

Adoption of Microsoft Project in the Management of Building Construction for Industrial Sustainability in Oyo State

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Abstract

New construction projects are extremely challenging due to their uniqueness and growing complexity and it is very difficult to monitor their cost, time and construction quality. This situation prompts the researchers to access the adoption of Microsoft project in the management of building construction for industrial sustainability in Oyo State. Three research questions guided the study and one null hypothesis was formulated and tested at 0.05 level of significance. Descriptive survey research was adopted for the study. Four hundred and twelve registered building professionals were involved which include; 138 builders and 274 electrical engineers in Oyo state constituted the study population. The sample for this study consisted of 74 builders and 152 electrical engineers selected through proportionate sampling technique. A structured questionnaire titled “Adoption of Microsoft Project Questionnaire (AMPQ)” was used to collect data. The questionnaire was face and content validated by three experts from Department of Technology Education, Emmanuel Alayande University of Education, Oyo. 0.91 reliability coefficient was obtained through Cronbach Alpha reliability co-efficient. Data was collected by the researchers and 100% return rate was achieved. Descriptive statistics of mean and standard deviation was used to answer the research questions while t-test was used to analysed the hypothesis. The decision rule was that any item with mean of 2.50 and above was considered high extent or agreed. Findings showed that electrical engineers and builders had little knowledge of

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the possibilities of the Microsoft project and perceived strategies in eliminating the obstacles to Microsoft project uptake were also noted. Therefore, it was recommended that, building construction professional bodies should create an awareness through seminars or workshops on the need for the adoption of Microsoft project in managing building construction among building professionals.

Keywords: Building project, Management, Microsoft project and Industrial sustainability

Background of the Study

Over many ages, buildings have changed from being cave dwellings to tall skyscrapers and more recently, they have developed into intelligent structures that can react intelligently to stimuli in their surroundings (Azhar, 2010). The belief that building practice has changed significantly in response to the dynamic nature of human needs and growth was supported by Kiviniemi, Fischer and Bazjanac (2005). Thus, Grilo and Jardim-Goncalves (2010) argues that the processes of building design and construction typically entail a number of specialists working together over comparatively short periods of time to create a facility that will be used for a long time. Unfortunately, the majority of building designs fall short of consumer needs and functionality, which causes inefficiencies in the construction industry's performance.

Generally speaking, the construction industry does not seem to have recognized the benefits and improvements that the new technology was offering to businesses in other economic sectors. A significant construction process necessitates a daily intensive data and information exchange between project participants (Masqsood et al., 2004). Because of this, the construction sector is one of the most information-intensive ones. To meet the project's objectives for quality, cost and time, a wide range of specialized but interdependent organizations and individuals must work closely together (Ugwu, 2005). It has been demonstrated that software is an essential instrument for helping the construction sector manage the growing

complexity of its goods and services and increase construction productivity (Liston et al., 2000).

Project management can be defined as the implementation of knowledge, skills, tools and techniques to project activities in order to meet project requirement (Danijela & Davorin, 2013). Microsoft project is a project management software product, developed and sold by Microsoft. It is designed to assist a project manager in developing a schedule, assigning resources to tasks, tracking progress, managing the budget and analyzing workloads. Microsoft project was the company's third Microsoft Windows-based application. Within a few years after its launch, it became the dominant PC-based project management software (Schwalbe, 2016). It is part of the Microsoft Office family and users' friendly for building professionals such as builders and electrical engineers. Microsoft project can be adopted to achieved the following managerial activities such as monitoring of all gathered information about the job, duration and resources; visualization and presentation of the project plan in standard formats; efficient allocation of task and resources; exchange of information on the project within the project team and communication with resources and others carriers of responsibilities (Danijela & Davorin, 2013; Harris, 2010; Marnel, 2007).

A registered Builder is a person who has received an approved standard of professional training and practice in building and found competent after due examination and his/her name is entered into the register of the Council (Nigerian Institute of Builders, 2018). "The Council" refers to the Council of Registered Builders of Nigeria (CORBON). A registered electrical engineer is someone who develop, test, install and maintain electrical system and equipment. Such an individual may work in private companies and government organization in various industries and registered with Nigerian Society of Engineers.

