain resilience; supply chain preparedness, supply chain alertness and supply chain agility. They used survey design to collect data from 77 firms through developed scales for preparedness, alertness and agility and found the findings revealed that supply chain resilience; preparedness, alertness and agility significantly impact a firm's financial performance. It is also found that supply chain preparedness, as a proactive resilience capability, has a greater influence on a firm's financial performance than the reactive capabilities including alertness and agility, suggesting that firms should pay more attention to proactive approaches for building supply chain resilience (Li *et al.,* 2017). The study, however, shows a conceptual gap since the researchers only focused on three aspects of resilience building (supply chain preparedness, supply chain alertness and supply chain agility).

Carla *et al.,* (2014) studied the role of procurement in Supply Chain Management in achieving supply chain resilience with the objective of understanding the role of procurement in identifying and managing the intra- and inter-organizational issues which impact organizational performance. Study methodology involved conducting of systematic literature review between 2000 and 2013 to answer the single research question proposed. To do so, a content analysis based on the literature was applied to 30 selected papers. The study findings revealed that procurement in Supply Chain Management characterized by resilience enhanced organizational performance. The study findings were supported by that of Lee *et al.,* (2016) whose study showed that dynamic SC capability-building process is an antecedent of SC ambidexterity and that SC ambidexterity is important to firms as it mitigate the negative impact of SC disruptions and enhance business performance. The study by Carla et al., (2014) however, showed a methodological gap as the researchers focused on secondary data leaving out primary data which would have allowed for triangulation of findings.

Ochieng (2018) conducted a study on supply chain resilience and organizational performance of pharmaceutical manufacturing companies in Nairobi. Descriptive design was used and the targeted population for the study was 23 pharmaceutical manufacturing firms in Nairobi. The study was informed by the Strategic Choice Theory and Resource Based view. Correlation analysis was used to establish the relationship between the study variables. The study established that agile supply chain and risk management culture positively and significantly affected organizational performance. The study concluded that supply chain resilience has a positive and significant effect on organizational performance. However, the study focused only on 23 pharmaceutical firms in Nairobi, which is a small population for generalization of findings in the entire pharmaceutical sector.

Nyang'au (2017) did research on the influence of supply chain risk management strategies on performance of food and beverage (F&B) manufacturing firms in Kenya. The research population was 187 food and manufacturing firms drawn from a KAM directory using a census survey

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method. Structural equation modelling (SEM) R-Lavaan 0.5- 20 was used to find out the influence of supply chain risk management strategies on supply chain performance. The study established that supply chain risk management strategies have an influence on performance of F&B manufacturing firms. This study concluded that the most important SC resilience strategies on the performance were the risk avoidance strategies, control strategies and flexibility strategies. This study showed a scope gap as it focused on food and beverage manufacturing firms whose findings may not be generalized for the pharmaceutical sector.

3.0 Research Methodology

The research adopted a descriptive research design. The target population included 171 (22 local pharmaceutical manufacturing and 149 importing firms). The study adopted a census sampling technique; thus all 171 firms were included in the analysis. The data was analyzed using SPSS 22 version by making use of multiple regressions analysis which helped to generate a weighted estimation equation (OLS) that was used to predict values for dependent variable from the values of the independent variable.

4.0 Findings and Discussion

4.1 Response Rate

The study adopted a census research design where all study subjects were enumerated. Therefore, the number of questionnaires distributed to respondents was 171 in tandem with sample frame. The results are as presented in table 1.

Table 1: Response Rate

Questionnaires	Frequency	Percentage (%)
Responsive	134	78
Non-Responsive	37	22
Total	171	**100**

Out of the 171 questionnaires, 134 were correctly, fully filled and returned. This presented a response rate of 78% which according to Kothari (2011) is appropriate for analysis; while 37 questionnaires were either never filled at all by respondents or not returned and could not be raced representing 22% of the questionnaires.

4.2 Descriptive Results

The respondents were asked to rate the extent to which they agreed with statement in the questionnaires concerning resilience building and the results presented in Table 2.

