

The role of innovation and strategic agility on firms' resilience: A case study of tertiary institutions in Nigeria

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ABSTRACT

The purpose of this study is to examine the relationship amongst innovation, strategic agility and firms' resilience in Nigerian tertiary institutions. A descriptive research design was employed with a sample size of 492 top management respondents from selected tertiary institutions, using SPSS and structural equation modeling (SEM) for analysis and hypotheses testing. The authors found that innovation and strategic agility predict a firms' resilience in tertiary institutions in Nigeria. This paper complements the limited literatures on education at post-secondary level by providing a model and empirical indications on innovation being a mechanism underlying resilience capability among tertiary institutions in Nigeria.

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1. Introduction

In recent times, the educational sector has become an important part of the service industry contributing to the growth of the nation's economy through a steady production of highly capable workforce (Talent Corp, 2015). In ascertaining corporate sustainability, strategic agility is required, which entails three vital rudiments comprising prompt strategic decisions, forestalling of customer's needs and the willingness to fit the dynamic business environment. Thus, the wariness to observe these fundamentals definitely result into new opportunities of being ahead of competitors (Brueller, Carmeli, & Drori 2014; Muthueloo, 2015). In every educational institution (private and public), top management teams and decision makers assert that firm resilience is a coping strategy in reconciling establishments to cut back the chance of facing abrupt disturbances, and resisting the emergence of such disturbances most especially while restoring the institution into a sturdy state of operations. Meanwhile, Cardoso & Ramos (2016) and Melnyk et al. (2014) suggest that resilience consists of two rudiments: first, the resistance capacity, which is concerned with the capability of reducing disruption effect through avoidance or lessening the stint between inception and recovery period and, second, the recovery capacity, which is concerned with system trail on stabilizing essential activities after disruption took place. However, the standard and survival of the educational sector remains comatose due to factors such as intense competition, outdated policies, emerging technologies, and inconsistent demands (Pucciarelli & Kaplan, 2016). Although, the academia had conducted numerous studies on resilience in the past suggesting its antecedents to include, among others, trust (Soni, Jain & Kumar, 2014), agility (Wieland & Wallenburg, 2013; Soni et al., 2014), leadership (Wilding, 2013; Demmer, Vickery & Calantone, 2011) and flexibility (Yang & Yang 2010; Nooraie et al.,

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2019, many of such studies largely focused on supply chain management and manufacturing companies where different technologies were said to be utilized based on the dynamic nature of their operations (Bag, Gupta & Foroapon, 2018; Ross & Buffa 2009; Cabral, Grilo & Cruz-Machado 2012). Nevertheless, sufficient verdict on the determination of the relationship between resilience and firm innovativeness, as well as an insight into strategic agility drives remained lacking, which, of course, form the basis of this research. Hence, this study seeks to examine the role of innovation and agility on firms' resilience as it applies to some selected tertiary institutions in Nigeria

2. Literature Review and Hypothesis Development

Innovativeness is a firm's ability and disposition to interact in new concepts and creative processes in product development (including service) or in high-tech advancement, which entails management structures. Based on the dynamic settings where organizations are domiciled, the long-term survival is accrued to its ambidexterity involving discovering innovative expertise, potential processes and skills, while efficiently exploiting their current knowledge, and competencies (Gibson & Birkinshaw, 2004; Raisch, Birkinshaw, Probst & Tushman, 2009). Teece (2007) asserts that firms desiring sustainability arising from today's dynamic environment, need to obviate routine practices, and, at the same time, anticipate creative and innovative ideas for survival. Firms' capability on innovation is improved when existing innovative resources are realigned in order to act in response to changes in the market despite the changes noticed in the operating environs (Ambulkar, Blackhurst & Grawe 2015; Marsh & Stock 2006). Innovation entails recognition of opportunities, exploiting capabilities from firms' cumulative learning, and experiences accruable at different points in time. Studies conducted on financial institutions in Uganda recognize relationship existing among firms' characteristics including innovation, financial resilience, and survival (Nkundabanyanga *et al.*, 2019). Golgeci and Ponomarov (2013) regard firm resilience as an essential constituent of firms' stability, while innovation is deemed as the primary driver of resilience. The findings of their work within the context of supply chain management reveal that innovativeness is substantially associated with resilience. Nkonoki (2010) reveals that organizational resilience facilitates businesses in exploiting competition and opportunities over time. Likewise, Audretsch and Lehmann (2005) affirm that certifying a long-term success and protection against rising threats requires that firms should be resiliently ascetic.

