

Impact of Project Management Software on the Project Failure Rates in Nigerian Construction Industry.

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Abstract

The study examines Impact of Project Management (PM) Software on Project Failure Rates in Nigerian Construction Industry. The study adopted the survey research design in sourcing information for the study. A sample size of 190 was chosen while stratified random sampling technique was adopted in choosing the samples. Questionnaires were administered to 190 respondents while 180 questionnaires correctly filled and returned, were used for analysis. The data collected were presented in tables, while frequencies, percentages and Chi-Square(X²) test were used for data analysis. After the data analysis, the following findings were made: PM Software has significant impact in the reduction of project failure rates in the Nigerian Construction Industry. Level of competition and changing trends of technology enhance the use of PM Software. The use of PM Software contributes immensely to the project success in Nigerian Construction Industry. The study however, recommended as follows: The professional bodies should sensitize their members and organize a training workshop for them on the application of PM Software. Application of PM Software should be one of the conditions for award of contract.

Key words: project management, software, construction industry, failure rates, information technology.

1. Introduction

The construction industry is so hierarchical and fragmented in nature that some of the major participants do not consider themselves to be part of the same industry (Hindle, 2000). This requires close coordination among a large number of specialized but interdependent organizations and individuals to achieve the cost, time, and quality goals of a construction project(Toole,2003).According to Maqsood e tal(2004), a major construction process demands heavy exchange of data and information between project participants on a daily basis.

Professionals in the project management field have a strong interest in improving their performance by using available Information technologies (IT) for better planning and control. The number of Project Management (PM) software offerings has also increased in recent years with wide spectrum of features, functionalities and prices.

The investments by organizations on implementing project management software systems and training their employees to use them have also amplified (Grevins, Sanders and Suresh 2000). The main purpose of these systems is to facilitate project management

processes and to aid project managers in coping with project scheduling, monitoring, controlling, and information sharing.

The aim of the study is to evaluate the impact of project management software on the project failure rates in the Nigerian construction industry. To achieve the above aim of the study, the following objectives were stated:

- . To identify the factors that enhances the use of project management software.
- . To identify the impact of the use of PM software on the project failure rates in Nigerian construction industry.
- . To find out the impact of PM software on project success in Nigerian construction industry.

The paper starts with an outline of the meaning of Project Management Software, uses and benefits PM software, project failures, Nigerian construction industry, Factors that enhance the use of PM software, PM software on project success, followed by the research methodology, the analysis and discussion of the results and the conclusion drawn from them.

2. Nigerian Construction Industry

The construction Industry, which is vital to growth and development of any nation, is one of the oldest in the world, indeed as old as civilization itself. Construction activity forecasts the general direction of an economy and for this reason, the industry is often described as the leading economic sector.

In Nigeria, the construction industry was the dominant contributor to the nation's GDP in the 1980s, accounting for about 70% of the GDP (Planning Committee on the National Construction Policy, 1989). This made the industry very strategic to Nigeria's development efforts. Unfortunately, however, the industry has been bedeviled by a combination of low demand and consistent low productivity and poor performance over the years (Olomolaiye, 1987; Aniekwu, 1995; Okuwoga, 1998; Adeyemi et al; 2005). This has reduced its contribution to the national economy to a mere 1% of the GDP in 2002(AfDB/OECD, 2004).

The industry is made up of an organized formal sector and unorganized informal sector. The formal sector comprises foreign and indigenous companies, which are classified into small, medium and large scale according to their level of capitalization and annual turnover. The few large firms(mostly foreign), which constitute just about 5% of the total number of contractors in the formal sector, control about 95% of the construction market, giving the small firms just about 5% share of the market.

3. Project Management Software

Project management software is an essential tool for all businesses involved with large projects. It helps to set deadlines for certain tasks, schedules them and informs those involved with the project what they should be doing. It is more efficient than other systems or relying on memory and it therefore picks up on things that might have been missed. If you frequently have to manage various projects, the Project Management Software may be the perfect piece for you, because is especially designed to make life easier for people who are dealing with large projects. However, there is not just one type of software. PM software is actually a term for many different types of software. These may include resource allocation, scheduling and collaboration software. Each piece of software is designed to make dealing with large complex projects an easier and more efficient task.

