



EVALUATION OF INTERNAL FACTORS INFLUENCING INNOVATION PRACTICES AMONG NIGERIAN CONSTRUCTION CONSULTANCY FIRMS

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ABSTRACT

Construction industry consultants who play vital roles in the conceptualisation, planning as well as in the implementation of construction projects are often criticised of inefficiency in their services delivery. Scholars generally agree that innovation practice is a vital strategy for achieving greater efficiency, competitiveness and sustainability in modern businesses including the construction consultancy services. The objective of this paper is to investigate the impacts of organisational factors on the innovation practices among Nigerian construction industry consultancy services firms. The data was obtained through structured questionnaire administered to various construction consultancy services firms; Architects, Quantity Surveyors, Engineers, Professional Builders and Consortium of services firm operating in Abuja and some selected states within its environs. Collected data was subjected to statistical screening and analysis. The results show that all the identified internal factors have significant impacts on the firms' innovation practices with organisation culture having the greatest impact followed by firm resources on these consultancy firms' innovation practices. The results imply the need to establish innovation enhancing culture within the various firms and introduce innovative delivery processes in their consultancy services delivery operation.

KEY WORDS: Consultancy, Competitiveness, Innovation practices, Organisation

INTRODUCTION

The pivotal roles played by various construction industry consultants in the conceptualisation, planning and production of construction projects are well acknowledged and documented in literatures. These roles are manifested in their various specialised, knowledge-based services offered towards clients' realisation of their construction projects dreams. Such services include production of project designs, feasibility (technical, financial and economic) assessment of proposed developments, supervision of projects in progress, financial and contractual advisory services, closing and handing over of completed projects, marketing of completed projects (in case of speculative developments) as well as improvement and/or reactivation

advice on existing projects. It is in recognition of the vital roles of these professionals that the various Contract Forms provide enormous power to the project leader (usually construction professional consultant) to take various decisions and controls that can facilitate the effective realisation of construction projects. However, construction industry's consultants have, over the years, been found wanting and criticised for inefficiency in the discharge of their professional services. As such, many clients were dissatisfied. Accordingly, Latham (1994) and Egan (1998) lament thus:

'.....more than a third of major clients are dissatisfied with contractors' performance in keeping to the quoted price and to time,

resolving defects and delivering a final product of the required quality.more than a third of the major clients are dissatisfied with consultants' performance in coordinating teams, in design, and innovation, in providing value for money'.

The British Property Federation's survey of major UK construction clients conducted in 1997 also show that more than a third of clients were dissatisfied with the performance of construction professional services providers in co-ordinating teams, design and innovation, providing a speedy and reliable service and in providing value for money (DETR, 1998). The Nigerian construction industry was accused of unsatisfactory services in its construction project delivery due to the industry's noted consistent low productivity and poor performance over the years (Adeyemi, Oladapo and Akindele, 2005; Ijigah., Oloruntoba and Mohammed, 2012). The Nigerian construction industry's inability to deliver services effectively and efficiently to its clients was attributed by scholars to various reasons ranging from its complex operation structure that would require diverse independent contributors (Duncan, 2009); low demand, on construction projects, poor performance and low productivity (Adeyemi et al., 2005; Wahab, 2006; Ijigah et al., 2012); poor funding and corrupt practices (Oforeh, 2006; Babalola, et al., 2010); inadequate budgetary provision, abuses of contractual engagements, poor planning and execution (Wahab, 2006); and resistance to innovative changes among key players (Manley, Blayse and McFalan 2005; Terzungwe, 2013).

Construction projects face numerous problems that are directly or indirectly traceable to professional consultants' inefficiencies. These include excessively high initial cost budgets, high incidences of cost and time overruns (Ijigah, et al, 2012), poor specifications of construction components, materials, methodology and loading calculations resulting in rapid dilapidation of construction projects, high incidences of structural failures and the most ugly but repeated incidences of building collapse

leading to colossal waste of scarce resources, poor social and economic welfare and, on many occasions, loss of lives.

