

Empirical Assessment of Nigerian Construction Industry Consultancy Services Innovation Practices

AdinoyiYa'qoobMoohammad¹Nor'AiniYusof²Ernawati Mustafa Kamal³

School of Housing, Building and Planning, Universiti Sains Malaysia,
11800, Pulau- Pinang, Malaysia
adinoyi2010@yahoo.com
norainy@usm.my
ernamustafa@usm.my

Abstract: *Debates on how to improve construction industry productivity have been on and a number of studies blamed the construction industry inefficiency on the lackadaisical / indolent disposition of the industry key players to innovative changes. This study is therefore carried out to investigate the level of innovation adoption of the construction industry Consultants that played pivotal roles in the conceptualization, planning and development of construction projects. A cross-sectional study was adopted using 5-point Likert structured questionnaire administered to stratified and randomly selected 500 construction consultants which includes Architectural, Quantity Surveying, Building, engineering and Consortium of services firms' consultants operating in Nigeria. A total of 285 properly completed responses were returned and analysed for the study. The collected data were subjected to Descriptive statistical tool of the SPSS for MS Windows and the results obtained were interpreted with the Rogers' Innovation Diffusion Theory to determine the level of innovation practices among the studied consultants. It was found that the construction industry consultants operating in Nigeria (Abuja and Environs) are adopters of process, product/technological and business system innovations. This result implies that the studied consultants adopt process, product/technological and business system innovations in their consultancy services operations. The major contributions of the paper include the extension of Rogers' Innovation Diffusion Theory to explain the levels of adoption of the process, product/technological and business system innovations among the Nigerian construction industry consultants operating in Abuja and environs thereby establishing an empirical evidence of the existence of innovation practices among the studied consultants.*

Keywords: *Innovation, Construction consultants, Process innovation, Product innovation, Business system innovation*

1. INTRODUCTION

Consultants generally refer to knowledge-based professionals (person or organization) employed to: Provide expert analysis and advice that will enhance decision-making; provide specialized and one-of service(s); and, perform task(s) that are not ordinarily available within the departments or agencies of the Clients (Victorian Government Purchasing Board, 2004; Ijigah et al., 2012). In Construction industry consultants are usually approached and commissioned by clients to provide services relating to the conceptualization, planning as well as the execution of the construction projects (Ibironke, 2004). The key consultants commonly involved in construction projects include; the Architects, the Quantity Surveyors, Professional Builders and the Engineers (Civil/Structural, Electrical, Mechanical, etc.). They usually follow the client's briefs and use their technical skills and professional judgements to bring into reality clients' dream construction projects.

The construction consultants in general have been found wanting by many clients in the discharge of their services. According to Cox and Thomson (1997) construction consultants have for a long time been blamed for inefficiency in their construction project delivery services and have failed to meet their clients' needs. The British Property Federation's survey of major UK construction clients conducted in 1997 showed that 'more than a third of clients are dissatisfied with the performance of construction professional service providers in co-ordinating teams, providing a

speedy and reliable service, design and innovation and in providing value for money' (DETR, 1998, p.123). Latham (1994) and DETR (1998) similarly hinted that most of the construction consultants cannot satisfy their clients because they fail to adopt innovate practices in their services delivery. As a result numerous construction projects suffer problems of cost overruns, time overruns, abandonment and sometimes structural failure leading to building collapses and its associated colossal losses. There are therefore considerable pressures from clients' organizations and other stakeholders for change in much of the current thinking, culture and practices of the construction industry in order to bring improvements in its projects delivery and satisfy its various clients (Latham, 1994 and DETR, 1998).

The need for innovation practices in the construction industry has been well documented (Cox and Thomson, 1997). For example, Yusof et al., (2010) emphasized the need for construction organizations' innovation in the face of the continuously increasing technological capabilities, changing clients' requirements, tighter control over environmental regulations and quality standard, rising construction costs, increased competition and other challenges. Innovation helps organization to overcome turbulent external environment and therefore the key factors for business survival especially in dynamic markets (Baker and Sinkula, 2002; Darrch and McNaughton, 2002; and Jimenez-Jimenez, 2011). Therefore, organisation with propensity to innovate can more readily respond to changes, and can take better advantages of new products and market opportunities than those that do not innovate (Brown and Eisenhard, 1995; Miles and Snow, 1978). Yusof et al. (2010) suggest that for innovation to be an effective strategy that sufficiently sustains organization within the challenging environment, it should not be treated as a one-time event. Rather, firms must continuously be innovative to sustain competitive advantage (Cooper, 1998).

