

A Framework for Enhancing Contractor-Subcontractor Relationships in Construction Projects in Nigeria

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Abstract

The delivery capability of main contractors depends largely on the quality of their subcontractors and the harmonious relationships that exist between them. Research work was therefore conducted to identify the mechanisms to facilitate the understanding between these pairs and also develop a model that puts emphasis on the factors. To achieve this aim, one hundred questionnaires each were administered randomly to main contractors and labor-only subcontractors in the study area. Seventy-five and eighty-eight questionnaires were respectively filled and returned in this regard. The application of total weight value and rating index techniques shows that type of contract, scope of contract, payment terms, cooperative attitudes, third-party involvement are the main factors that influence this relationship and this was further validated by a model. The paper concludes that this methodology could culminate into a useful decision making tool for both main contractors and subcontractors during the development and execution stages of construction projects in the study area.

Keywords: Construction projects; Main contractors; Methodology; Relationship; Subcontractors.

INTRODUCTION

The construction industry contributes significantly towards the economic output of a country. For instance, the construction industry in the United Kingdom (UK) contributed £103 billion in economic output which is 6.5 percent of the total output in 2014. It also created 2.1 million jobs which was 6.3 percent of the UK total employment (Rhodes, 2015). In Zambia, the construction industry comprised 9.9 percent of the national Gross Domestic Product (GDP), with a growth rate of 8.9 percent from 2013 (Mudzvokorwa, 2017) while it contributed over 10 percent to the Gross Domestic Product of Nigeria (Fagbenle, 2011). A major aspect of projects in the construction industry is subcontracting (Ujene *et al.*, 2011). Research has also shown that currently up to 90 percent of the work on a construction project is performed by subcontractors (Fagbenle *et al.*, 2014), hence, the quality of subcontractors is important as it has a direct bearing on the performance of the main contractors on the projects (Loh and Ofori, 2000). According to Albino and Garavelli (1998), the general contractor's performance is strongly dependent on

subcontractors. This statement is reinforced by Mbachu (2008) which stated that the ability of the general contractor and consultant to deliver the project within time, quality and cost depends largely on performance of subcontractors.

Ng (1986) confirmed that subcontracting is common in the industry because of uncertainties in construction demand. He stressed that the main contractors do not employ construction operatives directly, they engage subcontractors. In this way, main contractors can operate with substantially reduced overheads and ensure economic deployment of labour with greater mobility for the workers. Manu *et al.* (2013) indicated that subcontracting is a means of bargaining down labour cost, encourage quicker completion of tasks, externalize less rewarding and dangerous activities and rapidly meet changing product market demands.

However, with all its benefits, subcontracting can be a risk to construction projects (Yoke-Lian *et al.*, 2013). When the scope of work and logical dependencies between subcontractors works are not fully understood by general contractor and owners, it became a critical problem to the success of complex and fast-paced projects. Therefore, issues in subcontracting should not be ignored in defeating the challenge of achieving planned budget, cost, schedule and quality of project delivery. The relationship between main contractors and subcontractors in construction projects has always been a matter of concern for practitioners and researchers in the area of construction management. This paper presents a research effort with the purpose of identifying mechanisms to facilitate and improve the understanding between main contractors and labour-only subcontractors in Nigeria.

LITERATURE REVIEW

Construction contracting is considered the hub for construction sector in Nigeria. Hence, Nigerian contractors have proved their national role and outstanding ability in construction and reconstruction (Fagbenle, 2006). However, they are not in isolation in this business. They are accompanied by labour-only subcontractors, materials vendors, equipment dealers and financial institutions among other firms. Hence, the delivery capability of construction firms is determined to a large extent by the quality of their subcontractors. Labour subcontracting has also been the feature of the industry in many other countries, including United States (Gray and Flanagan, 1989), Japan (Beardsworth *et al.*, 1988), Nigeria (Fagbenle, 2011) and Zambia (Mudzvokorva, 2017). Research has shown that currently, up to 90 percent of the work on a construction project in Europe is performed by subcontractors (Rajput and Agarwal, 2015).

