



IMPACT OF INNOVATION ON PERFORMANCE OF SPECIALIST CONSTRUCTION CONTRACTORS IN KADUNA STATE

AYUBA , B.K .¹, TSADO A.J.²

*^{1, 2} (Department of Quantity Surveying, School of Environmental Technology,
Federal University of Technology, Minna, Nigeria)*

ABSTRACT

This study assessed the impact of innovation on the performance of specialist construction contractors (SCC) in Kaduna State. The study adopted a quantitative research approach. Data was thus collected with the use of a questionnaire survey. The population for the study comprises 28 specialist construction firms registered with the Federation of Construction Industry (FOCI) operating within Kaduna metropolis. Analysis of the data was undertaken with the use of frequency counts, percentages, and mean item score (MIS). The study revealed that intensified market competition and survival were the most significant drivers of innovation among specialist construction contractors in Kaduna state, with an MIS of 4.73 and 4.55, respectively. On average, all the drivers of innovation among specialist construction contractors are important (average MIS = 4.39). The most significant barriers to innovation among specialist construction contractors are the high cost of innovation (4.53) and a lack of understanding of the benefits of innovation (4.50): All the identified innovation among specialist construction contractors is moderate (average MIS = 3.87). Improvement of services (MIS = 4.69); and improvement of product quality (MIS = 4.62) are the most important benefits of innovation among specialist construction contractors. On average, all the identified benefits of innovation among specialist construction contractors are important (average MIS = 4.31). It was concluded that innovation, when adopted, has a positive impact on the performance of specialist construction contractors in Kaduna state. It was therefore recommended that Specialist contractors should make every effort to attend workshops and seminars that will educate them on new ideas, cutting-edge technologies, and how to apply them. The Nigerian

government should also provide favorable policies that will enable specialist contractors' firms to innovate.

Keywords: *Impact, Innovation, Performance, Specialist Construction Contractors*

INTRODUCTION

The construction sector contributes significantly to the social and economic development of nations all over the globe (Abdullateef and Seong, 2017). The industry contributes to societal development by providing jobs to a significant number of individuals. It offers fundamental infrastructure for the efficient operation of society (Ogunbayo *et al.*, 2010). Furthermore, in contrast to other sectors, Specialist Construction contractors in the construction industry has been chastised for its poor productivity and quality. One of the major causes of this predicament is the industry's slow acceptance of new technologies (Winch, 2003). Innovation may be defined as the process of turning an idea into a marketable product or service, or as the result of enhancing an existing product or service (Benmansour and Hogg, 2012). It may also be defined as a new or old concept, method, or process that is used in a unique manner for the creation of products or services, thus adding value to a system, process, or product (Ozorhon *et al.*, 2010).

However, improving all aspects of building operations is critical since they contribute significantly to the gross domestic product (GDP) of most developed and developing nations. The industry has the potential to grow in terms of size, market share, and profitability, and innovation is the key to achieving these goals. Damanpour and Schneider (2010) went on to say that innovation is critical for gaining a competitive edge and ensuring a firm's existence in business, especially for Specialist Construction Contractors. According to Blayse and Manley (2010), the more innovative Specialist Construction Contractors are, the more likely they will contribute to economic development. Furthermore, experts in engineering and construction companies in the sector must innovate in order to win, increase efficiency, and enhance project quality. To manage innovation, we must first comprehend the sector as a whole and how innovation affects the Nigerian construction industry as a whole, as well as how a new concept would bring value to the industry's companies. From the planning

phase through the construction phase and until successful delivery, innovation is required to handle changes in the scope of public projects (Amusan *et al.*, 2018).

Any project's aim is to avoid unnecessary modifications and, if possible, maintain scope changes within the allowed range. When a scope modification is authorized by the project manager on behalf of the project owner, it is referred to as a variation order in construction. When compared to variation orders that originate from other sources in a project, Afolabi, *et al.* (2018) found that variation orders started by a consulting team has a significant effect on cost overrun and delay in the project delivery. The consulting team will be able to accomplish continuous coordination of all activities with the assistance of suitable innovation, which will help minimize changes.

