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ABSTRACT

We examine the implementation of information and communication technology (ICT) projects with the context of commonly identified project success factors and present additional factors that are important and worthy of consideration in developing country environments. We also present a framework that ties these factors together and can serve as a guideline in ICT implementations in developing country environments. The proposed framework classifies ICT project success factors into: economic, cultural, and institutional variables.

Keywords

ICT, Project, telecommunication, developing nations, culture, institution, economic, success factors

INTRODUCTION

The information systems literature discusses several factors that influence project success in organizations. Factors that have been identified as being critical in successful information and communication technology (ICT) project implementation include executive support, user involvement, experienced project manager, clear business objectives, minimized scope, standard software infrastructure, firm basic requirements, formal methodology, reliable estimates, risk management, proper planning, and ownership (e.g., Whittaker, 1999; Ojiako et al., 2008; Standish group, 2001).

Since these factors were based on studies on developed nations, there may be additional factors that could be relevant in developing nations. This supports the claim that managing IT projects in developed nations is different from that in developing nations (Aladwani, 2002; Murithi and Crawford 2003; Oyemeluke, 1973). Studies have classified the success factors in information technology projects in developing nations as environmental, technical, inter-organizational, and intra-organizational (e.g., Enns and Huff, 1999). Some of the specific challenges identified in those studies are poor telecommunication infrastructure, lack of technological readiness, inadequate technical skills and training, and financial barriers. While these factors are useful, they are presented at the national level. Aladawani (2002), however, in an organizational study, identified adherence to budgets as specific project factor.

There is lack of research that focuses on examining the factors that influence ICT project success in developing nations although it has been argued that western-oriented management concepts may not be relevant in developing nations (e.g., Murithi and Crawford 2003). This paper uses a case study methodology to examine ICT implementation projects in a developing nation. The study examines whether typical IT project success factors identified for developed nations are relevant for ICT implementation in developing country environments. Specifically, the study seeks to answer pertinent questions such as: a) what factors influence project success in developing nations? b) Are the success factors identified with developing nations similar to those for developed nations? Results of the study are used to develop a framework that can serve as a guide for ICT implementations in developing nations especially for those in Sub-Saharan Africa.

A Brief History of AB Networks

AB Networks (ABN) is a telecommunications company in Ghana. Although ABN is one of the largest telecommunications providers, it was lagging behind its competitors. ABN's customers were dissatisfied with its products and services. For instance, the fixed line facilities were not being patronized. To reverse this trend ABN embarked on several projects to remain competitive. Though these projects were generally regarded as successful, they usually suffered delays and had to be scoped down to meet cost constraints as a result of dwindling finances of the company. A lot of projects planned for are in queue waiting for implementation due to "lack of funds". At ABN several resources are allocated for planning projects in the portfolio but are killed during the implementation. The understanding of the factors that influence project success or failure at ABN can provide lessons for other organizations in Sub-Saharan Africa and help improve proper selection and successful implementation of technology projects.

Competition in the Telecommunications Industry

For most part of the 20th century, ABN provided wire line services in a heavily regulated environment serving largely as government sanctioned monopoly and offered only plain old telephone service (POTS). In Ghana, deregulation in the telecommunication industry began in the early 1990s with the breakup of Ghana Post and Telecommunications Company (P&T) and the subsequent entrance of competitors into the industry. The Telecommunications Act of 1996 opened the domestic marketplace to widespread competition by allowing new and existing local and long distance companies, wireless companies, and Internet service providers (ISPs) to provide competing services. As a result of the move towards deregulation, the number of ICT providers in Ghana has risen dramatically over the past 8 years.

Currently, ABN is a founding partner of the SAT-3 submarine cable which links partner countries along the western side of Africa (from South Africa to Senegal) to Portugal from where they can be linked to Europe and USA via other submarine cables. This cable gives ABN a competitive advantage in the internet provision as all ISPs access capacity on the SAT-3 through ABN. This monopoly may end soon though, as Globacom, a telecommunications company with the sixth and latest mobile license in Ghana is laying its own submarine cable to the United Kingdom. The competition is getting keener and it thus behooves on ABN to manage its projects better to provide competitive and value-added services and products for the customer.