The use of software in construction project management has been studied extensively over a year. Waleed et al. (2020) examined the use of project management software in the construction industry. The authors found that the use of the software improved project planning, scheduling, cost management and resource allocation.

Amusan et al (2018) agreed with the low level of technology penetration within the industry stating some challenges hindering the adoption of ICT as inadequate knowledge about the profit of ICT investment, high cost of employing professionals, lack of staff with appropriate skill and knowledge in ICT and cost of training professionals. Owolabi and Olufemi (2018) found out that technical know-how and the fear of virus attack contribute adversely to the effective application of ICT in the Nigerian construction industry. Another study conducted by Wang et al. (2017) the authors explored the use of Building Information Modelling (BIM) software in construction project management. The study found that the use of BIM software improved communication, reduced errors and improved the overall quality of the construction project. In contrary, Gambo (2017) argued that information and communication technology hasn't gain significant acceptance in the construction Industry. He stated that both individual and corporate access to and ownership of software is still at the lowest ebb. It is against this backdrop that this research was set to assess the adoption of Microsoft project in the management of building project for industrial sustainability in Oyo State.

Statement of the Problem

Traditional approaches to project management practices among building professionals has always been resulted to inefficiencies and an ever-increasing tide of unprofessionalism. Cries and complaints from clients as a result of mismanage materials and non-materials resources has also been attributed to the approaches adopted by the professionals in managing modern constructions. The uniqueness of new construction projects and their increasing complexity make them highly challenging and it is very difficult to control their cost, schedule and quality of construction. This situation becomes even more complicated in the case of construction projects due to various additional factors, including space constraints, safety regulations and coordination requirements. Meeting these challenges is not achieved without an adequate planning and control system. Meanwhile, Microsoft project aids in allocating and tracking resources reducing waste and ensuring that resources are available when needed but its

awareness is uncertain. Therefore, need to access the adoption of Microsoft project in the management of building construction for industrial sustainability in Oyo State

Objectives of the Study

The main objective of this study is to access the adoption of Microsoft project in the management of building construction for industrial sustainability in Oyo State. Specifically, this study, sought to determine;

- i. level of awareness of Microsoft project in managing building construction and electrification.
- ii. constraints in the adoption of Microsoft project in managing building project
- iii. strategies in eliminating the constraints in the adoption of Microsoft project in managing building construction.
- iv. difference in the mean rating of opinion of builders and electrical engineers on level of awareness of Microsoft project in managing building construction.

Research Questions

The following research questions guided the study

- i. To what extent is the level of awareness of Microsoft project in managing building construction and electrification?
- ii. What are the constraints in the adoption of Microsoft project in managing building construction?
- iii. What are the strategies in eliminating the constraints in the adoption of Microsoft project in managing building construction?

Hypothesis

The null hypothesis was formulated and tested at 0.05 level of significance

1. There is no significant difference in the mean rating of opinion of builders and electrical engineers on level of awareness of Microsoft project in managing building construction.

Methodology

Descriptive survey research design was adopted for this study. Four hundred and twelve registered building professional which include; 138 builders and 274 electrical engineers in Oyo state constituted the study population (source: Council of Registered Builders of Nigeria (CORBON) & Nigerian Society of Engineers (NSE)). The sample for this study consisted of 74 builders and 152 electrical engineers selected through proportionate sampling technique. A structured questionnaire designed based on existing literatures was used to collect data from the respondents. The questionnaire was titled “Adoption of Microsoft Project Questionnaire (AMPQ)” designed based on four-point Likert scale of High Extent/Strongly Agreed – 4; Moderate Extent/Agreed – 3; Low Extent/Disagreed – 2; Slight Extent/Strongly Disagreed – 1. The question is made of two sections A and B. Section A solicited demographic data of respondents while section B was directed towards the research questions guided the study. The questionnaire was face and content validated by three experts from the Department of Technology Education, Emmanuel Alayande University of Education, Oyo. A pilot test was carried out on 45 builders and 78 electrical engineers in Ogun State and Cronbach Alpha reliability co-efficient was used to obtained 0.91 reliability coefficient which was high enough for the study. The distribution of the questionnaire by the researchers was facilitated by the adoption of google form. The link to the form was sent to the respondents’ emails and WhatsApp numbers (source: CORBON & NSE). 100% return rate was achieved. Descriptive statistics of mean and standard deviation was used to answer the research questions while t-test was used to analysed the hypothesis. The decision rule was that any item of 2.50 and above was considered

Results

Research Question 1

To what extent is the level of awareness of Microsoft project in managing building construction and electrification?