However, studies have shown that the key players of the construction industry in general are sluggish in their disposition to adopt new (innovative) techniques/ideas and changes (Gibb, 1999). The Nigerian construction industry's operators (including the consultants) were also rated to have low disposition towards adoption of innovative (new techniques/ideas) changes (Usman and Said, 2011; Ibrahim, 2011). According to Toole et al. (2010), the need for innovation in the construction industry (which produces architectural and engineering designs, building, industrial and infrastructures developments, procurement and services) has been undermined; whereas, innovation is well embraced by large engineering-procurement-constructions. In NESTA (2006) construction industry scores poorly against the standard measures of innovation; and the poor innovation practice accounts for its negative performance. Such resistance to change compromises innovation and improved performance and therefore negatively impacts on the client and the industry goals (Manley et al., 2005; Terzungwe, 2013). Furthermore, researches have also indicated that construction industry innovation studies has been scarce and mainly focused on the contracting organizations with very few paying attention to the consultancy sector (Yusof, et al., 2010). Spyros (2008), from his study on innovation activity in service industry concluded that innovation activity (within the service sector) remains an under explored area of research, due to lack of appropriate data at the firms' level. This is in spite of the pivotal roles played by the industry consultants in the conceptualization, planning, execution and control of construction projects from inception to completion and therefore supposed to be key-triggers to innovation in the built environment (Ebil and Akinciturk, 2010). It is therefore suggested that there should be shift in construction innovation research focus from the industrial/organisational level to sub-sectors (department/unit, project, consultancy, etc.) levels within the industry (Ozorhon et al., 2010); where innovation initiatives and programmes can be more easily established (Damapour, 1991; Seti and Zafar, 2008) and therefore monitored to its logical and successful accomplishment.

The above scholarly exposition clearly indicates the existence of innovation research gap in the consultancy sector of the construction industry. There is therefore a need for new innovation studies that focus on the construction consultancy sector to fill this gap. This research was therefore carried out with the aim of examining the innovation practices among the construction industry consultants with particular focus on Nigeria. The significance of this study therefore is that the results would help the Nigerian government to formulate effective strategies to encourage and sustain innovation among construction industry consultants. Specifically, by providing empirical evidence on the level of innovation practices among Nigerian construction industry

consultants the study has attempted to enhance the existing literature gap on innovation practices among Nigerian construction industry consultants.

1.1 Theoretical Background

Various scholars have recommended Innovation as an invaluable strategy to cope with the challenges of construction inefficiency problems (Dunican, 1972). Innovation have been defined as ‘a process that involves the generation of new ideas or practices within an organization’ (D.Wan et al., 2005); ‘an idea, practice or an object that is perceived as new by an individual or other unit of adoption’ (Rogers, 1995); ‘the application of a non-trivial change and improvement to an organization’s processes, products, or systems which is novel to the organization utilizing the change’ (Slaughter, 1998). Following Rogers (1995) and Slaughter (1998), the working definition of the organization innovation in the context of this paper is considered as “the generation and application of new ideas, practices or non-trivial change and improvement to an organization’s processes /methods, products/technology or systems of operation aimed at improving performance”..

1.2 Dimensions of Organizational Innovativeness

Various innovation scholars usually consider different dimensions depending on the focus or bias of their researches. In fact, there is still a lack of consensus among scholars on the established dimensions of organizational innovation studies (Manseau and Seaden, 2001). For example, Wang and Ahmed (2004, p 304), in response to different conceptualizations of organizational innovativeness in streams of research that result to difficulties in comparing findings across studies, provided five dimensions of organization innovativeness: product innovativeness, market innovativeness, process innovativeness, behavioural innovativeness, and strategic innovativeness.

Product innovation relates to the newness, uniqueness of a product “as perceived by the organization that produced the product or consumers” of the product. *Market innovation* relates to novelty in penetrating the market using new marketing approaches. It is defined as the newness of approach that companies adopt to enter and exploit the targeted market (Wang & Ahmed, 2004, p. 305). There are two means to market innovativeness: first, an organization can penetrate a market by introducing new product with advanced and latest technology. Second, an organization can penetrate the market using market research, advertising, and sales promotion for existing product. *Process innovation* refers to the application of new production methods, new management approach, and new technology that can be used to improve production and management process. While *product, market, or process* innovation is seen at organizational level, *behavioural* innovation can be viewed from individual or organizations’ management level. According to Rainey (1999), *managerial* innovativeness refers to not only management’s willingness to change but also the capacity in encouraging new ways of doing things and foster new ideas.

Behavioural innovation of individual staff and that of the management translates to group dynamics which ultimately reflect the *organizational behavioural* innovation. *Strategic innovation* on the other hand refers to the organization’s capacity to develop new competitive strategies that create value for the organization. It is defined as “organization’s ability to manage ambitious organizational objectives, and identify a mismatch of these ambitions and existing resources in order to stretch or leverage limited resources creatively” (Wang & Ahmed, 2004, p. 304-305). It will, therefore, be necessary for the organization to review the business concept in developing different approaches to business operations.

From construction industry perspective, Handerson and Clerk (1990) categorises 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 organization) (Manley et al., 2005). Yusof et al. (2014) considered innovation in

relation to new products, new processes, new raw materials, new forms of organization, and new markets.