A "specialist contractor" is a very broad term that describes a contractor appointed to carry out activities in the development of a built asset that involve specialist construction knowledge and skills. The decision-making process and the productive results of decision-making efforts are influenced by the leadership style. Because of the complexity of projects, effective delivery requires a mix of technical and specialized expertise (Ameh and Odusami, 2014). Though the authors originally suggested that project managers in Nigeria should follow a high task-high relationship behaviour model, subsequent research showed a mix of delegating and directing leadership styles (Buba, Chitumu, and Ibrahim, 2018). The findings of Afolabi, *et al.* (2018), Fadun and Saka (2018), and Hamma-Adama *et al.* (2018) all point to the fact that specialist construction practices in Nigeria have been influenced by a lack of innovation. In order to achieve this aim, the following objectives were formulated:

- i. Examine the drivers to innovation among specialist construction contractors in Kaduna State.
- ii. Assess the barriers to innovation among specialist construction contractors in Kaduna State.
- iii. Appraise the benefits of innovation among specialist construction contractors in Kaduna State.

LITERATURE REVIEW

Drivers of Innovation Amongst Specialist Construction Contractors in the Construction Industry

The literature on general and construction innovation reveals that many forces may drive firms to innovate. In general, competitive advantage refers to the ability of an organization/firm to perform at a higher level than others in the same industry/market, which can be achieved through innovation (Magretta, 2012). To gain an advantage over their competitors, specialist construction contractors need to innovate. Four drivers of innovation amongst specialist construction contractors identified by Goffin and Mitchell (2005) are technological advances, changing customers and needs, intensified market competition, and changing business environments. In recent years, changes towards sustainability has also been recognized as a key driver of innovation, and in the meantime, sustainable innovation has become a prominent agenda item (Dewick and Miozzo, 2004; Jepsen *et al.*, 2014).

According to Crossan and Apaydin (2010), the drivers of innovation can be internal or external (Crossan and Apaydin, 2010). For example, an internal driver can be corporate image (Chang, 2011), whereas an external driver can be market trends and opportunities (Yadav *et al.*, 2007). Generally, innovation should be value-added and value-based (Dringoli, 2009; Gerybadze *et al.*, 2010). However, it is not always the case. This is because innovation in low-tech firms and industries may be cost-driven as opposed to value-driven (Hirsch-Kreinsen and Jacobson, 2008). In Specialist construction, innovation can be stimulated by the new requirements of clients, the need to develop standards, compliance with new regulations, and the innovative ideas of research and development (Rand D) staff (Gann and Salter, 2000). Survival, stability, and development are identified by Sexton and Barrett (2003) as innovation drivers amongst Specialist construction firms. Cost reduction, competitive advantage, improved quality, and increased productivity can motivate innovation in Specialist Construction firms (Gambatese and Hallowell, 2011).

Barriers to Innovation Amongst Specialist Construction Contractors in the Nigeria Construction Industry

The building sector differs from many other businesses in the sense that it creates unique products (Gann, 1996). It is a complicated combination of both actors and processes, where relationships only last for a limited time (Hansson and Widén, 2007). It has also been argued that if the project does not provide conditions for innovation, other objectives will be prioritized, such as cost and

schedule (Tatum, 1989). According to Bygballe and Ingemansson (2014), the greatest difficulty regarding innovation among specialist construction contractors in the construction industry was to interconnect the "project and company levels of the single organization". It was established that endorsing new solutions that have proven to be successful in one project, across the organization, is not a sign of strength in the construction industry (Bygballe and Ingemansson, 2014). Hence, there is a room for improving the diffusion of innovative solutions in this business. The construction industry is also known for being traditional, which is argued to be one reason for having difficulties implementing innovations and not being innovative enough (Bygballe and Ingemansson, 2014). A survey, where twenty senior managers from the Norwegian and Swedish construction industries were interviewed, resulted in the conclusion that Swedish construction firms actually consider their co-workers to be the essential source for innovation. The runner-up driving force for innovation was found to be the customers (Bygballe and Ingemansson, 2014).

