Effect of Project Management Software on growth of the Organization and Information Technology Project

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Abstract

This study examined the effects of project management software on growth of the organization and information technology project. Non application of the project management software had lead to improper management of project constraints. To assess the situation this study administered 105 questionnaires to members of staff of information technology unit, Tripplea group incorporated in Lagos using purposive sampling technique and stratified sampling technique. The data collected was analysed using descriptive statistics and coefficient of multiple determination (R2). The findings revealed that 71.3% and 74.4% of the variance that occurred in the project success could be attributed to the

growth and use of information technology in the organization respectively. It was therefore recommended among others that project management software should be applied in the production, distributed and human development of organization operation.

Key words: *Software, project, Organizational growth, Information technology, Management.*

1.1 Introduction

The dynamic nature of projects, changing environment and increasing complexity of our world have long encouraged researchers to search for increasingly reliable solutions and more dependable support that can aid project managers in coping with these and other project challenges. The Work Breakdown Structure (WBS) technique was introduced to aid project planning and project cost management (Meredith & Mantel, 2006). The Critical Path Method (CPM) and the Program Evaluation and Review Technique (PERT) were developed to aid project scheduling and risk analysis. The Gantt chart was exploited to improve project control and monitoring. The Earned Value Method (EVM) has been used to integrate project scope management, cost management and time management, and to forecast project cost and schedule at completion (Anbari, 2003). All the aforementioned sophisticated scientific solutions have helped project managers cope with project management challenges.

However, these methods and techniques require quantitative skills that take a long time to develop, and need to be updated as the project and technology progress. These constraints reduce the application of these methods, given that projects are operated within constraints of time, cost, and performance specifications (Badiru, 1991).

Information technology (IT) has gotten involved in solving these challenges by introducing a key computer application, project management software, that attempts to maximize the advantages of project management methods and minimize the effort and time that are needed to use scientific solutions for project planning, scheduling, monitoring, and controlling(Meredith & Mantel, 2006). Popular examples of these are primavera, open plan, Artemis, and project workbench.

Organizational growth means different things to different organizations and researchers, Kaiser, & Ahlemann, (2010). believes the most meaningful yardstick in the measure of organization growth is one that shows progress with respect to an organization's stated goals. In addition to such qualitative

notions of organizational growth, there are many more tangible parameters a company can select to measure its growth. This could be number of employees, though, the quantity of employees in the company does not produce a good yardstick to say the organization is growing. It is the quantity of quality employee in an organization that determines the growth of that organization, as their contribution to growth of the organization is evidenced in their creative and innovative products (Business School, 2010). It could also be in term of revenue generated when comparing with previous period under observation or an improvement in value of infrastructural or physical asset of the organisation.

1.2 Statement of the Problem

Many researchers (Westhuizen & Fitzgerald, 2005; Procaccino & Verner, 2006 Buchhoiz, 2013; Kahura, 2013 etc.) recognized the positive relationship between Project Management Software (PMS) and project success in functional organization or non-project-driven businesses, and that project-driven organizations represent a distinct group that has its unique computing needs as well as a different technology acceptance pattern. This study identified the dearth in knowledge on how PMS affect the growth of organisation and information technology, and thus extends previous research by investigating the factors affecting project management software acceptance among users in project driven organizations in south west Nigeria.

1.3 Objectives of the Study

The primary purpose of this research is to determine the role of project management software in achieving project success in the information and telecommunication industry and to find out the relationship between the usage of project management software and perceived project managers performance. Specifically the purpose of this research is to:

i. Examine the effect of project management software on growth of the organisation

ii. Determine the effect of project software on information technology project.

1.4 Theoretical framework

In prior literature, it has been generally seen that there is no explicit theory of project management, project management software, and project success (Koskela & Howell, 2002). Koskela & Howell, (2002) argued that it is possible to precisely point out the underlying theoretical foundation of project

