

ASSESSMENT OF FACTORS AFFECTING THE SUCCESSFUL IMPLEMENTATION OF INFORMATION TECHNOLOGY PROJECTS AMONG SELECTED COMMERCIAL BANKS IN ETHIOPIA

Eyasu Desta Abule¹, Girmay Gebray Aduomer²

¹MSc. Candidate, Department of Project Management, Lunar International College, Ethiopia

²College of Computer Science & Electronics Engineering, Hunan University, China

Abstract: Projects in Ethiopian Commercial Banks are directed towards serving customers more efficiently and effectively by reducing costs for the banking institution. The adoption process of experiencing rapid technological innovations actualized through vibrant information technology projects. However, a number of projects in the Ethiopian banking industry show that successful project implementation is a problem. The purpose of this article is to evaluate and analyze factors affecting the successful implementation of information technology projects in Ethiopian commercial banks specifically to examine the influence of project procurement management, to determine the influence of project scope management, to establish the influence of project management methodology, to examine the influence of Executive commitment, to determine the moderating effect of project risk on the factors that affect the implementation of IT projects in Ethiopian commercial banks. Mixed research approach with mixed research design was used in this article. The total numbers of respondents were selected using Simple random sampling technique and the sample size of the article was calculated using [36] model and which was 205. Qualitative data was collected from project managers, IT Directors, Business managers by using an open-ended interview and also quantitative data was gathered by questionnaire comprised of 50 close-ended questions using Likert scale. Out of 205 questionnaires distributed, 190 questionnaires representing 92% were filled and collected. SPSS version 25 was used to facilitate data analysis. Multiple linear regression analysis was used to produce descriptive and inferential statistics. F-tests were employed to test the significance of the overall model while the significance of each specific variable was tested using T-test. The article showed that all the six project implementation factors namely Project procurement management, Project scope management, Project management methodology, Executive commitment, Adequate project cost estimation and budget and Project management and control capability positively influenced implementation of IT projects. However, Project procurement management and Project management methodology were found not to have a significant influence on implementation of IT projects. From the article findings, project risk was found not to have a significant moderating effect on the factors that affect the implementation of information technology projects by commercial banks in Ethiopia.

Keywords: Project scope management; Executive commitment; adequate project cost estimation and budget; Project management and control capability.

1 Introduction

Project management is something that has been practiced for a long time. Until the 1950s, organizations did not make project management a central discipline of their daily operations. Information technology, architecture, manufacturing, and other big fields have contributed to the development of project management as a discipline. In addition, project management in the Information and Technology (IT) sector is only a few decades old, dating back to the introduction of personal computers. Project management is designed to control resources in a specific activity within the limitations of time, cost, acceptable level of performance, and good customer relations for firms executing multiple short-term customer projects. Technology is one of the major forces and dynamic changes affecting the global business environment today, bringing new products, service market opportunities, and the development of more business-oriented information systems that support management processes such as fund management practices, controlling, and coordination [9]. ITs' ability to expand customer base, lower transaction costs, improve response quality and timeliness, expand advertising and branding opportunities, facilitate self-service and service customization, and improve customer communication and relationship management has been viewed as a potential of ITs in the banking sector [11]. This project implementation, particularly in the field of information technology, has had a considerable impact on the growth and development of the banking industry.

The major variables that contribute to project success are aspects that determine whether a project succeeds or fails, and regulating these parameters at the right time increases the likelihood of success [13]. Due to the pressures of successful project implementation in a dynamic global market and ever-changing business world, where continuous innovation is a must in order to achieve competitive advantage, many researchers have approached the struggle to identify critical success factors as a work in progress. However, as [10] point out, there is no broad agreement among scholars and practitioners in identifying essential project success elements. According to [24], the elements considered vital for efficient project implementation vary depending on the type of project and industry, but all of these characteristics have a significant impact on the project's and organization's success.

50,000 projects from around the world were reviewed for the [31]. According to the data, 29% of the initiatives were successful, 52% of the projects were contested, and 19% of the projects were unsuccessful. Lack of project management skills, scope creep, poorly defined objectives, high staff turnover, insufficient resources, poor follow up, insufficient authority given to project

managers, and no common project management methods were identified by project management consultants such as IT Cortex and the American Management Association. The [14] produced research on the execution of IT projects in the banking industry around the world, and found few success stories. Despite the large investments, the majority of banks have expressed unhappiness with their new systems.

Furthermore, as compared to other economically developed countries, Ethiopia's finance industry confronts many of the same challenges and limitations as the financial sectors of other developing countries, according to the World Bank [1]. As a result, financial project management skills have become increasingly important in order to deal with the huge responsibility of managing a big number of projects in today's banking business. According to [8], Ethiopian IT capabilities are still in the early stages of development and are weak in comparison to other Western technologically advanced countries.