Benefits of Innovation Among Specialist Construction Contractors

A lot of research has been done on the benefits of innovation adoption. The identified benefits were noted to be strategic in adopting innovation because they exert a decisive influence on an organization's likelihood of future success as specialist construction contractors (Siano *et al.*, 2009). According to Adow *et al.* (2013), the benefits of innovation adoption amongst Specialist construction contractors include an increase in the competitive edge of the market and a reduction in the staff strength needed for the execution of a project. The most significant impacts of innovation adoption are improving the company's image, advancing the services and products rendered by the firm, improving and enhancing client satisfaction, and improving the current processes adopted by the firm (Ozorhon *et al.*, 2010).

Blayse and Manley (2004) furthered the research on the benefits of innovation by Ozorhon *et al.* (2010) and suggested that the more specialized construction firms become creative and innovative, the higher their chances and opportunities of winning more projects and also improving the financial results of these projects. Ozorhon *et al.* (2010) continued the research by saying that the other benefits that firms get from innovation adoption include an increase in organizational effectiveness, penetration of market and growth, introduction

of new services and processes, increase in technical capability, growth in revenue due to new services, short-term and long-term profitability, advancement of organisational structure, and enhancement of human skills and resources. Ozorhon *et al.* (2010) add that the most important outcome and impact of innovation amongst specialist construction contractors is a better company image. Roper *et al.* (2008) also proposed that reputation is the most valuable asset for any construction firm, specialized or not, and is effective in sustaining long-term competitive advantage.

RESEARCH METHODOLOGY

A quantitative research approach was adopted in this study. The targeted population for this research are specialist construction contractors within Kaduna State, North West Nigeria. This study's population consists of active specialist construction project sites in Kaduna, Nigeria, as obtained from the Federation of Construction Industry in Nigeria (FOCI) directory (2021), which states that there are 28 registered firms in Kaduna. Since the population size for the study is small (28), a census of the whole number of construction firms in Kaduna registered with FOCI was therefore made. For the purpose of this research, the sample size is 28 respondents (specialist construction contractors). A purposive sampling method was adopted for the research in order to guarantee equal representation for each of the samples in the population. The use of structured questionnaires was employed for data collection in order to achieve the study's objectives. The questionnaire (designed in a five-point Likert scale format) addressed issues relating to the research objectives respectively. The collected data was analyzed using the Mean Item Score (MIS).

RESULTS AND DISCUSSION

Result and Discussions on the drivers to innovation among specialist construction

The MIS analysis results of the drivers of innovation in specialist construction are summarized in Table 1.

Table 1: Drivers to innovation among specialist construct

SN	Drivers to innovation among specialist construct	MIS	Rank	Decision
1	Intensified market competition	4.73	1st	Very Significant
2	Survival	4.55	2 nd	Very Significant
3	Changing customers and needs	4.50	3rd	Very Significant

4	New requirements of clients	4.44	4th	Significant
5	Changes towards sustainability	4.42	5th	Significant
6	Technological advances	4.38	6th	Significant
7	Needs to develop standards	4.34	7th	Significant
8	Compliances with new regulations	4.30	8th	Significant
9	Changing business environments	4.28	9 th	Significant
10	Stability and development	4.00	10 th	Significant
	Average MIS	4.39		<i>Significant</i>

Table 1 shows that there is: intensified market competition (MIS = 4.73); survival (MIS = 4.55); and changing customers and needs (MIS = 4.50). Other drivers of innovation among specialist construction contractors are also important. These range from new requirements of clients (MIS = 4.44) to stability and development (4.00). Averagely, all the drivers of innovation among specialist construction contractors are important (average MIS = 4.39). The study by Goffin and Mitchell (2005) corroborates the findings of this study by identifying four drivers of innovation amongst specialist construction contractors, which are technological advances, changing customers and needs, intensified market competition, and changing business environments.