Table 1: Respondents mean score on extent of awareness of Microsoft project in managing building construction

S/N	Items	Mean	SD	Remark
1	Microsoft Project enables efficient coordination of varied resources, including labour, equipment and materials ensuring they are utilized optimally and avoiding over-allocation through resource-levelling	2.10	0.87	Low Extent
2	Microsoft Project offers advanced tools to establish and manage comprehensive project schedules, including creating Gantt charts, visually representing tasks, timelines and dependencies	2.47	0.90	Low Extent
3	Microsoft Project fosters seamless collaboration by providing platforms like SharePoint and email integrations, ensuring clear communication, information sharing and real-time updates among architects, contractors, engineers, clients and other stakeholders.	2.37	0.90	Low Extent
4	Microsoft Project has various reporting tools, offering visual reports and customizable dashboards that provide detailed insights and a real-time overview of project status.	2.12	0.94	Low Extent
5	Microsoft Project offers a high degree of customization and scalability, allowing project managers to tailor the software to meet the specific needs of each construction project.	2.25	0.93	Low Extent
6	Microsoft Project aids in developing detailed project budgets, tracking expenses, controlling costs and managing changes, ensuring financial discipline and project profitability.	2.30	0.89	Low Extent
7	Integrating with other Microsoft 365 applications and various construction	2.40	0.91	Low Extent

software enhances Microsoft Project's functionality, making data management and sharing more cohesive and efficient, which is vital for completing construction projects.			
Average mean	2.28	0.90	Low Extent

Information contained in Table 1 presented the mean rating and standard deviation with respect to research question 1. All the items on level of awareness of Microsoft project in managing building construction and electrification were rated to low extent. The 7 items had mean rating ranging from 2.10 and 2.47 which fell below the decision rule. Likewise, the cluster mean (2.28) also fell below the decision rule. The table also showed that the standard deviations range from 0.87 to 0.94 indicating that the respondents' opinions were not far from one another.

Research Question 2

What are the constraints in the adoption of Microsoft project in managing building construction?

Table 2: Respondents mean score on constraints in the adoption of Microsoft project in managing building construction

S/N	Items	Mean	SD	Remark
1	Non understanding about software potentials	3.48	0.86	Agreed
2	Communication gap between software vendors and users contribute to nonunderstanding of the full scope of the software	3.42	0.85	Agreed
3	Inadequate training or supports on the use of the software	3.38	0.87	Agreed
4	Virus attack on the computer or software led to loss of data	3.40	0.85	Agreed
5	The resource function of the software used for resource management is not up to expectation	3.07	0.89	Agreed

6	Complexity in nature for beginners to adopt for managerial purpose	3.23	0.91	Agreed
7	Difficulty in understanding the communication medium used in the software	3.38	0.94	Agreed
8	Cost of obtaining software is extremely high and unaffordable	3.07	0.94	Agreed
9	Epileptic power supply hinders the adoption of software amongst construction teams in Nigeria	2.98	0.90	Agreed
10	Ignorance of the existence of this software hinders the builders from adoption	3.64	0.91	Strongly Agreed
11	Constraints in getting software update for users' flexibility	3.20	0.86	Agreed
12	Crashing of the software leading to total loss of data	3.13	0.86	Agreed
	Average Mean	3.28	0.88	Agreed

Based on the data presented in Table 2 it was evident that all the twelve items were rated above 2.50 boundary limit. The 3.28 cluster mean was obtained from the items which proved that all the respondents reacted positively to the statement showing the constraints in the adoption of Microsoft project in managing building construction. The results also showed standard deviation ranged from 0.85 to 0.94 indicating that the respondents were not too far from one another in their responses, proving that the respondents' opinions were similar.