Hovgarrd and Hansen (2004) in their examination of innovation in forest product industry dimensioned organization innovativeness into products, process, and business system. The business system could be opening or development of new market, marketing methods, introduction of new management system, while process could include manufacturing process and new administrative process towards innovativeness. Knowles *et al.* (2008) similarly conceptualized organizational innovation as a product, process, and business system in their study of wood industry. The other dimensions of innovation found in literature include paradigm innovation, technical/technological innovation, information technology innovation, administrative innovation, among others. However, this paper in line with Knowles *et al.* (2008) and Hovgard and Hansen (2004) attempts to investigate three dimensions (process, product/technological and business system) of innovation practices among the construction industry consultancy services firms operating in Abuja and environs as conceptualized in Table 1.1 below.

Table 1.1 *Conceptualization of Each Dimensions Adopted in the Study*

DIMENSION	CONCEPT DEFINITION	SOURCE
Process Innovation	The introduction of completely new or significantly improved methods of producing or delivering services, including new information and communication technologies. Organization process innovativeness consists of its methods of production, management styles, and the organizations' adopted or introduced technology intended to improve productivity	Wang and Ahmed (2004) (Hilmiet <i>et al.</i> , 2010).
Product/Technological Innovation	The development of new products, changes in design (improvement) of established orexisting products; or use of new materials or components in the manufacture of established products “...the novelty and meaningfulness of new products introduced to the market in a timely fashion.”	(Wikipedia free Encyclopedia, 2010). (Wang and Ahmed, 2004; Hilmiet <i>et al.</i> , 2010, p. 558).
Business System Innovation	A business model articulates or outlines, the business logic, the data, and other evidence that support a value proposition for the customer and a viable structure required to earn a revenues and costs for the enterprise delivering that value and, once adopted, defines the way the enterprise 'goes to market'	Teece (2010) Knowles <i>et al.</i> (2007)

2. METHODS

2.1 Research Design and Sampling procedure

The research is a cross-sectional quantitative survey research on innovation practices of the construction industry consultants operating in Abuja (Nigeria's Federal Capital) and environs (its four surrounding states). The research considers five major consultancy practices (specializations) that are commonly involved in construction development projects. They include Architectural, Quantity Surveying, Professional Builders, Engineering, and Consortium of services consultants operating in Abuja and environs (Nigeria). The data collection was done through the use of self-administered structured questionnaires. 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 was considered in line with Roscoe's (1975) Rule of Thumb, cited in Sekaran (2006), who considers sample size of between 30 and 500 as sufficient. Table 3.1 described the population and sample distribution of the study.

Table 2.1 Research population and its sample distribution

	Abuja	Kaduna	Kogi	Nasarawa	Niger	Total	%	No. Sampled
Architects	70	58	50	35	46	259	26.06	130
Qty. Surveyors	38	24	18	20	23	123	12.37	62
Prof. Builders	55	50	28	38	25	196	19.72	99
Engineers	71	63	47	32	35	248	24.95	125
Consortium	52	43	28	21	24	168	16.90	84
Sub-Total	286	238	171	146	153	994	100.00	500

2.2 Research Instrument and Data Analysis

The primary data on the perceptions of the respondents on the firms’ innovation practices was collected through the structured questionnaires containing 5-point Likert scale items (based on previous similar studies) administered to consultants in the various practices to tick the item he/she considers to be appropriate. A combination of self-evaluation and current technology were used for measuring consultancy services firms’ innovation practices. A total of 285 representing 57% of the 500 distributed questionnaires were completed and returned used for the study.

The collected data were subjected to statistical screening to verify psychometric properties of the instrument and to ascertain that they are suitable for SPSS analysis before the actual data analyses. Hence the data for the various dimensions involved in the study were tested for normality and they were all normally distributed. All scales also show satisfactory reliabilities, with Cronbach’s alphas above the acceptable cut off of .70 (i.e., .903) and KMO of above .70 (i.e., .893). The main data analysis then followed using the descriptive software Version 20 of the SPSS.

2.3 Data Analysis Techniques

The study adapted the Rogers’ (1995) innovation diffusion theory (Rogers’ adopters’ categories) to explain the extent of the consultants’ innovation practices. The Rogers’ adopters’ categories include: the ‘innovators’, ‘early adopters’, ‘early majority’, ‘late majority’ and the ‘laggards’, with the innovators and laggards (being the highest and the least in ranking, respectively) as depicted in Figure 4.1 below.