Project driven organizations increasingly adopt PM software to help them deliver high quality products and services within a short time with fewer costs (Meredith and Mantel 2002). PM software tools are based on network analysis and scheduling techniques, a schematic display of the logical relationship of project activities (Mcgonigle 1992), that reflect project chronology (Project Management Institute 1996). The critical path method (CPM) determines the project completion time and the start and end dates for each activity. Project managers are expected to manage all activities on the critical path because a delay in any of them would delay the entire project (Meredith and Mantel 2002). PM software creates the project network and critical path automatically upon input of project activity sequences and duration. Any change of start date, end date, or duration of any activity on the critical path must be followed by recalculating and possible shifting of the critical path. This is tedious, especially in a complex project with hundreds of activities or more, but PM software carries these changes automatically and makes project manager's jobs much easier (Nelson, Coleman and Dolliver 2000). Some PM software tools provide PERT analysis to determine the probabilities associated with project durations. This feature is helpful in answering questions about the probability of a project being completed on a specific date.

Most PM software tools have capabilities to produce a Gantt chart, a graphic display of schedule related information that shows activity durations along with the percentage of task completion (Ward 1997)..

4. Use of Project Management Software in the Construction Industry

The construction industry is currently experiencing a paradigm shift from the traditional paper-based to digitally based information exchange, which other industries such as aircraft manufacturing and banking have adopted and benefited long ago (Rivard et al., 2004). This shift has been aided to a large extent by the drastic reduction in computer hardware and software prices and the increased power, usefulness and popularity of computers over the last few years (Rivard et al., 2004). As more and more computers are

connected through the Internet to form the worldwide web, thus allowing firms located on different streets or in different cities, provinces, countries, or even continents to readily exchange information, the reach and benefits of Information and Communication Technology (ICT) to industries and organization have indeed become global.

The use of Project Management Software can impact on the traditional processes of professional organizations in construction and result in change in organizational processes, working methods and culture (Ruikar et al, 2005). In this regard, some benefits of PM software is critical to the performance of professional consultants are to reduce the time for data processing and communicating information, and to improve communications for effective decision-making and coordination among construction participants (Peansupap and Walker, 2005) to enhance construction productivity (Liston et al., 2000). This is possible because the Internet-based tools of ICT allow communication between even remote users and enables them to share files, comment on changes and post requests for information (De Lapp et al., 2004)

5 Research Methodology

The study adopted a questionnaire survey method of contractors, architectural, building, engineering and quantity surveying consultants, and academic researchers in the South East, Nigeria. This comprises of 40 each of the consultants, 15 contractors and 15 academic researchers. The questionnaire used a five-point Likert-type scale to measure a range of opinions from “strongly disagree” to “strongly agree”, “undecided” to “very effective”, etc, as the case may be.

The total number of 180 questionnaires were properly completed and returned, representing a response rate of 94.7%, provided quantitative data. This response rate is considered very adequate as, according to Ellhag and Boussabaine (1999) and Idrus & Newman (2002), a response rate of 30% is good for construction studies. The data were analyzed using mean score ranking and simple percentage.

6 Research Hypothesis

The following research hypothesis were formulated for the study

Ho: The use of project management software has no significant impact on the reduction of project failure rates in Nigerian Construction Industry.

H1: The use of project management software has significant impact on the reduction of project failure rates in Nigerian Construction Industry.

7 The Questionnaire

The questionnaire comprised of two parts. Part One sought the background information of the contractors, consultants and the academic researchers, based on their ages, and areas of specialization as well as respondents’ qualifications and years of professional experience. Part Two asked the respondents to score the factors that enhance the use of PM software, Effective use of PM software in reducing project failure rates and impact of PM software on project success. The questionnaire for this study were hand-delivered to and retrieved from the respondent between August and December 2010. The questionnaires were mostly self-administered by respondents, although in some cases the interview method was used. This approach improved the response rate.

8 Analysis And Discussion of Results

The results of the survey were analyzed using mean score ranking and simple percentage and presented in this section with respect to, factors that enhance the use of PM Software, Effective use of PM software in reducing project failure rates and the impact of PM software on project success.

8.1 Use of Project Management Software in reducing project failure rates

Table 1: Response on Effectiveness of Project Management Software in reducing project failure rates

S/No	Response opinion	Frequency	Percentage of response
1	Highly Effective	116	64.4
2	Effective	54	30
3	Low Effective	7	3.9
4	Very Low Effective	3	1.7
5	Undecided	-	-
Total		180	100

Source: Field Survey 2016.