Studies have shown that certain internal and external factors usually influence the practice of innovation by organisations. The organisational factors include the firm structure, firm culture and firm resources which are usually within the control of the organisation, while firm external factors include government innovation support, environmental uncertainty and market demand and competition (Yusof, Shafei, Ilias and Anidin, 2010). For an organisation to practice innovations productively, the knowledge of these interacting factors is very crucial. This study is aimed at evaluating the factors that influence innovation practices among Nigerian construction consultancy firms with the view to enhance innovation culture within the various firms, the firms were selected from Abuja and its environs.

LITERATURE REVIEW

The concept of Innovation has been variously defined by scholars based on their perspectives. For example, it is defined as a 'process that involves the generation of new ideas or practices within an organisation (D'Wan, ONG, and Lee (2005)); 'an idea, practice or an object that is perceived as new by an individual or other unit of adoption' (Rogers, 1995). However, Slaughter (1998), considered innovation as the use of non-trivial change and improvement in a process, product, or system that is novel to the institution developing the change. Following Rogers (1995), Slaughter (1998) and D'Wan et al, (2005), this paper considers innovation as 'a deliberate search (or acquisition), establishment and application of change in the organization's process, product, or system (way and manner of carrying out business activities or services) in its production or services delivery, with a view to improve performance'.

Innovation has been identified as one of the key activities that improve the performance of

the construction industry, (Tavistock Institute, 1977); and determine the success of an organization (D.Wan et al, 2005). According to Toole et al. (2013) success in the construction industry requires effective inter-organisational management. That, he said, is so, 'because construction projects often need collaboration among themselves and the effective management of contributing firms to achieve a common goal'.

Typologies of Organisation Innovation Practices

From construction industry perspective, Handerson and Clerk (1990) categorise innovation into four (incremental, modular, architectural and radical), but paired architectural innovation with product and distinguish them according to the degree to which product architectural knowledge is required to implement the innovation. Slaughter (1998) similarly categorises innovation into five but added system innovation as the fifth, as explained hereunder; Incremental innovation, where the innovation is small, and based on existing experience and knowledge; Radical innovation, where a breakthrough in science and technology or major transformation is involved; Modular innovation, where a change in concept within a component occurs; architectural innovation, where a change is linked to other components or systems; and System innovation, where the change that occurs has multiple and integrated impacts within the whole system (i.e., affect the entire system or organisation) (Manley et al., 2005).

The Organisation for Economic Cooperation and Development (OECD, 2005) provided a broader categorisation of innovation into Technical and Organisational innovation in the Oslo Manual on the basis of international research across a number of industries. The Technical innovation involves either process or product innovation. Organisation innovation, on the other hand, involves changes to the organisation structure, introduction of advanced Management techniques, and implementation of new corporate strategy orientations.

It should be noted that the above innovation typology/dimensions is only intended to bring an overview of the broad classifications from existing literatures and by no means exhaustive. This study however conceptualises organisation innovation practices (innovativeness) as product, process, business system and technological information system. Studies have shown that these dimensions are commonly pursued and measured by most innovating organisations and, as such, many innovation scholars adopted this conceptualisation, for example, Knowles et al. (2008) and Wang & Swanson (2007).

Organisational Factors influencing innovation adoption and Practices

Organisational Factors are internal variables that can be controlled, reviewed and improved upon within the organization (Kamarudeen, 2011). This study conceptualised them as organisation structure, organisation culture and organisation resources on the basis understanding the adoption and practice.