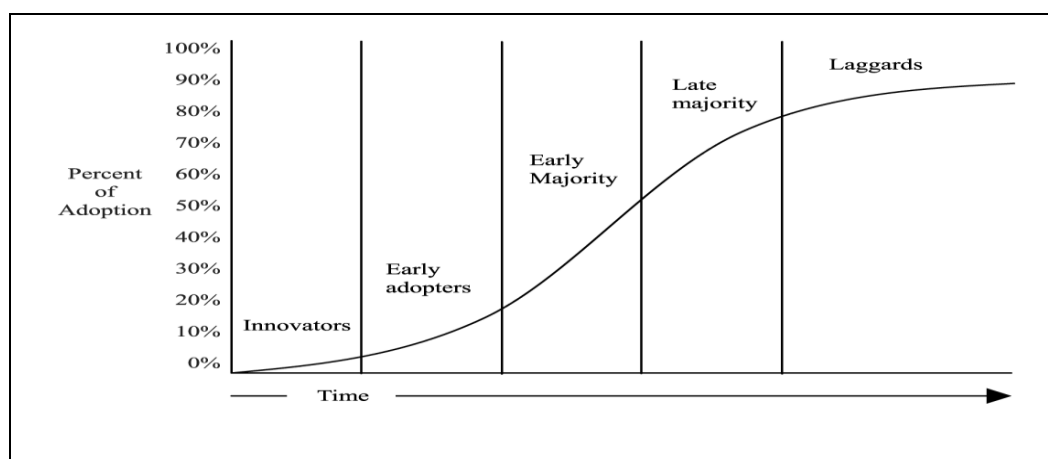


Figure 2.1. Innovation Diffusion Process Source: Rogers (1983, p. 96)

The procedure involves the use of numerical value in the 5-point scale questionnaire as interpreted in Alstone and Miller’s (2001) (see Table 2.2) to rate the Rogers’ five adopters’ categories in reverse order interpretation of the Likert scale as shown in Table 2.3. Hence, the innovator category will be represented by maximum of 4.5-5.0 points while the laggards will be represented by 1.0-1.49 in the Likert scale questionnaire responses. Fell, Hansen and Panches (2002) previously adopted Rogers (1995) five innovation adoption categories to identify the demographic characteristics of early adopters, majority adopters and late adopters for segmented single-family home builder in Washington, and California. Kamarudeen (2011) similarly adapted Rogers (1995) five categories innovativeness categories, with slight modification, to determine

the level of innovation practices among Malaysian housing developers and identified them as laggard, late majority, early majority, adopters (instead of early adopters as in Rogers, 1995). In like manner, Usman (2013) used the Rogers' innovation diffusion theory (adopters' categories) to explain the level of adoption of ICT on construction sites among construction contracting firms in Nigeria.

Table 2.2 Likert Scale Interpretation and Values Distribution

Likert Scale	Likert Description	Value Allocation
1	Not at all	1.0-1.49
2	Slightly true	1.5-2.49
3	Moderately true	2.5-3.49
4	Mostly true	3.5-4.49
5	Completely true	4.5-5.00

Source: Alstone and Miller's (2001)

Table 2.3. Interpretation of Rogers' Innovation Adoption categories based On 5-point Likert Scale

Likert description	Value Range Allocation	Rogers Innovation Adoption Status
Not at all	0.1-1.0	Laggard
Slightly True	1.1-2.0	Late Majority
Moderately True	2.1-3.0	Early Majority
Mostly True	3.1-4.0	Adopters
Completely True	4.1-5.0	Innovators

2.3.1 Examining the Extent of Innovation Practices among Construction Industry consultants in Abuja (Nigeria)

As stated earlier, this study sets out to investigate the construction industry consultants' innovation practices. To achieve this, the data collected from the various consultants were subjected to statistical analysis using the descriptive statistics software of the SPSS for Windows. The generated output (mean) of the responses from consultants on their firms' innovation practices items in the questionnaire were compared with the range of values allocated to each of the Rogers' Innovation categories in the 5-point Likert scale to determine the status of adoption that coincides or corresponds with the mean score of the responses. The results of the analysis are presented in Tables 4.3, 4.4, 4.5 and 4.6 below.

Table 2.4. Extent of Consultancy Firm's Process Innovation Practices

S/ N	Likert Scale Description	Interpreted Extent of Innovation Practices	Allocated Value Range	Frequency	Percentage (%)	Mean	Median	Mode	Std. Dev.	Variance
1	Not at all	Laggard	0.1-1.0	-	-	-	-	-	-	-
2	Slightly True	Late Majority	1.1-2.0	27	9.47	-	-	-	-	-
3	Moderately True	Early Majority	2.1-3.0	97	34.04	-	-	2.67	-	-
4	Mostly True	Adopters	3.1-4.0	115	40.35	3.24	3.17	-	0.8344	.696
5	Completely True	Innovators	4.1-5.0	46	16.14	-	-	-	-	-
Total				285	100					

From Table 2.4 above, which depicts the responses on the Extent of Innovation practices among construction industry Consultants, the highest frequency is 115 representing 40.35% of the 285 respondents. The mean score is 3.24 which fall within the 4th description of the Likert Scale indicating Mostly True. Relating this to Roger's (1995) five categorization of innovation adoption as interpreted in Table 2.3, Process Innovation practices among the consulting firms fall under

“Adopters’ category” as shown in Table 2.3 above. Hence the consultants are generally adopters of innovation process.