Continuous innovation creates sustainable competing performance resulting into a distinct benefit towards firm's resiliency. For instance, Kamalahmadi and Parast (2016) affirm the negligence on the role of innovation in enhancing firms' resilience, even though innovation is proven to be a module for long-run survival and improvement. Innovation is expounded as the application of ideas, skills, methods, and knowledge associated in influencing organizational competitiveness while building a distinct capability (Andersson, Lindgren & Henfridsson, 2008). Kim, Choi & Skilton (2015) mention that firms demand innovation while reacting to swift change in products, services, and client's preference. During a survey conducted on 122 corporations, Akgün and Keskin (2014) suggest the existence of strong connection between firms' innovation and resilience capacity, in addition to innovation (product) playing a mediating role between firm's resilience and performance.

Reinmoeller and Baardwijk (2005) affirm that enterprises largely focus on innovation and researchers argue that firms capable of assigning adequate resources into innovation may surmount disruptions overtime based on dynamic nature of the business world. Dosh (2009) confirms the existence of a positive relationship between tactical innovation and resilience while Clark, Huang & Walsh (2010) support innovation capability as a determinant of a firm's resilience. However, it is suggested that deploying innovative resolutions ahead of time in meeting unarticulated needs and/or existing market would invariably increase the resiliency and sustainability of firms (Gao *et al.*, 2017).

Van, Waarts & Van (2006) view agility as organizational vast competence to address unanticipated modifications that might occur in business settings by speedily reacting to competition. Dalvi, Shekarchizadeh & Baghsorkhi (2013) also discuss agility as being the capability paradigm in handling surprising challenges and threats domiciled within the business environs resulting into a competitive advantage, and path towards opportunities. Hossein & Sepideh (2019) posit five major components of agility, namely: responsiveness, competence, flexibility, speed, and market orientation; thus, stating it as the basis for maintaining and developing capabilities among organizations. At the instance of increasing agility, organizations ought to react to changes timely and as such; innovation is proven as a crucial antidote in improving organizational agility (Esterhuizen, Schutte & Toit, 2012; Van *et al.*, 2006).

Studies enthralled by evolving models for supply chain resilience reveal that organizational resilience can be enriched when strategic assets are adapted, out of which agility is ranked the highest among the drivers (Jain, Kumar, Soni & Chandra, 2017; Soni *et al.*, 2014). Meanwhile, Wieland *et al.*, (2013) view agility as a reactive dimension of resilience while firms' agility is proven as being significant to innovation capability. Ashrafi, Ravasan, Trkman & Afshari (2019), in their study, reveal that strategic agility is substantially driven by innovation capacity; whereas, Sullivan-Taylor & Branicki (2011), in their study conducted on 11 SMEs decision-makers, depict agility as the most notably potential in enhancing resilience.

From the foregoing, it can be concluded that agile firms are more likely to pursue innovative ideas, which tends to permit prompt response to intending disruptions on their survival, even as the business environment becomes dynamic. Thus, supporting these discussions, the following propositions are being made:

- H₁.** Innovation has positive influence on firms' resilience.
- H₂.** Innovation has positive influence on strategic agility.
- H₃.** Strategic agility mediates the relationship between innovation and firm resilience.

Following the discussions on the nexus between firm resilience and innovation, the proposed framework is depicted below:

