

Assessment of Factors Affecting Implementation of ICT Projects in Telecommunication Industry of Rwanda: A Case Study of Airtel Rwanda

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Abstract: Organizations are complex in nature, their operations and strategic focus could be greatly enhanced by well-focused application of Information and Communication Technologies (ICT) to support improvements in productivity, management effectiveness and ultimately, the quality of services offered. The issue of ICT failure can be analyzed by assuming that learning from IS failures will provide important lessons for formulating successful strategies for the planning, development, implementation and management of information systems. The general objective of this study was to investigate the factors affecting implementation of ICT projects in telecommunication industry of Rwanda using a case study of Airtel Rwanda. To achieve this the study covered the following specific objectives: To assess the influence of the technical team on successful implementation of ICT projects in Airtel Rwanda, investigate the effect of project planning on successful implementation of ICT projects in Airtel Rwanda, assess the influence of management support on successful implementation of ICT projects in Airtel Rwanda and to establish the impact of Information Technology infrastructure on successful implementation of ICT projects in Airtel Rwanda. The study adopted a descriptive research design. The target population for the study was 150 full time employees of Airtel Rwanda that included IT and Network staff, Heads of the following departments: Customer Care, business Market, Marketing and Finance department. A sample size of 110 respondents was determined using Yamane's formula. Simple random sampling technique was used to select a sample size from the departments of IT and Networking, whereas Census was applied for departments where only heads were considered. The study used both primary and secondary data. Structured questionnaires and interview were used for data collection. Data collected was analysed through SPSS version 21. Data analysis involved statistical computations for averages, percentages, and correlation and regression analysis. Results revealed that a strong relationship exist between the factors that influence implementation of ICT projects in Rwanda. The study found a positive relationship between Technical team, project planning, management support and IT infrastructure. A 1% increase in technical team leads to 41.8% change in implementation of ICT projects, while a 1% increase in project planning leads to a 58.9% change in implementation of ICT projects, a 1% increase management support leads to 22.8% change in implementation of ICT projects whereas 1% increase IT infrastructure leads to 61.2% change in implementation of ICT projects. The study concluded that firms should lean technical team and IT infrastructure to increase their implementation of ICT projects. This relationship is expected as firms improves positively on IT infrastructure and technical team implementation of projects is enhanced. The study recommends that the Airtel Rwanda should pay more attention to the factors influencing the implementation of ICT projects particularly the Business Case as it directly relates the justification and the potential significant business benefits and values to all stakeholders.

Keywords: Technical team, Project planning, Management support and Information technology infrastructure.

1. INTRODUCTION

1.1 Background to the study:

Globally the swift development of Information Technology (IT) in industries today has both opportunities and problems (Deeds, 1999). Deeds added that IT presents many opportunities in that companies have used it to help them gain a competitive edge. It also presents challenges in the management of IT has at the same time a major problem to several companies. In effect, cost-effective deployment and usage of IT resources has become a strategic success factor for business firms (Breakfield & Burkley, 2002).

Businesses today face a stark reality of competition and are required to anticipate, respond and react to the growing demands of the marketplace in order to remain relevant (Bryman, 2007). In the fiercely competitive environment, effective business strategy centers on aggressive and efficient use of Information Communication Technology (ICT). Both governments and organizations are investing heavily and relying highly on ICT to improve productivity through streamlining of business process in order to enhance efficiency and effectiveness. Many researchers have evaluated benefits of investing in ICT Projects (Yang & Seddon, 2004), and all agree that information systems are designed to help manage organizational resources in an integrated manner. The level of integration that is promoted across functions in an enterprise closely relates to the primary benefits that are expected as a result of their implementation. The issue of ICT failure can be analyzed by assuming that learning from IS failures will provide us with important lessons for formulating successful strategies for the planning, development, implementation and management of information systems. While discussing dimensions of ICT failure, Beynon-Davies (2002) considers both the horizontal and vertical dimensions of the informatics model. The horizontal dimension is expressed in terms of the difference between development failure and use failure. The vertical dimension is expressed in terms of failure at the levels of ICT systems, IS projects, or organization, or at the level of the external environment.