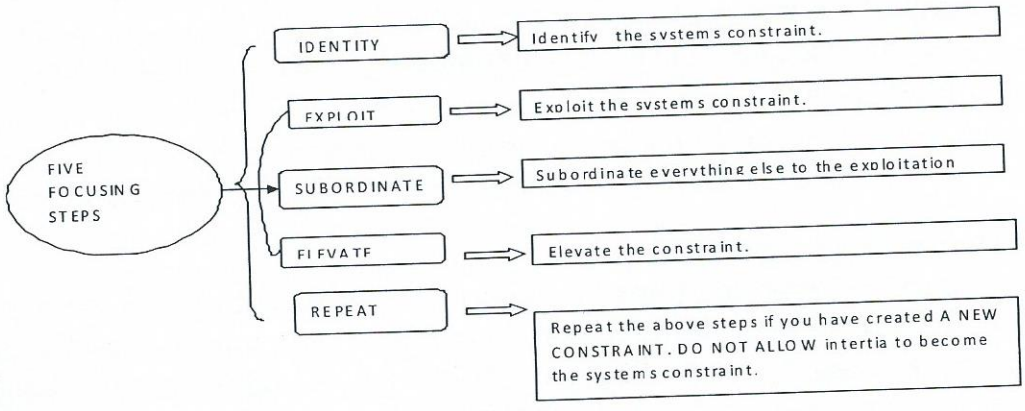
management software espoused in the PMBOK by PMI and mostly applied in practice. This foundation can be divided into a theory of project software and a theory of management.

The theory of project software is provided by the transformation view on operations. In the transformation view, a project is conceptualized as a transformation of inputs (programs and data feed into the system) to outputs (plans on which decision could be taken).

There are a number of principles, on which the designed software to manage a project is based. These principles suggest, for example, decomposing the total transformation hierarchically into smaller transformations, tasks, and minimizing the cost of each task independently.

Koskela & Howell, (2002) contend that management in project is based on three theories: management-as-planning, the dispatching model and the thermostat model. In management-as-planning, management at the operations level is seen to consist of the creation, revision and implementation of plans. This approach to management views a strong causal connection between the actions of management and outcomes of the organization. The dispatching model assumes that planned tasks can be executed by a notification of the start of the task to the executor. The thermostat model is the cybernetic model of management control that consists of the following elements: there is a standard of performance; performance is measured at the output; the possible variance between the standard and the measured value is used for correcting the process so that the standard can be reached.

Theory of Constraints (TOC) is another well known theory for its so called "Five Focusing Steps", and often that process is referred to when trying to identify and deal with bottlenecks in Kanban for Software as shown in figure 1 below.



The Theory of Constraints (TOC) is a management method developed primarily by Dr. Eliyahu M. Goldratt during the last 30 years, and first exposed as a business novel, "The Goal," in Goldratt, 1992; cited by The Chronologist (2012). More recently TOC has been described extensively in the "Theory of Constraints Handbook" by Cox and Schleier (Cox, 2010; cited by The Chronologist (2012).

TOC originated from manufacturing, but has since been applied to engineering, project management, sales, accounting, marketing and other business processes. TOC is based on Systems Thinking, the Scientific Method and Logic.

The Scientific Method mentioned above is not to be confused with scientific management, which is a different management theory altogether. In fact, TOC has a strong appeal on people with mathematics, engineering or physics backgrounds, while it has not gained the same recognition from the people whom it should interest most, those with business, administration, management and accounting backgrounds.

TOC like the transformation view considers any business project as a system transforming inputs into outputs. The inputs could be aided by software to undergo a number of work steps and are transformed into outputs. The outputs are the products/services valued and paid for by the business's customers. The key tenet of TOC is that the system's output capability is limited by one of the work steps; the system's so called Constraint. The resource performing that work step is the system's Capacity Constrained Resource (CCR). Often a similarity is drawn with a chain: the chain (the system) is only as strong as its weakest link (the CCR).

TOC proposes a very simple Process of Ongoing Improvement (POOGI), consisting in the Five Focusing Steps (5FS) as shown here:

The 5FS is what TOC is most well known about. When systematically applying the 5FS, and effect-cause-effect logic thinking, the areas touched upon wills pan the whole business organization. (Smith, 1999; cited by The Chronologist (2012) sums up TOC in two words: focus and leverage, stating that: "TOC guides management toward where and how they should focus resources to leverage return on investment.

The penetration of information technologies into project management is more profound and intensive than one might imagine. It has a deep history, strong present and promising future. It is manifested in the proliferation of project management software packages and the use of other technologies and solutions such as expert systems, decision support systems, geographic

information systems, the internet and intranet, graphical and design tools, virtual reality, database, cost management systems, and risk management tools. Project-driven organizations increasingly adopt IT solutions to help them deliver high- quality products and services within a short time with lower cost (Meredith & Mantel, 2006).

