Evaluation of Construction Risk Management Techniques in Developing Economies: A Case of Nigeria

[1]Michael G. Oladokun, [2]Adegbenjo D. Adelakun and [3]David O. Ashimolowo

[1]Department of Building, Faculty of Environmental Studies, University of Uyo, Uyo, Nigeria
[2]Department of Building Technology, The Oke Ogun Polytechnic, Saki, Nigeria
[3]Formerly Postgraduate Student, School of the Built Environment, Napier University, Edinburgh, United Kingdom

Abstract

Construction projects have been described to be highly complex and executed under conditions of varying degrees of risks. The purpose of this paper is to propose suitable risk management techniques for use by construction firms in a developing economy country. Specifically, the study assessed the frequency of use of the risk management techniques by construction companies, and evaluated the effectiveness in the use of the risk management techniques by construction companies in the study area. Literature search was undertaken to review issues relating to risk management along the line of the objectives. A research questionnaire was designed to collect data in Nigeria. In all questionnaires were purposefully sent out to 200 respondents via e-mail out of which 57 of the questionnaires were returned. Responses from these retrieved questionnaires were subjected to analysis. The results of the study revealed that 'checklist', 'brainstorming', 'break-even analysis', and 'reduction' are the most frequently used techniques for risk identification, analysis, assessment and evaluation, and risk mitigation measures respectively. However, in terms of the effectiveness of those techniques, the results showed that 'brainstorming', 'Monte-Carlo simulation', 'expected monetary value', and 'retention' are the most effective risk management techniques for risk identification, analysis, assessment and evaluation, and mitigation measures respectively. In conclusion, the study has provided a pragmatic approach to exploring the construction professionals' perspective on the issue of different techniques that could be employed in the management of construction risk and their effectiveness in Nigeria, which may be used as a representation of what is obtainable in other developing countries. The study therefore recommends that construction practitioners involved in execution of construction works in the country need to take a proactive effort in the identification and analysing of risk from inception of the project by the use of the techniques this study identified and assessed.

Keywords: Construction; developing economies; Nigeria; risk management

1. Introduction

The fact that risk is inherent in construction projects is generally accepted. It has been argued that risk has long been recognised in the construction industry that those within the industry are continually faced with a variety of situations involving unknown, unexpected, frequently undesirable and often unpredictable factors (Odeyinka *et al.*, 2006). The construction industry is subjected to more risks and uncertainties than many other industries (Ahmed *et al.*, 2007). This conforms to the opinion of Tah and Carl (2000) who advocated that the construction industry,

more than most, is plagued by risks. The construction industry and its clients are widely associated with high degree of risks, due to the nature of construction business activities, process, environment and organisation (Kartam & Kartam, 2001). This, of course, exposes the reason why construction risks vary from one location to another.

It has also been stated that risks are inherent and anticipated in construction projects due to its complex and challenging process (Pich, Loch & Meyer, 2002). This is then the more reason risk should be identified and managed appropriately at the early stage of construction projects since this has a significant impact on the success of construction projects in terms of cost, time, quality and other performance indicators. The effects of serious risks on construction projects, however, can be very damaging which can lead to time and cost overrun thereby turning a potentially viable project to a loss-making venture (Tang *et.al*, 2007).

Construction in developing countries tends to attract high risks due to various uncertainties and unrest which affects the industry negatively. In a bid to curtail the havoc caused by various uncertainties and unrest which affects the industry negatively, proper risk management is essential. In order to properly manage the risk, it should be noted that among other things construction activities require conformity with myriad laws, codes and regulations as well as coordinating with multiple parties – clients, contractors, subcontractors, different consultants, planning authorities and in some cases, the end users of the project or where necessary, the general public among others. The stakeholders often have different conflicting goals and conflicting risk attitude towards the project. This suggests that construction activities are indeed risk prone activities and as a result require the attention of all parties and stakeholders in the construction industry.