Organisational Structure

Organisation structure represents the totality of links and relationships between and within its various factors at all levels of the organisation in a precisely defined manner (Sehanovic and Zugaji, 1997). There are basically two dimensions of organisational structure, viz; configuration and structural. The configuration issues, commonly known as organisation chart, include whether organisational hierarchies are tall or flat and involve which activities are assigned to which hierarchies whereas the structural dimensions implies the extent of formalisation, centralisation and specialisation (Dalton et al., 1989). While centralisation describes the centrality of the decision making in the organisation, specialisation refers to the specialised skills of the personnel in the functional areas of the firm (Subrahman and Nilakanta, 1996). Studies have shown that many structural attributes influence firm's innovation decisions. For instance, Russell (1999) found that an informal, decentralized structure provides increased autonomy and control to firm's subordinates and encourages

firms to embark on new ventures. Zaltman et al. (1973) also found that the more formalised and centralised organisations (often larger firms) are less likely to initiate or take innovation adoption decisions, but are better equipped to implement an innovation. This study is concerned about the relationships between structural dimension and innovation practices of construction industry consultancy firms in Nigeria and conceptualises firm structure as formalisation and centralisation.

Organisational Culture

Corporate culture represents the core set of attitudes and practices that are shared by the members of the firms (Denison, 1996; Scultz and Hatch, 1996). It encompasses the firm's shared values, behaviours patterns and the set of norms that shape the firm's manner of carrying out its businesses (Teece, 1996). Cameron and Quinn (1999) classified corporate culture into four types, including the Clan culture, Hierarchical culture, Market culture and Adhocracy culture. Organisation with Clan Culture tends to emphasise on friendly relations and interaction among employees and therefore adopts flexible operation procedures and its core values generally include co-operation, consideration, agreement, fairness and social equality; Organisation with Hierarchical Culture adopts a formal and structured approach to task assignment and relationships. It places a high value on economy, formality, rationality, order and obedience. Organisation with Market Culture tends to be results-orientated and concentrate on getting the job done achieved through high productivity and economical operation. Its leadership strongly desire to be at the forefront and outperform competitors in their field of endeavour by maintaining stability and control. Organisation with adhocracy culture is generally dynamic, entrepreneurial and creative, which engender work place where people stick their necks out and take risks. The paper conceptualises organisation culture as adhocracy culture and market orientation.

Adhocracy Culture: Leadership here are visionary and innovative and promotes

members' values, creativity, experimentation, risk, autonomy and responsiveness (the willingness to act). The organisation with hierarchical culture tends to promote and favour innovative development and adoption. Studies on the relationship between firm culture and its innovation practices found that there is positive relationship between the two variables (Hurley and Hult, 1998).

Market Orientation: The market as an innovation factor implies the 'market readiness of the firm (Yusof et al, 2010). Therefore, organisation 'market orientation' implies the extent to which the firm considers the meeting of the needs of its current and future customers a main goal (Kohli and Jawoski, 1990). Hence, a market-responsive firm can easily gather ideas for improvement of its existing and/or development of new products for the market (Hurley and Hult, 1998).

Organisational Resources

Firm resources have been grouped into tangible assets or intangible assets. Tangible assets are those with physical embodiment. e.g., land, equipment, labour, and capital. Intangible assets, on the other hand, are those resources without physical embodiment, and they include education and training of organisation personnel (Inmyxai and Takahashi, 2009), Patents, databases, R&D in progress, and human capital (Rose et al., 2009). According to Barney (1991) a firm's valuable innovation resources must meet four basic criteria, viz; uniqueness, add positive value to the firm, cannot be easily imitated by competitors and cannot be substituted by other resources. The study conceptualises firm resources as Transformational Leadership Style, Organisational Learning and Human Resources.

Transformational Leadership Style

This is one of the essential resources required by an organisation to succeed in its operation. This is because all other organisation's resources and programme (including innovation) are planned for, acquired, and managed by the leadership of the

organisation. Several studies indicate that organisation members' adoption of innovations does not only depend upon their desires but also on their organisation's management strategies, policies, and actions (Leonard-Barton and Deschamps, 1988).