RESEARCH METHODOLOGY

The research uses a case study methodology to gather information from multiple sources (Yin, 1984). This methodology allows the researcher to get clear detail understanding of the phenomena of interest and enables an in-depth analysis of ABN projects' success factors as they exist currently and in the recent past (Dalcher and Brodie, 2007). We used multiple data sources: interviews, observations, and archival sources (preliminary acceptance test documents, as-built documents and annual reports); using multiple data sources strengthens the findings (Eisenhardt, 1989).

Data Collection Method

The study looks at about 30 projects that were implemented by ABN between 2000 and 2007. Appendix A is a list of projects considered in this study. The data was collected through interviews conducted between November 1, 2008 and December 5, 2008. The participants were mainly ABN employees consisting of 5 top executive management members, 50 Projects office staff, and 20 internal end users (10 Network Operation Center staff and 10 marketing staff). Five (5) contractors (vendors) who were involved in the implementation of the projects under the supervision of the project implementation staff were also interviewed.

The actual interview was a semi-structured one-on-one session with each interviewee. There was a first meeting to request for the interview and to assure the individual that everything discussed will be confidential and strictly for academic purpose. The date, time and place were then agreed upon and the interviewee was given an idea about the questions that would be asked. The interviews were carried out at a site away from the office and on weekends so that the interviewees were more relaxed from the pressures of work and where there were very little distractions. The purpose of the interview was to find out from the interviewees what they considered to be important factors in the implementation of ICT projects carried out at ABN.

The interviewer did less talking and tried to listen more to the interviewees. There was also a small recorder to record the conversation. The interviewee was asked for permission for the interview to be recorded. The interviews were typically about one hour in length.

Coding of Data

The recorded interviews were transcribed, coded and analyzed. Our initial categories in the coding process were the typical IT project success factors identified in the literature. During the interview, the participants were asked questions that sought to verify whether the participants considered the IT project success factors for developed nations relevant to projects at ABN and to determine any additional factors.

Some of the questions were: *Do you have formal procedures that all projects follow? Do you involve the end user in planning your projects? To what extent does the involvement of the end user considered important to the success of projects at ABN? To what extent does support from senior management of ABN considered important in project success or failure*? *Are there any other factors that in your opinion determine project success at ABN that we have not discussed? How important are these factors to project success in ABN?*

The answers to the questions were written in notes and also recorded after gaining consent from the participants. The notes and recorded data were then reviewed to identify concepts similar to the categories. Specifically, individual ideas, sentences, observations and events were grouped and then mapped onto the predefined categories (success factors identified in studies in developed nations). Other concepts that emerged during the interview that did not fit into any of the predefined categories were recorded. For instance, political power was a concept that was derived from the interview. Initially, interviewees used terms such as "favor", "big men" to describe how government officials influence project success as they can ask for resources to be diverted to projects in their constituencies resulting in delays or cancelations of other projects. Upon further probe, and review of other data sources including project reports it became clear that it was a political issue so we revised our coding and then labeled it a new factor called Political Power.

ANALYSIS AND DISCUSSION

From the coding and analysis the successful factors and their relative order of importance were established (See Table 1). A closer look at the table demonstrates that some of the most important factors in technology implementation in developed nations such as end-user involvement (Amoako-Gyampah, 2004) were ranked low at ABN. We discuss in the following sections detailed explanations of the various factors identified by the interview participants as being critical to the successful implementation of ICT projects at ABN.

FACTORS	LEVEL OF IMPORTANCE AT ABN
Availability of funds	1
Executive management support	2
Training	3
Motivation	4
Proper planning	5
Minimized scope	6
User involvement	7
Firm basic requirements	8
Clear statement of requirements	9
Formal methodology	10
Ownership	11
Culture	12
Political power	13
Risk Management	14
Capital budgeting & post-implementation audit	15