The critical importance of subcontracting to the success of construction projects has been recognized (Dainty *et al.*, 2001). Debrah and Ofori (1997) submitted that subcontracting enables general contractors to keep a limited nucleus of full-time employees, maintaining costs and yet being able to engage the necessary skilled craftsmen. Abdullahi (2014) opined that by subcontracting portions of the work, the main contractor is freed of the administrative tasks relating to the recruitment, deployment and supervision of workers. Debrah and Ofori (1997) submitted that subcontractors facilitate the work of the general contractors through the provision of quotations for the subcontracted work. It was further argued that subcontractors could work faster than directly employed labour because their profit is only realized if they complete the work with expedition. Fagbenle (2006) pointed out that the system has acted as a means whereby contractors can accommodate great fluctuations in demand and the high costs of employing permanent labour within the industry. Fagbenle (2011) also reported that the growth in the practice of outsourcing labour has allowed large companies to effectively divorce themselves from the physical work of construction and concentrate on service function. Subcontracting is

also fraught with pitfalls. For instance, many labour subcontractors lack qualifications or proper training. They reiterated further that it is difficult to identify their workers and properly train them and to endeavor to enhance their welfare and safety. Many labour subcontractors are not registered, operated with a minimum paid-up capital and are largely incommunicado (Loh and Ofori, 2000; cited by Fagbenle, 2011). It was also found that subcontracting leads to problems including unsatisfactory time and cost performance. Debrah and Ofori (1997) also discovered that subcontract agreements are atimes inadequate or ambiguous, even when they are written. As a result, disputes may arise and often, the working relationship between the main contractors and subcontractors becomes strained.

There is no definite definition of relationship as projects differ from each other and because it is difficult to define the exact factors that a relationship strategy consists of (Mudzvokorwa, 2017). Relationship is generally understood as a commitment by parties involved in a project to work closely or cooperatively, instead of competitively or adversarial (Widen *et al.*, 2014). It is a long term commitment between two or more organisations to implement a structured collaborative approach that facilitates team work across contractual boundaries for the purposes of achieving specific business objectives (Mudzvokorwa, 2017). It involves the building of harmonious working ties between stakeholders by aligning of shared goals and objectives (Meng, 2012). Rajput and Agarwal (2015) specified that in order to improve the relationship between main contractors and subcontractors, the documentation between main contractors and subcontractors regarding designs, drawings, plans, schedules and management systems should be clear and complete.

Selecting the right subcontractor does not guarantee the success of a construction project. Hence, the working relationship between a contractor and his subcontractor(s) is one of the most important determinants of project success. Serpell and Wagner (1997) identified the main factors that impact owner-contractor relationship as: type of contract; relative capabilities of owners and contractors; co-operative attitude; personalities of key managers; scope of the work; third-party involvement; contractual liabilities; senior management support; planning abilities; and other factors. McCord (2010) highlighted the subcontractor perspectives of top seventeen factors that are critical to the success or failure of their relationships with general contractors. They are: bid shopping; project manager capability; project manager fairness; superintendent; timeliness of payments; safety; financial capability; retainage practices; future work; previous claims; the pay-when-paid clause; indemnity clauses; back charging; insurance; bonding; takeover of equipment; and termination for convenience. Mudzvokorwa (2017) also enumerated a number of factors that can enhance the relationship between the main contractors and subcontractors on construction sites. These are regular communication, complete and clear contract documents, information communicated in time, timely progress payment to subcontractor, communicating when there is a problem, good construction work quality, subcontractor possess enough skilled labour, adherence to the construction schedule, adherence to the conditions of the contract and accuracy of the project cost estimate. Little (2011) enumerated guidelines on establishing relationship with a subcontractor. They include writing up the contract, terms of employment, indemnification/liability, payment, scope of work, work for hire, assumptions and clarity of expectations. Decisions on individual projects are often influenced by the objective of sustaining an on-going relationship. In spite of the shift in the attitude of main contractors to subcontract procurement and the importance of these specialty contractors, there is little emphasis on their relationships with main contractors. Moreover, the few literature that is available on this topic were outside the purview of Africa and especially Nigeria. This research therefore provided

insight into panacea for stimulating contractor-subcontractor relationships on construction projects in Nigeria.