Organisational Learning

This has been defined as the process of improving behaviour of organisation members through better knowledge and understanding (Fiol and Lyles, 1985). David and Skerlavag (2009) provided a more comprehensive definition of organisational learning as 'the process of acquiring, distributing, interpreting, and reflecting information in behavioural and cognitive changes'. Helena et al. (2010) however note that though much research attention has been made on understanding how knowledge is created and distributed, little is known about its influences on firm's innovation or performance.

Human Resources

This includes skilled labourers employed by the firm (Abdul Hamid, 2002) or accessible to the firm for services. A well trained and skilled workforce is generally considered as pre-requisite for developing innovative ideas and products (Tellis et al, 2009). Hence, firms that have superior intellectual resources have better understanding of how to explore, deploy, combine and configure resources and capacities to generate satisfactory and valued services to their clients than their competitors (Teece, Pisano, and Shuen, 1997). Availability of highly qualified and skilled employees equip firms with adaptable, responsive and pro-active workforce that can adequately face the challenges of changes in the market environment and the emergence of disruptive technologies (Baldwin and Lin, 2002).

Organisation Characteristics

This consists of firm variables such as Firm structure, Firm culture, Firm size, and Firm Age and firm sector (ownership) type (Roxas, Battisti, Deakins, 2013). The firm structure and firm culture are already discussed. A number of studies found that relationship

between the other firm characteristics (size, age and sector) and innovation do not usually give consistent results and, therefore, they consider them as control variables during their analysis (Roxas, Battisti and Massey, 2013). Following Roxas, Battisti and Deakins (2013), who used the three elements (dimensions) of the firm characteristics (firm size, firm age, and firm sector) as control variables in their respective studies, the current study considers firm size, firm age and firm sector (ownership) type as control variables during the data analysis for the study. In addition, holding the firm size, age, and sector constant, as control variables in Hierarchical Multiple Regression Analysis, will enhance a clearer and more robust outcome of the interaction between the independent and the dependent variables (Sefendi, 2007).

RESEARCH METHODOLOGY

Research Design

The study is a cross-sectional quantitative survey research of the construction industry consultancy firms operating in Abuja and environs (four surrounding states). This study employed questionnaires survey method of data collection and use a combination of descriptive statistics and hierarchical multiple regression analysis (HMRA).

The following hypotheses are proposed for the interaction between firm internal factors and firm innovation.

H_{A1}: Organisational factors have positive and significant effects on its innovation practises.

H_{A1.1}: Organisation structure has positive and significant effects on its innovation practises.

H_{A1.2}: Organisation culture has positive and significant effects on its innovation practises.

H_{A1.3}: Organisation resources devoted to innovation have positive and significant effects on its innovation practises.

Population and Sampling

Probability random sampling was used for

selecting each element in the population. A total of 500 samples representing 50.30% of 994 practicing firms identified within the study areas were considered in line with Roscoe's (1975) Rule of Thumb, cited in Sekaran (2006).

Data Collection

This primary data on the perceptions of the respondents of the relationship between firm internal factors and firm innovation practices was collected through the use of structured questionnaires containing 5-point Likert scale items (based on previous similar studies) administered to the respondents to tick the item he/she considers to be appropriate. However, only 285 representing 57% of the 500 distributed questionnaires were returned duly completed and used for the study. The variables measured in the study include the dependent (firm innovation practices) and the independent variables (i.e., organisational factors: structure, culture and resources).

The collected data was subjected to statistical screening to verify psychometric properties of the instrument and to ascertain that they are suitable for SPSS regression analysis before the actual data analyses. All scales show

satisfactory reliabilities, with Cronbach's alphas above the acceptable cut off of .70 and KMO of above .70. The main data analysis then followed using Version 20 of the SPSS Software for Windows.