Table 1. Project success factors

Availability of Funds

All interviewees rated Availability of funds as the most important factor. Very important and crucial projects were truncated due to insufficient funds. As one finance executive explained, "ABN had to depend on loans to finance projects and when the company had over borrowed, only restricted borrowing facilities were available to it. As a result, money was not budgeted for projects; contractors were made to pre-finance projects to be paid later when funds were acquired. When funds were made available for projects, they usually came late. Thus, there were usually delays in clearing equipment and other resources shipped from overseas. The contractors' major concern was that funds were not made available to them on time for them to produce their deliverables according to their contract". A project team member from one of the vendors reminisced, "During the first phase of the expansion of GSM coverage to the Volta region, the plan had been to simultaneously build sites and get them 'on air'. The microwave link had to be transmitted from the Northern region to the Volta region. This could not materialize due to lack of funds. The contractor had to secure funds from other sources thereby delaying the project's completion date." Another said, "On one occasion, the sites in the Volta region could not be put 'on air' because there were no funds to provide them with standby generators."

Executive Management Support

Executive management support was ranked the second most important success factor for ICT implementation at ABN. The interviewees claim that most projects originate from the executive management. Functional managers from the various departments are usually not allowed to initiate projects. For instance, some divisional managers found that payphones generated significant revenue and that there was a need to invest more money to expand the network of payphones. However, because the need did not originate from the executive management, the payphone expansion project was not considered as important even though funds were spent in the early stages of the project. This action on the executives' part led to the failure of the project and consequently to the loss of the payphones market as customers switched over to competitive products that met their needs.

The project office staff revealed that there had been instances where top management had been passionate about a particular project and they saw the project progress steadily without any hitches as top management was always ready to give approvals for all the required resources. Top management's willingness to support a particular project is also demonstrated by their making time to attend steering committee meetings without excuses.

Training

Training was a very important factor for the project office group. Interviewees stated that they needed project management training to enable them handle projects in a professional manner. They believed just as all those interviewed that some projects failed because of lack of good project management practices which could only be gained through formal training. A project office's interviewee complained, "They are not concerned about us having the requisite training. Usually they expect us to learn from the vendors forgetting that when we are adequately trained we serve as checks on the vendors to do the right thing. We are also able to better question them about their actions and understand their reasons better". "I suppose insufficient funds are the main cause for us not getting the training we desperately need. They tend to prefer on the job training because it is cheaper. A lot of the time, we are unable to operate and maintain the network as we should because we lack training in handling the equipment", said a Network Operating Center (NOC) staff. While funds could be a major reason for failure to provide effective training, it could also be management's lack of attention to the need for training.

Motivation (Appreciation)

Motivation was also a factor that the project office group said influenced project success. The interviewees stated that most projects at ABN required a lot of sacrifice on the part of the project manager and the project team for projects to come to fruition. Most of the time, needed resources, such as vehicles and tools were unavailable and yet the project team made lots of commitment. However, when projects were successfully completed, the efforts of the project managers and their teams were not acknowledged. This action, on the part of the executive, results in lackadaisical attitude of the project team towards later projects which in some cases led to project failure. A project manager interviewed, complained, "I do not see why I should continue sacrificing and toiling for a company that does not appreciate my hard work."

Proper Planning

Improper project planning is believed to be a major cause of a lot of the failed projects. An example that was cited by one of the interviewees is that an expatriate was flown into Ghana earlier than he was actually needed on the project increasing personnel cost unnecessarily.

Even the top management members interviewed agreed that projects lack proper planning at ABN. They believed there was some level of planning but this is usually vendor driven. The contractors also complained of having to stop construction in some situations because all the necessary inputs were not made available to enable them continue. The fact that several projects are killed because of lack of funds also suggests that the organization does not have effective project portfolio management. Having an effective project management would ensure that projects are effectively prioritized to minimize the number of projects that are killed because of lack of funds.

Minimized Scope (Small Milestones)

Minimized scope was cited as an important success factor as all ABN projects are broken down into smaller components such as civil works, general planning, and implementation. The reason for this may be found in the statement of one project office member; "ABN project managers are not experienced enough to handle big projects". Also, larger projects have many dependencies which might not be readily provided on time thus making them prone to failure.