The Six types of IS failures are identified as follows: Technical failure, Project failure, Organizational failure, Environmental failure, Developmental failure; and Use failure. Beynon-Davies supports the argument with and several case studies and quotes other models for IS failure put forward by Lyytinen and Hirschheim (1987). ICT success or failure in developing countries can be categorized into three types depending on the degree of success (Heeks, 2002). First, is the total failure of an initiative never implemented or in which a new system was implemented but immediately abandoned. Secondly, it is a partial failure of an initiative, in which major goals are unattained or in which there are significant undesirable outcomes. Associated with partial failure is the sustainability failure where an initiative first succeeds but is then abandoned after a year or so. The last is success of an initiative where most stakeholders attain their major goals and do not experience undesirable outcomes.

In Africa, most society's today's are being transformed by continuously evolving technologies that are changing the way we do things at the most fundamental levels (Hilsenrath & Paletta, 2008). At a macro level, IT is one of the driving forces behind globalization of world economies and at an enterprise level, it is playing a crucial role in re-engineering and restructuring of business processes in response to increased competition (Claessens et. al., 2010). On an individual level, every aspect of our daily lives is subject to technological innovations. We have become dependent on the flexibility, access, and services that they provide us. Computers, fax machines, networks, cable television, fiber optics, and ATMs have all played a pivotal role in the way we communicate, work, play, and do business (Shachmurove, 2011).

Several recent studies related to information communication technology (ICT) implementation frameworks have identified key ICT implementation drivers and barriers which are useful in providing a strategic view of its success. These studies explored barriers to ICT use and adoption. Common highlighted barriers include low ICT literacy and investment levels (Love, et al., 2001).

One recent study of 134 architectural, engineering and construction professionals identified IT implementation barriers and coping strategies at the industry, organization, and project level (Stewart, et al., 2004). Review of the literature however, reveals that few empirical studies explain ICT implementation constraints from an innovation diffusion perspective at the organization, workgroup and individual level (Peansupap & Walker, 2005). One recently completed study (Peansupap, 2004) differs from, previous IT innovation research in two important ways. First, by organization-wide ICT diffusion such as groupware or intranet applications is assumed to differ from stand-alone ICT innovation such as CAD systems or non- integrated project planning and scheduling. This is because organization-wide ICT innovation requires a commitment from a greater number of users than does IT innovation focused upon individual stand-alone ICT

applications. Second, the research reported upon here focuses on micro level ICT innovation diffusion within an organization.

Rwanda continues to be one of the fastest growing African countries in ICT and there are several avenues for growth for the ICT sector – from e-commerce and e-services, mobile technologies, applications development and automation to becoming a regional center for the training of top quality ICT professionals and research. Despite being the fastest growing African countries in ICT Rwanda still faces challenges in implementation of ICT projects. It is with this regard that the researcher aims at assessing the factors affecting implementation of ICT projects in Rwanda using Airtel for the case study. This study identifies ICT implementation constraints from the diffusion perspective in order to improve understanding of the importance of ICT implementation.

1.2 Statement of the Problem:

For many years' implementation of projects has been a topic of debate. The issue of factors that influence implementation of ICT projects has become of great importance especially with the ever growing concerns and demands from various players in the market. Telecommunication industry is being viewed as one with poor implementation emphasis compared to other sectors like the manufacturing and service sectors (Kubal, Wong & Fung, 2009). Many criticisms have been directed to the telecommunication industry for generally IT infrastructure. It is not only the competition that is subject to criticisms but among others, include factors that affect implementation in projects.