Risk, generally, has been a subject of problem to any construction company. The need to have a risk management framework that can be deployed to mitigate risks in the construction companies of a developing economy like Nigeria has become an issue of urgent importance. This is because several studies like Odeyinka and Yusuf (1997), Aibinu and Jagboro (2002), Oladokun *et al.*, (2010), Okenwa (2011), Fabi and Awolesi (2013). *etc.* have reported major risks experienced by Nigerian construction companies. These studies opined that the effects of the risks have resulted into loss of corporate reputation of construction companies due to poorly delivered projects which led to cost overrun, delays, poor quality as previously mentioned. Project delay in construction has become endemic in Nigeria (Aibinu & Jagboro, 2002) and over seven out of ten construction projects experience delays (Odeyinka & Yusuf, 1997). Other epidemic issues that are widespread in the Nigerian construction industry even from the design stage are incessant design errors, constructability issues, incomplete plans and insufficient design.

From the literature, risk management has been viewed as an important tool to deal with risks in construction projects by assessing and ascertaining project viability; analysing and controlling the risks in order to minimise loss; alleviating risks by proper planning; and avoiding dissatisfactory projects and thus enhancing profit margins (Mills, 2001; Perminova, Gustafsson & Wikstrom, 2008). Risk management encompasses the techniques of managing risk which are risk identification, analysis, evaluation and eventual mitigation techniques. At each of these phases, there are some techniques that have proven useful in developed economies like the United Kingdom. The study of application of these techniques to the developing economies like

Nigeria has been given little attention. The existing literature remains the experience from the United Kingdom (UK), United States of America (USA) and other developed countries. This research is therefore an attempt to carry out a study on the construction risk management techniques in the context of a developing economy. It is believed that the research will extend the frontiers of knowledge on the subject beyond the European and North American experiences.

Specifically, the aim of this study is to research the risk management techniques being used by the construction firms in a developing economy with a view to proposing a more suitable approach when compared with what is obtainable in developed countries. In order to be a place to fulfil the aim of this study, the following objectives have been formulated:

1. To assess the frequency of use of the risk management techniques by construction companies in the study area.

2. To evaluate the effectiveness in the use of the risk management techniques by construction companies in the study area.

2. Research Methods

The objectives of this study are fulfilled by using a research design that involved a critical review of extant literature on construction risk management. This is by generally examining leading academic and technical journals, technical reports, text books, conference proceedings, and case studies. Also, the research used a survey approach to achieve the objectives. Data were collected by purposefully sampling construction professionals with requisite construction experience in Nigeria through the use of questionnaire administered to them online. Those that participated in the study were carefully selected to reflect the professionals working in the client organisations, construction companies and construction consulting firms. Details of these individuals are provided in Table 1. The questionnaire was designed in such a way that it was able to elicit necessary information required to fulfil the objectives of this study.

3. Data Analysis and Discussion of Results

3.1 Respondents' Background Information

Table 1 gives the background information about the respondents. The sampled respondents were asked to indicate the profession they belong to in the construction industry based on their involvement in construction projects in the country. The result, as shown in Table 1, indicates that 16 representing 28.1% indicated that they are builders, 12 each representing 21.0% indicated that they are architects and civil engineers, ten (15.1%) are quantity surveyors, four and three respondents are electrical and mechanical engineers respectively. By implication, all the respondents are professionals in the built environment and they are hence qualified to participate in the survey.