User Involvement

User Involvement was found to be important although it was not ranked as high as it has been in other studies involving developed nations. A top executive manager expressed the importance of user involvement in the following way, "the end user determines everything". 95% of the project team agreed that the involvement of the end user is necessary as without factoring their preferences into the planning of new products, one may end up with a 'white elephant' product if the end user does not like the product that is implemented. An example was given of an installation of a switch in a suburb of Accra at a time when there was no cable access network to the suburb. The marketing group stated that they always require users' views in product development with surveys carried out to assess whether the product would be successful or not. Though most of the project team members were of the view that the end user is involved in the planning and implementation of the project, some internal users such as the NOC staff complained that they were usually not included in the planning phase of the projects and were usually invited at the end of the project for acceptance testing. The project office group also complained that top management determined deliverables before stakeholders were consulted.

Clear Statement of Requirements (Business Objectives)

All participants agreed that firm basic requirements were necessary for project success. It was also acknowledged that projects suffered scope creep because projects were usually initiated by top management who may not necessarily have the expertise to clearly define the basic requirements.

Formal Methodology

At ABN there is no formal methodology for all projects to follow. 70% of the project office members said they have procedures in their individual sections but these do not ensure project success because they are not standard procedures. 100% of the contractors, however, stated that they have procedures obtained from previous projects and they are constantly improved to ensure project success. Because of the lack of formal methodology at ABN, there is no documentation of lessons learned for new project managers to fall back on when handling similar projects.

Ownership

50% of the project office group said project managers and their teams do not take full responsibility for the project citing lack of motivation due to poor remuneration and the lack of availability of resources for the project as reasons. Additional reason for lack of ownership as suggested by interviewees is that project managers were not empowered to exert the necessary authority because of the bureaucratic organizational structure.

Culture

Most interviewees agreed that the culture of the nation does affect the success of the project. Most of the interviewees spoke of top managers who usually gave contracts to family members and close friends. Another culture issue is with respect to believe in spiritual beings. "I remember the instance when the road in a suburb of Accra had to be turned into a dual carriage

way and our telephone lines had to be temporarily diverted. The project was delayed for a long period because there was a tree in the path which had to be cut down to make way for the road. The natives believed the tree was a god and had to be pacified before it could be cut down. Failing to perform the necessary ritual, all machines which were used in an attempt to construct the road broke down. The tree could not be felled delaying the project considerably. It was only after the pacification rites were performed that miraculously, all machines were able to function for the successful completion of the project", said one interviewee. We note such beliefs are sometimes also present even in developed countries. Stories abound about the Denver International Airport being constructed over native Indian burial grounds that required pacification ceremonies before and after the completion of the project (Hodges, 1995).

Bribery is an additional cultural influence on project success. Most interviewees from the projects office spoke of this as being a major factor external to ABN which affects the success of projects. An interviewee stated that some staff members of utility firms usually expect to be bribed before extending utility such as electricity to a new site. About 90% of interviewees, however, conceded that this practice will gradually be eroded as the economy of the country develops and standard of living improves.

Political Power

Most interviewees stated that the main political issues affecting ABN had to do with changes in government resulting in the change in the management of ABN. This usually implies that the new management comes with its own business objectives and strategic plan resulting in projects which were initiated by the previous management being discontinued. "A typical example is where a project which was initiated by one management team was discontinued by another management when a change of government occurred", said one project office interviewee.

What 100% of those interviewed found disturbing was that politicians, especially ministers of state, could demand projects in their constituencies or hometowns. As said by one top management member, "On one occasion, one minister had a big function in his hometown. As a lot of people were going to attend the function and unfortunately there was no telephone coverage there, he insisted that a cell site is located there before the function. And it was done. The process had to be sped up and a lot of approval stages were skipped just to satisfy his request."

Risk Management

Almost 100% of interviewees agreed that risk management is not practiced effectively at ABN. Thus, a lot of projects have been delayed due to lack of risk management. The project office members observed that there have been occasions when the project team had foreseen some risk and raised the issue but their decision was overruled by top management who wanted the project to go ahead without finding mitigating measures for the risk. The contractors, on the other hand, stated that they did risk management as far as the health and safety of their staff were concerned. However, they have ineffective risk management with respect to resources and durations although they know that team members may request time off when they need to assist close family members.

Capital Budgeting and Post-implementation Audit

Lack of capital or improper capital budgeting results in undertaking projects that do not produce sufficient returns on funds invested. This factor is directly related to proper planning factor. Post-implementation audits are necessary guide for the success of later projects. During post implementation audits, the project that has just been completed is evaluated to ascertain whether all goals and objectives were met, and whether there were some loopholes in the processes and procedures. Measures are then taken to address these issues to ensure more efficient implementation of subsequent projects.