Result and Discussion on Barriers to Innovation Among Specialist Construction Contractors in Kaduna State:

The result of the analysis on the barriers to innovation among specialist construction contractors in Kaduna State is presented in Table 2.

Table 2: Barriers to Innovation Among Specialist Construction Contractors In Kaduna State

SN	Barriers to Innovation Among Specialist Construction Contractors In Kaduna State	MIS	Rank	Decision
1	High cost of innovation	4.53	1st	Very Significant
2	Lack of understanding of benefit of innovation	4.50	2nd	Very Significant
3	Lack of resource/capacity	4.00	3rd	Significant
4	lack of focus, lack of support	3.97	4th	Significant
5	Belief that innovation is risky	3.90	5th	Significant

6	Perception that the industry is doing well without innovation	3.84	6th	Significant
7	Lack of spare-time to develop new ideas	3.50	7th	Significant
8	Cultural issues	3.47	8th	Significant
9	Politics	3.44	9th	Moderate
10	Constantly shifting priority	3.38	10th	Moderate
11	Lack of shared vision	3.38	10th	Moderate
12	Lack of Collaboration.	3.37	12th	Moderate
13	Cultural issues	3.32	13th	Moderate
14	Lack of awareness	3.31	14th	Moderate
15	Lots of idea, no delivery to market,	3.09	15th	Moderate
16	Government regulation	3.00	16th	Moderate
17	Lack of urgency	2.90	17th	Moderate
18	Unwillingness to acknowledge and learn from past	2.81	18th	Moderate
19	Type of organization structure and no creative thinking	2.70	19th	Moderate
20	Risk aversion	2.50	20th	Moderate
	Average MIS	3.44		Moderate

Table 2 reveals the results of MIS for the twenty (20) identified barriers to innovation among specialist construction contractors by this study. It was shown that the most significant barriers to innovation among specialist construction contractors are: the high cost of innovation; lack of understanding of the benefits of innovation; lack of resource/capacity; lack of focus; lack of support; belief that innovation is risky, Perception that the industry is doing well in the absence of innovation, Lack of spare-time to develop new ideas and cultural issues with MIS values of 4.53, 4.50, 4.00, 3.97, 3.90, 3.84, 3.50, and 3.47, respectively. On average, all the identified innovations among specialist construction contractors are moderate (average MIS = 3.87

Findings from the study by Benmansour and Hogg (2012) support the findings of this study by establishing the hindrances to innovation among specialist construction contractors in the construction industry. These are: a lack of

understanding of the benefits of innovation, the perception that the industry is doing well without innovation, and the cost of innovation.

Result and Discussions on the benefits of innovation among specialist construction contractors in Kaduna State

The result of the MIS analysis undertaken to rate the benefits of innovation among specialist construction contractors in Kaduna State is summarised in Table 3.

Table 3: Benefits of Innovation among Specialist Construction Contractors in Kaduna State

SN	Benefits of innovation among specialist construction contractors in Kaduna State	MIS	Rank	Decision
1	Improvement of services	4.69	1st	Very important
2	Improvement of product quality	4.62	2nd	Very important
3	Increase in technical capability	4.55	3rd	Important
4	Increase in organizational effectiveness	4.54	4th	Important
5	Improvement of process	4.49	5th	Important
6	Improvement of client satisfaction	4.49	5th	Important
7	Better company image	4.32	7th	Important
8	Revenue growth due to new products and services	4.32	7th	Important
9	Improvement of organizational structure	4.28	9th	Important
10	Improvement of human resources	4.25	10th	Important
11	New services	4.22	11th	Important
12	New processes	4.20	12th	Important
13	Market penetration and growth	4.17	13th	Important
14	New product	4.15	14th	Important
15	Intellectual property (patent, trademarks, design)	4.00	15th	Important
16	Short- and long-term profitability	3.80	16th	Important