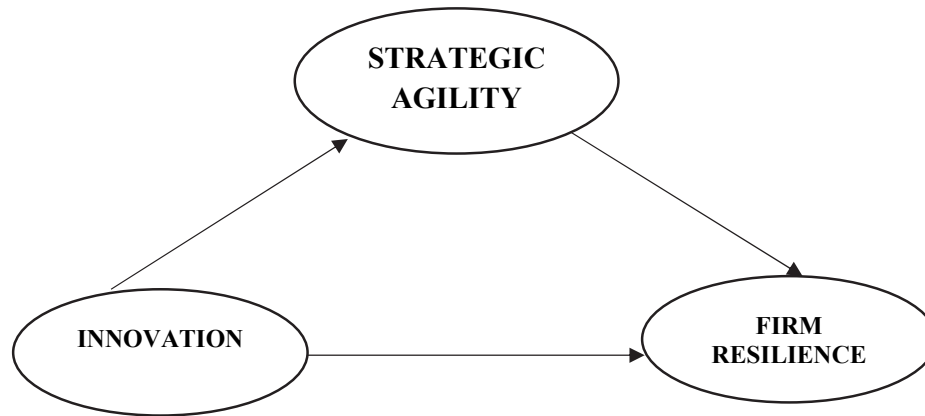


Fig. 1. Conceptual Framework

3. Methodology

3.1 Research Design, and Sampling Procedure

This study is quantitative in nature, which necessitates the use of a cross-sectional survey. The emphasis of this study centers on tertiary institutions in Nigeria, which comprises universities, polytechnics, and colleges. Nigeria is divided into six (6) geo-political regions housing many tertiary institutions (universities, polytechnics and colleges). However, universities are the focus of this research; the reason being that it attracts a reasonable stake of scholarly consideration with adequate teaching technology and numerous programs for career choice making by the populace and the apex of higher education which necessitates a quality and proper funding from individuals and government at all levels.

Based on purposive sampling technique and a multi-respondent survey used in this study, five universities were selected out of each geo-political zone, while twenty members of top management team (TMT) were selected from each university to arrive at a total of 600, as the sample size. Out of the 600 surveys administered online, 492 were retrieved to give a response rate of 82%. These TMT members include vice chancellors, deputy vice chancellors, board members of governing councils, deans and deputy deans of faculties, heads of departments, and directors of units, hence, these representatives were considered knowledgeable on the concerned subject matter.

3.2 Measures

A well-structured questionnaire was developed to obtain the data containing items used from prior research. Innovation was operationalized using a dimensional context of innovation activities comprising product (services inclusion) and process (Liao et al., 2008; Daft, 1982; Škerlavaj et al., 2010). Strategic agility was gauged employing a scale adopted from Trinh, (2015) & Krush et al., (2016), while firm's resilience was also measured with 5-item scale borrowed from previous studies (Zulfiqar et al., 2017; Gunasekaran et al., 2011; Ates & Bititci, 2011). Hence, all the scales used were on a 5-point likert scale.

4. Data Analysis and Result

Descriptive analysis was adopted to explain the sample population frame, where frequency and percentage was employed to describe the socio-economic characteristic of the respondents. The proposed structural model was subjected to strings of tests, where the measurement, analysis and hypotheses testing were achieved using the Partial Least Square Structural Equation Modeling (PLS-SEM). In addition, the measures were subjected to a confirmatory factor analysis (CFA) using PLS-SEM approach in SmartPLS 3.0 version (Henseler et al., 2009).

4.1 Demographic Profile of the Respondents

The demographic data of the sample (n=492) such as gender, marital status, educational level, working experience and job position are presented in Table 1. The gender distribution shows that majority (83.7%) of the respondents are male while 16.3% are female. Majority of the respondents are well informed about the operations of each university, since about 86% of the respondents had worked for more than 10 years in the system. Almost 67% of the respondents occupy the lower cadre of TMT comprising the directors and heads of departments while the remaining 33% comprises of respondents occupying higher cadre of TMT comprising vice chancellors, deputy vice chancellors, deans and deputy deans. This implies that the respondents are well versed in the strategic operations of the university in relation to agility, resilience and innovation.

Table 1

Socio-economic characteristics of the respondents

n=492

Responses	Frequency	Percentage
Gender		
Male	412	83.7
Female	80	16.3
Marital Status		
Single	13	2.6
Married	446	90.7
Divorced	33	6.7
Age		
30-39 years	199	40.5
40-49 years	165	33.5
50-59 years	126	25.6
60 years & Above	2	0.4
Educational Level		
Bachelors	4	0.8
Masters	52	10.6
PhD	436	88.6
Work Experience		
Below 10years	68	13.8
10-15 years	168	34.1
16-20 years	119	24.2
Above 20 years	137	27.8
Position Held		
Head of Departments/Director of Units	328	66.7
Dean & Vice Dean of Faculties	96	19.5
Members of Governing Council	34	6.9
Deputy Vice-Chancellors	25	5.1
Vice-Chancellors	9	1.8

