PROCEEDING 10

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

SCHOOL OF ELECTRICAL ENGINEERING AND TECHNOLOGY &
CHOOL OF INFRASTRUCTURE, PROCESS ENGINEERING AND TECHNOLOG

3rd INTERNATIONAL ENGINEERING CONFERENCE IEC 2019

THEME THE ROLE OF ENGINEERING AND TECHNOLOGY IN SUSTAINABLE DEVELOPMENT

BOOK of PROCEEDINGS

DATE:
24TH - 26TH
SEPTEMBER 2019

VENUE:
CHEMICAL ENGINEERING
LECTURE THEATER, FEDER
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FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

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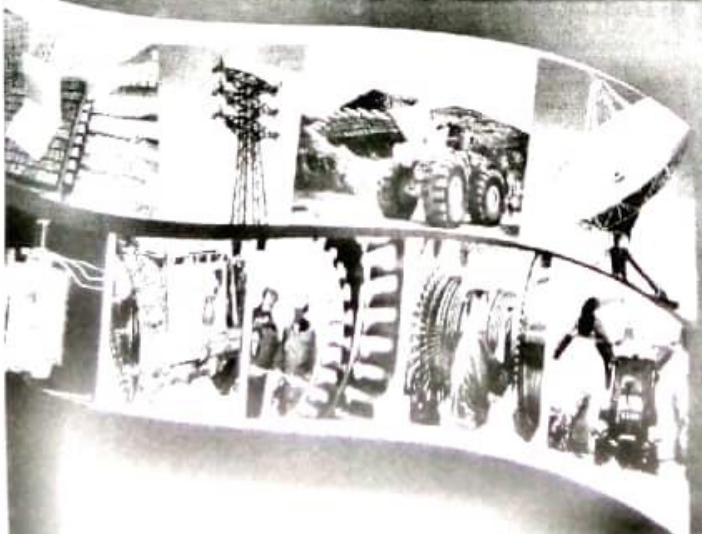

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SCHOOL OF ELECTRICAL ENGINEERING AND TECHNOLOGY (SEET) &
SCHOOL OF INFRASTRUCTURE, PROCESS ENGINEERING AND TECHNOLOGY (SIPET)

DATE: 24TH - 26TH SEPTEMBER, 2019

THEME: THE ROLE OF ENGINEERING AND TECHNOLOGY IN SUSTAINABLE DEVELOPMENT

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FORWARD

The School of Engineering and Engineering Technology, Federal University of Technology, Minna, organized the 1st and 2nd International Engineering Conference in 2015 and 2017 respectively. With the emergence of the new School of Electrical Engineering and Technology and the School of Infrastructure, Process Engineering and [illegible] two schools came together to organize this 3rd International Engineering Conference (IEC 2019) with the theme: "The Role of Engineering and Technology in Sustainable Development" considering the remarkable attendance and successes recorded at the previous conferences. The conference is aimed at offering opportunities for researchers, engineers, captains of industries, scientists, academics, security personnel and others who are interested in sustainable solutions to socio-economic challenges in developing countries, to participate and brainstorm on ideas and come out with a communiqué, that will give the way forward. In this regard, the following sub-themes were carefully selected to guide the authors' submissions to come up with this communiqué.

1. Engineering Entrepreneurship for Rapid Economic Growth.
2. Regulation, Standardization and Quality Assurance in Engineering Education and Practice for Sustainable Development.
3. Solutions to the Challenges in Emerging Renewable Energy Technologies for Sustainable Development.
4. Electrical Power System and Electronic as a Panacea for Rapid Sustainable Development
5. Promoting Green Engineering in Information and Communication Technology
6. Reducing Carbon Emission with Green and Sustainable Built Environment
7. Artificial Intelligence and Robotics as a Panacea for Rapid Sustainable Development in Biomedical Engineering
8. Petrochemicals, Petroleum Refining and Biochemical Technology for Sustainable Economic Development.
9. Advances and Emerging Applications in Embedded Computing.
10. Traditional and Additive Manufacturing for Sustainable Industrial Development
11. Emerging and Smart Materials for Sustainable Development.
12. Big Data Analytics and Opportunity for Development
13. Building Information Modeling (BIM) for Sustainable Development in Engineering Infrastructure and Highway Engineering.
14. Autonomous Systems for Agricultural and Bioresources Technology.