In Ethiopia, commercial banks and microfinance institutions are licensed and regulated under the banking laws, as well as rules and prudential principles. The National Bank of Ethiopia, in particular, has the authority to license, monitor, and keep all commercial banks' reserves as well as lend money to them. It also monitors and regulates the interest rates of all commercial banks' loans. The National Bank of Ethiopia (NBE) is responsible for not only formulating and implementing monetary and fiscal policies in the country, but also ensuring that all banking industry players follow the established statutory regulations and standards.

In Ethiopian commercial banks, the development of a strong financial infrastructure has become a top priority, and the National Bank of Ethiopia has been at the forefront of ensuring that effective IT systems are developed and maintained to facilitate smooth payment platform operations and financial market stability [26]. Commercial banks have been rapidly expanding, necessitating technological changes, resulting in more product offerings in the market while leveraging technology investments such as automated clearing houses, better and more versatile core banking systems, self-service online portals, mobile banking, internet banking, and other third-party integrated systems. Examining current activities of selected commercial banks in Ethiopia IT projects, classifying the major factors influencing the successful implementation of IT projects using the IT Project Management Process, and formulating conclusions and recommendations is very helpful to improve the bank's PMO maturity are all critical tasks based on these facts.

2 Literature Review

2.1 Theoretical Review

The chapter develops a theoretical review to justify the need for the current article and the empirical review on the five objectives. The chapter also looks at the knowledge gap.

2.1.1 The concept of project management

Thousands of years have passed since project management was first used. It is concerned with the use of tools, techniques, processes, methodologies, and experience to achieve a project's ultimate goal [29]. While [19] uses the classical definition of project management to define it as the planning, organizing, directing, and monitoring of an organization's resources for a temporary purpose that will eventually achieve particular goals and objectives. All of these definitions refer to project management as a "means to an end." As a result, it entails project planning, organization, monitoring, and control, as well as its own tools and methodologies. The balance of the iron triangle of time, cost, and production, which is a common topic running through the different project management bodies of knowledge, is at the heart of project management. All three components must be present for a management process to be considered project management [28].

Information technology (IT) is an important element of our lives and how we interact with the outside world. Technologies are a burgeoning field that is rapidly changing, with developments occurring in both developed and developing countries around the world. Information systems are at the heart of today's start-ups. IT initiatives must be appropriately scoped and implemented in order to be successful. Despite best practices, specified procedures and methods used in project management, as well as progress and advancement in the project management profession, there are still errors in implementing information system-based projects around the world. The importance of information systems is growing every day around the world, but the failure rate of information systems initiatives remains high.

2.1.2 Theory of Constraints

By reducing uncertainty, the theory of constraints (ToC) focuses on minimizing resource constraints for various undertakings. It can be used to assess project barriers, constraints, and other issues and design a breakthrough solution [35]. Due to imperfect estimates, contingent events, and generally constrained resources, project reality involves dynamic fluctuations. Instead of breaking down the process and enhancing the efficiency of each phase, the organization should focus on project timeframes and identifying the underlying restrictions that prohibit project execution from performing better.

The long-established technique of focusing on task completion does not appear to perform very well in too many circumstances, and for a variety of reasons. As a result, ToC will serve as a foundation for understanding and recommending what project management practices should be changed, what they should be changed to, and how to make the change in order to continuously improve the implementation of information technology projects in the current article.

2.1.3 Systems Theory

Systems theory aims to explain and generate ideas about traits that emerge in complex systems that do not appear to occur in any single system within the entire system [5]. A system is an organized whole made up of multiple components that interact in a way that is distinct from how they interact with other entities and that lasts for a specific amount of time. According to [6], understanding

the components and dynamics of client systems allows us to identify problems and build balanced intervention approaches that maintain the "goodness to fit" between people and their surroundings. Project managers, according to [11], work with complex systems that have multiple stakeholders, nonlinearities, interdependencies, and feedback loops. Nonlinearities are generally unforeseen changes in the scope of the project, firing of key project workers, or termination of project funding arrangements, whereas interdependencies are the interactions between the project team, stakeholders, clients, contractors, and suppliers. The article will be guided by the systems theory in order to understand how diverse project management methodologies interact with one another and how these connections influence the implementation of IT-related projects.

2.1.4 Contingency Theory

Because two projects are not the same, according to contingency theory, they should not be organized and managed in the same way [16]. The concept of contingency theory states that no single management technique will work for all project types [16]. A distinct management technique, or a combination of approaches, may be beneficial to each project that an organization begins. Different project management approaches are used by different project organizations. Contingency theory is significant to this article since it states that different projects require different management strategies and methodologies, all of which are targeted at improving the effectiveness of information technology initiatives. As a result, because it explains all of the variables, this is the article's overarching theory.