Business environments these days are characterized by complexity, and acceleration of everything from communication to production methods. ICT has been one of the major drivers of this complexity and acceleration. However, research continually shows that companies have difficulty in the implementation of ICT projects. The Government of Rwanda (GoR) has received significant support from private donors willing to invest in its ICT programs, providing opportunities that will reach out to the wider population spectrum. But implementation of these projects are faced with challenges in many circumstances. From observation and previous studies, it is noted that factors such as top management support, project teamwork and composition, project management, effective communication, business case, change management program and culture, business plan and vision, weak external consultancy, post implementation support, inappropriate skills, unclear goals and objectives, scope management during the project, unrealistic time or resource estimates, all influence the implementation of ICT projects (Cushing, 2002).

Most of the stakeholders, consultants and project managers have made up their own personal opinion and conclusion about the ultimate causes of failure of ICT Projects. However, success or failure of a project cannot be determined at one single point in time, but over the full-life of the solution delivered by the project. According to Whittaker, (1999), most ICT projects fail due to lack of structural issues such as poor project planning, weak business cases and a lack of top management support. The bull survey, (1998), concluded that major causes of project failure during the project life cycle are a breakdown in communication (57%), lack of planning (39%) and poor quality control (35%).

According to the Peansupap, (2004) lack of proper requirements analysis, lack of user involvement, lack of resources, lack of planning, lack of IT management, technology illiteracy, lack of executive support and unrealistic expectations are among the major causes of ICT project failure. Based on The OASIG study, 1995, Lack of attention to the human and organizational aspect of IT, poor project management and poor articulation of user requirements as key factors responsible for ICT project failure.

Individuals and societies resist change. Technology brings change. Higher education has its own sets rules and expectations of behavior. Technology threatens to reorder those behavior patterns and is therefore a threat. The first instinct is thus a graft technology onto existing modes of behavior.

Despite previous studies focusing on telecommunication industry in Rwanda, none has focused on the factors affecting implementation of projects in Airtel Rwanda. The researcher will motivate to fill this prerequisite element of spreading awareness to the market about the new products to be launched for achieving a shorter payback period and by investigating other factors affecting implementation of ICT projects in Airtel Rwanda.

1.3 Objectives of the study:

1.3.1 General objective:

The general objective of the study was to investigate factors affecting implementation of ICT projects in Airtel Rwanda.

1.3.2 Specific objectives:

The study was guided by the following specific objectives:

1. To assess the influence of technical team on successful implementation of ICT projects in Airtel Rwanda.
2. To investigate the effect of project planning on successful implementation of ICT projects in Airtel Rwanda.
3. To determine the influence of management support on successful implementation of ICT projects in Airtel Rwanda.
4. To establish the impact of Information Technology infrastructure on successful implementation of ICT projects in Airtel Rwanda.

2. CONCEPTUAL FRAMEWORK

The Independent variables in this research are the technical team, availability of resources, management support and IT infrastructure and dependent variable is Successful Implementation of ICT Projects.