Table 1: Respondents' background information

Background information	Frequency	Percentage
Professions		
Architect	12	21.0
Mechanical Engineer	3	5.4
Civil Engineer	12	21.0
Electrical Engineer	4	7.0
Quantity Surveyor	10	17.5
Builder	16	28.1
Total	*57*	*100.0*
Professional Affiliation		
NIA	12	21.0
NIQS	10	17.5
NIOB	16	28.1
NSE	19	33.4
Total	*57*	*100.0*
Years of Experience in the Construction Industry		
Under 6 years	4	7.0
6-10 years	22	38.6
10-20 years	27	47.4
20-30 years	4	7.0
Above 30 years	0	0
Total	*57*	*100.0*
Qualifications		
OND	0	0
HND	3	5.4
BSc	22	38.6
PGD	5	8.6
MSc	27	47.4
PhD	0	0
Total	*57*	*100.0*
Classification		
Client organisation	15	26.3
Contracting companies	25	43.9
Consultants	17	29.8
Total	*57*	*100.0*

Respondents were also asked to indicate their professional affiliations. The result as shown in Table 1 reveals that 33.4% of the respondents belong to the Nigerian Society of Engineers (NSE), whereas 28.1% are affiliated with the Nigerian Institute of Building (NIOB). 21.0% are registered with the Nigerian Institute of Architects (NIA), while the remaining 17.5% are registered with the Nigerian Institute of Quantity Surveyors (NIQS). The implication of this is that all the respondents that took part in the survey are seasoned professionals.

Moreover, Table 1 shows the years of experience of respondents in the construction industry. The category of the respondents having between 10-20years industry experience represent the

highest with 47.4% followed by those who have between 6-10 post qualification construction industry experience representing 38.6%. 7.0% each of the respondents with years of experience between 20-30 years and under 6years respectively. Since none of the responded have over 30years construction industry experience, it can be deduced that over 90% of respondents are trained professionals that have been practising in the construction industry for over 6years. The Table 1 reveals that more than 50% of the respondents have over 10 years of cognate professional experience in the construction industry. The interpretation therefore is that the respondents have required cognate post qualification industry experience and as such qualified to take part in the survey.

The highest academic qualifications of the respondents are also shown in Table 1. Specifically, 47.4% of the respondents indicate that master's degree is the highest level of education they possess. 38.6% indicates that they hold bachelor's degree as their highest qualification, 8.8% indicates that Postgraduate Diploma (PGD) is their highest academic qualification, while the remaining 5.4% holds Higher National Diploma (HND). This shows that over 90% of the respondents hold bachelor's degree and above. This by implication means that majority of the respondents have required academic qualification to be knowledgeable about the subject of the survey.

Table 1 also shows the classification of the respondents' organisations. The result indicates that 43.9% of the respondents are working for contracting companies i.e. Contactors, 29.8% are working for consultancy firms, while the remaining 26.3% are working in client organisation. It can be reasoned that the survey could tend to explore the contractors' perspective of construction risk and its management. Stakeholders are those who have the potential to influence or affect an organization, and or be influenced or affected by it. It is important to note though that stakeholders have different perspectives to risk as what considered as risk to a stakeholder could be and opportunity in disguise for another. While project risk management usually focuses on issues of cost/schedule constraints or reliability issues, it is equally important to know the interpretation of risk as it affects different stakeholders (Cooper, 2003). These can only be explained by and the project team itself as they can provide important insights into the full spectrum of risk that needs to be managed (Cooper, 2003).

3.2 Analysis of Risk Management Techniques in Use

This section involves analysis and discussion of information obtained regarding risk management techniques used by construction companies in Nigeria based on the experience of the professionals sampled. In this study, four (4) techniques were identified for risk identification, seven (7) for risk analysis, three (3) for risk assessment/evaluation, while four (4) techniques were identified for risk mitigation, as revealed from the literature review. All these were analysed based on the responses from 57 respondents who returned their completed questionnaire.

3.2.1 Ranking of Risk Identification Techniques

From Table 2, the summary of the ranking on frequency of use of risk identification techniques by the respondents are shown. MIS was calculated for each of the techniques. The results

presented in Table 2 indicates that respondents ranked 'checklist' as the most frequently used technique by contractors in the study area for risk identification with MIS of 0.895. This is followed by 'brainstorming' with MIS of 0.846. The next being the 'influence diagram' and 'cause and effect diagram' with MIS of 0.761 and 0.723 respectively. It is worthy to say that all the identified risk identification techniques have MIS greater than 0.5 which shows that all of them are actually in use in the study area, though checklist is most frequently used.