2.1.5 Agency Theory

The way procurement managers carry out procurement operations on behalf of donor funding organizations is determined by agency theory. Poor principal agent relationships result in a low level of top management commitment, which has an impact on the connection between institutions and suppliers. Existence of conflict of interest amongst the agents leads to execution of procurement practices against the standard policies which leads to waste of time in tendering and cancelling of tender advertised and loss of procurement funds [32].

According to [39], sometimes conflicts exist between principals and agents; each party acts in its own self-interest; there are frequent similarity between principals and agents; agents are more risk averse than the principal; and efficiency is the effectiveness criterion. Poor principal agent relationships result in a low level of senior/executive commitment, which has an impact on the connection between institutions and suppliers. This article will use this to see how procurement management affects the effective implementation of IT projects in Ethiopian Commercial banks.

2.2 Empirical Review

Several Researchers have placed their empirical evidences about project implementation and factors that affect it. Project planning and controlling refer to the extent to which planning and controlling practices are used in a project. Planning and good process implementation have been shown to have a beneficial association in previous study [38]. Poor planning is likely to be linked to development inefficiencies, resulting in severe budget and time deviations. According to [34], leadership attributes have a beneficial impact on the successful implementation of information technology initiatives. Many argue that better leadership would go a long way toward addressing many of the issues that lead to project failures, resulting in measurable improvements in efficiencies and costs in a multibillion-dollar sector. Similarly, [34] indicated that change management characteristics, vision and mission significantly and positively impacted the effective implementation of information technology projects. Separately, [21] defined organizational culture as a set of fundamental assumptions that a group invents, discovers, or develops as it learns to deal with external adaptation and internal assimilation problems that have proven compelling enough to be taught to new members as the correct way to recognize, think about, and feel about those problems.

Significant user involvement, according to [30], leads to perceived project success in terms of scope, but not in terms of time, cost, or quality. According to [18], a lack of user experience has a significant and negative impact on the quality of work produced, but not on other success factors. Furthermore, [17] revealed that a lack of user experience has a considerable detrimental impact on project performance. This indicates that users should have some level of business domain expertise, training, education, and understanding. [18], on the other hand, found no statistically significant link between user support (willingness) and project implementation success. [38] discovered that while user support increases the likelihood of a project being completed on time and without being redefined or abandoned, it can also raise budget deviations. In a similar study, [22] discovered a statistically significant and favorable link between user collaboration and project success. [17] discovered a strong and favorable link between user support and the performance of information technology products. Communication, empowerment, competence, experience, dedication, and composition of the project team are all important factors in the successful implementation of IT projects. Although these subgroups directly relate to the project teams' competence, the parent organization and the broader business culture that is inherited from it frequently influence some characteristics such as empowerment, team makeup, size, and geographic dispersion [16]. The project team's capacity to communicate successfully may be hampered by the aforementioned variables and organizational boundaries. Previous scholars have indicated that, based on the empirical literature study, it is better to gain a deeper understanding of the elements that influence the effective implementation of projects.

3 RESEARCH METHODOLOGY

3.1 Research approach and design

The article used a mixed research approach, i.e., it will make use of both quantitative and qualitative methods, because mixed method explores a research problem better. Mixed research methodology refers to studies in which quantitative and qualitative data are collected, analyzed, and interpreted in the same article to examine the same underlying issue [7]. A research design, according to [20], is a master plan that describes the methods and procedures for gathering and interpreting the required data. In this article,

the research design is mixed between explanatory, exploratory and descriptive methods. The purpose of the article was exploratory since the article is to assess factors that affect the successful implementation in light of IT projects and understand what is happening in implementation of the projects through use of questionnaire and document review. The article is partly descriptive since it tries to measure the extent of IT projects implementation success. And it is explanatory, because the article examines the relationships between six independent variables, which are project procurement management, project scope management, project management methodology and executive commitment, cost estimation, project management and control capability and one moderator variable which is project risk.

3.2 Sample size

The purpose of sampling is to gain a better understanding of some features or qualities of the total population based on the sample's characteristics. The subjects in this article were chosen in such a way that the existing subgroups in the entire population were more or less replicated in the sample [25]. The method utilized was stratified random sampling, with different departments forming the strata.

Employees in various departments were classified into six strata based on the sampling frame: information technology, human resources, business teams, finance, procurement teams, and research and development teams (see Table 3.3), with each key categorization comprising a stratum. The proportionate stratified sampling method ensures that each stratum is represented in the sample and is more accurate in representing the population's characteristics. The sample size was calculated using [36] model, as illustrated;

Where:

n = Sample size

N = Population size

e = Level of precision/margin of error 0.05 at 95% confidence level

By substituting the values in determining the sample size from the target population are;

$$n = 420 / (1 + 420(0.05)^2)$$

$$n = 420 / (1 + 1.05) = 420 / 2.05$$

$$n = 205$$

3.3 Data sources and collection instruments

This article employed proper data collection methodologies in order to meet the specified objectives. Primary and secondary sources of information were used to compile the data.