Framework for ICT Project Success factors in developing nations

Figure 1 is a framework that ties the project success factors together and can serve as guideline in ICT implementations in developing country environments. The success factors are classified into three variables: economic, cultural, and institutional (organizational or governmental) variables. We suggest that the framework may serve as a guideline for ICT implementations in developing nations especially for South-Saharan African nations.

Nine factors were classified as Organizational institutional factors because they are dictated by the organizational practices. Institutional factors are classified into Organizational and Governmental. Governmental factors category represents activities of government institutions or authorities that influence the projects implemented at ABN for the period under study. Organizational institutional factors are those that result from the actions or inactions of an organization's leaders or executives.

The factors identified in the framework are not new. However, organizing them in the manner suggested here provides a means to understand in greater detail how the factors might influence project success in developing country environments. For example, political influences are present even in developed country environments. Examples of pet projects being undertaken in specific districts of congressmen are well known. However we notice that here, the influence can occur in the middle of project that is already underway and thus not only impacting a particular project but others as well.

Although our framework posits linear relationships and independent relationships between the factors and project success, it is possible that the impact of the factors on project success is nonlinear as well as interactive. For example, the culture of bribes might not only affect the project cost but it can also lead to the team members experiencing frustrations and becoming less motivated. As another example, top management support has generally been understood to imply the provision of resources during project implementation. In the environment studied, we observe that top management influence includes the stifling of project ideas which do not originate from senior management. This has the potential to not only affect the involvement of users but also the funds made available for the project.