METHODS

A survey instrument in the form of questionnaires was used to capture the needed data which were quantitative and qualitative in nature. Two sets of questionnaires were designed and administered on the main contractors and labour-only subcontractors using random sampling techniques. The first set of questionnaires (Questionnaire A) centred on the main contractors while the second set (Questionnaire B) addressed the pertinent issues on subcontractors. The two sets differ in the design (questions) and the enhancing factors listed in the questionnaire were elicited from the literature. Test retest method of reliability was used to determine the reliability of the sets of questionnaires. Also, results were correlated using Pearson Product Moment Correlation (PPMC) and 0.90 coefficient was obtained which is high enough to make the instruments reliable and valid for the study. The questionnaires' sets were distributed by hand/emails and research assistants were employed to facilitate this process. Out of one hundred copies of the questionnaires administered on each of the target categories of respondents, 75 (75% response rate) and 88 (88% response rate) were respectively filled and returned by main contractors labour-only subcontractors. Ninety percent of the respondents held senior managerial positions in their respective organizations. The first step of the methodology was to identify the relationship factors that can cause problems between contractors and labour-only subcontractors and those that can enhance their relationship at the same time.

The total weight value (TWV) for each factor was computed by summing the product of the number of respondents for each rating to a factor and the respective weight value. The mathematical expression is given thus (Afon, 2009):

$$TWV = \sum_{i=1}^5 P_i V_i \text{ ----- (1)}$$

Where; TWV = Total weight value; P_i = Number of respondents that rated factor; and V_i = Weight assigned to each factor. The RRI to each factor is arrived at by dividing the TWV by the summation of the respondents to each of the five rating of a factor.

$$\text{Thus, } RRI = \frac{TWV}{\sum_{i=1}^5 P_i} \text{ ----- (2). That is, } RRI = \frac{\sum_{i=1}^5 P_i V_i}{\sum_{i=1}^5 P_i} \text{ ----- (3)}$$

Where TWV = Total weight value and RRI = Respondents' rating index. The closer the RRI of a factor is to five, the higher the respondents' rating and this is shown in Table 1. Respondents were instructed to rate the perceived satisfaction levels as follows: 1 – not satisfactory; 2 – less satisfactory; 3 – satisfactory; 4 – very satisfactory and 5 – highly satisfactory. Also shown in Table 1 is the average RRI represented by \overline{RRI} for each category of respondents. It was obtained by adding up the RRI for each factor and dividing it by the number of the identified factors ($n = 15$). That is, $\overline{RRI} = \sum RRI/n \text{ ----- (4)}$

RESULTS AND DISCUSSION

The results of RRI (Table 1) showed that the top five factors that can enhance the relationship between main contractors and labour-only subcontractors on construction projects were type of contract (RRI = 4.00), scope of work (RRI = 3.84), payment terms (RRI = 3.72),

cooperative attitude (RRI = 3.71), and third-party involvement (RRI = 3.61). This is followed by financial capacity (RRI = 3.58), regular communication (RRI = 3.52), personalities of key players (RRI = 3.51), adherence to construction schedule (RRI = 3.44) and project cost estimate accuracy (RRI = 3.41).

The type of contract in terms of complete and clear contract documents and clauses therein is very key to the success of any relationship between these two parties and little wonder that this factor was accorded the greatest premium by the concerned parties. This supports the views of Rajput and Agarwal (2015) that the documentation between main contractors and subcontractors in terms of working drawings and management systems should be clear and complete in order to improve the relationship between these two parties.