Primary data sources: A qualitative data was collected from interviews with project managers and quantitative data was collected through questionnaires from the respondents.

Secondary data sources: Secondary data was gathered from a variety of published and unpublished sources, including books, research papers, literature, written documents, the Internet, journal articles, reports, and thesis papers. This allows you to double-check and validate the primary data's outcome.

To materialize the above analysis, a statistical software package for social science (SPSS) was used to perform the PCA is a statistical estimating technique that includes using descriptive statistics to rank critical elements, computing similarities, unrotated and rotated component matrices, total variance computation, Pearson correlation technique, and covariance.

3.4 Data analysis techniques

The filled questionnaires were cleaned and reviewed for completeness and consistency before being processed. In this paper, the research variables were analyzed utilizing qualitative and quantitative data analysis approaches. This mix of instruments was essential because some of the article's components were qualitative while others were quantitative. Finally, the article's hypotheses were tested using an appropriate statistical test, the F-test. To examine the information, statistical techniques must be applied to quantitative data once it has been collected.

3.4.1 Qualitative Data Analysis

The process of making meaning of text and visual data is known as data analysis [7]. In qualitative research, the researcher gathers extensive information on the phenomena under investigation and attempts to deduce patterns, trends, and linkages from the data. Data preparation was done for the completed surveys before processing the replies, which included editing, coding, cleaning, and entering the data. The researcher jotted down notes, keywords, and phrases, and those that resurfaced were identified and manual themes constructed, establishing the foundation for the analytic codes.

The code categories were developed based on the article's research questions and entered into a computer program, SPSS version 25, with developed pattern codes to group the summaries of data into a smaller number of sets, themes, or constructs, and the researcher analyzed the frequencies of the emerging themes using the program; typically, the frequency of appearance of a particular idea.

3.4.2 Quantitative Data Analysis

Quantitative analysis takes things a step further by putting the theories in the theoretical framework underpinning the article to the test in order to prove or disprove them. Frequencies and central trends were used to assess descriptive data, which was then displayed in the form of tables and pie charts. The investigation of the relationship between the independent variables and the dependent variable was the starting point for inferential evaluation in this article. The moderating effect of project risk on the elements of information technology project execution by selected Ethiopian commercial banks was carried out using the combined influence of the independent variables. According to [4], the article must show that the nature of the association varies as the values of the moderating variable M change in order to confirm that a third variable is having a moderation effect on the link between two

variables X and Y. Multiple regression analysis was utilized to investigate the strength of the association between the individual independent factors and the implementation of IT projects as the dependent variable, as well as how project risk affects that relationship. The direction of the association between the article variables was determined using Pearson's product moment correlation analysis.

3.5 Summated Scale

Summing the answers to questions with Likert scale responses is the usual practice. As per [33], it is possible to construct Summated scales by adding together the numerical codes of answers. The total or the average (mean) score of the variables is used as a replacement variable [11]. The summated scales provide two specific benefits. First, it provides a means of overcoming the measurement error by using multiple variables to reduce the reliance on a single response. Second, summated scales have the ability to represent the multiple aspect of a concept in a single measure. In this article, summated scales are created by adding items under each of the six independent variables (PPM, PSM, PMM, EC, ECB and PMCC).

3.6 Dimensionality

The components must be unidirectional, which means they must be firmly related with each other and represent a single concept, as an underlying premise and important need for generating a summated scale [11]. Factor analyses are one approach to check for dimensionality. This indicates that the relevance of a factor loading is dependent on the sample size. According to this, a loading of 0.722 for a sample size of 50 can be considered significant; for a sample size of 100, the loading should be greater than 0.512; for a sample size of 200, it should be greater than 0.364; for a sample size of 300, it should be greater than 0.298; for a sample size of 600, it should be greater than 0.21; and for a sample size of 1000, it should be greater than 0.162.

4 Data analysis and presentation

The researcher distributed two hundred and five (205) questionnaires out of which one hundred and ninety (190) were filled which represented 92% of the total questionnaires distributed. According to [20], a response rate of 50 percent is considered ordinary, 60 percent to 70 percent is considered adequate, and anything beyond 70 percent is considered good. The response rate of 92 percent was thus excellent, which could be attributed to the data collection procedure used.

4.1 Demographics Information

As the above table indicated that 130 respondents were male representing 68.42% while 60 respondents were female representing 31.58%. This is an indication that the article involves more males. Regarding the age of respondents, majority were between 20 and 30 years constituting 41.6% of total respondents. 26.8% of respondents were between the ages of 30 and 40. Respondents between the ages of 40 and 50 made up 18.9% of the total, while those above the age of 50 made up 12.6 percent. The above table also shows that the majority of the respondents (58.4%) have a bachelor's degree, with 0.5 percent having a certificate, and 41.1 percent having a master's or higher level of education. This shows that the respondents were sufficiently educated to comprehend the questions and, as a result, would provide reliable results.