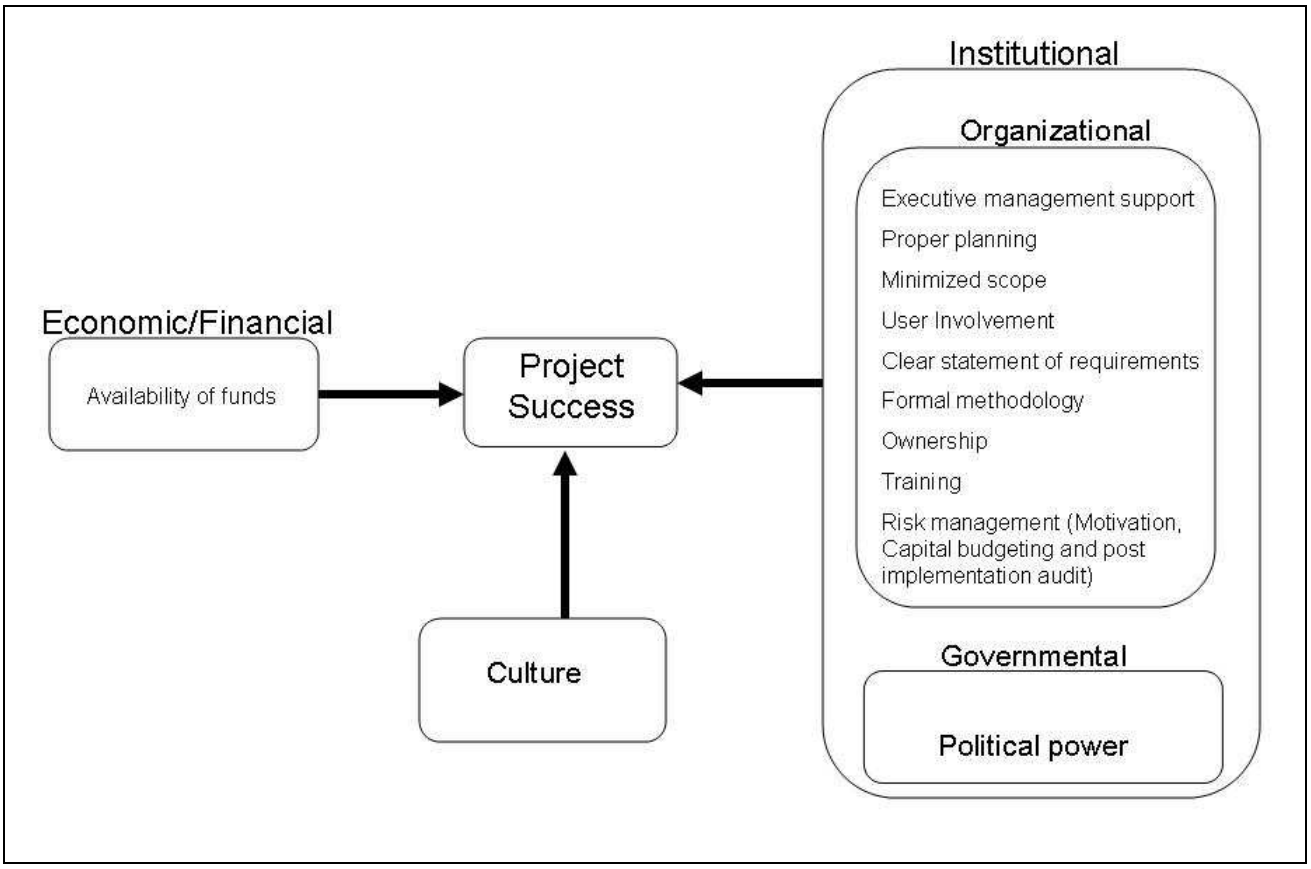

Figure 1. Success framework for ICT project implementation

CONCLUSION

The study sought to explore success factors for ICT project implementation in developing nations. By examining ICT project implementations in Ghana through a case study, we identified factors that influence ICT projects in developing nations. Based on the results we developed a framework that relates ICT project success to three major variables: institutional, economic and culture. We believe that the framework can be used as a guide for ICT implementations in developing nations especially those nations in Sub-Saharan Africa. This is because of the similarity of economic, cultural and political conditions within those countries.

We found that the factors that were identified to be relevant to project success in developed nations were also relevant in developing nations. We also found that lack of funds and culture were additional factors that influence project success. Further, we note that the ranking of project factors in terms of importance in developing nations were different from those of

developed nations as discussed in the literature. For instance user involvement was ranked 7th in this study while prior studies had identified user involvement as one of the two most important factors.

Overall, availability of funds was found to be the most important factor. While fund availability is also sometimes an issue in developed country environments, we note that perhaps for projects in developing countries, it plays a very dominant not so much in the project selection phase as in the implementation phase. Training needs to be taken seriously if developing countries are to catch up with the more developed nations. Motivation is also a means of obtaining maximum effort from staff at all times. Organizations which may not have sufficient funds can find other means of effectively motivating staff. One such action is public appreciation. Post-implementation audits need to be incorporated into projects to ensure the success of future projects. Governments and their institutions should address bribery and the interference of government officials in organizations as they can hinder successful implementations of projects.

LIMITATIONS AND FUTURE RESEARCH

Most of the project office staff and other staff of ABN were all hard pressed for time which made it difficult for people to accept interview schedules. The projects studied are primarily technology installations. The ranking of the success factors may change for different projects. Future research could look at multi-organizational studies. The organizational institutional factors can be further categorized. We also believe that several other governmental institutional and cultural factors were not identified in this case. Applying this framework to organizations in other developing nations may reveal additional variables of interest. At the end a more theoretical model or framework could be developed to serve as a guideline for building successful technology project implementations in developing nations.

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Appendix A

Project	Duration
Osibi Optical Network	July '03 – May '05
Eastern Corridor Optical Backbone	Oct. '04 – Apr. '09 (expected)
Northern Corridor Optical Backbone	Jan.'08 – Feb. '08
Osibi-Brema fiber construction	Aug. '07 – Dec. '07 (5 months)
Expansion of ABN2 Network phase I	Jan. '04 – Oct. '06
Expansion of ABN2 Network phase II	March '06 – Nov. '07
Broadaccess to Sama	Aug. '07 – Jan. '08 (6 months)
Mobile switch center expansion I	Mar. '04 – Apr. '04 (4 weeks)
Mobile switch center expansion II	Aug. '06 – Sept. '06 (4 weeks)
Mobile switch center expansion III	Dec. '07 – Jan. '08 (6 weeks)

Appendix A: List of projects considered in the study