Table 2: Frequency of use of risk identification techniques

Risk Identification Techniques	5	4	3	2	1	Total	MIS	Ranking
Checklist	33	20	2	2	0	57	0.895	1
Brainstorming	28	17	9	3	0	57	0.846	2
Influence diagram	17	23	9	5	3	57	0.761	3
Cause and Effect diagram	7	24	23	3	0	57	0.723	4

3.2.2 Ranking of Risk Analysis Techniques

From Table 3, the summary of the ranking of risk analysis techniques by the respondents are shown. The most frequently used technique for risk analysis as identified by the construction practitioners is "brainstorming" which has an MIS of 0.884. This is closely followed by "probability analysis" which shares the same percentage with brainstorming though it has an MIS of 0.877. "Decision tree" ranked next with MIS of 0.874. It is worth to note however that "Monte-Carlo Simulation" ranked least with MIS of 0.404. The implication of this is that Monte-Carlos simulation is rarely used by these practitioners as the MIS is below 0.5.

Table 3: Frequency of use of risk analysis techniques

Risk Analysis Techniques	5	4	3	2	1	Total	MIS	Ranking
Brainstorming	30	22	4	1	0	57	0.884	1
Probability Analysis	29	23	3	2	0	57	0.877	2

Decision Tree	29	21	6	1	0	57	0.874	3
Graphical Method	27	23	5	2	0	57	0.863	4
Sensitivity Analysis	26	17	9	4	1	57	0.821	5
Delphi Analysis	11	13	15	14	4	57	0.646	6
Monte-Carlo Simulation	0	7	10	17	23	57	0.404	7

3.2.3 Ranking of Risk Assessment and Evaluation Techniques

Risk Assessment and evaluation is a crucial part of risk management techniques. Table 4 indicates the respondents' reactions regarding risk assessment and evaluation techniques. In making decisions about construction projects, respondents believe that contractors consider the period it takes to break even as a major risk tool for evaluating the risks involved in the projects with break-even analysis having an MIS of 0.888. Probability analysis ranked second among the respondents with an MIS of 0.849. This is closely followed by "expected- monetary value" with an MIS of 0.653. "Scenario analysis" was ranked least by the respondents with an MIS of 0.625. A striking segregation occurred here as break-even and probability analysis closely followed each other while there is a sharp drop in the MIS values of the next two techniques – expected monetary value and scenario analysis that closely followed each other. This by implication means that break-even analysis and probability techniques are the most used by contractors in Nigeria.

Table 4: Frequency of use of risk assessment and evaluation techniques

Risk Assessment And Evaluation	**5**	**4**	**3**	**2**	**1**	**Total**	**MIS**	**Ranking**
Break-Even Analysis	29	24	4	0	0	57	0.888	1
Probability	25	22	9	1	0	57	0.849	2
Expected Monetary Value (EMV)	9	17	18	6	7	57	0.653	3
Scenario Analysis	0	27	15	10	5	57	0.625	4

3.2.4 Ranking of Risk Mitigation Measures

It is essential to evaluate the frequency of use of different risk mitigation measures as identified from the literature. Table 5 reports the frequency of use and ranking of these measures based on the MIS values. The result indicates that 'risk reduction' is ranked first as the most frequently utilised risk mitigation techniques in the study area with a MIS score of 0.849. This is followed by 'risk transfer' with a MIS value of 0.684. 'Risk avoidance' has a MIS of 0.618. The last two are 'risk elimination' and 'risk retention' with a MIS of 0.435 and 0.568 respectively. By implication, 'risk reduction' is the most frequently utilised risk mitigation measures in Nigeria.