Also, scope of work and payment terms which trailed behind type of contract in this relationship enhancement might not be unconnected with the ambiguities that normally arise between main contractors subcontractors on construction projects. This is in line with Mudzvokorwa (2017)'s assertion that some main contractors are always in the habit of foot-dragging in the payment of subcontractors for completed work, whereas, payment and profit are main concerns for subcontractors and no issue is more important than payment in this regard.

For the main contractors however, the top five factors that can enhance their relationship with labour-only subcontractors were type of contract (RRI = 4.51), scope of work (RRI = 4.21), cooperative attitude (RRI = 4.16), payment terms (RRI = 4.13) and project cost estimate accuracy (RRI = 3.92). The last five factors that need to be improved upon in this regard were adherence to construction schedule (RRI = 3.63), retainage practice (RRI = 3.60), future work (RRI = 3.55), indemnification/liabilities (RRI = 3.55) and previous claims (RRI = 3.49).

Table 1. Identification and Weighting of Factors That Can Enhance the Relationship between Main Contractors and Labour-Only Subcontractors

S/N	Factor	Both			Main Contractor			Labour-only Subcontractor					
		TWV	RRI***	$\frac{RRI - \overline{RRI}}{\overline{RRI}^2}$	TWV	RRI**	$\frac{RRI - \overline{RRI}}{\overline{RRI}^2}$	TWV	RRI†	$\frac{RRI - \overline{RRI}}{\overline{RRI}^2}$			
1.	Type of Contract	652	4.00	0.48	0.2304	338	4.51	0.66	0.4356	314	3.57	0.34	0.1156
2.	Scope of Work	626	3.84	0.32	0.1024	316	4.21	0.36	0.1296	310	3.52	0.29	0.0841
3.	Payment Terms	606	3.72	0.20	0.0400	310	4.13	0.28	0.0784	296	3.36	0.13	0.0169
4.	Cooperative Attitude	605	3.71	0.19	0.0361	312	4.16	0.31	0.0961	293	3.33	0.10	0.0100
5.	Third-Party Involvement	590	3.61	0.09	0.0081	290	3.87	0.02	0.0004	300	3.41	0.18	0.0324
6.	Financial Capacity	583	3.58	0.06	0.0036	284	3.79	-0.06	0.0036	299	3.40	0.17	0.0289
7.	Regular Communication	573	3.52	0.00	0.0000	276	3.68	-0.17	0.0289	297	3.38	0.15	0.0225
8.	Personalities of Key Players	572	3.51	-0.01	0.0001	287	3.83	-0.02	0.0004	285	3.24	0.01	0.0001
9.	Adherence to Construction Schedule	560	3.44	-0.08	0.0064	272	3.63	-0.22	0.0484	288	3.27	0.04	0.0016
10.	Project Cost Estimate Accuracy	556	3.41	-0.11	0.0121	294	3.92	0.07	0.0049	262	2.98	-0.25	0.0625
11.	Future Work	547	3.36	-0.16	0.0256	266	3.55	-0.13	0.0169	281	3.19	-0.04	0.0016
12.	Construction Work Quality	547	3.36	-0.16	0.0256	281	3.75	-0.10	0.0100	266	3.02	-0.21	0.0441
13.	Previous Claims	538	3.30	-0.22	0.0484	262	3.49	-0.36	0.1296	276	3.14	-0.09	0.0081
14.	Indemnification/Liabilities	525	3.22	-0.30	0.0900	266	3.55	-0.30	0.0900	259	2.94	-0.29	0.0841
15.	Retainage Practice	513	3.15	-0.37	0.1369	270	3.60	-0.25	0.0625	243	2.76	-0.47	0.2209
			52.73			57.67				48.51			

Note:

** $\sum P_i = 75$

* $\sum P_i = 88$

*** $\sum P_i = 163$

Also depicted in Table 1 is the average RRI denoted by \overline{RRI} for each of the two construction stakeholders. Thus, the average (\overline{RRI}) enhancement factors for main contractors and labour-only subcontractors were respectively 3.85 and 3.23 while the \overline{RRI} for the two categories was 3.52. Since the figures are close to five, this is a clear indication that the satisfaction level of the identified factors that can strengthen the relationship between main contractor's labour-only subcontractors is high and acceptable. Further analysis indicated that six out of the fifteen identified factors have positive deviation about the \overline{RRI} of main contractors and it is denoted by $RRI - \overline{RRI}$. These were: type of contact; scope of work; cooperative attitude; payment terms; project cost estimate accuracy; and third-party involvement with the respective deviations of 0.66, 0.36, 0.28, 0.07 and 0.02. However, each of the remaining nine factors has negative deviations about \overline{RRI} and this implies that the identified factors need to be further improved for an enhanced relationship between these two construction stakeholders. These factors were previous claims, indemnification/liabilities, retainage practice, adherence to construction schedule, regular communication, future work, construction work quality and personalities of key players.

In divergence to what was elicited from the main contractors, labour-only subcontractors demonstrated strong embracement of nine out of the fifteen factors that can enhance their relationship with the main contractors. These were type of contracts (0.34), scope of work (0.29), third-party involvement (0.18), financial capacity (0.17), regular communication (0.15), payment terms (0.13), cooperative attitude (0.10), adherence to construction schedule (0.04) and personalities of key players (0.01). The remaining six factors were below the average which suggests that they need to be worked upon for an enhanced relationship between these two key players. The factors were retainage practice, indemnification/liabilities, project cost estimate accuracy, construction work quality, previous claims and future work. Their deviations about \overline{RRI} of labour-only subcontractors were -0.47, -0.29, -0.25, -0.21, -0.09 and -0.04 respectively.

On both categories, eight of the fifteen factors have negative deviations about the \overline{RRI} . These were retainage practice (-0.37), indemnification/liabilities (-0.30), previous claims (-0.22), future work (-0.16), construction work quality (-0.16), project cost estimate accuracy (-0.11), adherence to construction schedule (-0.08) and personalities of key players (-0.01). This is also an indication that a dedicated attention is needed on these aspects in an attempt to further foster the relationship that exists between main contractors and labour-only subcontractors. Forming a good relationship between two parties does not involve just the making of the contract offer but also the selection of the parties involved through strong adherence to the highlighted enhancing factors. Figure 1 therefore illustrates the proposed model for an enhanced relationship between main contractors and labour-only subcontractors on construction projects in line with the identified factors. The model indicates that the combined action plan between the concerned two parties will trigger the main contractor's relationship priorities and the subcontractor's requirements in this regard. This may bring about the needed cordiality which might in turn influence subcontractor's performance with the major purpose of increasing the likelihood of achieving overall project success. X_1 to X_{15} and R_1 to R_{15} represent the identified enhancing factors for the combined parties and labour-only subcontractors respectively.