The conference editorial and Technical Board have members from the United Kingdom, Saudi Arabia, South Africa, Malaysia, Australia and Nigeria. The conference received submissions from 4 countries namely: Malaysia, South Africa, the Gambia and Nigeria. It is with great joy to mention that 123 papers were received in total, with 0.9 acceptable rate as a result of the high quality of articles received. Each of the paper was reviewed by two personalities who have in-depth knowledge of the subject discussed on the paper. At the end of the review process, the accepted papers were recommended for presentation and publication in the conference proceedings. The conference proceedings will be indexed in Scopus.

On behalf of the conference organizing committee, we would like to seize this opportunity to thank you all for participating in the conference. To our dedicated reviewers, we sincerely appreciate you for finding time to do a thorough review. Thank you all and we hope to see you in the 4th International Engineering Conference (IEC 2021).

Engr Dr. S. M. Dauda
Chairman, Conference Organizing Committee

ACKNOWLEGEMENT

The Chairman and members of the Conference Organizing Committee (COC) of the 3rd International Engineering Conference (IEC 2019) wish to express our gratitude to the Vice Chancellor and the management of the Federal University of Technology, Minna, the Deans and all staff of the School of Electrical Engineering and Technology (SEET) and the School of Infrastructure, Process Engineering and Technology (SIPET) for the support towards the successful hosting of this conference. We also thank the entire staff of the university who contributed in one way or the other. We are sincerely grateful to you all.

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Federal University of Technology, Minna, Nigeria

Assessment of Factors Affecting Stakeholder Management in Nigeria Construction Projects

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ABSTRACT
Managing multiple stakeholders and maintaining an acceptable balance between their interests are crucial to successful project delivery. Several factors impede the management of stakeholders for sustainable construction projects. This study assessed 86 factors affecting stakeholder management which was subsequently reduced to 2 major factors. The study employed the use of questionnaires. Data gotten was analysed using reliability analysis, Mean Item Score and correlation matrix. The study found out that management conflict and many motivation factors are significant factors to be considered and improved upon in future construction projects.

Keywords: *Construction, Factors, Management, Projects, Stakeholders*

1 INTRODUCTION

Construction projects are traditionally divided into series of operations undertaken by different individuals or groups who may have different levels of interest in the project (Ikerali et al., 2015). Therefore, the process of design and execution of construction projects constitutes a complex system which involves collaboration and negotiations among many stakeholders. Managing multiple stakeholders and maintaining an acceptable balance between their interests are crucial to successful project delivery (Takim, 2009; Jurbe, 2014).

Disagreement among stakeholders during the implementation of projects adversely affects the ability of the management teams to deliver the construction project within the time and allocated budget and expected degree of quality. These disagreements are often caused by inappropriate identification and management of the different stakeholders involved (Olander and Landin, 2005).

Conflicting objectives among the project stakeholders impede the achievement of best value in construction projects (Aapaoja and Haapasalo 2014). Karlsen (2002) considered poor management of stakeholders to be a recipe for potential and serious challenges that are often associated with construction projects. These problems include factors such as incessant change order in scope of work, poor definition of work and scope, poor allocation of scarce resources to projects, poor communication, conflicts and controversies which are majorly the origin of delays and attendant time and cost overruns.

Despite several contributions on management of stakeholders in the construction industry, several studies point towards critical success factors hence bypassing the root problems that contribute to poor stakeholder management (Bergeon et al., 2006; Chinyio and Akintoye, 2008; Olander and Landin, 2008; Yang et al., 2009; Jepsen and Eskerod, 2009; Li et al., 2012). Contributing factors also appear limited in literature (Karlsen, 2002), thereby considering more in-depth studies in the areas as stipulated by Takim and Akintoye (2002).

Therefore, a need arises to assess the factors that affect stakeholder management in construction projects in Nigeria.

2 METHODOLOGY

A Quantitative research approach was adopted for this study. The scope of the study was limited to North Central Nigeria and higher institutional construction projects were the focal point of the study. Internal stakeholders within the eight (8) sampled institutions in the study area were selected using stratified and purposive sampling techniques. 210 questionnaires were self-administered to the respondents while 170 were returned giving an 81% response rate which was very suitable for the study.

Data gotten for the study was analysed using Mean Item Score, reliability analysis and correlation matrix. The results were discussed and conclusions were drawn for the study.

3 RESULTS AND DISCUSSION

A reliability analysis was done to check the internal consistency and reliability of the data. The Cronbach Alpha coefficient of 0.70 (DeVellis, 2003) was used as the indicator. Table 1 shows that the alpha value of 0.846 is greater than 0.70 which suggests a high level of internal consistency reliability for the scale.