Research Question 3

What are the perceived strategies in eliminating the constraints in the adoption of Microsoft project in managing building construction?

Table 3: Respondents mean score on perceived strategies in eliminating the constraints in the adoption of Microsoft project in managing building construction

S/N	Items	Mean	SD	Remark
1	Original and updated software should be made available in market or online for users to install	3.43	0.83	Agreed
2	An alternative means to epileptic power supply such as solar inverter or generator should subsidized or users to purchase	3.53	0.80	Strongly Agreed
3	A central backup database be created and maintained	3.83	0.76	Strongly Agreed
4	Creation of technology support centre for handling all arising problems	3.45	0.80	Agreed
5	Subsidizing cost of obtaining software	3.01	0.87	Agreed
6	Vendors should provide a user-friendly manual or tutorial video for flexibility	3.60	0.79	Strongly Agreed
7	Seminars should be organised on the need for an antivirus and the cost should be subsidized for users need	3.63	0.81	Strongly Agreed
8	Seminars should be organised to enlightens users on the benefits of adopting the software	3.57	0.84	Strongly Agreed
	Average Mean	3.50	0.81	Strongly Agreed

The data presented in Table 3 revealed that the respondents agree with all the items as the perceived strategies in eliminating the constraints in the adoption of Microsoft project in managing building construction. Result indicated that all the 8 items were rated Strongly Agree (SA) since their means scores ranged from 3.01 to 3.63 which were between the boundary limit of 2.50-4.00 on 4-point modified rating scale. 3.50 cluster mean was obtained which means that the respondents agreed to the items statement. The table also showed that the standard deviations range from 0.76 to 0.87 indicating that the respondents' opinions were not far from one another.

Hypothesis 1

There is no significant difference in the mean rating of opinion of builders and electrical engineers on level of awareness of Microsoft project in managing building project.

Table 4: Summary of t-test of differences between the mean rating of builders and electrical engineers on level of awareness of Microsoft project in managing building construction

Group	N	Mean	SD	t	df	Sig.	Remarks
Builders	74	10.43	2.11	1.89	225	0.52	NS
Electrical engineers	152	10.37	2.32				

Data from Table 4 revealed a not significant difference between builders ($M = 10.43$; $SD = 2.11$) and electrical engineers ($M = 10.37$; $SD = 2.32$) ($t = 1.89$; $df = 225$; $p > 0.05$). The hypothesis was therefore not rejected in the light of the result. Hence, there is no significant difference in the mean rating of builders and electrical engineers on level of awareness of Microsoft project in managing building construction.

Discussion of Findings

Based on findings in research question 1 it was clear that the electrical engineers and registered builders only have a cursory understanding of the Microsoft project's potential. The implication is that most of their project being handling are not adequately planned in term of resource allocation and time and might have led to re-budgeting and extension in time of project delivery. This submission is similar to the findings of Amusan et al (2018) and Gambo (2017) who posited that information and communication technology hasn't gain significant acceptance in the construction Industry and that both individual and corporate access to and ownership of software such as Microsoft project is still at the lowest ebb. On hypothesis 1 the both the builders and electrical engineers are not in variance in their

opinion on the low extent of awareness of Microsoft project in managing building construction.

Findings from research question 2 showed that the respondents agreed with all the items on constraints in the adoption of Microsoft project in managing building project. Findings revealed the existing communication gap between software vendors and users which contribute to non-understanding of the full scope of the software and virus attack on the computer or software leading to loss of data. This finding is in-line with the position of Amusan et al (2018) who outline some constraints in the adoption of ICT related software to include; inadequate knowledge about the profit of technology investment, high cost of employing professionals, lack of staff with appropriate skill and knowledge in software and cost of training professionals. Owolabi and Olufemi (2018) added that technical know-how and the fear of virus attack contribute adversely to the effective application of ICT in the Nigerian construction industry.

Findings from research question 3 showed that the respondents agreed with all the items on perceived strategies in eliminating the constraints in the adoption of Microsoft project in managing building construction. Strategies identified were similar with the findings of Wang et al. (2017) who found that the use of software improved communication, reduced errors and improved the overall quality of the construction project. Furthermore, Waleed et. al. (2020) added that software improved project planning, scheduling, cost management and resource allocation.