Table 1 above shows that 116 respondents representing 64.4% of the respondents agreed that PM Software is highly effective in reducing project failure rates. Fifty-four (54) respondents representing 30% of the respondents agreed that the PM Software is effective in reducing project failure rates also seven and three respondents representing 3.9% and 1.7% of the respondents respectively agreed that PM Software is low effective and very low effective in reducing project failure rates. The implication of the analysis above is that PM Software is very useful and effective in reducing project failure rates in the Nigerian Construction Industry. The above deduction is further confirmed by testing a hypothesis using the Chi- Square

Table 2: A 2x5 Contingency Table on whether PM Software has significant Impact in the reduction of Project Failure Rates in Nigeria Construction Industry.

Response Pattern	Observed Frequency	Expected Frequency
Highly Effective	116	36
Effective	54	36
Low Effective	7	36
Very Low Effective	3	36
Undecided	0	36

Source: Derived from Table 1

$$X^2 = \frac{\sum(O_{ij} - E_{ij})^2}{E_{ij}}$$

Where O_{ij} = Observed Frequency
 E_{ij} = Expected Frequency

$$..X^2 = \frac{(116-36)^2}{36} + \frac{(54-36)^2}{36} + \frac{(7-36)^2}{36} + \frac{(3-36)^2}{36} + \frac{(0-36)^2}{36} = 252.39.$$

Level of significance(a) adopted is 5% or 0.05 while the degree freedom(d.f) is calculated thus

$$d.f = (R-1)(K-1)$$

Where R= No of rows
 K= No of columns

$$\text{ie } (5-1)(2-1) = 4 \times 1 = 4$$

$$d.f = 2, a = 0.05$$

.. X^2 critical value at 0.05a and 4d.f = 9.49

Decision: Since X^2 calculated 252.39 is greater than X^2 critical value 9.49, we reject the null hypothesis and uphold the alternative.

Conclusion: We therefore conclude that PM Software has significant impact in the reduction of project failure rates in the Nigeria Construction Industry.

8.2 Factors that enhance the use of Project Management Software

Table 3: Responses on the factors that enhance the use of PM Software

S/No	Response Options	Response Rates							
		5	4	3	2	1	Mean	Rank	Remarks
1	Level of competition	116	60	5	2	-	4.58	1 st	Accept
2	Changing trends of technology	123	40	15	2	-	4.57	2nd	Accept
3	Client/customer demand	131	35	7	2	-	4.55	3rd	Accept
4	Construction Industry demand	86	80	7	5	2	4.35	4 th	Accept

Source: Researcher’s field survey 2016.

The mean in Table 3 above were computed by scoring the response rate for each of response option thus, strongly agree, agree, disagree, and undecided 5, 4,3,2,1 respectively. The score were used to multiply the response rates to obtain the mean using the formular $\frac{\sum fx}{\sum f}$

Where f = number of respondents
 X = response pattern.

The response option with the highest mean was used for the ranking. However, a cut off point for the mean was computed by adding weighted response , that is 5+4+3+2+1 = 15 and dividing by the number of response pattern, which is 5 in this case Hence, cut off point = 15/5= 3. This implies that any response option which has a mean of three and above is accepted as a factor that enhances the use of PM software. The table shows that all the factors scored and ranked are all accepted as enhancing the use of PM software.

8.3 Impact of PM Software on Project Success in Nigeria Construction Industry

Table 4: Impact of PM Software on Project Success

S/N	Factor	Strongly agree	Agree	Disagree	Strongly disagree	Undecided	Mean X	Rank	Remarks
1	Improves quality of work	107	52	15	6	-	4.44	6 th	Accept
2	Makes complex tasks easier to perform	122	47	5	4	2	4.56	4 th	Accept
3	Saves time	130	40	6	4	-	4.64	2 nd	Accept
4	Enhances public image	100	55	15	7	3	4.34	7 th	Accept
5	Improves document presentation	135	20	17	10	-	4.19	10 th	Accept
6	Facilitates decision making	141	20	9	8	2	4.61	3 rd	Accept
7	Enhance productivity	150	20	7	2	1	4.75	1 st	Accept
8	Gives users competitive advantage	95	80	5	-	-	4.50	5 th	Accept
9	Improves public image of users	90	73	10	3	-	4.32	9 th	Accept
10	Savings in operating cost	106	47	15	7	5	4.34	8 th	Accept

Source: Researcher’s field survey 2016

Table 4 above revealed that all the response options are acceptable as the benefits of using project management software in preventing project failure rates in Nigerian construction industry. However, the table shows that the software enhances productivity and also makes complex task easier to perform as they rank first and second.