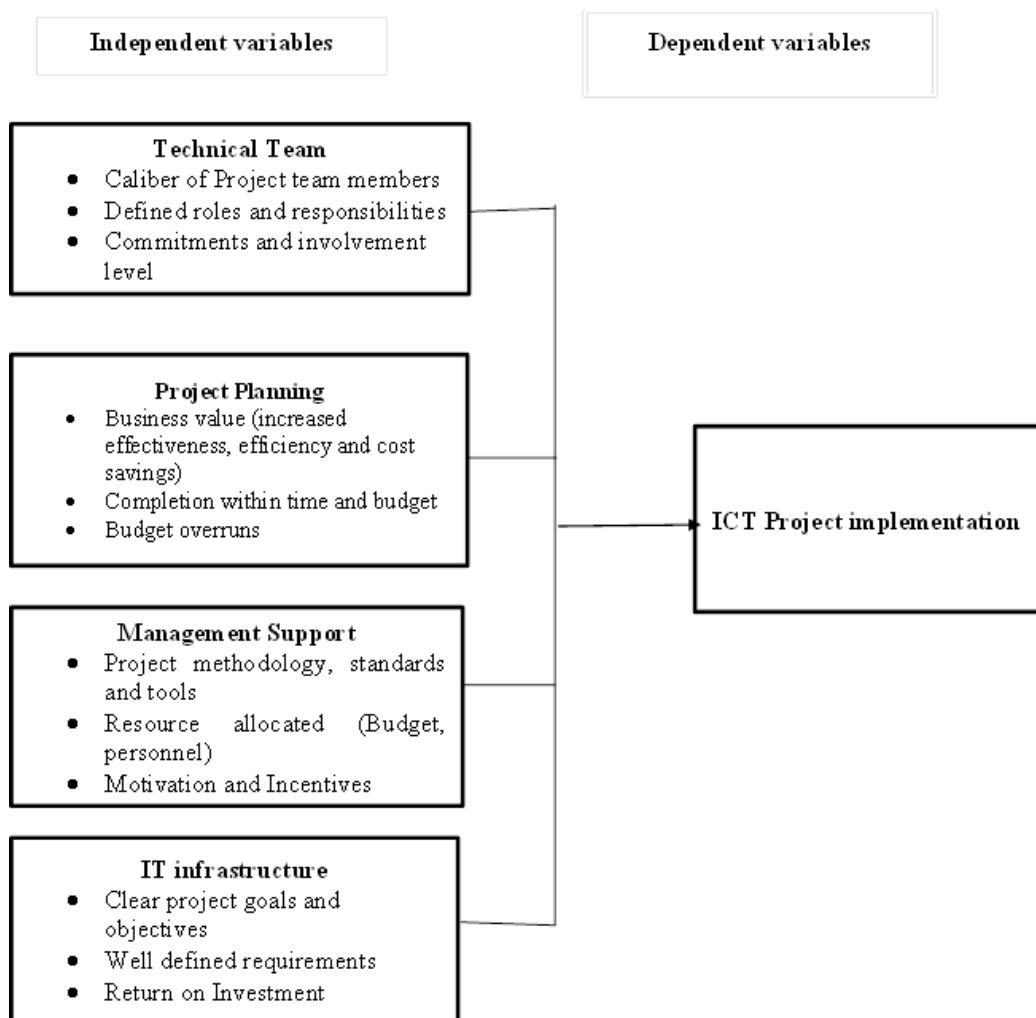


Figure 1: Conceptual framework

3. RESEARCH DESIGN

The research design refers to the overall strategy that you choose to integrate the different components of the study in a coherent and logical way, thereby, ensuring you will effectively address the research problem; it constitutes the blueprint for the collection, measurement, and analysis of data.

A descriptive study design was used. A case study was used to obtain an in-depth investigation of an individual, institution or phenomenon (Mugenda & Mugenda, 2003). The primary purpose of case study was to determine the factors

that influence the implementation of ICT projects at Airtel Rwanda. A descriptive study design is deemed the best design to fulfill the objectives of the study. Case study research design has the advantage of generating new understandings, explanations and is cheaper than survey and takes less time; it is for this that the % study adopted a case study research design. A research design is the general plan of how one goes about answering the research question (Saunders, Lewis & Thornhill, 2000).

3.1 Target population:

According to Mugenda and Mugenda, (2003), a population can be defined as an entire set of relevant units of analysis or data. The target population of this study was 150 staff from the Airtel Rwanda Ltd headquarters. The target population was drawn from a group of individuals who are actively involved in the implementation of main ICT projects; namely, IT and Network, and the heads of the following departments: Customer Care, business Market, Marketing and Finance.

Table 3.1: Target population

Area of Operation	Population
Top level managers	9
IT and Network	137
Customer Care	01
Marketing	01
Finance	01
Business market	01
Total	150

3.2 Sample size and sampling procedure:

Sampling technique provides a range of methods which enables reduction of data to be collected, by focusing on data from a sub-group rather than all cases of elements. The sampling design used is non-probabilistic since it allows a selection of individuals who have been involved in implementation of ICT projects and that are best suited to answer the research question. This technique is also suitable when working with smaller samples since it caters for cases that are particularly informative.