SOURCE: Computations from Survey Data, 2020

4.2 Measurement Model

Table 2

Construct Reliability and Validity

Model construct	First Order	Second Order	Loadings	Cronbach's alpha	rho_A (pA)	CR	AVE
RES1	Resilience		0.817	0.885	0.888	0.915	0.684
RES2			0.829				
RES3			0.862				
RES4			0.820				
RES5			0.804				
PROCSINN1	Process	Innovation	0.938	0.756	0.823	0.806	0.436
PROCSINN2			0.945				
PROCSINN3			0.919				
PRODINN1	Product		0.892	0.894	0.895	0.934	0.825
PRODINN2			0.931				
PRODINN3			0.901				
SAG1	Strategic Agility		0.864	0.862	0.867	0.905	0.706
SAG2			0.878				
SAG3			0.852				
SAG5			0.762				

SOURCE: Computations from Survey Data, 2020

The entire measurement shows an acceptable fit and high predictive power, since the Cronbach's alpha, rho_A, and composite reliability (CR) values are well above the threshold of 0.7, which reflects its internal consistency and reliability (Hair et al., 2017). Meanwhile, most of the AVE values are above 0.5 except that of innovation with estimated AVE of 0.436, which still falls within the acceptance region since its composite reliability is higher than 0.6 (CR = 0.806). Hence, the convergent validity of the construct remains acceptable as presented by Fornell and Larcker (1981).

Table 3

Discriminant Validity

	Fornell-Larcker Criteria			Heterotrait-Monotrait Criteria (HTMT)		
	INNOV	RES	SAG	INNOV	RES	SAG
INNOV	0.661					
RES	0.791	0.827		0.804		
SAG	0.585	0.753	0.840	0.638	0.838	

SOURCE: Computations from Survey Data, 2020

Fornell and Larcker test and Heterotrait-Monotrait Criteria (HTMT) Criterion

Considering the Fornell and Larcker criterion as a measure of discriminant validity, Fornell and Larcker (1981) suggest that the “square root” of AVE of each latent variable should be greater than the correlations among the latent variables, hence, result in Table 3 affirm positively, revealing the existence of discriminant validity between the research construct. Furthermore, the Heterotrait-Monotrait Ratio of Correlations (HTMT) was usually the most recognized criterion while using SEM. Gold et al., (2001) mentioned that acceptable HTMT value falls below the threshold of 0.9. Hence, the result depicts that there is a definite discriminant validity among the constructs, since HTMT value is below suggested upper limit (Gold et al., 2001).

4.3 Structural Model and Results

The hypothesized relationship between the constructs was illustrated using the structural model in Fig. 2. The R-squared (R^2), path coefficients and t-values were estimated using a bootstrapping of 2000 re-sampling process. The R-Squared value of strategic agility was 0.343, implying that 34.3 percent of the variance in strategic agility could only be described by the shared effect of innovation (product and process), while the R-Squared from strategic agility towards resilience was estimated at 75.4 percent. Hence, all paths (indirect and direct) determined were significant. Table 4 depicts the result of the structural model of the hypothesized direct and indirect effect relationship. All the hypotheses were supported, which implies that innovation and strategic agility had positive, and significant influence on resilience ($\beta = 0.528$; $\beta = 0.583$; $\beta = 0.445$ at $p < 0.01$).

