FACTORS AFFECTING SUCCESSFUL IMPLEMENTATION OF INFORMATION TECHNOLOGY PROJECTS: EXPERTS' PERCEPTION

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Abstract

The alarming rate of Information Technology (IT) project, and business failure, even globally, remains a major concern to stakeholders, especially clients, in developing countries like Nigeria where infrastructure per capita is known to be low. In order to survive, firms depend on the implementation of new IT ideas with their capital intensive nature, and a major objective of reducing time-to-market for the private sector, and increased social benefit for the public sector. Using data from experts in the industry in Nigeria, this paper presents an ordinal profile of factors contributing to successful project implementation and the extent of the contribution based on variance analysis, and regression models. It was discovered at the end of the study that six factors namely clear requirements and specification, clear objective and goal, realistic schedule, effective project management methods/skills, support from top management and user/client involvement have collective effect on implementation of IT-Projects in Nigeria. It was further deduced that the most critical factor is realistic schedule while the least is clear objective and goals. The predictive model developed accounted for 62.9% effect of these factors on Implementation of IT-Projects in Nigeria.

Keywords: Critical Success Factor (CSF), User Involvement, Rapid Application Development (RAD), IT-Projects, Consistency Analysis

1. Introduction

Although a global trend, the increasing deployment of Information Technology (IT) in a developing country like Nigeria will remain a source of concern for all stakeholders and especially clients who fund these investments. The concern arises particularly from the alarming rate IT project and business failure even globally. The above situation can however be accounted in part by the shortening of product life cycles, and the Internet revolution (Shenhar and Dvir, 2007), and firms' success having to depend on the implementation of new ideas (Jost and Lammers, 2008). In support of the above trend, clients are now compelled to use projectization (Zack, 2004) as a recurrent business model. IT projects are often capital intensive, and while time-to-market is of the essence especially in the private sector, social benefits are a major goal in the public sector. This paper therefore seeks to identify the major factors, and the order in which such factors account for successful implementation of IT projects using the Nigerian case.

Three separate surveys of software projects cost overruns done by Jenkins, Phan and Bergeron in 1984, 1988 and 1992 respectively as cited by Jorgensen et al(2006) found out that the average cost overrun for all of the projects in their survey samples (not just unsuccessful projects) were 33-34 percent (Jorgensen et al, 2006).

The researchers' major motivation for the paper is to stimulate and sustain discuss in this new field of discipline- IT-Project Management Technology. Brynjolfsson and Hitt (2000) as cited by Wami, (2012) are of the opinion that successful implementation of ICT has the capacity to cut cost of coordination, communication and information processing; and many businesses have taken advantages of this. With the emergence of ICT and e-government, it is possible to improve efficiency and effectiveness of internal administration within government and to relocate government service from cities to locations closer to her citizens.

Objective of the Study

The broad objective is to evaluate the factors affecting successful implementation of IT-Projects in Nigeria. The specific objectives are:

i. Identification of common factors affecting successful implementation of IT-Projects in Nigeria.
ii. Assessing collective effects of these factors on IT-Project implementation
iii. Assessing the individual effect of each of these factors on IT-Projects
iv. Ranking these factors according to the weight of their effects on IT-Projects

Research Questions

Based on the statement of problem and objective of study, the researcher posed the following questions

i. What are the factors affecting successful implementation of IT-Projects in Nigeria?
ii. To what extent do all the factors collectively affect successful implementation of IT-Projects in Nigeria?
iii. To what extent does each of the CSFs influence successful implementation of IT-Projects in Nigeria?
iv. How can these factors be ranked in relation to their influence on the successful implementation of IT-projects in Nigeria?

These questions will be answered based on the findings from facts and figures collected in the course of this study.

Statement of Hypothesis

Ho_1: There is no significant effect of the collective CSFs on successful implementation of IT-Projects in Nigeria

Ho_2: There is no significant effect of each CSF on successful implementation of IT-Projects in Nigeria

Ho_3: There is no significant difference between the effects of various factors affecting successful implementation of IT-Projects in Nigeria.

2. Justification of the Study

Schwalbe (2007): said "Just as Information Technology Projects have poor track record of meeting projects goals, they also have poor record in meeting budget goals"

This paper is thus relevant as Nigeria experiences Information Technology boom. Another significance of this work is that even in Project management, most emphasis is on construction projects with little work in the area of Information Technology Projects. It is apt to note that some factors or combination of factors that may guarantee successful implementation of construction projects may not translate to guarantee success in IT-Projects.