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Table 2: Descriptive Results for Resilience Building

Statement	no extent	small extent	moderate extent	large extent	very large extent	Mean	SD
we adapt quickly to new customer requirements	1.12%	5.20%	19.33%	47.21%	27.14%	3.94	0.88
Our firm is always prepared to deal with supply disruptions	1.12%	4.46%	20.07%	43.87%	30.48%	3.98	0.89
Our firm has invested in building visibility	0.74%	5.95%	17.10%	46.47%	29.74%	3.99	0.88
Our firm has stable and assured supply	1.49%	5.58%	17.10%	42.38%	33.46%	4.01	0.93
Our firm is flexible to customer requirements	0.37%	2.97%	20.07%	52.79%	23.79%	3.97	0.77
Our firm is alert to new customer demands	0.74%	5.95%	19.70%	41.26%	32.34%	3.99	0.91
We respond to unanticipated customer needs in time	0.00%	4.83%	23.79%	47.96%	23.42%	3.9	0.81
Our firm is innovative to new preferences	0.00%	6.32%	16.73%	43.12%	33.83%	4.04	0.87
Average						**3.98**	**0.87**

From the findings presented in Table 2, 74.35% of the respondents indicated large extent on the statement about how quickly their firm adapts to new customer requirements (mean=3.94). These findings agree with Waqar *et al.*, (2019) that resilience enables a firm to build capability to respond effectively and rapidly in any market situation. Through acquiring agile capabilities, firms move towards differentiation giving them an edge over their competition in any uncertain situation, thus agility plays a vital role in achieving competitive advantage (Wu *et al.*, 2017). The findings were in line to those Stefan *et al.*, (2019) which asserted that quick adaptation to new customer requirements is essential in business operation and performance of the company. The results also found out that 74.35% of the respondents rated large extent on the statement about their firm's preparation to deal with supply disruptions(mean=3.98) which is in line with the findings of Fayezi et al. (2017) that resilience involves responding quickly when a change occurs in demand in terms of variety and volume (Chan *et al.*,2017).

Further, the results revealed that 76.21% of the respondents indicated that their firm has invested in building visibility to a larger extent (mean=3.99) consistent with the Braunscheidel and Suresh, (2018) and Eckstein *et al.*, (2015) findings that resilience is focused on customer service and responsiveness toward customer demand or requirements. Further 75.84% of the respondent indicated that the firm has stable and assured and supply (mean=4.01) which is in line with the findings of Tejpal (2014). Many 76.58% of the respondents indicated that their firm is flexible to customer requirements to a larger extent (mean=3.97) which is consistent with Dubey *et al.*, (2018) and Najmi and Khan, (2017) that flexibility enables firms to internally enhance competency and adaptability.

Additionally, 73.6% of the respondents indicated that their firm was alert to new customer demands (mean=3.99) while 71.38% of the respondents indicated a large extent on firm's response to unanticipated customer needs in time (mean=3.99) which is in line with Fayezi et al. (2015)

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explanation of agility component of resilience where firms have built flexibility in their system to cope in a timely manner with the market turbulence or the capability of a firm to successfully respond to disturbances in the supply chain (Fayezi *et al.*, 2017). The results also revealed that 76.95% of the respondents agreed on a larger extent that their firms are innovative to new preferences (mean=4.04) consistent with Dubey *et al.*, (2018); Najmi and Khan, (2017) that resilience focuses on externally intensive competency that includes quick market responsiveness, introduction of new products, speed, reduction of time and distribution consistency as well as Fayezi (2015) whose study reported positive results on firm innovative to new customer preferences. On a five-point scale, the average mean of the responses was 3.98 which implies that the majority of the respondents agreed to a large extent with statements; however the answers were varied as shown by a standard deviation of 0.87.

4.3 Correlation Analysis

The researcher performed correlation analysis between resilience building and performance of pharmaceutical firms in Kenya. The correlation results show the association between variables. The results in Table 3 show the correlation between resilience building and performance of pharmaceutical firms.