40% of the respondents have served the organization for 6 to 10 years, 24.7% of the respondents indicated that they have served the company for less than five years, 25.8 % indicated to have served in the organization for eleven to fifteen years, 6.3 % indicated to have served in the organization for sixteen to twenty years, whereas 3.2% of the respondents indicated to have served for greater than twenty-one years.

Regarding the functional department of respondents, there were IT experts (22.1%), procurement management teams (16.8%), business team (6.8%), finance team (16.8%), project management office (11.6%), HR expert (9.5%) and R&D (16.3%).

In terms of job titles, 38.5 percent of respondents are experts (staff), 19.2 percent are officers, 11.5 percent are (head officers, supervisors, and domain experts), and 7.7 percent are supervisors. Because all of the relevant respondents are included in this article, we may conclude that the responses were worthwhile.

Table 4.1 descriptive summary of demographic variables

Gender		
	Frequency	Percent
Male	130	68.4
Female	60	31.6
Age		
	Frequency	Percent
20-30	79	41.6
31-40	51	26.8
41-50	36	18.9
Above 51	24	12.6
Education		
	Frequency	Percent
Certificate	1	.5
Degree	111	58.4
Master	78	41.1
Experience		
	Frequency	Percent
≥5	47	24.7
6-10	76	40.0
11-15	49	25.8
16-20	12	6.3
21 and above	6	3.2
Department		
	Frequency	Percent
IT	42	22.1
procurement management	32	16.8
business team	13	6.8
finance	32	16.8
project office	22	11.6
HR expert	18	9.5
Research and development	31	16.3
Position		
	Frequency	Percent
Junior officer	63	33.2
Senior officer	19	10.0
chief officer	14	7.4
Director	21	11.1
Manager	20	10.5
project manager	9	4.7
staff	44	23.2
Total	190	100.0

* Source: Field survey, 2021

4.2 Implementation of IT projects

The purpose of this article was to analyze the factors of implementation of information technology projects by commercial banks in Ethiopia. This section tries to assess the relationship between each of the independent variables (PPM, PSM, PMM, EC, CEB and PMCC) to the dependent variable of implementation of IT projects. Frequencies and descriptive statistics are presented first, followed by qualitative analysis then inferential statistics. Questionnaire responses were based on a Likert scale which was coded with numerical values for ease of data analysis. 1 meant severely disagree, 2 meant disagree, 3 meant neutral, 4 meant agree, and 5 meant highly agree.

Concerning project procurement management, respondents were given seven statements to score on a Likert scale, with the average result calculated by adding the responses from each statement. The average responses of the respondents demonstrate a high level of agreement, with some respondents' indifference to project procurement management ($M = 3.26$, $S.D = 0.667$). This means that during the implementation process, the selected commercial banks will face project procurement issues. As a result, the selected commercial banks should focus more on project procurement management in order to reap the benefits when the IT project is implemented.

When it came to project scope management, respondents were asked a variety of questions and indicated a degree of agreement that was neutral. Despite the fact that project scope management was critical in the implementation of IT projects, the average replies of respondents were disagreeing and neutral, implying that the majority of respondents were uninterested in project scope management. As a result, the chosen banks should pay more attention to project PSM in order to reap the benefits when the IT projects are implemented. It has the highest rating but the third lowest variation in replies ($M = 3.30$, $S.D = 0.715$), according to the article.

Regarding project management methodology seven questions were presented to the respondents to assess their level of agreement towards the project management methodology. It had the fourth highest rating with fourth highest variation in response ($M=3.07$, $SD=0.652$). From the responses, a number of respondents seemed unsure of the project management methodologies used in their respective banks since there are many methodologies and the respondents were not in a position to comfortably delineate the particular methodologies that were in use. Regarding executive commitments the respondents were asked if upper-level management of the bank routinely backs projects and provides resources, most of the respondents agree that executive commitment is important in implementation of IT projects, the average responses of the respondent show that the majority of the respondent indifference on top executive commitment. It had the fifth highest rating with highest variation in response ($M=3.06$, $SD=0.796$).

This means that the executive management has not played an instrumental role in the implementation process. Thus, the organization should pay more attention to executive commitment in order to realize the benefits after the implementation of IT projects.

The respondents were also asked about adequate project cost estimation and had the third highest rating fifth lowest variation in responses ($M = 3.19$, $S.D = 0.643$). From this the average responses of the respondent show that Ethiopian commercial banks are encountering problems during the execution of IT projects, so they should pay attention for adequate project cost estimation and budget. Again, the respondents were asked about project management and control capability specifically about the tools and procedures for successful project management and the respondents agree on even though the project management and control capability are important for implementation of IT projects, the average responses of the respondent show disagreed and neutral level of agreement, this implies that the majority of the respondent indifference on PMCC. It had the second highest variation in responses ($M = 2.96$, $S.D = 0.692$). This means that the banks are facing challenges concerning project management and control capability during implementation of IT projects.