In a nutshell, the research will help draw attention of IT-Professionals to the need to imbibe project management principles for successful implementation of IT-Projects. It will also help challenge curriculum and academic planning units of every university in Nigeria to appreciate the need to ensure that project management courses are incorporated in the training of IT-Professionals and by implication, all professionals. The research will also bring to the fore, the need for professionals to collaborate throughout the life cycle of any project. It will also be of interest to employers of IT-Professionals in the sense that additional emphasis will be placed on the non-technical capabilities of their IT-professionals. In order words, beyond an IT expert building, designing and implementing an IT-Project, how holistically

successful is the project? Finally, Project management professionals will also appreciate the need to see their profession from the broader view of adapting their expertise to every field of endeavour since all projects are dynamically affected by varying factors depending on the type of projects.

In addition, both the IT sector of the Nigerian economy as well as project management practitioners will benefit from this work as it will contribute to body of knowledge. It is important for IT practitioners to understand the dynamics of factors affecting the successful implementation of IT-Projects.

Considering the rate of deployment and expansion of IT-Projects in Nigeria, it is critical to understand the dynamics of IT-Projects and guaranteeing a proper grasp of special features of IT-Projects is critical to the successful implementation of IT-Projects. Both the Federal, State and local Government will benefit from the findings of this work since it will serve as a feedback on some of the reasons why their various projects are either successful or on the verge of failing or already failed.

Also, Professional bodies (e.g. NCS, IEEE, NIIE, etc) will benefit as an eye opener to the need of incorporating the gaining of relevant knowledge in IT-Project management as criteria for inducting or accepting membership in the profession.

3. Research Methodology

The population of the study comprises of all persons who have the capacity, experience and responsibilities to undertake IT projects. A sample size of 120 was randomly chosen (selected), which was divided among IT experts' in both private and public sector of the IT industry in south eastern states. The research is a descriptive study survey which involved the use of structured questionnaires, which was personally delivered randomly to the respondents. There was instrument mortality of twenty (20) of the questionnaires out of the 120 distributed and bringing the total of the respondents and copies used to 90. Stratified sampling technique was used in capturing respondents since only experts involved in IT Projects were targeted. The factors were selected after careful review of several articles and adapting the work of Akinyoku (2012). Analytical tool used for the analysis was linear regression analysis comprising F-test, ANOVA, t-test and pearson correlation. In other to ensure error free computation, a statistical software package SPSS was employed. The sample size is considered okay considering the fact that most IT-experts are located in the capital cities of most south eastern states of Nigeria. The justification of this methodology is based on the fact that several papers abound where the factors considered in this research have been established (See: Nasir and Sahibuddin, 2011 and Akiyoku , 2012).

4. Results and Discussion

4.1 Results Presentation and Ranking of Factors

Table i shows that the R^2 is 0.629. This means that 62.9% of the critical success factors account for success of IT Projects in Nigeria. The relationship model is very reliable since F Change is 0.000 as shown in the table i below. The unaccounted factors not covered in this project are 37.1%. Further research into identifying such factors can improve the value of R^2. This however, does not affect the integrity of our findings. This 62.9% is an improvement on Johansson and Gustafsson (2009) with response rate of their survey analysis of 21%.

Table i: Model Summary

Model	R	R^2	Adjusted R^2	Standard Error of the Estimate	Change Statistics	
					F Change	Sig. F Change
	0.793	0.629	0.702	1.41904	23.431	0.000

Source: Researcher's computation (SPSS version 17)

The model is thus shown in equation 1

$$Y= 0.176X_1+0.016X_2+0.297X_3+0.278X_4+0.230X_5+0.228X_6+1.41904\text{------}1$$

F-Test (ANOVA)

The analysis of variance (ANOVA) table ii is shown below.

Table ii: ANOVA

Model		Sum of Squares	Degree of freedom	Mean Square	F	Significant.
1	Regression	283.088	6	47.181	23.431	.000
	Residual	167.134	83	2.014		
	Total	**450.222**	**89**			

Source: researcher's computation (SPSS version17)

Table ii presents the ANOVA report on the general significance of the relationship model. As F -significant of 0.000 is less than 0.05 level of significant, the model is significant. Thus, the combination of the independent variables X_1, X_2, X_3 X_4, X_5 and X_6 significantly predicts the dependent variable Y.

Ranking of the Factors

The ranking of the factors is based on the standardized beta coefficients, which shows the actual level of impact or contribution of independent variables to any change in the dependent variable. The ranking is as follows:

$1^{st} = X_3$: Realistic Schedules
$2^{nd} = X_4$: Effective Project Management Skills/Methods
$3^{rd} = X_5$: Support from top management
$4^{th} = X_6$: User/Client Involvement
$5^{th} = X_1$: Clear requirements and Specifications
$6^{th} = X_2$: Clear objectives and goals

In summary, realistic schedule is considered very critical to successful implementation of IT-Projects in Nigeria. Closely, following is the need for effective use of project management skill/methodology and support from top management. User/client involvement was considered next while the two trailing behind were clear requirement and specification and clear objectives and goals.