A sample size of 110 respondents was determined from a total population of 150 individuals using the formula by Yamane (1967). Simple random sampling technique was used to select the project team members from the departments of IT and networking. Simple random sampling technique ensures that a population is adequately represented in the sample by giving equal chance to all elements. The heads of other departments were chosen by applying Census. The following formula was applied for sample size determination:

$$n = \frac{N}{1 + N(e)^2}$$

Where n = the desired sample size

e= probability of error (i.e., the desired precision, e.g., 0.05 for 95% confidence level)

N=the estimate of the population size.

$$n = \frac{150}{1 + 150(0.05)^2} = 110$$

Table 3. 2: Sample frame

Area of Operation	Sampling Method	N	n
Top level managers	Census	9	6
IT and Network	Simple Random	137	100
Customer Care	Census	1	1
Marketing	Census	1	1
Finance	Census	1	1
Business market	Census	1	1
Total		150	110

4. REGRESSION RESULTS

The study further carried out regression analysis to determine the relationship between factors that influence ICT project implementation in Airtel. This is in accordance with Green & Salkind (2003) who noted that regression analysis is a statistical process of estimating the relationship between variables. He goes further to suggest that regression analysis helps in generating equation that describes the statistical relationship between one or more predictor variables and the response variable. The regression analysis results were presented using regression model summary tables, analysis of variance (ANOVA) table and beta coefficient tables as shown below.

Combined effect Model:

In this section, multiple regression analysis was to determine whether independent variables notably, technical team, project planning, management support and information technology infrastructure influences implementation of ICT projects in Rwanda. The findings are presented below.

Table 4.1 Model summary of the combined effect

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.934 ^a	.789	.701	.727
a. Predictors: (Constant), Technical team, Project planning, Management support and Information technology infrastructure				

Table 4.2 shows that the coefficient of determination R square is 0.789 which mean that 78.9% of variation in implementation of ICT projects in Airtel is explained by technical team, project planning, management support and information technology infrastructure. The regression equation appears to be relatively useful for making predictions. R square and adjusted R is high; therefore, this implies that there is a high variation that can be explained by the model.

Table 4.2: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.575 ^a	3	.192	11.388	.000 ^b
	Residual	1.379	82	.017		
	Total	1.953	85			
a. Dependent Variable: Implementation of ICT projects						
b. Predictors: (Constant), Technical team, Project planning, Management support and Information technology infrastructure						

The ANOVA results for regression coefficients on Table 4 showed that the significance of the F statistics is 0.000 which is less than 0.05. This implied that there was a significant relationship between technical team, project planning, management support and information technology infrastructure influences implementation of ICT projects in Airtel Rwanda

Table 4.3: Coefficient results showing the relationship between the combined effect

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.455	.231		1.973	.106
	Technical team	.016	.009	.444	1.815	.009
	Project planning	.182	.050	1.231	3.616	.036
	Management support	.153	.017	1.075	3.159	.025
	IT infrastructure	.204	.240	.230	.850	.028

From the data in the above table the established regression equation was

$$Y = 0.455 + 0.016 X_1 + 0.182 X_2 + 0.153 X_3 + 0.204 X_4$$

From the above regression equation, it was revealed that holding technical team, project planning, management support and information technology infrastructure to a constant zero, implementation of ICT projects in Airtel Rwanda would be at 0.455. A unit increase on technical team would lead to increase in implementation of ICT projects in Airtel Rwanda by a factor of 0.016, a unit increase in project planning would lead to increase in implementation of ICT projects in Airtel Rwanda by a factor of 0.182, a unit increase in management support would lead to increase in implementation of ICT

projects in Airtel Rwanda by a factor of 0.153 and unit increase in information technology infrastructure would lead to increase in implementation of ICT projects in Airtel Rwanda by a factor of 0.204.