TABLE 1: RELIABILITY STATISTICS

Cronbach's Alpha	Cronbach's Alpha Based	N of Items
0.836	0.842	86

TABLE 2 FACTORS AFFECTING STAKEHOLDER MANAGEMENT

Coding	Factors	Mean	Std. Dev	Rank
OGF	Management factors	3.77	0.67	1
COS	Conflict management factors	3.76	0.63	2
COF	Communication factors	3.72	0.61	3
MGF	Cost factors	3.65	0.61	4
STE	Relationship factors	3.65	0.67	5
CMF	Contractual factors	3.63	0.60	6
STR	Stakeholder requirements	3.61	0.61	7
REF	Organization factors	3.61	0.55	8
CTF	Stakeholder Engagement	3.58	0.69	9
MAR	Marginalization	3.24	0.85	10

Table 2 showed the factors affecting stakeholder's management on construction projects. Management related factors ranked first with a mean item score of 3.77, followed by conflict management factors with a mean of 3.76. Next in line was communication factors and cost factors with mean scores of 3.72 and 3.65 respectively. This is in agreement with the findings of Aaltonen and Kujala (2010) that conflicts have a resultant effect on stakeholder management which affects the overall success of a project. However marginalization factor ranked least with a mean of 3.24. This particular factor adds contribution to knowledge that agrees with Golder and Gawler (2005) that gender is an important factor to be considered in stakeholder management as this affects the performance of a project.

The results in Table 3, 4 and 5 give a detailed breakdown of the most significant factors that affect stakeholder management which calls for attention for future construction projects.

TABLE 3: MANAGEMENT RELATED FACTORS

Management Related Factors	Mean	Rank
Inadequate Planning, coordinating and programming	3.92	1
lack of wide and deep knowledge - understanding of the concepts of project and stakeholder management by stakeholders	3.86	2
Poor feedback mechanism	3.77	3
Poor strategies to manage stakeholder responsibility	3.71	4
Lack of technical capacity and support on the part of the stakeholders	3.69	5
stakeholder competencies	3.66	6
Decision making problems	3.66	7
Difficulty in identifying stakeholders	3.59	8
Lack of ability to understand the implications of the project	3.55	9
non - existence of formal systematic process of project stakeholder management	3.55	10
lack of knowledge about stakeholder groups and their expertise	3.54	11
inability to clearly identify the attitudes of stakeholders either positively or negatively towards the project	3.53	12

The results in Table 3 showed the management related factors that affect stakeholder management. Inadequate planning, coordinating and programming, lack of wide and deep knowledge - understanding of the concepts of project and stakeholder management by stakeholders, Poor feedback mechanism most affect stakeholder management in management related factors with a mean score of 3.92, 3.86 and 3.77

TABLE 4: CONFLICT RELATED FACTORS

Conflict Related factors	Mean	Rank
poor approaches in solving conflict and controversies among stakeholders	3.86	1
poor implementation and non adherence to conflict contract condition by project stakeholders	3.84	2
Consequences of mismanagement of stakeholders	3.67	3
different perceptions of the same issue	3.53	4
Analyzing conflicts and coalition among stakeholders	3.33	5

The conflict related factors in Table 4 showed that there are poor approaches in solving conflicts amongst stakeholders which ranked 1st with a mean score of 3.86, followed by poor implementation and non-adherence to conflict contract condition by project stakeholders, Consequences of mismanagement of stakeholders, different perceptions of the same issue, and Analyzing conflicts and coalition among stakeholders with mean scores of 3.86, 3.84, 3.67, 3.53 and 3.33 respectively. The findings agree with Olander and Landin (2005) and Jurbe (2014) that disagreements amongst stakeholders can have adverse effect on construction project as a whole.

TABLE 5: MARGINALIZED RELATED FACTORS

Marginalization Factors	Mean	Rank
Poor incentives and benefits	3.73	1
influence of the stakeholders	3.52	2
Type of stakeholder (indigenous, foreign, etc)	3.31	3
sensitivity of stakeholders	3.30	4
social and economic characteristics of the stakeholder	3.28	5
the position of the stakeholders in the project	3.21	6
discrimination of gender	3.12	7
status of stakeholders	3.05	8
potentials of men and women in the stakeholder group	3.05	9
gender inequalities	3.01	10
volume of allocation of task to men and women	3.01	11
Gender differences	2.91	12

As seen in Table 5, poor incentives and benefits, influence of the stakeholders, type of stakeholders, sensitivity of stakeholders ranked highest with mean scores of 3.73, 3.52, 3.31 and 3.30 in that order. However, volume of allocation of task to men and women, Gender differences ranked the least with mean scores of 3.01 and 2.91 respectively. These are new findings and are lacking in the findings of Yogita (2016), hence call for consideration for future projects.