Table iii: Comparing Frequency Ranking and Beta Ranking of the factors

Factors	Frequency Ranking	Beta Ranking	Consistency test	Comment
X1	1	5	No	Difference is high
X2	6	6	Yes	No Difference in judgment
X3	5	1	No	Difference is high
X4	3	2	Yes	Difference is low
X5	2	3	Yes	Difference is low
X6	4	4	Yes	No Difference in judgment

Source: Researcher's computation 2013(SPSS Version 17)

From the above table iii, it can be deduced that percentage of consistency = 4/6 * 100 = 67%. This is high enough to show that the respondents demonstrated good knowledge of the subject matter and thus their entries are validated. However, we observed that there seems to be a misunderstanding of what constitute realistic schedule and clear requirement and specification.

User/Client involvement as the fourth ranked factor showed consistency in the opinion of IT-Experts. The implication here is that the respondents were unequivocal in their position as to the effect of user/client involvement in successful implementation of IT-Projects in Nigeria. Same consistency applies to Clear objectives and goals which was considered the least factor in order of ranking.

The above agrees with Nasir and Sahibuddin (2011) who listed both 'Clear requirement and specification' and 'realistic schedule' among the top critical success factors. Also, our conclusion of 'clear objective and goals' as the least critical agrees with Ugwu et al (2003a) as cited by Ugwu and Kumaraswamy(2007) when they listed clear objective and goals as the 6^{th} among 9 factors. It also agree with Nasir and Sahibuddin (2011) who listed Reaslitic schedule among the top 3 out of 26 factors identified as affecting Successful Implementation of IT-Projects.

4.2 Test of Hypothesis

Ho_1: There is no significant effect of the collective CSFs on successful implementation of IT-Projects in Nigeria

$Ha_{1:}$ There is significant effect of the collective CSFs on successful implementation of IT-Projects in Nigeria

Decision

Since the F-test and ANOVA show Significant F change of 0.000, we reject Ho_1 and accept Ha_1 which states that there is significant effect of the collective CSFs on successful implementation of IT-Projects in Nigeria. Also the F-test give a value $F_{cal} = 23.431$ which is greater than $F_{tab} = 2.17$ at 0.05 confidence interval

Test of second hypothesis

Ho_2: There is no significant effect of each CSF on successful implementation of IT-Projects in Nigeria

Ha_2: There is significant effect of each CSF on successful implementation of IT-Projects in Nigeria

Decision

From the t-test, we conclude all other individual factors have significant effects on successful implementation of IT-Projects in Nigeria except X_2(clear objectives and goals) that showed a t-sign figure of 0.86 which is greater than 0.05. Thus for X_2, we accept null hypothesis which states that there is no effect of clear objectives and goals on successful implementation of IT-Projects in Nigeria. However, for other factors, we reject null and accept alternative.

Test of hypothesis 3

Ho_3: There is no significant difference between the effects of various factors affecting successful implementation of IT-Projects in Nigeria.

Ha_3: There is significant difference between the effects of various factors affecting successful implementation of IT-Projects in Nigeria.

Decision

From the coefficients and pearson correlation, it was discovered that none of the factors have the same effect on the dependent variable. We thus, reject null and accept alternative hypothesis which states that there is a significant difference between the effects of various factors affecting successful implementation of IT-Projects in Nigeria.

4.3 Results Discussion

The research explored the critical success factors affecting the implementation of Information Technology Projects in Nigeria. The results arrived at show that the following factors affected the successful implementation of IT-Projects in Nigeria in order of ranking:

X3= Realistic Schedule

X4=effective use of project management skill/methodology

X5=support from top management

X6= user/client involvement

X1= clear requirements and specification

X2= clear objective and goals

The deduction here is consistent with Shelly and Resenblatt (2010) that identified three keys to project success namely that Information system(or IT) must satisfy business requirements, stay within its budget, be completed on time and be managed effectively.