The article also sought to determine the moderating effect of project risk on the determinants of implementation of information technology projects by commercial banks in Ethiopia.

Again, the respondents were asked to look at different issues that can measure implementation of IT projects. From the responses, it can be seen that the respondent disagreed that the overall implementation of IT projects was successful and effectively implemented. We may deduce from all of the responses that the majority of respondents believe IT projects are experiencing difficulties throughout execution. As a result, the selected commercial banks should devote greater attention to the project in order to reap the benefits after it is completed. Based on criterion-referred definitions of the mean of PPM, PSM PMM, EC, CEB, and PMCC the response for that individual question to those independent variables were neutral level of agreement. The grand or cumulative mean score of the dependent variable implementation of IT projects is 2.71. This implies that all and nearly all have got a neutral level of agreement which indicates that the status of implementation of IT projects in mind of employees has moderate successful implementation.

Table 4.2 descriptive summary of factors that affect the successful implementation of IT projects in selected banks

Project	N	Min	Max	Mean	Std. dev.
Project procurement management	190	1.71	5	3.26	0.667
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	N %	N %	N %	N %	N %
	52 27.3	314 165.3	291 153.1	650 293.1	97 51
Project scope management	N	Min	Max	Mean	Std. dev.
	190	1.57	4.71	3.30	0.715
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	N %	N %	N %	N %	N %
	89 46.7	257 116.8	280 147.3	571 300.5	133 66.8
Project management methodology	N	Min	Max	Mean	Std. dev.
	190	1.43	4.71	3.07	0.652
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	N %	N %	N %	N %	N %
	98 51.5	350 184.2	321 168.9	473 248.9	88 46.1
Executive commitment	N	Min	Max	Mean	Std. dev.
	190	1	4.83	3.06	0.796
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	N %	N %	N %	N %	N %
	99 52.1	329 173.1	197 104	428 214.8	87 45.3
Adequate project cost estimation	N	Min	Max	Mean	Std. dev.
	190	1.40	4.40	3.19	0.643
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	N %	N %	N %	N %	N %
	58 45.8	229 130.5	181 78.9	419 214.2	63 30.6
Project management and control capability	N	Min	Max	Mean	Std. dev.
	190	1.17	4.67	3.03	0.692
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	N %	N %	N %	N %	N %
	87 45.9	335 176.3	238 125.3	414 218	65 35.8
Implementation of IT projects	N	Min	Max	Mean	Std. dev.
	190	1.17	4.67	2.71	0.922
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	N %	N %	N %	N %	N %
	233 122.7	444 233.7	195 102.6	381 201.2	77 40.5

* Source: Field survey, 2021

4.3 Qualitative Analysis

This article employed both qualitative and quantitative means in obtaining data. Arising from the concept of triangulation, data was obtained from respondents through open and closed ended questions. Methodological triangulation entails combining both quantitative and qualitative data collection methods [7], based on the rationale that a single data collection method is insufficient to provide adequate and accurate research results. A wide array of open-ended questions related to the article objectives were included in the questionnaire and content analysis done by use of SPSS version 25.

Regarding project procurement management, respondents were asked about if there is a defined or formalized procurement management procedure for IT projects in their bank. Responses were many and varied, but the average result indicates procedure manuals, risk related contract decisions and activity resource requirements are considered when preparing procurement plan. As can be seen from the average responses, the majority of respondents are uninterested in project procurement management. Nearly 80% of respondents agreed that activity estimate and organizational process asset should be considered, whereas project timeline should be considered only by a small percentage of respondents. It implies that project deliverable time to accomplish project activity are not taken into consideration if resources needed for each project activity are not timely procured the project will be behind the schedule. This result supports the interview response obtained from the procurement managers as well as project managers revealed that Ethiopian commercial banks should pay attention regarding project procurement management.

Concerning project scope management as the result got from the interview showed that there was a defined tools and techniques for defining scope, like facilitated workshops, focus group discussion and interviews with the stakeholder, but there were some problems in the application of proper tools and techniques and in defining activates & result expected. Another question regarding

stakeholder engagement during scope defining process was asked as project managers and division manager confirmed that there was good involvement of stakeholders in the implemented IT projects. But they said also the involvement of stakeholders was not sufficient. In general, from the interview result and from responses of the respondents of the questioner we can see that Ethiopian commercial banks are facing problems regarding project scope management.

Respondents were also asked about project management tools that help to keep track of the bank's IT projects. Almost 70% of respondents expressed their agreement on the methodologies that they apply for different types of IT projects in their banks may vary. They are using mixed project management methodologies but, using customized project management methodologies in all Ethiopian commercial banks was still under question.