Table 2.5. *Extent of the Firms’ Technological/Product Innovation Practices*

	Likert Scale Description	Extent of Innovation Practices	Allocated Value Range	Frequency	Percentage	Mean	Median	Mode	Std. Dev.	Variance
1	Not at all	Laggard	0.1-1.0	-	-	-	-	-	-	
2	Slightly True	Late Majority	1.1-2.0	21	18.5	-	-	-	-	
3	Moderately True	Early Majority	2.1-3.0	105	29.7	-	-	2.80	-	
4	Mostly True	Adopters	3.1-4.0	119	41.75	3.24	3.20		0.7933	0.629
5	Completely True	Innovators	4.1-5.0	40	12.9	-	-	-	-	
Total				285	100					

From Table 2.5 above, which depicts the responses on the extent of firms’ Technological / Product innovation practices among construction industry consultants, the highest frequency in the table is 119 representing 41.75% of the respondents. The mean score is 3.24 which fall within the 4th description of the Likert Scale indicating Mostly True. Relating this to Roger’s (2003) five categorization of innovation adoption in his Innovation Diffusion Theory discussed earlier and interpreted in Table 2.3, the Technological/Product Innovation practices among the consulting firms fall under “Adopters’ category”. Hence the consultants are generally adopters of Technological/Product innovation practices

Table 2.6 *Extent of the Firms’ Business System Innovation Practices*

S/ N	Likert Scale Description	Extent of Firm Innovation Practices	Allocated Value Range	Frequency	Percentage	Mean	Median	Mode	Std. Dev.	Variance
1	Not at all	Laggard	0.1-1.0	-	-	-	-	-	-	
2	Slightly True	Late Majority	1.1-2.0	19	6.67	-	-	-	-	
3	Moderately True	Early Majority	2.1-3.0	79	27.72	-	-	-	-	
4	Mostly True	Adopters	3.1-4.0	122	42.81	3.42	3.50	4.00	0.8712	0.759
5	Completely True	Innovators	4.1-5.0	65	22.81	-	-	-	-	
Total				285	100					

From Table 2.6 above, which depicts the responses on the Extent of Firms’ Business System innovation Practices among construction industry Consultants, the highest frequency in the table is 122 representing 42.81% of the respondents. The mean score is 3.42 which fall within the 4th description of the Likert scale indicating Mostly True. Relating this to the Roger’s (2003) five categorization of innovation adoption in his Innovation Diffusion Theory discuss earlier and interpreted in Table 2.3, the Business System Innovation practices among the consulting firms falls under “Adopters’ category”. Hence the consultants are generally adopters of Business System Innovation practices.

Table 2.7. *Extent of Firms’ Overall Innovation Practices*

	Likert Scale Description	Extent of Firm Innovation Practices	Allocated Value Range	Frequency	Percentage	Mean	Median	Mode	Std. Dev.	Variance
1	Not at all	Laggard	0.1-1.0	-	-	-	-	-	-	
2	Slightly True	Late Majority	1.1-2.0	-	-	-	-	-	-	
3	Moderately True	Early Majority	2.1-3.0	89	31.23	-	-	-	-	
4	Mostly True	Adopters	3.1-4.0	152	53.33	3.30	3.29	3.17	0.7209	0.520
5	Completely True	Innovators	4.1-5.0	44	15.44	-	-	-	-	
Total				285	100					

From Table 2.7 above, which depicts the responses on the Extent of Firms' overall Innovation practices among construction industry consultants, The highest frequency in the table is 152 representing 53.33% of the respondents. The mean score is 3.30 which fall within the 4th description of the Likert Scale indicating Mostly True. Relating this to Roger's (2003) five categorization of innovation adoption in his Innovation Diffusion Theory discussed earlier and interpreted in Table 2.3, the overall Innovation practices among the consulting firms fall under "Adopters' category". Hence the consultants are generally adopters of overall Innovation practices.

3. RESULTS AND DISCUSSION

3.1 Findings

In general, the results of the descriptive statistics show that the Nigerian construction industry consultancy services firms operating in Abuja and environs fell within Adopters' category of the Rogers (1995) innovation adoption classifications in all the dimensions of innovation (process, product/technological and business system) considered for the study.

The use of Roger's (1995) innovation adoption categories, which underscores his diffusion theory, was considered appropriate because the criterion of assessment is the firms' innovation practices. The Roger's innovation diffusion theory is widely used by researchers for determining the level of innovation practices of organizations.