Project management software was initially developed in the 1960s and 1970s to run on large computers. More than 500 project management software packages were developed in the 1990s, with a wide variety of prices and capabilities (Meredith & Mantel, 2006). Project management software tools are evolving at a fast pace, from personal computers (low-end systems), which support a limited number features such as project scheduling and cost management, to the client server and web-enabled (high-end systems) with new collaboration and communication capabilities. The high- end tools take advantage of the internet and allow organizations to manage concurrent projects in different locations with high source and equipment control and coordination. Project systems are moving away from isolated islands of information (low-end software) toward integrated data across projects with automated processes that allow multiple users to view and update project data remotely without time and space limitations (Lawton, 2000; cited by Caniëls, & Bakens, 2011). The proliferation of project management software packages and the diversity in their types, capabilities, and prices make selection of the appropriate software a project in itself. Therefore, a large body of project management software literature has focused on the evaluation of different types of project management software packages and compare their strengths and weakness to help businesses and project professionals select the appropriate tools that best meet their needs. The project management institute (PMI) publishes a periodic survey of project management software that list their types and capabilities (1996, 1999). Other buyers' guides have conducted test and comparisons to assist in selecting the right tool (Biggs, 2000; Mitchell & Dineley, 2000-cited by Caniëls, & Bakens, 2011). However, most of these tests and comparison are limited to small numbers of packages and were subject to software selection bias. In the empirical research arena, studies that have been undertaken to evaluate the value of project management software and examine the pattern of its usage are very limited.

Fox (1997;) examined the effect of decision style on the use of project management software. He found that a project manager's decision style has a significant correlation with project management software usage. He also tested the effect of user satisfaction and training on the use of project management

software and found that project managers seem to be satisfied with their computer based tools and that there is a significant relationship between their level of satisfaction and level of utilization. Several other attempts have been made to study the use of project management software. However, the outputs from these attempts were found to be limited to descriptive statistics. In addition, most of the previous study have focused on the technical factors and ignored the human and organizational effects (Chambers & Perrow, 1997).

Systems utilization is often viewed as the ultimate goals of a series of financial and economic marketing analysis that have traditionally been conducted by organizations during the process of implementing a new information system. Therefore, system usage has been identified as a proxy of an information system's success, and low usage of installed systems has been identified as a major factor underlying a lack of return from organizational investments in IT (Venkatesh & Davis, 2000). It is usually argued that systems usage will not occur unless the users' perspectives have been taken into account, and usage will not continue unless the users are satisfied with the system's performance (Gallion, 2000).

The relationship between information technology and individual performance has also been an ongoing concern in IS research (Goodhue & Thompson, 1995). Organizations spend large sums of their annual budgets on developing and implementing IT and on training their employees to use it to enhance their effectiveness and productivity. However, there is wide concern about a lack of a positive impact of IT on employees' performance (Zhang, 1998; cited by Caniëls, & Bakens, 2011).

The main stream of research that has focused on IS use can be classified into three subgroups: IT adoption and diffusion, technology acceptance, and user satisfaction. IT adoption studies are based on innovation and diffusion theory. Rogers (1995), a distinguished researcher in this area of research, defined five variables that have positive relationships with IT adoption. These variables are relative advantages, compatibility, complexity, trialability, and observability. His research has found that these five variables explain 49% to 87% of the variation in the rate of IT adoption.

Davis' (1989) Technology Accepted Model (TAM), which is based on the theory of Reasoned Action, has been widely accepted and applied because it is easy to understand and apply. A large number of studies have supported it over a long period of time and through a wide variety of applications (Lucas & Spitler, 1999). Ease of use and usefulness are the major constructs in TAM that measure user intention toward the use of technology. These two constructs are

found to persist over a wide variety of studies as powerful measures of user attitude toward using IT (Lucas & Spider, 1999; Venkatesh & Davis, 2000). Researchers, including Davis, recognize other important constructs that have been left out of TAM. Taylor and Todd, (1995; cited by Caniëls, & Bakens, 2011) incorporated the theory of planned Behaviour into TAM by adding the following explanatory variables: (1) system compatibility with the user work, (2) social influence (peer influence and supervisor influence), (3) user efficiency in operating the system, (4) technical compatibility with other systems or hardware, (5) resource availability, and (6) personal attitude toward the technology (attitude, control, intention), which enhance the power of predicting user intention toward IT usage.

The concept of user satisfaction has played an increasingly important role in MIS research and has been used to measure IS success (Gelderman, 1998). User satisfaction studies tend to assess the subjective level of user satisfaction with technology systems characteristics, and other factors such as organizational support. Gallion (2000) found that user satisfaction has a significant positive relationship with systems usage. Doll and Torkzadeh (1988) developed a popular model to measure computing satisfaction based on analysis of factors found in previous studies. The model has the following five variables that have been found to affect user satisfaction with IT user: content, accuracy, format, ease of use, and timeliness. This model has been widely applied and found to be an accurate measure of user satisfaction (Fox, 1997).