Regarding Executive commitment of Ethiopian commercial banks 30% of the respondents confirmed that their banks had expressly provided for continuing and upcoming projects, while 40% averred that their banks accommodated projects as and when they were due. The remaining 30% were not aware of their institutions' working positions. The findings meant that majority of the banks shared their strategic blueprints with project teams which is good for driving the IT projects agenda forward but still there were problems in funding projects and participating in important milestones of projects on the behalf of top management.

Concerning project risk respondents were asked about effect of technological uncertainty the bank's project implementation. 65% of the respondents posited that because technology was fast moving and had many secondary risks including uncertainty and criticality, most of the time it occasioned negative repercussions where an ongoing project became overtaken by emerging technologies or attendant risks became overwhelming.

4.4 Correlation Analysis for the Linear Relationship between the Article Variables

The researcher ran a correlation matrix to establish if there existed a relationship between the variables. Pearson Product Moment Correlation was used for the correlation analysis, with (r) being used to determine the linear relationship between the article variables. According to [25], the correlation coefficient yields a statistic that ranges between -1.0 (perfect negative correlation) to 1.0 (perfect positive correlation) and it shows the magnitude of the relationship between two variables. How big the correlation coefficient value is points to a stronger association between two variables. A zero value of (r) shows that there is no association between two variables. The correlation coefficients were computed for each pair of the variables and the results shown in the correlation matrix (Table 4.3).

Table 4.3: Correlation analysis results from article variables

Project procurement management	Pearson Correlation								
	Sig. (2-tailed)								
	N	190							
Project scope management	Pearson Correlation	.567**	1						
	Sig. (2-tailed)	.000							
	N	190	190						
Project management methodology	Pearson Correlation	.480**	.554**	1					
	Sig. (2-tailed)	.000	.000						
	N	190	190	190					
Executive commitment	Pearson Correlation	.516**	.519**	.550**	1				
	Sig. (2-tailed)	.000	.000	.000					
	N	190	190	190	190				
Project risk	Pearson Correlation	.205**	.179*	.181*	.194**	1			
	Sig. (2-tailed)	.004	.014	.012	.007				
	N	190	190	190	190	190			
Cost estimating and budget	Pearson Correlation	.633**	.634**	.607**	.528**	.289**	1		
	Sig. (2-tailed)	.000	.000	.000	.000	.000			
	N	190	190	190	190	190	190		
Project management and Project control capability	Pearson Correlation	.491**	.613**	.659**	.726**	.323**	.626**	1	
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		
	N	190	190	190	190	190	190	190	
Implementation of IT projects	Pearson Correlation	.512**	.429**	.563**	.665**	.197**	.643**	.677**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
	N	190	190	190	190	190	190	190	190

** Source: Field survey, 2021*

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The findings showed that implementation of IT projects had a high correlation with cost estimating and budgeting (r = .633, p-value < 0.01). That meant that a positive change in cost estimating and budgeting resulted in effective implementation of IT projects. Also, commercial banks that focused on project scope management in projects recorded improved effectiveness in implementation of IT projects as indicated by a significant correlation value (r = .567, p-value < 0.01). The article findings also showed that implementation of IT projects and adoption of project management and control had a relatively significant relationship (r = .491, p-value < 0.01). It showed that banks that embraced project management and control achieved effective implementation of IT projects. Project risk being the moderating variable also showed a weak positive correlation with implementation of IT projects (r = .205, p-value < 0.01). The p-values for project risk were above the criteria of $\alpha < 0.05$ and therefore they were not statistically significant.

4.5 Descriptive Statistics based on Principal Component Analysis

The following table shows descriptive statistics analysis result. It shows the means and standard deviations that is identification of seven critical factors in ascending order of 5-point Likert scale (1=Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly agree). The standard deviations column tells us that there are no exaggerated outliers for among each of the following 7

critical factors. The ‘Analysis N’ tells us the exact number of valid cases and as it is put on the same table the entire sample was included.

Table 4. 4: Descriptive Statistics based on Principal Component Analysis (PCA)

Descriptive Statistics			
	Mean	Std. Deviation	Analysis N
PPM	3.264662	.6674658	190
PSM	3.3023	.71523	190
PMM	3.0774	.65235	190
EC	3.0658	.79621	190
PR	3.5884	.71245	190
CEB	3.1947	.64355	190
PMCC	3.0314	.69275	190
IITP	2.7180	.92283	190

* Source: Field survey, 2021

Similar to the above finding of this paper, according to [35] finding realistic Schedule, effective use of project management skill/methodology, support from top management, clear specification, measurable objective and goals are important towards successful IT project implementation.

4.5.1 Results of Sampling Adequacy and Goodness-of-fit Tests

The Kaiser-Meyer-Olkin measure of sampling adequacy is a quick way to see if the sample is large enough (KMO-test). If the KMO value is more than 0.5, the sample is sufficient (Field 2000: p.446). As a result, based on the KMO test result of 0.875), the amount of sample already considered in this research is judged to be quite suitable. Furthermore, as shown in the table in the Annex section of this article, SPSS computed an anti-image matrix of covariance and correlations. If the sample is enough, all entries on the diagonal of this matrix should be bigger than 0.5.