Conclusion

The study concluded that using Microsoft project to manage construction projects gives electrical engineers and builders a competitive advantage over those who haven't. Professionals would also be better equipped to meet their clients' needs as a result of software adoption. In the meanwhile, a few obstacles have been found that could impede adoption, such as the expense of the necessary training to comprehend the software. Nonetheless, a few strategies for getting rid of these limitations were found.

Recommendations

Based on the findings and conclusion drawn from the study, the following recommendations are suggested

- i. Professional organizations for building construction should hold seminars or workshops to raise awareness among building professionals about the necessity of using Microsoft project to manage building projects. Government should subsidize the cost of purchase and training on Microsoft project for the professionals to allow swift adoption of Microsoft project.
- ii. To facilitate the easier adoption of Microsoft project, the government, professional associations for the building industry, and charitable organizations should support building professionals in putting the identified ideas into practice.

References

- Amusan, L. M., Oloniju, L. I., Akomolafe M., Makinde, A., Nkolika-Peter, P., Farayola, H., & Faith, O. (2018). Adopting Information and Communication Technology in Construction Industry. *International Journal of Mechanical Engineering and Technology*, 9(1), 739–746. Retrieved from <http://www.iaeme.com/IJMET/issues.asp?JType=IJMET&VType=9&IType=1>
- Azhar, S. (2010). Building Information Modelling (BIM): Trends, benefits, risks and challenges for the AEC industry. *Leadership and Management in Engineering*, 11(3), 241-252
- Danijela, K., & Davorin, V. (2013). Using Microsoft project management in Non-Governmental organisations. *Advances in Computer Science Research*, 1(1), 811-814
- Gambo, M. D. (2017). Impact of Information Communication Technology on Building Construction Project Delivery in Nigeria. *International Journal of Sciences, Engineering & Environmental Technology*, 2(2), 10-1.
- Grilo, A., & Jardim-Goncalves, R. (2010). Value proposition on interoperability of BIM and collaborative working environments, *Journal of Automation in Construction*, 19(5), 522- 530.
- Harris, P. E. (2010). *Planning and control using Microsoft office project and PMBOK*. Guide Fourth Edition, Eastwood, Australia

- Kiviniemi, A., Fischer, M., & Bazjanac, V. (2005). Integration of multiple product models: IFC models servers as a potential solution. Construction Informatics Digital Library.
- Liston, K. M., Fischer, M. A., & Kunz, J. C. (2000). Designing and evaluating visualization techniques for construction planning. Proceedings of the 8th international conferences on Computing in Civil and Building Engineering (ICCB-E-VIII) Stanford University, Stanford, CA, p. 12933000.
- Marnel, E. (2007). *Microsoft Project 2007 Bible*. Wiley Publishing, Indianapolis
- Masqsood, T., Walker D. H. T., & Finnegan, A. D. (2004). An Investigation of software diffusion in an Australian construction company using SSM. Proceedings of The Joint CIB-W107 and CIB0TG23 Symposium on Globalisation and Constitution, Bangkok, Thailand, p. 485-495.
- Nigerian Institute of Builders (2018). *Nigerian institute of building handbook*. NIOB Publishers: Lagos, Nigeria.
- Owolabi, O. S. B., & Olufemi, O. D. K. (2018). Effect of the Use of ICT in the Nigerian Construction Industry. *The International Journal of Engineering and Science*, 7(5), 71-76.
- Schwalbe, K. (2016). Appendix A: Brief Guide to Microsoft Project Professional 2016. In An Introduction to Project Management (p. 66). Minneapolis,, MN: Schwalbe Publishing.
- Ugwu O. O. (2005). A Service-Oriented Framework for Sustainability Appraisal and Knowledge Management. *International Journal of Software Construction*, 10 (1), 245-263.
- Waleed, M., Rizwan, M., Zahid, M., & Tariq, M. (2020). Project management software usage in construction industry: An overview of benefits and challenges. *Journal of Building Engineering*, 29, 101-150.
- Wang, X., Lu, W., Peng, Y., & Zhang, L. (2017). The application of building information modeling (BIM) in construction project management. *Journal of cleaner production*, 142, 579-590.