<i>Average MIS</i>	<i>4.31</i>	<i>Important</i>
---------------------------	--------------------	-------------------------

It was revealed from Table 3 that of the sixteen (16) benefits of innovation among specialist construction contractors in Kaduna State, improvement of services (MIS = 4.69), improvement of product quality (MIS = 4.62), increase in technical capability (MIS = 4.55) and increase in organisational effectiveness (MIS = 4.54) are the most important benefits of innovation among specialist construction contractors. On average, all the identified benefits of innovation among specialist construction contractors are important (average MIS = 4.31). In line with this finding, Adow *et al.* (2013) explain that the benefits of innovation adoption include an increase in the competitive edge of the market and a reduction in the staff strength needed for the execution of a project. In support of these findings, Blayse and Manley (2004) expanded on Ozorhon *et al.*'s (2010) research on the benefits of innovation, arguing that the more specialised construction firms become creative and innovative, the better their chances and opportunities of winning more projects, as well as improving the financial results of these projects.

CONCLUSION AND RECOMMENDATIONS

In view of the findings from the results of the data analysis carried out, it was shown that intensified market competition and survival were the most significant drivers of innovation among specialist construction contractors in Kaduna state, respectively. On average, all the drivers of innovation among specialist construction contractors are important. The most significant barriers to innovation among specialist construction contractors are the high cost of innovation and a lack of understanding of the benefits of innovation. All the identified innovation among specialist construction contractors is moderate. Improvement of services and improvement of product quality are the most important benefits of innovation among specialist construction contractors. On average, all the identified benefits of innovation among specialist construction contractors are important. It can therefore be concluded that innovation, when adopted, has a positive impact on the performance of specialist construction contractors in Kaduna state. In view of the findings and conclusions of this study, the following recommendations were made.

- i. Specialist contractors should endeavor to attend workshops, seminars and other training programs that will enlighten them on new ideas, modern technologies and how to apply them.
- ii. Nigerian government should provide favorable policies that will enable Specialist contractor's firms to innovate.
- iii. More awareness programmes should be organized to enlighten Specialist contractor's on the need for innovation.

REFERENCES

- Abdullateef, O. and Seong, Y. T. (2017). Roles of communication on performance of the construction sector.
- Adow, A., A. .Allotey, S. E ., Arthur-Aidoo., (2013). The Impact of Innovation of the Construction Industry in Ghana. *Civil and Environmental Research* www.iiste.org. Vol.3, No.12, 2013
- Afolabi, A. O., Amusan, L. M., Owolabi, J. D., Ojelabi, R. A., Joshua, O., and TunjiOlayeni, P. F. (2018). *Assessment of the linkages and leakages in a cloudbased computing collaboration among construction stakeholders*. Paper presented at the Construction Research Congress 2018, New Orleans, LA.
- Ameh, O. J., and Odusami, K. T. (2014). The leadership profile of Nigerian construction project managers. *Scientia Iranica, Transactions A: Civil Engineering*, 21(4), 1241-1248. Retrieved from <http://www.scientiairanica.com>
- Amusan, L. M., Oloniju, L. I., Akomolafe, M., Makinde, A., Peter, N. J., Farayola, H., and Osawaru, F. A. I. T. H. (2018). Adopting information and communication technology in construction industry. *International Journal of Mechanical Engineering and Technology (IJMET)*, 9(1), 739-746.
- Benmansour, C. and Hogg, K. (2012). An Investigation into the Barriers to Innovation and their Relevance within the Construction Sector. In: Greenwood, D (Ed.), 18th Annual ARCOM Conference, 2-4 September 2012, University of Northumbria. *Association of Researchers in Construction Management*, (2), 677686.
- Blayse, A. and Manley, K. (2010). Key influences on construction innovation. *Construction Innovation: Information, Process, Management*, 4(3), pp. 143- 54
- Buba, S. P. G., Chitumu, D. Z., and Ibrahim, H. M. (2018). Project leadership and its impact on time performance in Nigerian construction projects. *Advanced ScienceLetters*, 24(5), 3791-3796. doi: 10. 1166/. Asl.2018.11485
- Bygballe, L. E. & Ingemansson, M. (2014). The logic of innovation in construction. *Industrial Marketing Management*, 43(3), 512-524.
- Crossan, M.M. and Apaydin, M. (2010). "A multi-dimensional framework of organizational innovation: a systematic review of the literature", *Journal of Management Studies*, Vol. 47 No. 6, pp. 1154-1191.
- Damanpour, F., and Shneider, G. (2010). The dynamics of the adoption of product and process innovations in organizations. *Journal of Management Studies*, 38(1), 45 65.
- Dewick, P. and Miozzo, M (2004). Networks and innovation: sustainable technologies in Scottish social housing, *R&D Management* 2004; 34(3), 323-33.