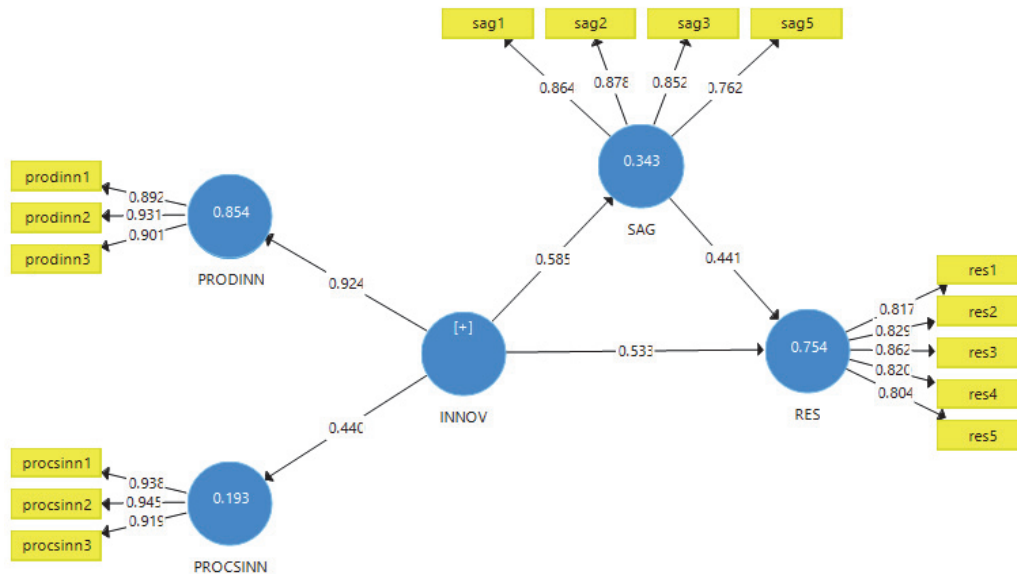


Fig. 2. Structural model

Table 4

Direct and Specific Indirect effects

Hypothesis	Relationship	Path coefficient	Standard beta (β)	t-value	P-value	Decision
H1	INNOV → RES	0.533	0.528	15.638**	0.000	Supported
H2	INNOV → SAG	0.585	0.585	19.097**	0.000	Supported
H3	INNOV → SAG → RES	0.441	0.260	11.860**	0.000	Supported

SOURCE: Computations from Survey Data, 2020

** $p < 0.01$. * $p < 0.05$ (based on one-tailed test).

5. Discussion and Conclusions

The findings of this research are consistent with prior studies on innovation and firm’s resilience (Akgün & Keskin 2014; Kamalahmadi & Parast 2016; Golgeci & Ponomarov 2013; Doz & Kosonen, 2010). Direct impact of product and process innovation dimension connotes that firm’s resilience and survival hinge on its innovative capability (Clark, Huang & Walsh 2010; Sabahi & Parast, 2019). Hence, this result aligns with the suggestion of Carmeli and Markman (2011) that resilience do not involve crisis administration or change designs, but rather, continuous redistribution of innovation strategies. The positive and significant path posed by innovation dimensions in relation to resilience, entails willingness of management of Nigerian tertiary institutions towards innovation, as well as reacting to changes in a timely and agile manner. Although, the R-square value of the process (administrative) is quite low (19.3 percent), which is a reflection of a deficient implementation of quantifiable motivation strategies by the university management in such areas as tangible incentives and effective reward system, team work, adequate training program and good working relationship.

The results also clearly support the second hypothesis by revealing that strategic agility mediates the association between innovation and firms' resilience. Even as the significance acquaint with norms of business that, every organization ought to acquire a substantial extent of agility in order to remain in operations over time. Hence, decision and policy makers (university management) in the education sector should venture into ingenious pursuits such as modernized technology-based teaching resources and methodologies, as well as active and productive research development for better performance. In addition, the willingness of the tertiary institutions adapting to changes proves the more reason why innovation is required at more edified internal processes of administration.

Finally, it is clear that this research has no dissimilar result, but the conceptualization on the connection between innovation and firm resilience offers a new path for research in improving understanding about firm resilience through investment in innovation, while making the tertiary institutions agile-driven to survive any dwindling policies in the competing environs.

6. Limitations and Future Research

The results of this study are limited by the measures espoused to measure innovation and resilience, although the measures used are acknowledged as being dependable and useable with a well-impregnable selection, but supplementary insights on its association may be gained by adopting more measures to reflect different perspectives. The researched constructs were viewed in determining how resilient Nigerian tertiary institutions are, leaving behind its implications on performance and which requires further studies. Since Nigeria is known for her diverse cultural upbringings, it would be key to hypothesize organizational culture and learning as a moderator, in addition to other possible mediating variables. In future studies, this model and its related constructs would make immense contribution applied to more service industries like hotel, health, transportation, tourism, education and financial services sector.

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