Data Analysis

A two-step Hierarchical Multiple Regression Analysis (HMRA) was performed on the data to determine how well firms' internal factors are able to predict their innovations practices. The HMRA also indicates which of the internal factors best predicts firm innovation practices. In the first step, the control variables (which includes firm size, firm age and firm ownership types) were entered into the model (Table 3) and then the second step which involves the introduction of the predicting (independent) variables. The value of R^2 was used to indicate the predictive strength of the independent variables on the dependent variable. A higher R^2 indicates a higher predictive capability of the block of independent variables on the dependent variables. The Beta value signifies whether the relationship between the dependent and independent variables is positive or not when F value is found to be significant (Pallant, 2011).

Table1. Research Population and its Sample Distribution

Firms	Abuja	Kaduna	Kogi	Nasarawa	Niger	Total	%
Architectural firms	70	58	50	35	46	259	26.06
Quantity Surveying firms	38	24	18	20	23	123	12.37
Building firms	55	50	28	38	25	196	19.72
Engineering firms	71	63	47	32	35	248	24.95
Consortium	52	43	28	21	24	168	16.90
Sub-Total	286	238	171	146	153	994	100.00

Table 2: Summary of Factor Analysis and Reliability Tests Results

Variables	Construct	No. Dim	No. of items retained	No. of items dropped	Factor Loading	% of Variance Explained	Cronbach's Alpha	KMO
1. Independent Variables (organizational factors)	Firm Structure	2	10	2	.561-.854	56.703	.778	.736
	Firm Culture	2	16	5	.510-.810	48.45	.887	.883
	Firm Resources	3	15	1	.537-.838	57.10	.882	.867

RESULTS AND DISCUSSION

As stated at the beginning, the study sets out to investigate the influences internal factors on construction industry consultancy firms' innovation practices. To achieve this, the set of hypotheses formulated for the study were tested by subjecting the associated data to a two-step HMRA described above, the result of which are presented as follows.

HA1.1: Influences of Firm structure on the Firm Innovation Practices'

In Table 3, the results of the HMRA carried out to test Hypothesis HA1.1 which states that Firm structure has positive and significant impact on the Firm Innovation Practices' show that only firm size among the control variables had significant effect on the overall firm innovation practices with Beta value=0.182 at $p < 0.05$ (0.003) in the first step. The control variables cumulatively explained 4.7% of the total variance in the overall firm innovation practices. The introduction of the Firm structure in the second step explained an additional 11.8% of the variance in overall firm innovation practices. This implies that the control variables and the Firm structure cumulatively explained 16.5% of the variance in Firm Innovation practices.

Table 3: HMRA Results on Influences of Firm Structure on overall Firm Innovation Practices

Dependent Variable	Variables	Beta	
		Step 1	Step 2
Overall Firm Innovation Practices	Control		
	Firm	-0.096	-0.071
	Ownership	0.036	0.014
	Firm age	0.182	0.180
	Firm size		
	Independent		
	Firm Structure		0.346
	F value		13.797
	R ²		0.165
	R ² Change		0.118
	F change		39.587

The results in table 3 above shows that Firm

Structure had a significant impact on the Firm Innovation Practices with $\beta = 0.346$ at $p < 0.05(0.000)$. Therefore, Hypothesis HA1.1: which states that 'Firm structure has significant and positive impact on the Firm Innovation Practices' is supported.

HA1.2 Influences of Firm Culture on Firm Innovation Practices.

In Table 4, the results of the HMRA carried out to test Hypothesis HA1.2: which states that Firm culture has positive and significant impact on the Firm Innovation Practices' is the same as for the first step as in HA1.1 above. The control variables similarly cumulatively explained 4.7% of the total variance in the overall firm innovation practices. The introduction of the Firm Culture in the second step explained an additional 49.0% of the variance in overall firm innovation practices. This implies that the control variables and the Firm Culture cumulatively explained 53.7% of the variance in Firm Innovation practices.