TABLE 6: CORRELATION MATRIX OF FACTORS

Inter-Item Correlation Matrix										
Factors	MGF	CMF	COF	COS	REF	CTF	STR	OGF	STE	MAP
Mangement factors	1	0.6	0.4	0.1	0.7	0.2	0.3	0.2	0.2	0.2
Conflict management factors	0.6	1	0.6	0.3	0.2	0.1	0.3	0.3	0.3	0.2
Communication factors	0.4	0.6	1	0.5	0.4	0.4	0.3	0.3	0.3	0.1
Cost factors	0.3	0.3	0.5	1	0.6	0.3	0.3	0.3	0.4	0.2
Relationship factors	0.2	0.2	0.4	0.6	1	0.6	0.4	0.4	0.4	0.3
Contractual factors	0.2	0.3	0.4	0.3	0.6	1	0.7	0.4	0.3	0.3
Stakeholder requirements	0.3	0.3	0.3	0.3	0.4	0.7	1	0.4	0.3	0.3
Organisation factors	0.2	0.3	0.3	0.3	0.4	0.4	0.4	1	0.5	0.4
Stakeholder Engagement	0.2	0.3	0.3	0.4	0.4	0.3	0.3	0.5	1	0.4
Marginalization	0.2	0.2	0.1	0.2	0.3	0.3	0.3	0.4	0.4	1

Table 6 showed the correlation matrix of the variable factors. 12 major factors were analyzed. From the result it can be seen that the value of 1.0 is above 0.70 which was used as the indicator. This implies that there is a strong significant relation among the variables and that these factors studied affect stakeholder management.

4 CONCLUSION

The study concluded that management related factors, conflict, communication and cost factors have a significant effect on the stakeholder management of construction projects. However, a new contribution to knowledge is being made on additional factor such as marginalization factor which is lacking in other studies. These factors calls for serious considerations for future construction projects.

In order to improve the management of stakeholders on projects, the study recommended that a management support group should be put in place to manage stakeholders, adherence to conflicts contract conditions

and consideration of gender in stakeholder analysis. These will improve construction performance for future projects.

This study is part of a doctoral research and hence further research in the aspect of developing a model that will curb these factors assessed to enhance project success, is in view. The researcher acknowledges the efforts of the supervisory committee which contributed to the success of this paper.

REFERENCE

Aaltonen, K., and Kujala, J. (2010). A Project Lifecycle Perspective on Stakeholder Influence Strategies in Global Project. *Scandinavian Journal of Management*. 26 (4), 381 - 397.

Aapaoja, A., and Haapasalo, H. (2014). A Framework for Stakeholder Identification and Classification in Construction Projects. *Journal of Business and Management*. 2, 43 – 55.

Chinyio, E. and Akintoye, A. (2008). Practical Approaches for Engaging Stakeholders: Findings from the UK. *Construction Management and Economics*, 26 (6), 591-599.

Heravi, A., Coffey, V., and Trigunarsyah, B. (2015). Evaluating the Level of Stakeholder Involvement during the Project Planning Processes of Building Projects. *International Journal of Project Management. Elsevier* 20, 1 – 13.

Jepsen, A.L. and Eskerod, P. (2009). Stakeholder analysis in projects: Challenges in using current guidelines in the real world. *International Journal of Project management*, 27, 335-343.

Jurbe, J.M. (2014). Stakeholder Management in Construction Projects: A Life Cycle Based Framework. Published Phd Thesis. Heriot Watt University, Edinburgh.

Karlsen, J.T. (2002). Project Stakeholder Management, *Engineering Management Journal*, 14 (4), 19-24.

Olander, S. & Landin, A. (2005). Evaluation of Stakeholder Influence in the Implementation of Construction Projects. International Journal of Project Management. 23 (4), 321-328.

Olander, S. and Landin, A. (2008). A comparative studies of factors affecting the external stakeholder management process. *Construction Management and Economics*. 26(6), 553.

Takim, R. (2009). The Management of Stakeholders' Needs and Expectations in Needs and Expectations in the Development of Construction Project in Malaysia. *Modern Applied Science*. 3 (5), 167-175.

Yang, J., Shen, Q., and Ho, M. (2009). An Overview of Previous Studies in Stakeholder Management and its Implications for Construction Industry. *Journal of Facilities Management*. 7 (2), 159 – 175.