Table 5: Frequency of use of risk mitigation measures

Risk Mitigation Techniques	5	4	3	2	1	Total	MIS	Ranking
Reduction	25	21	11	0	0	57	0.849	1
Transfer	17	18	5	6	11	57	0.684	2
Avoidance	10	14	15	7	11	57	0.618	3
Retention	9	13	10	10	15	57	0.568	4
Elimination	2	8	8	19	20	57	0.435	5

3.3 Analysis of the Effectiveness of Risk Management Techniques Used by Construction Companies in Nigeria

This section seeks to understand the effectiveness of the risk management techniques that were identified and discussed in Section 4.2.

3.3.1 Effectiveness of Risk Identification

It is apparent from Table 6 that respondents ranked 'brainstorming' as the most effective risk identification technique in the study area with a MIS of 0.877. Next to this is 'checklist' which has a MIS of 0.828. 'Cause and effect' ranked last as the least effective technique of risk identification with MIS of 0.582. It is very interesting to note that there is a slight reversal on the ratings between the frequency of risk identification and the effectiveness of the risk identification technique. For example, 'checklist' was considered by the respondents to be the most frequently used risk identification technique closely followed by 'brainstorming'. However, it was discovered here that though 'checklist' is the most frequently used technique, 'brainstorming' is considered to be the most effective.

Table 6: The Effectiveness of Risk Identification Techniques

Risk Identification Techniques	5	4	3	2	1	Total	MIS	Ranking
Brainstorming	31	19	5	2	0	57	0.877	1
Checklist	28	19	5	0	5	57	0.828	2
Influence diagram	6	23	13	4	11	57	0.632	3
Cause and Effect diagram	5	10	23	13	6	57	0.582	4

3.3.2 Effectiveness of Risk Analysis

Table 7 shows the ranking of the effectiveness of risk analysis techniques. 'Monte-Carlo simulation' is therefore considered to be the most effective risk analysis technique based on the ranking of the respondents with a MIS of 0.898. This is closely followed by 'sensitivity analysis' with a MIS of 0.870 and then 'probability' technique with a MIS of 0.835. 'Graphical method' of risk analysis was however considered to be the least effective risk analysis technique with a MIS of 0.558. The result as presented in Table 7 is profound and significant. That is, comparing the results with that of frequency of use of risk analysis as presented in Table 3, respondents ranked brainstorming as the most frequently used technique of risk analysis. It is therefore puzzling to note that brainstorming which is mostly used is considered to be almost ineffective. The rationale for using a technique which is considered to be ineffective is beyond the scope of this research and as a result will be recommended for future to explore this area.

Table 7: The Effectiveness of Risk Analysis Techniques

Risk Analysis Techniques	5	4	3	2	1	Total	MIS	Ranking
Monte-Carlo Simulation	33	19	5	0	0	57	0.898	1
Sensitivity Analysis	32	16	6	3	0	57	0.870	2
Probability	29	17	6	2	3	57	0.835	3
Decision Tree	25	19	11	2	0	57	0.835	4
Delphi Analysis	23	15	11	6	2	57	0.779	5
Brainstorming	17	17	13	6	4	57	0.730	6
Graphical Method	9	7	13	19	9	57	0.558	7

3.3.3 Effectiveness of Risk Assessment and Evaluation

Table 8 shows the respondents' responses on effectiveness of risk assessment and evaluation techniques. Of the four techniques identified under this process, 'expected monetary value' was ranked as the most effective with a MIS of 0.828. This is followed by 'break-even analysis' which has MIS of 0.712 and then 'probability' with a MIS of 0.582. The least ranked is 'scenario analysis' with a MIS of 0.554. There is a reversal here as the frequency of use under Section 4.2.3 shows that 'break-even analysis' is the most frequently used risk evaluation technique while 'expected monetary value' ranked third in the frequency of use. However, the effectiveness Table 8 indicates that 'expected monetary value' is considered to be most effective followed by 'break-even analysis'.