1.5 Conceptual Framework

There is a familiar French Proverb that says, "Nothing Succeeds like success (PMPERSPECTIVES, 2008). But it's difficult to get the benefit if success is not defined, measured and built on. This is particularly true of information technology (IT) projects. Most organizations find it troublesome to identify the criteria that represent a successful IT project outcome. Consequently, they are inconsistent in managing to these criteria or evaluating the results (Thomas &Fernandez, 2008). But it should be noted that, due to their technical and complex nature, projects are commonly acknowledged as successful when they are completed on time, within budget, in accordance with specifications and to stakeholders' satisfaction (Kahura, 2013). Even with good designs and plans it is of paramount importance that they are well managed if they are to be successful. However, the definition of project management suggests a shorter term and more specific context for success (Munns & Bjeirmi, 1996). The outcomes of project management success are many. They would include the

obvious indicators of completion to budget, organisation growth, satisfying the project schedule, project management software used, adequate quality standards, and meeting the project goal. But in this study, the indicators will be limited to organisation growth and, project management software

In this study, the concept of PMS will be as explained by Janssen, (2013). To Janssen PMS is a program that has the capacity to help a system (individuals, manages etc.) plan, organize, and manage resource pools and develop resource estimates. Depending on the sophistication of the software, it can manage estimation and planning, scheduling, cost control and budget management, resource allocation, collaboration software, communication, decision-making, quality management and documentation or administration systems. One of the most common project management software tool types is scheduling tools. Scheduling tools are used to sequence project activities and assign dates and resources to them. The detail and sophistication of a schedule produced by a scheduling tool can vary considerably with the project management methodology used, the features provided and the scheduling methods supported. Scheduling tools may include support for multiple dependency relationship types between activities, activity cost accounting among others (Nevogt, 2013). Project management software has been implemented as a web application to be accessed using a web browser. This may also include the ability to use a smart phone or tablet to gain access to the application (Top 10 Open Source Web-Based Project Management Software, 2009).

PMS are important building blocks of efficient and effective project management and have considerably changed from been just scheduling applications to complex information systems that cover wide range of project processes while addressing multitude of stakeholders (Kaiseret al., 2010; cited in Kahura, 2013) Organizational growth is something for which most companies strive, regardless of their size. Small firms want to get big, big firms want to get bigger. Indeed, companies have to grow at least a bit every year in order to accommodate the increased expenses that develop over time (Boggs, 2004; cited in Kahura, 2013). Organizational growth has the potential to provide small businesses with a myriad of benefits, including things like greater efficiencies from economies of scale, increased power, a greater ability to withstand market fluctuations, an increased survival rate, greater profits, and increased prestige for organizational members. Many small firms desire growth because it is seen generally as a sign of success, progress. Organizational growth is, in fact, used as one indicator of effectiveness for small businesses and is a fundamental concern of many

practicing managers (Gould, 2006; cited in Kahura, 2013).

As mention in the introductory section, organizational growth, however, means different things to different organizations. There are many parameters a company may use to measure its growth. Since the ultimate goal of most companies is profitability, most companies will measure their growth in terms of net profit, revenue, and other financial data. Other business owners may use one of the following criteria for assessing their growth: sales, number of employees, physical expansion, success of a product line, or increased market share. Ultimately, success and growth will be gauged by how well a firm does relative to the goals it has set for itself.

1.6 Operationalization of the Study Variables

The dependant variable for this study is project success while project management software is taken as the independent variable. For the purpose of this research work project success is taken as a function of growth in the organization and information technology.

The above is expressed as follows:

P.S. = f(P.M.S) with the following relations

P.S = f(G)

P.S = f(IT) where; P.S =Project Success 2

P.M.S = Project Management Software

G = Growth in the Organization

IT = Information Technology

1.7 Research Design

The research design chosen for this study was survey research design. it attempts to investigate the relationship between the identified variables in the research questions.

1.8 Population of the Study

This study population covered all the employees of Tripplea group incorporated located in Lagos which is 105. Questionnaires were administered to employees of the organization.

1.9 Sampling Techniques

Purposive sampling techniques will be used to select the organization because of the nature of the company being a technology base software organization. A stratified sampling technique was adopted in selecting the sample size of 32. The population was stratified into two groups for effective

gathering of information and these include staff/technicians of the firm and top management staff of the organization which constitute 70percent and 30percent respectively of the staff strength. Hence, the number of respondent selected in each group was directly proportional to the population in each group.