From the descriptive statistics, the mean score for the firms' process innovation practices is 3.24 with standard deviation of .8344 which coincides with 'adopters' category in the Likert scale interpretation of the Rogers' (1995) innovation 'adopter' categories. The result shows that the studied consultants are generally adopters of process innovation in their practices. The results suggest that they generally adopt innovative process in their consultancy business operations. In the same way, the mean score for the firms' technological/ product innovation practices is 3.24 with standard deviation of .7933 which also coincides with adopters' category in the Likert scale interpretation of the Rogers' (1995) innovation adopter's categories. This result also implies that the studied firms are generally adopters of technological/product innovation practices meaning that they generally utilize technological/innovative products in their consultancy business operations. Furthermore, mean score of 3.42 for the firms' business systems with standard deviation of .8712 which also coincides with adopters' category in the Likert scale interpretation of the Rogers' (1995) innovation adopter's categories. This result also suggests that the studied consultants are adopters of business systems innovation in their practices. Finally, it was found that on the scale of the overall innovation practices, the studied consultants were generally found to be adopters in their overall innovation practices. This was indicated by the mean score of 3.30 with standard deviation of .7209 which coincides with adopters' category in the Likert scale interpretation of the Rogers' (1995) innovation adopter's categories.

The above results suggest that the Nigerian construction industry consultants operating in Abuja and environs generally adopts of process, product and business system innovation in their practices.

3.2 Discussion

This result on the extent of innovation practices among consultancy services firms in Nigeria is consistent with the findings of the previous innovation studies on other construction sectors that used the similar method. For example, Kamarudeen (2011) study of innovativeness among Malaysian housing developers and Jantan, et al (2003) study on Malaysian organizations found that they were adopter of these process, product/technological and business systems innovations.

Statistically, the use of mean values underscores important measure of central tendency that indicates the popular position of a set of scores by indicating where scores tends to cluster in the given distribution (Oche, 2011). Looking at the standard deviation, which is widely used for measuring the extent to which the scores tend to deviate from the mean, the study's results ranged between .7209 and .8712 which are very small compared to the mean. This implies that most members of the scores for the sampled consultants cluster around their respective means which ranged between 3.24 and 3.42. Hence, in this study, the mean score and standard deviation for firms' process, product and business system innovations are 3.24 and .8344; 3.24 and .7933; and

3.42 and .8712 respectively. And the mean score for the overall extent of firms' innovation practices is 3.30 with standard deviation of .7209. These results which describe the construction industry consultancy services firms as adopters in all the facets of the conceptualized innovation practices are reliable.

4. CONCLUSION

The above results suggests that Nigerian construction industry consultancy services firms generally practice the three dimensions of innovations (process, product/technological and business system) under the Rogers' "adopters' category" in their consultancy services business operations. This means that they utilize novel ideas, processes, products (e.g. technology) and business system (such as marketing strategies) in their day to day operations. It is therefore concluded that the Nigerian construction industry consultancy services firms operating in Abuja and environs adopt various innovation practices (i.e., process, product and business system innovations) in their operations.

The major contributions of the paper include the application of Rogers' Innovation Diffusion Theory to explain the level of innovation practices of the Nigerian construction industry consultancy sector thereby establishing the empirical evidence on their level of adoption of the various types of innovations (process, product/technological and business system innovation). In the Rogers' (1995) diffusion theory, the adopters are described as the role model respected by their peers for their success in the application of new ideas. They therefore play the role of decreasing uncertainty among other members about an innovation by adopting it and conveying a subjective evaluation of the innovation through interpersonal networks. Potential adopters therefore look to early adopters (or "adopters") for advice and information about the new innovation (Rogers (1995).

4.1 Implications of the Study Results

Practically, the findings of the study have contributed to the advancement of innovation knowledge by bringing to bear new empirical evidence on the characteristics of the Nigerian construction consultants' innovation adoption/practices thereby attempting to close the existing research gap. The result from the study will also provide a pointer to Managements of consultancy firms on their respective firms' current innovation status and basis for taking decisions on strategies for improving the firms' innovation programs in order to achieve sustainable growth. Furthermore, the study provides a watershed that the Nigerian government can harness to formulate appropriate policy for construction sector implementation to achieve greater productivity that will ultimately engender the growth and sustainability of the construction industry.

The results of this study however have limitation of generalization to other sub-sectors of the construction industry or other environments outside the areas of the study. This is because the data collected for the study are limited to the construction consultants operating in Abuja (the Federal capital of Nigeria) and its four neighbouring states (Kaduna, Kogi, Minna and Nasarawa states). It is therefore recommended that this study should be extended to other areas of the country as well as the other sub-sectors of the construction industry (e.g., contracting, sub-contracting and projects) in order to have a holistic overview of the entire industry's innovation practices. Researches should also be focused on the *modus operandi* of these sub-sectors' innovation practices in order to determine their effectiveness.

REFERENCES

- Alstone, A. J., & Miller, W. W., Analyzing the Barriers and Benefits Toward Instructional Technology Instruction in North Carolina and Virginia Secondary Agricultural Education Curricula. *Journal of Southern Agricultural Education Research*, 51(1), 50 -62 (2001).
- Ashton, W.B., Kinzey, B.R. and Gunn Gunn Jr., M.E., A structured approach for monitoring science and technology developments, *International Journal of Management*, 6,91-110 (1991).
- Baker, W.E., Sinkula, J.M., Market orientation, learning orientation and product innovation: delving into the organization's black box. *Journal of Marketing Focus Management*. 5(1):5-23 (2002).