9 Summary and Conclusion

The study assessed the Impact of Project Management Software on Project Failure Rates in Nigeria Construction Industry. It was discovered that the following enhance the use of PM Software in Nigerian Construction: Level of competition, Changing trends of technology, Client/Customer demand and Construction Industry Demand.

Also, the use of PM Software has significant impact in reduction of Project failure rates in the Nigeria Construction Industry.

The use of PM Software has the following impacts on project success: improves the quality of work, saves time, makes complex tasks easier to perform, facilitates decision making, savings in operating costs etc.

It is expected that these results will guide policymakers in Nigeria and other developing countries to identify where to concentrate their efforts to promote increased use of ICT, especially in the construction industry.

It is recommended that professional bodies in the Nigerian Construction Industry should sensitize their members and organize training workshops for them on the application of Project Management Software. Application of project management software should be one of the conditions for award of construction contracts in Nigeria.

References:

- Adeyemi et al (2005) Balancing globalization and the sustainable Development equation in the Nigerian construction industry. *Proceeding of the 3rd Postgraduate conference, Johannesburg, South Africa*
- AFDB / OECD (2004). *African economic outlook*.
- Aniekwu N. (1995). The business environment of the construction industry in Nigeria, *Construction Management and Economics 13*
- De Lapp J. A.; Ford D.N. Biyant J. A. and Horlen J. (2004) Impacts of CAD on design realization, *Engineering, construction and Architectural Management, 11(4)*,
- Elhag T. M. and Boussabaine A. H. (1999). Evaluation of Construction costs and time attributes. *Proceedings of the 15th ARCON conference. Vol. 2, Liverpool John Moores University*,
- Grevins, Sanders and Suresh (2000). The Role of Project Management Software in Project Management Process and Project Success. *Paper presented at the PMI Research Conference 2000. Paris, France*.
- Hindle, B. (2000) Construction Industry Development through Intervention: A right and a wrong way? *Proceedings of the 2nd International Conference on Construction in Developing Countries: Challenges Facing the construction Industry Developing Countries. Gaborone Botswana 15-17 Nov. [http://buildnet.csir.co Z9/cdcpio/doc/2d proceedings:htinkuj](http://buildnet.csir.co.Z9/cdcpio/doc/2d%20proceedings:htinkuj)*.
- Idrius A.B. and Newman J.B. (2002) Construction related factors influencing choice of concrete floor systems. *Construction Management and Economics, 10*, <http://www.itcom.org/2005>.
- Liston K.M. Fischer M.A. and Kunz J. C. (2000) Designing and evaluating visualization

- techniques for construction planning. *Proceedings of the 8th International Conference on computing in civil and Building Engineer (JCCBE-Viii), Stanford University, Stanford. C.A.*
- Maqsood et al (2004) An Investigation of ICT Diffusion in an Australian Construction Contractor Company using SSII; *Proc of the Joint CIB-W107 and CIB-TG23. Symposium an Globalization and construction; Bang Kok. Thailand*
- Mcgonigle J. I. (1992) An Evaluation of Project Schedule on United States Army Installations Unpublished Thesis for Master of Science University of Louisville, Louisville.
- Nelson, Cole man & Dolliver (2000) *Effectiveness executions guide to project 2000. The eight steps for using Microsoft project 2000 to organize, manage and finish critically important projects.* Redmond W.A. Redmond Technology Press.
- Okuwoga A. A. (1998). Cost-time performance of public sector housing project in Nigeria. *Habitat International.*
- Olomolaiye P.O. (1987) Problems influencing craftsmen productivity in Nigeria, *Building and Environment, 22,*
- Peansu pap V. and Walker D. (2005). Factors affecting ICT diffusion: a case study.
- Project Management Institute (1998). Project Management software survey. *PM Network,*
- Rivard K. et al (2004) case studies on the use of information technology in the Canadian Construction.
- Ruikar; Anumba C. J. and Carrillo P. M. (2005) End-user perspectives on use of project extranets in construction organizations. *Engineering, Construction and Architectural Management.*
- Toole, T. M. (2003) Information Technology Innovation: A view of large contracts, *proc of the ASCE construction Research congress, Honolulu, Hawaii, March 19-21*
<http://www.facstaff.bucknell.edu/ttools/itinovations.doc>.
- Ward J. L. (1997) Project Management terms: a working glossary, Arhington V.A. *EST International.*