- Dringoli, A. (2009). *Creating Value through Innovation*, Edward Elgar, Cheltenham.
- Fadun, O. S., and Saka, S. T. (2018). Risk management in the construction industry: Analysis of critical success factors (CSFS) of construction projects in Nigeria. *International Journal of Development and Management Review*, 13(1).
- Gambatese, J.A. and Hallowell, M. (2011). "Factors that influence the development and diffusion of technical innovations in the construction industry", *Construction Management and Economics*, Vol. 29 No. 5, pp. 507-517.
- Gann, D.M. and Salter, A.J. (2000). "Innovation in project-based, service-enhanced firms: the construction of complex products and systems", *Research Policy*, Vol. 29 No. 7-8, pp. 955-972.
- Gerybadze, A., Hommel, U., Reiners, H.W. and Thomaschewski, D. (2010). *Innovation and International Corporate Growth*, Springer, Heidelberg.
- Goffin, K. and Mitchell, R. (2005), *Innovation Management: Strategy and Implementation Using the Pentathlon Framework*, Palgrave Macmillan, Basingstoke.
- Hamma-Adama, M., Salman, H. and Kouider, T. (2018). Diffusion of innovations: The status of building information modelling uptake in Nigeria. *Journal of Scientific Research and Reports*, 17(4), 1-12.
- Hirsch-Kreinsen, H. and Jacobson, D. (2008), *Innovation in Low-Tech Firms and Industries*, Edward Elgar, Cheltenham.
- Jepsen, L.B., Dell'Era, C. and Verganti, R. (2014), "The contributions of interpreters to the development of radical innovations of meanings: the role of 'Pioneering Projects' in the sustainable buildings industry", *R&D Management*, Vol. 44 No. 1, pp. 1-17.
- Magretta, J. (2012), *Understanding Michael Porter: The Essential Guide to Competition and Strategy*, Harvard Business Review Press, Boston.
- Ozorhon, B., Abbott, C., Aouad, G. and Powell, J. (2010). *Innovation in Construction A Project Life Cycle Approach*, SCRI Research Report, Salford, England.
- Sexton, M., Barret A (2003). A literature synthesis of innovation in small construction firm: insight, ambiguities and questions. *Construction Management and Economics* 21(6): 613-622.
- Tatum, C.B. (1989), "Organizing to increase innovation in construction firms", *Journal of Construction Engineering and Management*, Vol. 115 No. 4, pp. 602-617.
- Yadav, M.S., Prabhu, J.C. and Chandy, R.K. (2007). "Managing the future: CEO attention and innovation outcomes", *Journal of Marketing*, Vol. 71 No. 4, pp. 84-101.