Table 8: The Effectiveness of Risk Assessment and Evaluation

Risk Assessment And Evaluation Techniques	5	4	3	2	1	Total	MIS	Ranking
Expected Monetary Value (EMV)	25	15	17	0	0	57	0.828	1
Break-Even Analysis	17	12	17	8	3	57	0.712	2
Probability	5	13	21	8	10	57	0.582	3
Scenario Analysis	0	20	17	7	13	57	0.554	4

3.3.4 Effectiveness of Risk Mitigation Technique

Table 9 gives the respondents' responses on the effectiveness of risk mitigation techniques. Risk 'retention' was ranked first with a MIS of 0.864. This is closely followed by risk 'avoidance' technique which is ranked second most effective risk mitigation technique with a MIS of 0.828 and then 'transfer' with a MIS of 0.611. The least effective risk mitigation technique is 'elimination' with a MIS of 0.509. However, the result is a bit different from the one in Section 4.2.4 under the frequency of use of the risk mitigation techniques. The finding is profound in the sense that the frequency of use of a technique does not necessarily mean that it is effective.

Table 9: The Effectiveness of Risk Identification Techniques

Risk Mitigation Techniques	5	4	3	2	1	Total	MIS	Ranking
Retention	25	20	12	0	0	57	0.846	1
Avoidance	25	19	11	0	2	57	0.828	2
Transfer	13	12	10	9	13	57	0.611	3
Reduction	7	9	13	13	15	57	0.530	4
Elimination	6	7	14	15	15	57	0.509	5

Conclusions

This study has provided a pragmatic approach to exploring the construction professionals' perspective on the issue of different techniques that could be employed in the management of construction risk and their effectiveness in Nigeria, which may be used as a representation of what is obtainable in other developing countries.

Stemming from the findings of this research, it can be concluded that the most frequently used of the various techniques discovered for risk identification is "checklist", while "brainstorming" is most frequently used for risk analysis and in assessing. Additionally, in evaluating the impacts of the risks, the survey revealed that "break-even" technique gained the most approval. The final procedure which is mitigating the risks, the survey shows that the practice is the use of "risk reduction" technique.

It is however puzzling to discover in the final part of the research that respondents proposed a more effective risk management technique. It is noted that none of the risk management techniques that are in use is considered to be effective. For risk management techniques, the survey shows that the most appropriate techniques which should be use though not being utilised at the moment are presented in the table below.

Table 10: The Proposed Effective Risk Management Techniques

The Proposed Effective Risk Management Techniques		
Risk Management Techniques	**In Use**	**Proposed**
Risk Identification	Checklist	Brainstorming
Risk Analysis	Brainstorming	Monte-Carlo Simulation
Risk Assessment And Evaluation	Break-even Analysis	Expected Monetary Value (EMV)
Risk Mitigation	Risk Reduction	Risk Retention

References

Ahmed, A., Kayis, B., and Amornsawadwatana, S. (2007). A review of techniques for risk management in projects. *International Journal of Project Management*. 14, 22-36.

Aibinu, A.A. and Jagboro, G.O. (2002) The Effects of Construction Delays on Projects delivery in the Nigerian Construction Industry. *International Journal of Project Management*, 20, 593 – 599.

Fabi, J. K. and Awolesi, J. A. (2013). A Comparative Study of Construction Risk Management Practice between Indigenous and Expatriate Contactors in Nigeria. RICS-Cobra Conference, New Delhi, India.

Kartam, N.A. and Kartam, S.A. (2001). Risk and its management in the Kuwaiti construction industry: a contractor's perspective. *International Journal of Project Management*, 19(6), 325–335.

Mills A. (2001). A systematic approach to risk management for construction. *Structural Survey*, 19(5), 245-252.

Odeyinka, H. A. Oladepo, A. and Akundale, O. (2006). Assessing risk impact in construction in Nigeria, Proceedings of the Annual Research; Conference of the Royal Institution of Chartered Surveyors, pp. 7-8; University College London.

Odeyinka, H. A. and Yusuf, A. (1997). The causes and effects of construction delays on completion cost of housing project in Nigeria. *Journal of Financial Management of Property and Construction*, 2, 31-41.