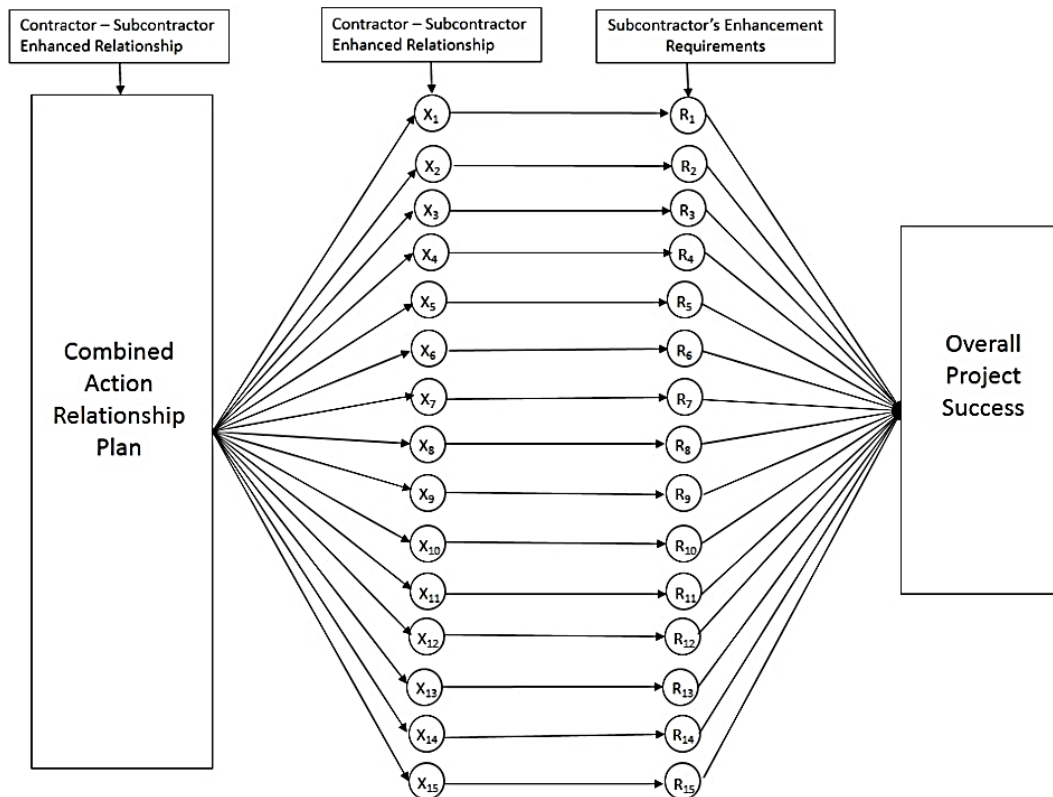


Figure 1. Contractor-Subcontractor Enhanced Relationship Model for Project Success

CONCLUSION AND RECOMMENDATION

This study has examined the working relationship between main contractors and labour-only subcontractors in Nigeria. This was done by identifying fifteen factors that may enhance the relationship between the two construction stakeholders, taking cognizance of the important role being played by subcontractors in the successful completion of construction projects. Main contractors and labour-only subcontractors were then asked to rate how the identified factors can enhance the relationship between them. The top five overall factors that can stimulate this relationship were contract type, scope of work, payment terms, cooperative attitude and third-party involvement. In order to further address the relational challenges between main contractors and labour-only subcontractors in the construction sector, the identified factors were suggested and a model of processes to be adopted was developed.

Further study regarding all aspects of the relationship between main contractors and labour-only subcontractors in other parts of the world is suggested. Similar study between main contractors and other types of subcontractors on construction projects is also recommended.

REFERENCES

- Abdullahi, A. H. (2014). "Review of subcontracting practice in the construction industry." *J. Env. Sciences & Resources Mgt.*, 6(1), 23-33.
- Arditi, D., and Chotibhongs, R (2005). "Issues in subcontracting practice." *J. Constr. Eng. & Mgt*, ASCE, 131(8), 866-876.