- Brown SL, Eisenhard KM., Product development: past research, present findings, and future directions. *Academic Management Review*. 20(2):343–78, (1995).
- Cooper, J.R., A multidimensional approach to the adoption of innovation. *Management Decision*, 36(8), 493–502 (1998).
- Cox, A. and Thompson I., "Fit for purpose'contractual relations: determining a theoretical framework for construction projects." *European Journal of Purchasing & Supply Management* 3(3): 127-135 (1997).
- Damanpour, F., Organizational innovation: a meta-analysis of effect of determinants and moderators. *Academy of Management Journals*, 34(3), 555-590 (1991).
- DETR, "Rethinking construction", The report of the construction Task Force [www.construction.detr.gov.uk/cis/rethink] (1998).
- Duncan, R.B., Characteristics of organizational environments and perceived environmental uncertainty, *Administrative Science Quarterly*, 17, 313-27 (1972).
- Egan, J., "Rethinking construction: The report of the construction task force", URN 98/1095, DT1, London (1998).
- Fell, D., Hansen, E. N., & Panches, J., Segmenting Single-Family Home Builders on a Measure of Innovativeness. *Forest Product Journal*, 52(6), 28-34b (2002).
- Filippetti, A., Innovation Modes and Design as a Source of Innovation: A Firm-Level Analysis. *European Journal of Innovation Management*, 14(1), 5-26. <http://dx.doi.org/10.1108/14601061111104670> (2011).
- Gibb, A. G. F., *Off-site Fabrication: Prefabrication, Pre-assembly and Modularisation*. Caithness: Whittles Publishing (1999) .
- Henderson, R. M. and K. B. Clark., "Architectural innovation: the reconfiguration of existing product technologies and the failure of established firms." *Administrative Science Quarterly*.9-30 (1990).
- Hovgaard, A., & Hansen, E., Innovativeness in the forest products industry. *Forest Products Journal*, 54(1), 26-33 (2004).
- Ibironke, O.T. *Contract Law and Arbitration for construction works*. Adewale Press, BirninKebbi, Nigeria (2004).
- Ibrahim A.D., *Concept of Value for Money in Public Infrastructure Development*, Paper delivered at QSRBN/NIQS BCERT 2011 Held in Abuja, Nigeria, April, (2011).
- Ijigah, E.A., Oloruntoba, K. & Mohd H. R., Towards Accomplishing Millennium Development Goals (MDGs) In Abuja F.C.T Nigeria: The Project Management Consultants Roles, "International Journal of Research in Management & Technology" (*IJRMT*), Vol. 2, No. 4 p.414-424, (ISSN: 2249-9563) (2012).
- Jantan, M., Nasurdin, A. M., & Fadzil, N. F. A., Designing Innovative Organizations in Malaysia: Do Structure and Culture Matter? *Global Business Review*, 4(2), 213-226 (2003).
- Jiménez-Jiménez, D. and R. Sanz-Valle., "Innovation, organizational learning, and performance." *Journal of Business Research* 64(4): 408-417 (2011).
- Kamarudeen A.M., *An Assessment of firm innovativeness among the Housing Building Developers in Malaysia.*, unpublished PhD Thesis submitted to School of Building and Planning, Universiti Sains Malaysia (2011).
- Knowles, C., Hansen, E., and Dibrell, C., Measuring firm innovativeness: Development and refinement of a new scale. *Journal of Forest Products Business Research* 5(5), 1-24 (2008).
- Latham, M., *Constructing the Team, Joint Review of Procurement and Contractual Arrangements in the UK Construction Industry*, HMSO, London, Mass (1994).
- Lyon D, Ferrier W., Enhancing performance with product –market innovation: the influence of the Top Management Team. *Journal of Management Issues*. 14(14):452–69 (2002).
- Manley, K. Blayse, A. and McFalan, S., "Demonstrating the benefit of construction innovation , creating an environmental economy: the role of enterprise and innovation". International Research Conference, University of Waikato, Hamilton, New Zealand, 7th - 8th July (2005).