Okenwa, S., (2011). *Architects Review Of National Housing Policy*. http://allafrica.com/stories/201109051349.html. Accessed On 2nd December, 2015.

Oladokum, M.G., Ikediashi, D.I., Adewuyi, T.O, and Oladokum, A.A. (2010). Assessment of risk on residential building projects in Nigeria: In Proceedings of The Construction, Building and Real Estate Research Conference of the Royal Institution of Chartered Surveyors Held at Dauphine Université, Paris, 2-3 September 2010.

Perminova O, Gustafsson and Wikstrom K. (2008). Defining uncertainty in projects- a new perspective. *International Journal of Project Management*, 26, 73-79.

Pich, M. Loch, M. and Meyer, A. (2002). On uncertainty, Ambiguity and Complexity in project management. *Journal of Management Science*, 48(8), 1008-1023.

Tah, J.H.M. and Carr, V. (2000). A proposal for construction project risk assessment using fuzzy logic. *Construction Management and Economics*, 18(4), 491–500.

Tang, W. Qiang, M., Duffield, C. and Yong, D. (2007). Risk management in the Chinese construction industry. *Journal of Construction Engineering and Management*, 944-956.

About the Authors

Dr. Michael G. Oladokun

Nigeria

Dr. Oladokun graduated in 2001 with an honours degree in Building from Obafemi Awolowo University, Nigeria. He also obtained a master degree in construction management from University of Lagos in 2008. He obtained a PhD in Construction at Heriot-Watt University, United Kingdom in 2014. He is licensed to practice as Registered Builder by the Council of Registered Builders of Nigeria. He is currently a Senior Lecturer in the Department of Building, University of Uyo, Nigeria. Before joining academia in 2008, Dr. Oladokun had a stint in some construction companies under varied roles. During those years, he was deeply involved in the management of many high profile construction projects. His areas of research interest are: sustainability issues in the built environment, modelling complex systems in the built environment, system dynamics applications to construction and construction project management in general. Dr. Oladokun's research outputs are published in high impact academic/professional journals and refereed conference proceedings. His work on energy consumption in buildings received 2016 Emerald Literati Award for the most outstanding paper in the International Journal of Energy Sector Management. He is a reviewer for a number of local and international journals such as Sustainable Cities and Society; Engineering, Construction and Architectural Management; Facilities; and Ecological Indicators. He has also been a member of scientific review committee of many local and international conferences. He has acted as external moderator for a Polytechnic in Nigeria. Dr. Oladokun can be contacted at michael.g.oladokun@uniuyo.edu.ng.

Adegbenjo D. Adelakun

Nigeria

Mr. Adegbenjo D. Adelakun attended Ajegunle Baptist Primary School, Saki, Oyo State, Nigeria between 1982-1988 for his primary education and Baptist High School, Saki, Nigeria between 1988-1993 for his secondary education. In 2001, Mr. Adelakun graduated with a bachelor's degree in Building from Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria. Thereafter, he obtained his master's degree in Construction Management from University of Lagos, Nigeria. Mr. Adelakun worked briefly in a construction company before securing a lecturing job with the Polytechnic, Ibadan, Saki Campus (now The Oke-Ogun Polytechnic, Saki, Oyo State, Nigeria) as Lecturer III in 2006. Throughout the years he

has risen to the post of senior lecturer. Mr. Adelakun specialises in construction management, building services and building materials. He is a registered Builder. He is married and blessed with three children. Mr. Adelakun can be contacted at adelakunadegbenjo@gmail.com.

David O. Ashimolowo

Nigeria

David O. Ashimolowo graduated with a bachelor of technology degree in Architecture from Ladoke Akintola University of Technology, Ogbomosho, Nigeria. He obtained a master's degree in Built Environment specializing in Building Management from Edinburgh Napier University, United Kingdom. He is currently practicing as a project manager.