Table 4: HMRA Results on Influences of Firm culture on overall Firm Innovation Practices

Dependent Variable	Variables	Beta	
		Step 1	Step 2
Overall Firm Innovation Practices	Control		
	Firm	-0.096	0.094
	Ownership	0.036	0.040
	Firm age	0.182	0.154
	Firm size		
	Independent		
	Firm Culture		0.702
	F value		80.855
	R ²		.537
	R ² Change		.490
	F change		295.296

The result of the Hierarchical regression analysis in Table 4 above shows that Firm culture had a significant impact on the Firm Innovation Practices with $\beta = 0.702$ at $p < 0.05(0.000)$. Therefore, Hypothesis HA1.2: which states that 'Firm culture has significant and positive impact on the Firm Innovation Practices' is supported.

H_A1.3 Influences of Firm Resources on Firm Innovation Practices

Table 5 shows the result of the HMRA carried out to test Hypothesis H_A1.3 which states that; 'Firm resources have positive and significant impact on the Firm Innovation Practices' is the same as for the first step as in HA1.1 above. The control variables similarly cumulatively explained 4.7% of the total variance in the overall firm innovation practices. The introduction of the Firm Resources in the second step explained an additional 38.2% of the variance in overall firm innovation practices. This implies that the control variables and the Firm Resources cumulatively explained 42.8% of the variance in Firm Innovation practices.

Table 5: HMRA Results on Influences of Firm Resources on overall Firm Innovation Practices

Dependent Variable	Variables	Beta	
		Step 1	Step 2
Overall	Control		
Firm	Firm	-0.096	-0.116
Innovation	Ownership	0.036	-0.014
Practices	Firm age	0.182	0.075
	Firm size		
	Independent		
	Firm		0.631
	Resources		
	F value		52.255
	R ²		.428
	R ² Change		.382
	F change		186.238

The result also shows that Firm Resources had a significant impact on the Firm Innovation Practices with $\beta = 0.631$ at $p < 0.05(0.000)$. Therefore, Hypothesis H_A3.3 which states that 'Firm resources has significant and positive impact on the Firm Innovation Practices' is supported.

In general, the results of the analysis show that all the three dimensions of Firm Internal factors (i.e., Firm Structure, Firm Culture and Firm Resources) tested have positive and significant impacts on the firm's overall innovation practices. Therefore, these results provide statistical evidence to support the

Hypothesis H_A1, which postulates that 'Firm Internal factors have positive and significant impacts on the firm's overall innovation practices'.

The aim of this study is to determine the impact of organisational factors on the innovation practices of the construction industry consultancy services firms in Nigeria. The three firm internal factors, firm structure, firm culture and firm resources considered for the study were measured using Hierarchical Multiple Regression Analysis. The results show that internal factors generally have positive and significant impacts on the innovation practices of the studied construction industry consultancy firms. This also implies that the hypothesised relationships were all supported by the results. When the findings of the study are evaluated by considering the existing literatures on the subject matter, it was observed that the study results were generally consistent with the previous organisation innovation studies. However, the regression results show that Firm culture at $p < 0.05(0.000)$, $\beta = .702$, has the most significant predictive effects on the dependent variable (innovation practices) among the organisational factors. This is followed by firm resources with $\beta = 0.631$ at $p < 0.05(0.000)$, and the firm structure with $\beta = 0.346$ at $p < 0.05(0.000)$ has the least predictive effects on the dependent variable. This implies that innovation practices cannot be successfully implemented and that organisation with innovative culture and resources has greater propensity to practice innovation.

CONCLUSION AND RECCOMENDATION

Based on the results of the study, it can be concluded that, among the internal factors, Firm culture has the highest predicting impact while firm structure has the least predicting effects on the firm's overall innovation practices. It is therefore suggested that for construction industry consultancy firms to successfully practice and immensely benefit from innovation practices, the management of

consultancy firms must develop positive and favourable innovative culture within the organisation and endeavour to inculcate this among organisation members through appropriate training and reorientation and human resources management. In addition, relevant innovation resources such as R&D, modern ICT facilities and other required for the organisation innovation must be provided. Finally, existing organisation policies and practices must be reviewed and fashioned to promote innovative culture.

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