5.0 Conclusion and Recommendation

5.1 Summary of Findings and Conclusions

In summary, the accepted hypotheses were:

$H_{a2\text{-}1}$: There is a significant effect of Clear requirements and specifications on successful implementation of IT-Projects

$H_{a2\text{-}3}$: There is a significant effect of Clear requirements and specifications on successful implementation of IT-Projects

$H_{a2\text{-}4}$: There is a significant effect of Effective Project Management Skills/Methods on successful implementation of IT-Projects

$H_{a2\text{-}5}$: There is a significant effect of Support from top management on successful implementation of IT-Projects

$H_{a2\text{-}6}$: There is a significant effect of User/Client Involvement on successful implementation of IT-Projects

$H_{o2\text{-}2}$: There is no significant effect of Clear Objectives and goals on successful implementation of IT-Projects

Interesting conclusion worthy of note is that of user/client involvement in the implementation of IT-Projects. This perhaps corroborate the position of Okonta et al(2013) who argued for the need to satisfy customer needs which they described as 'voice of the customer'. This 'voice of the customer' is the term used in describing the stated and unstated customer needs or requirements. The Standish group also listed the top three CSFs as executive support, user involvement and experience project manager (Standish, 2001). The failure of an IT-Project also can be caused by poor project management techniques (Shelly and Rosenblatt, 2010). This calls for realistic schedule and proper monitoring in order to recognize the early warning signs and handling them effectively.

5.2 Recommendations

Based on the top ranked factors discovered to have effect on success of IT-Project implementation, it is recommended that experts in Information and Communication Technology (ICT) Industry should embrace project management technology skills and methodologies. This will go a long way to enhancing the role of IT-experts and system analyst as project managers. It is only an IT-expert that have good project management training or capabilities that can develop a realistic schedule for any project and been able to win the support of top management.

Organisations should start engaging project management technology experts in their project management issues and not to assume that 'every graduate' can plan. Finally, realistic schedule is critical to meeting the

transformational agenda objective and adaption of project management techniques and skills even in the national policies will be very critical to Nigeria meeting both her millennium development goals and vision 20:2020.

References:

Akinyoku C.O., Angaye C.O. and Ubaru M.O. (2012): Factor analysis of the performance indices of information and communication technology projects in public sector of the Nigerian economy. Journal of Technology Research

Johansson J. And Gustafsson B. (2009) : Critical Success Factors affecting Decision Support System Success from an end-user perspective. Masters Degree Thesis, Department of Informatics Lund University. Available at www.lunduniversity.edu/lu.lub.lu.se/student-papers accessed on 01/08/2013 by 09:10am

Jorgensen, Magne and Kjetil Molokken (2006): 'how large are software cost overruns?' a review of the 2004 CHAOS report. Simula research laboratory. Inform. Software Tech., 48(4): 297-301. (www.simula.no/departments/ engineering/artifacts/standish-1st.pgf)

Jost P.J. and Lammers F. (2008): Organization of Project Evaluation and Implementation under Moral Hazard. http://papers.ssrn.com/sol3/ papers.cfm?abstract_id=1135577. Accessed on 20-08-13 by 21:45 pm.

Nasir M.H.N. and Sahibuddin S. (2011): addressing a critical success factor for software projects: a multi-round Delphi study of TSP. International journal of the physical sciences vol.6 (5), pp 1213-1232,4th march 2011. http://www.academicjournals.org/IJPS ISSN 1992-1950 downloaded from http://www.academicjournals.org/sre/fulltext/2011/18May/Nasir%20and%20 Sahibuddin.htm. Date of download 26/10/2012 and time 11.58am

Okonta et al (2013) Embedding Quality Function Development in software development: A novel approach. West African Journal of Industrial and Academic Research, Vol. 6 No1 (March 31, 2013) p.40

Schwalbe K. (2007): Information Technology Project management, fifth edition, Thomson Course Technology, printed in United States of America

Shelly G.B. and Rosenblatt H.J. (2010): Systems Analysis and Design, Eight edition. International Student Edition, Shelly Cashman series, Course Technology Cengage Learning USA.

Shenhar A.J. and Dvir D. (2007): Reinventing Project Management: The diamond approach to successful growth and innovation, Harvard Business School Press, Printed in United States of America.

Standish Group International (2010): Chaos Summary for 2010, Technical Report.

Ugwu O.O. and Kumaraswamy M. (2007): critical success factors for construction ICT projects-some empirical evidence and lessons for emerging economies. IT con vol 12 (2007) page 231-249. Electronic journal of

information technology in construction –IT con vol 12(http://www./itcon.org/2007).
Wami K. I. (2012): factors affecting the implementation of government ICT project (a case study of rivers state ICT department). Unpublished MSc. Thesis. Department of project management technology, federal university of technology owerri imo state Nigeria.
Zack (2004): Project Management in Crisis. Downloaded from: http://www.icoste.org/ICMJ%20Papers/Cape%20Town-Zack.pdf. Accessed on 21-08-13 by 21:18pm