Table 3: Correlation Analysis

Sub variables	Performance	New requirement	Supply disruptions	Stable assured supply	New customer demands	Unanticipated-ted needs met	Innovativeness
performance	Pearson Correlation	1.000					
	Sig. (2-tailed)						
New customer requirements	Pearson Correlation	0.191**	1.000				
	Sig. (2-tailed)	0.002					
Supply disruptions	Pearson Correlation	0.201**	0.113	1.000			
	Sig. (2-tailed)	0.001	0.063				
Assured supply	Pearson Correlation	0.190**	0.626**	.217**	1.000		
	Sig. (2-tailed)	0.002	0.000	0.000			
New customer demands	Pearson Correlation	0.171	0.666**	.180**	.617**	1.000	
	Sig. (2-tailed)	0.065	0.000	0.003	0.000		
Unanticipated customer	Pearson Correlation	0.169**	0.170**	0.111	.149*	.129*	1.000
	Sig. (2-tailed)	0.006	0.005	0.068	0.014	0.034	
Innovativeness	Pearson Correlation	0.111**	0.140*	0.098	.151*	.213**	.212**
	Sig. (2-tailed)	0.000	0.022	0.11	0.013	0.000	0.000

** Correlation is significant at the 0.01 level (2 tailed).

* Correlation is significant at the 0.05 level (2-tailed).

The results in Table 3 shows that response to new customer requirements and firms' performance have a positive and significant association (r=0.191, p=0.002). Additionally, the results revealed that adaption to supply disruptions have a positive and significant association with the pharmaceutical firms performance of (r=201, p=0.001). These findings were consistent with that of Lee (2016), who found out that adaptations to new customer requirements and supply disruptions have positive effect on firm performance. Additionally, the results indicated that assured supply have a positive and significant association with performance of pharmaceutical firms (r=0.190, p=0.002). This finding is similar to that of Andreas *et al.* (2013) whose findings indicated that communicative and cooperative relationships have a positive effect on resilience,

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while integration does not have a significant effect. Further, the results revealed that timely response to new customer demands was positively and insignificantly correlated with at performance of pharmaceutical firms (r=0.171, p= 0.065) and response to unanticipated customer needs is positively and significantly correlated with performance of pharmaceutical firms (r=0.169, p=0.006).

These findings were in line with that of Fayezi (2015) who found out that response to customer needs, response to new customer demands, and assured supply have large and positive influence on the performance of pharmaceutical firms hence firms should devise ways on how to effectively respond on them. Finally, the results also revealed that innovative to new preferences is positively and significantly associated with the performance of pharmaceutical firms (r=0.111, p=0.000) which is consistent with the findings by Lee (2016) who found that there was improved resilience, obtained by investing in agility and robustness, enhances a supply chain's customer value

4.4 Regression analysis

The objective of the study was to establish the influence of resilience building on performance of pharmaceutical firms in Kenya. Regression analysis examines the relationship between variables. It is a set of statistical methods used for the estimation of relationships between a dependent variable and one or more independent variables. Regression analysis was used to examine whether resilience building can be used to explain performance of pharmaceutical firms in Kenya. The regression analysis included the model summary, analysis of variance (ANOVA) and regression coefficients.

Table 4: Regression Analysis

Model Summary

Variables	R	R Square	Adjusted R Square	Std. Error of the Estimate
Coefficients	.758	.575	.521	.4927

a. Predictor: Resilience Building

ANOVA

Measure	Sum of Squares	Df	Mean Square	F	Sig.
Regression	6.198	6	1.033	4.2510	.000[b]
Residual	63.593	127	.243		
Total	69.791	133			

a. Dependent variable: performance of pharmaceutical firms
b. Predictors: resilience building

Coefficients

Variables	β	Std. Error	T	Sig.
(Constant)	2.823	0.237	11.9114	0.000
Adapting to customer requirements	0.58	0.050	11.6	0.005
Supply disruptions	0.09	0.035	2.571	0.001
stable and assured supply	0.34	0.045	7.556	0.000
Alert to new customer demands	0.08	0.048	1.6667	0.007
Innovativeness to new preferences	0.27	0.036	7.5000	0.002

a. Dependent variable: performance of pharmaceutical firms

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Regression model:
$Y_1 = 2.2823 + 0.58\ CR + 0.34SS + 0.27NP + 0.09SD + 0.08CD$
Where:
Y_1 = Performance
CR- New Customer Requirements
SS- Stable and assured Supply
NP- New Preferences
SD- Supply Disruptions
CD- Alertness to Customer Demands