- Afon, A. O. (2009). "Residents and the development control agency: A perceptual study of two local planning authorities." *J. Env. Design & Mgt.*, 2(1), 44-54.
- Beardsworth, A. D., Keil, E.T. Bresnen, M., and Bryma, A. (1988). "Management, transience and subcontracting the cases of the construction site." *J. of Mgt. Studies*, 25(6), 603-263.
- Bennett, J., and Ferry, D. (1990). "Specialists contractors: a review of issues raised by their new role in building." *Constr. Mgt. and Econs.*, 8, 259-263.
- Chung, A. S. Y., and Ng, S. T. (2006). "The practice of subcontractor appraisal in the construction industry of Hong Kong." *CIB W107 Construction in Developing Countries*, Santiago, Chile.
- Costantino, N., Pietroforte, R., and Hamill, P. (2001). "Subcontracting in commercial and residential construction: an empirical investigation." *Constr. Mgt. & Econs.*, 19, 439-447.
- Dainty, A. R., Briscoe, G. H., and Millet, S. J. (2001). "Subcontractor perspectives on supply chain alliances." *Constr. Mgt. & Econs.*, 19, 841-848.
- Debrah, Y. A., and Ofori, G. (1997). "Flexibility, labour subcontracting and HRM in the construction industry in Singapore: Can the system be refined?" *J. Human Resources Mgt.*, 8, 690-709.
- Enshassi, A. (2010). "The contractor-subcontractor relationship: The general contractor's view" *Schl. of Eng., IUG., Palestine*.
- Fagbenle, O. I. (2006). "An appraisal of the performance of labour-only subcontractors in construction industry in southwestern Nigeria." *Unpublished Ph.D. Thesis, Dept. of Building, Obafemi Awolowo University, Ile-Ife, Nigeria*.
- Fagbenle, O. I. (2011). "A comparative study of the time and cost performance of labour-only subcontractors in the construction industry in southwestern Nigeria." *J. Bldg. Performance*, 2(1), 94-105.
- Fagbenle, O. I., Adeosun, J. O., and Amusan, L. M. (2014). "A system for raising productivity of construction craftsmen in southwestern Nigeria." *Constr. Research J.*, 3(1), 22-38.
- Gray, C., and Flanagan, R. (1989). "The changing role of specialist and trade subcontractor." *Chartered Inst. of Bldg. J., ASCOT*, 89-104.
- Little, M. (2011). "Guidelines on establishing your relationship with a subcontractor", Seminar Paper. www.wikipedia.com. Extracted on: 31/07/2017.
- Loh, W. H., and Ofori, G. (2000). "Effect of registration on performance of construction subcontractors in Singapore." *Engineering, Construction Architectural Mgt.*, 7(1), 29-42.
- Manu, P., Ankrah, N., Proverbs, D., and Suresh, S. (2013). "Mitigating the health and safety influence of subcontracting in construction: The approach of main contractors." *Int'l J. of Project Management*, 31(7), 1017-1026.
- Mbachu, J. (2008). "Conceptual framework for the assessment of subcontractors' eligibility and performance in the construction industry," *Constr. Mgt & Econs.*, 26, 471-484.
- McCord, G. (2010). "The long interview." Thousand Oaks, CA: Sage Publishers, Inc.
- Meng, X. (2012). "The effect of relationship management on project performance." *Int'l J. Project Mgt.*, 30, 188-198.
- Mudzvokorwa, T. (2017). "Improving the main contractor-subcontractor relationship through partnering on construction projects." *Project Mgt. World J.* 4(2), 1-15.

- Ng, T. N. (1986). "Subcontracting problem in Singapore (the private sector)" Unpublished B.Sc. (Building) Dissertation, National University of Singapore, Singapore.
- Rajput, B. L., & Agarwal, A. L. (2015). "Study of pros and cons of subcontracting system adopted in executing Indian construction projects, *Int'l J. Modern Trends in Eng.*, 35, 2349-9745.
- Rhodes, C. (2015). "Construction industry: Statistics and policy" Briefing Paper Number 01432, 6 August, 2015.
- Serpell, A., and Wagner, R. (1997). "Application of quality function deployment (QFD) to the determination of the design characteristics of building apartments", In *Lean Construction: Alarcon, Balkema & Rotterdam* (Eds.)
- Ujene, A. O., Achuenu, E., and Abakadang, O. E. (2011). "The nature and effects of subcontracting on the performance of building projects in south-south zone of Nigeria", *J. Architecture, Planning & Constr. Mgt*, 1(2), 13-21
- Widen, E., and Úlfarsson, A. K. (2014). "*Effects of partnering on construction projects: The cultural, collaborative and contractual aspects.*" Unpublished dissertation, Royal Institute of Technology in Stockholm.
- Yoke-Lian L, S., Hassim, R., Muniandy, M., and Law Teik-Hua, (2013). "Review of subcontracting practice in construction industry." *Int'l J. Eng. & Tech.*, 4(4), 442-445.