1.10 Data Collection Instrument

The data collection instruments used were questionnaires; personal interview and observation. The personal interviews enable the researcher to be more flexible because the interviewer can alter his questions to fit the situation as he sees it. The researcher was also able to probe more deeply when answers were unsatisfactory.

Observation gives room for familiarity with the operations facility and verification of the sampling techniques used for business process.

The questionnaires have two sections which are: Section A and Section B. Section A consist of bio-data of respondents while Section B consists of relevant questions to the respondents. The respondents in this section were implored to tick as appropriate the boxes relevant to them. Section B of the questionnaire consists of statements relevant to the research study. In this section, a Likert scale was used to measure the degree of agreement by the respondents

The Likert scale in the questionnaire will have (5) points, which are expressed as follow:

5-Strongly Agree
4-Agree
3-Undecided
2-Disagree
1-Strongly Disagree

1.11 Method of Data Analysis

The research study focused on the members of staff of information technology unit of Tripplea Group incorporated located in Lagos State. The data collected were analyzed using descriptive statistics and step wise regression analysis.

1.12 Reliability and Validity of the Instrument

The validity of the research instrument that was used for this study was measured by content validity test. In content validity, the emphasis is on adequate coverage by the instrument of the scope implied by the topic of study.

The reliability of the instrument used for this study was obtained through the

test-to-test method. Copies of the questionnaires were administered to the two groups of staff at two different periods within the month to establish the reliability of the instrument used. The correlation co-efficient of the data collected from the respondents at two different periods for the questions were 0.980. These results confirmed the reliability of the instrument used for this study.

1.13 Model Summary

The table 1 below shows the summary of the data analyzed

Table 1: Model Summary

Indicators for dependent variable	Means	SD	R^2(PMS)%
Growth in the organization	65.2	1.2	71.3
Use of information technology	67.1	1.1	74.4

1.14 Findings

On the average 65.2 and 67.1 of the respondents in the organization agreed that growth in the organization and the use of information technology is responsible for the success of project in the organization respectively. The standard deviation of 1.2 and 1.1 showed that there was little or no variance in the opinion of the respondents. This implies that the mean of the distribution has a very high validity.

The coefficient of multiple determinants of 71.3percent and 74.4percent showed that the percentage contribution of the variance that occurred in the project success of the organization could be traced to the growth and use of information technology in the organization.

1.15 Discussion

From table 1, the usage of project management software has positive effect on the outcome of IT project that is the achievement of project objective. The various reasons given by respondent are ; to contribute to the economic advancement of Nigeria; to satisfy the basic needs of customers via delivery of project deliverable on the scheduled date, and to promote corporate image.

Table 1 also revealed that, the usage of project management software affects the turnover growth of the organization. This brought about improved service delivery to project sponsor and the target users of the project

deliverables. Projects are being delivered on time from when the company started using project software such Microsoft office project application.

Software has helped in adding more efficiency and increasing the success rate of project outcome. It has also been used in monitoring the progress of project, during the implementation stage and help in attaining the target outcome of project as designed by the project sponsor. The benefit of project management software includes; timely completion of project, efficient and effective use of resources and implementation of project within the scope at was design in the planning stage.

The study revealed that project management software such as Microsoft Office Project as being utilized by Info-technology Solutions Inc (Subsidiary of Tripplea Group Inc) has brought about huge success in planning, scheduling and controlling ICT projects.

The study revealed that project software has significant relevance to the productivity of an organization. It also reveals that project software has brought fast growing innovations into the implementation of ICT project.

The more organizations are becoming more dependent on information technology, it is very important to ensure a maximized availability and implementation of these services.

For most organization, the rapid utilization of project management software to the planning, scheduling and monitoring of project provides management with an opportunity to develop and implement new or improve products and services.

1.16 Conclusion

Project management software has played a crucial role in the survival and growth of business organisation and must be maintained for effective monitoring of project.

The study reveals that project software brings fast growing innovation into the implementation of IT projects. The more organisations are becoming more dependent on information technology, it is important to ensure a maximized availability and implementation of project software.

1.17 Recommendations

1) All organisations appraise the implementation and incorporation of management software to project planning, as this would help them toward achieving organisational aims and objectives as well as the achievement of targeted results.

2) Usage of project management software will have an even bigger effect on the economy if it can be applied to most aspect of production, distribution and human development projects.

3) The use of relative performance to a base period will assist an organization to know how productive it has been if the base period is not overestimated or underestimated. Especially in the measure of the two variable PMS and organizational growth.

4) The consistence improvement in the development of new project management software will continually expand and improve the competitive advantage organisations have.

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