The regression results presented on Table 4 shows that resilience building was satisfactory in explaining performance of pharmaceutical firms which was supported by a coefficient of determination also known as the R^2 of 57.5%. This means that the model Resilience building can explain 57.5 % of the variations in the dependent variable which is performance of pharmaceutical firms. Further, the results implied that Resilience Building is a good predictor of performance of pharmaceutical firms as supported by calculated F statistic of 4.2510 which is greater than the critical F statistic of 2.19 and the reported p value (0.000) which was less than the conventional probability of 0.05 significance level. The regression of coefficients showed that that adapting to new customer requirements and performance of pharmaceutical firms have a positive and significant relationship (β=0.58, p=0.005) which is in agreement with Khanna (2012), in his study on aligning to marketing strategies.

Further, supply disruptions and performance of pharmaceutical firms have a positive and significant relationship (β =0.09, p=0.001) which is supported by Khanna (2012) whose findings showed positive and significant relationship between preventing supply disruptions and performance of pharmaceutical firms. Stable and assured supply and performance of pharmaceutical firms have a positive and significant relationship (β =0.34, p=0.000) while being alert to new customer demands and performance of pharmaceutical firms are positively and significantly related (β =0.08, p=0.007). These findings are supported by (Kumar, 2014) who found out that stable and assured supply was significantly and positively associated with the performance of the firm. In addition, timely response to unanticipated customer needs and performance of pharmaceutical firms was found to have positive and insignificant relationship (β =0.71, p= 0.065). This is in line with Bill (2016), who found that there was positive relationship between satisfaction of customer needs and performance of the pharmaceutical firms. Finally, the findings suggested that innovativeness to new preferences and performance of pharmaceutical firms have a positive and significant relationship (β =0.27, p=0.002) which is supported by Green (2012) who suggested that the best strategy to stay competitive is to be innovative which boosts the performance.

5.0 Summary of Findings and Conclusion

The objective of the study was to determine the influence of resilience building on the performance of the pharmaceutical firms in Kenya. The results revealed most pharmaceutical firms have established processes for resilience building. The firms have built polices on adapting quickly to new customer requirements, enhancing stable and assured supply, effective ways to deal with supply disruptions as well as creating environment and culture that promotes innovation to new preferences. Resilience building is used by most firms as part of the performance measurement

and most respondents agreed that the firms has adopted ways of resilience building to improve the performance of the company. Regression results revealed that resilience building had a positive and significant relationship with performance of pharmaceutical firms. The regression results showed a coefficient of determination, that is, R^2 of 57.5% which means that resilience building explains 57.5% of the variations performance of pharmaceutical firms. The Null Hypotheses was rejected showing that there was a significant relationship between resilience building and performance of the firms in Kenya. This implies that pharmaceutical firms should pay close attention to the principles guiding resilience building in their firms and correct mix of resilience building factors. The firms should be able to align their resilience building policies with the firm's resources so that they can be able to match the customer requirements and the market changes.

The study concluded that resilience building has a positive and significant effect on performance of pharmaceutical firms. The firms that have put processes in place to ensure resilience in their firms in conjunction to having contingency plans for risks management registered improved performance margins. The firms' resilience building policies and plans clearly identifies the areas susceptible to risks and how they can be mitigated from both external and internal sources of the company's operations. In conclusion, resilience building is sort of risk management strategies where supply chain visibility and adaptability are in place. Resilience building creates efficiency and responsiveness in the supply chain relationship management which are key to the performance of the pharmaceutical firms.

6.0 Recommendations

Based on the study findings, pharmaceutical firms should develop and implement the resilience building practices to increase reliability, visibility, adaptability and build reputable brands. Among the practices which are of great significance are those to do with timely and effective response on new customer customers preferences, stable and assured supply, innovativeness to new preferences and preparedness to deal with supply disruptions. The study also recommended that management in pharmaceutical firms should implement the aforementioned practices since they lead to an improved firm performance in terms of sales, customer service and efficiency.

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