- Manseau A and Seaden G., *Innovation in Construction: An international Review of Public Policies*, Spon Press, New York (2001).
- Miles, R. E., and Snow C.H.C., "Organizational strategy, structure, and process." *Academy of management review*, 3(3): 546-562 (1978).
- NESTA (National Endowment for Science, Technology and the Arts), *The Innovation Gap - Why Policy Needs to Reflect the Reality of Innovation in the UK*, NESTA, London (2006).
- Oche E.O., *Fundamentals of Research Methodology, and Statistics*, Selfers Academic Press Limited, Makurdi, Nigeria (2011).
- Ozorhon, B., Abbot C., Abuad G., and Powell J., "*Innovation in Construction: A project Life Cycle Approach*", SCRI Research Report, University of Safford, England (2010).
- Pallant, J., *SPSS Survival manual (4th Edition)*. Australia: Allen and Unwin (2011).
- Rainey, H. G., Using comparison of public and private organizations to assess innovative attitudes among members of organizations. *Public Productivity and Management Review*, 23 (2), 130-149 (1999).
- Rogers, E.M., *Diffusions of innovations*, Collier Macmillan Publishers, New York, NY (1995).
- Rogers, E. M., *Diffusion of Innovations (5th ed.)*. New York, NY: The Free Press (2003).
- Roscoe, J. T., "*Fundamental Research Statistics for the Behavioural Sciences*". New York: Holt, Rinehart and Winston. Cited in Sekaran, U., & Bougie, R. (2010). *Research Methods for Business: A Skill-Building Approach (5th ed.)*: Haddington: John Wiley & Sons (1975).
- Sekaran, U., *Research Method for Busines, A skill Building Approach (4 ed.)*. New Delhi, India: John Willey & Sons (2006).
- Sethi, R. and Iqbal Z., "Stage-gate controls, learning failure, and adverse effect on novel new products." *Journal of Marketing*, 72 (1): 118-134 (2008).
- Slaughter E. S., Models of Construction Innovation, *ASCE Journal of Construction Engineering and Management*, 124 (3), p. 226-232 (1998).
- Spyros Arvanitis., *Expanding innovation activities in service industries*, Economics of Innovation and Technology, Micro data evidence for New Zealand. URL: www.tanfonline.com//oi/gein20 (2008).
- Teece, D. J. Business models, business strategy and innovation. *Long range planning*, 43(2), 172-194(2010).
- Terzungwe T.D., "*Technological innovation for sustainable development in a developing economy*". Lead paper presented at National Conference on Technological innovation for sustainable development at SES, Federal Polytechnic, Nasarawa, Nigeria on 9th October, (2013).
- Toole, T.M., Chinowsky, P., and Howell, M.R, "*A toole for improving construction organizations innovation capabilities*". *Proceeding of 2010 construction research congress*, ASCE Press, p. 727-736 (2010).
- Usman, N., Said, I., and Yahaya, A.Z., "*Indolent Disposition towards ICT acceptance among practising Quantity Surveyors in Nigeria*". *Acta Technica Corviniensis, Bulletin of Engineering Tone V (year 2012) Fascicle 2, April-June, ISSN 2067-3809* (2012).
- Victoria Government Purchasing Board Report., Lagos, Nigeria (2004).
- Wan, D., Ong, C. H., & Lee, F., Determinants of firm innovation in Singapore. *Technovation*, 25(3), 261-268 (2005).
- Wang, C. L., and Ahmed, P. K., The development and validation of the organizational innovativeness construct using confirmatory factor analysis. *European Journal of Innovation Management*, 7(4), 303-313 (2004).
- Wolfe, R. A., Organizational innovation: Review, critique and suggested research directions. *Journal of Management Studies*, 31(3), 405-431(1994).
- Yusof , N.B., Shafei M.W.M., Ilias S. and Anidin, N.Z., Factors Influencing Firms Readiness Towards Innovation in House Building Industry; A Multi-dimensional construct, *International Journal of Organizational Innovation*, Vol 2, No. 3, p 74-86 (2010).

Yusof, N., Ernawati, M.K., Kong-Seng, L. and Iranmanesh, M., Are Innovations Being Created or Adopted in the Construction Industry? Exploring Innovation in the Construction Industry SAGE Open Sept. 4,4(3)DOI:10.1177/2158244014552424 (2014)

AUTHORS' BIOGRAPHY



AdinoyiYa'qoobMoohammad is a PhD candidate (Project Management-Innovation in Construction Industry) at the school of Housing, Building and Planning, Universiti Sains Malaysia, Pulau Pinang. He is a Chief Lecturer with Quantity Surveying Department of Federal Polytechnic, Nasarawa, Nigeria, Registered Quantity Surveyor and Member, Quantity Surveyors Registration Board of Nigeria (QSRBN). He is a holder of HND QS, PGD QS, PGD Mgt. Studies, MBA (General, Full-Time), M.Eng. Constr. Mgt. Tech. He was Head of QS Department for over ten years and Dean of School of Environmental Studies as well as Chairman, Committee of Deans at the Federal Polytechnic, Nasarawa. His research interests include Procurement, Project Management, Environmental sustainability and Innovation in construction sector.



DrNor'AiniYusof is an Associate Professor at the School of Housing, Building and Planning, Universiti Sains Malaysia (USM). She has supervised and graduated many PhD and Masters by research candidates. She was a visiting Associate Professor at the Department of Business Administration, Prince Sultan University Riyadh, Saudi Arabia



Dr. Ernawati Mustafa Kamal is a senior lecturer of Construction Management at School of Housing, Building & Planning, Universiti Sains (ID: 02V2I921) Malaysia. Her research interest include: innovation in construction organisation, technology transfer and absorptive capacity.