5. CONCLUSIONS

The findings of this study revealed that there is a significant positive relationship between factors that influence implementation of ICT projects in Rwanda. When combined with Pearson Product Moment Correlation Coefficient the study found that implementation of ICT projects in Rwanda is positively correlated to technical team, project planning, management support and information technology infrastructure. The regression model obtained an adjusted R^2 of 0.701. This implies that, 70.1% of the variations in implementation of ICT projects can be explained by variations in the discussed factors (technical team, project planning, management support and information technology infrastructure) whereas 29.9% of the variations in implementation of ICT projects can be explained by other factors outside of the multiple regression models developed.

Following the findings, the study concluded that technical team is significantly related to implementation of ICT projects. This is evidenced by the correlation analysis that that generated R value of with P value less than 0.01. Firms with experienced technical team would therefore find implementation of ICT projects more achievable compared with firms with unexperienced project team. The finding of the study is consistent with Glaser, (2004) who emphasized the importance of executive support in aligning business with their projects. On the other hand, Gross, (2005) concluded that projects often fail due to improper or poor communication.

Regarding the effect of project planning on implementation of ICT projects the study concluded that project planning affects implementation of ICT projects. This was confirmed through the significant correlation between project planning and implementation of ICT projects realized through correlation analysis.

For any success in ICT project implementation. Effective project management which includes; planning, budgetary, monitoring and evaluation are critical and helps in achieving project goals, thus the need for project managers to remain aware and anticipate change as re-planning is necessary throughout the project. Planning is necessary to develop reasonable project estimates, enhance the management of customer and stakeholder expectations, mitigate project risks, establish and standardize a scope management process to develop concise project scope statements and handle issues consistently.

Additionally, the study concluded that Airtel management support affects implementation of ICT projects. The study revealed a significant correlation between Airtel management support and implementation of ICT projects.

Lastly, the study revealed that IT infrastructure positively influenced implementation of ICT projects.

6. RECOMMENDATIONS

The Researcher recommends that the Airtel Rwanda should pay more attention to the factors influencing the implementation of ICT projects particularly the Business Case as it directly relates the justification and the potential significant business benefits and values to all stakeholders. There is a need for proper leadership and management in all areas to in order to support the project throughout the project cycle. The organizations should adopt more adequate communication systems to ensure there is effective communication flow of information and feedback. This will also facilitate monitoring and evaluation, to ensure that milestones are delivered within time and budget.

On the project Team and Composition, there is a need to equip the team with the necessary trainings in order foster team work. The team composition should also be knowledgeable and skilled for the delivery of the project, and should be all inclusive and representative of all key stakeholders. For ICT projects to be effectively implemented in the Airtel Rwanda Ltd there is a need for a clear and transparent performance incentive system that stipulates rewards for achievement and punishment/sanction for failure to perform.

Project teams should be motivated through incentives and compensation to encourage motivation and productivity towards achieving their results. ICT Project Implementation should be embraced by all employees in Airtel Rwanda Ltd and not be seen as a preserve for top- management and Board only. There is inherent need for change management and culture change to be embraced by all employees and concerned stakeholders hence need for internalization and appreciation of the concept, objectives and expectation of ICT Project implementation through training, and sensitization.

Despite the numerous challenges related to ICT project implementation in the Airtel Rwanda Ltd, the organizations and project managers should learn useful lessons from these failures which will give them an opportunity while focus on areas

which is more likely to fail, thus reducing the possibility for project failure, “while elephants’ projects”. Among the key areas of focus includes; adherence to best practice in project management as a discipline, ensuring that the ICT projects have clear objectives and understanding project trade-offs when making decisions regarding scope change.

Areas for further research:

The further research suggested by the researcher would be to consider a survey on the ICT sector which have been ranked as the best performers in implementing ICT Project Implementation and find out what other factors have influenced them to perform well. The study should include, apart from the ICT Project influencing factors, other factors like the nature of the industry, past profits and organization history, level of competencies of staff, government incentives among others to determine whether they influence the success of ICT Project Implementation in the public sector of developing countries like Rwanda

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