Table 4.5: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.875
Bartlett's Test of Sphericity	Approx. Chi-Square	810.103
	df	28
	Sig.	.000

* Source: Field survey, 2021

The Goodness-of-fit Test determines if the sample data (correlations) are likely to arise from some correlated factors. In this situation we want the probability value of the Chi-square statistic to be *greater than* the chosen alpha (generally 0.05). Based on our results the five-factor model is a good description of the data [3].

Table 4.6: Goodness-of-fit Test

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	667.515 ^a	572	.003
Likelihood Ratio	461.748	572	1.000
Linear-by-Linear Association	34.814	1	.000
N of Valid Cases	190		
^a . 621 cells (100.0%) have expected count less than 5. The minimum expected count is .01.			

* Source: Field survey, 2021

4.5.2 Communalities

Communalities can be considered of as the R2 for each of the variables that have been included in the analysis, according to [3]. For each item, it represents the proportion of variance explained by the factors. This is calculated and then retrieved from the initial solution. These are reported in the Initial and Extraction, as shown in the table below.

Table 4.7: Extraction method Principal Component Analysis

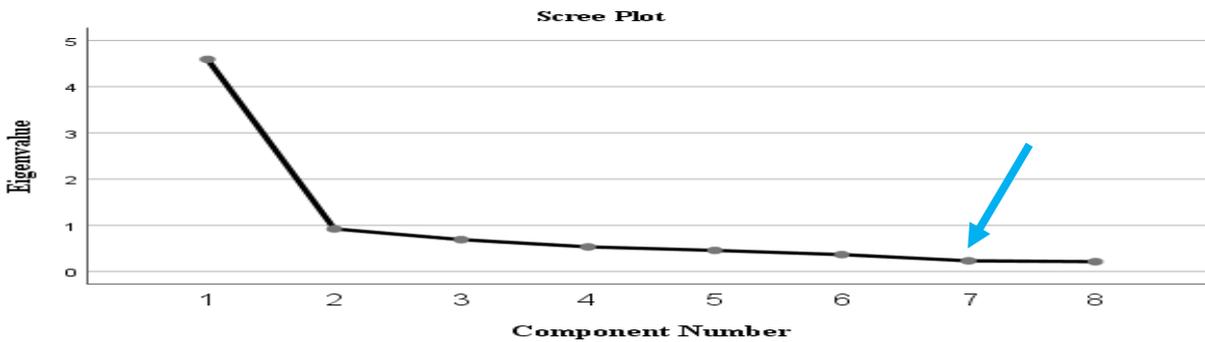
Communalities		
	Initial	Extraction
PPM	1.000	.995
PSM	1.000	.974
PMM	1.000	.993
EC	1.000	.989
PR	1.000	.995
CEB	1.000	.991
PMCC	1.000	.880
IITP	1.000	.972
Extraction Method: Principal Component Analysis.		

* Source: Field survey, 2021

In the above table, initial communalities are estimates of the variance in each variable accounted for by all components or factors. Extraction communalities are estimates of the variance in each variable accounted for by the components in the factor solution. Values less than four wasn't considered in this analysis. As an initial step, a number of components equal to the number of variables are extracted. This means that all of the original variability is explained by the components and communalities are all equal to one. These are the communalities after the number of selected components has been fixed, for instance, according to the eigenvalues above one rule [23]. Precisely speaking, communalities indicate the amount of variance in each variable that is accounted for.

4.5.3 Factor (Component) Extraction

Fig4.1: Scree Plot of Component Number Determination (SPSS Result).



* Source: Field survey, 2021

As it can be seen from the above figure, scree-plot shows all factors before the breaking point. This is the point where the graph is just starts to be flatter. That particular point is found to be seven principal components are valid to be considered for this particular article.

4.5.4 Component Matrix Results

Table below shows the correlation between the item and the unrotated factor (component). For instance, the correlation between Project procurement management and component one is 0.739). These correlations can assist you devise an interpretation of the components. This is through by looking for a common line between the variables that have biggest or higher loadings to the respective factor or component [3].

Table 4.8: Component Matrix^a

	Component						
	1	2	3	4	5	6	7
Project procurement management	.739	-.065	.425	.405	.064	.295	.092
Project scope management	.762	-.109	.396	-.320	.266	-.197	.113
Project management methodology	.782	-.121	-.059	-.361	-.360	.322	-.014
Executive commitment	.801	-.109	-.343	.086	.361	.120	-.256
Project risk	.352	.932	.001	-.011	.014	.043	.009
Adequate cost estimation and budget	.837	.022	.230	.090	-.267	-.283	-.278
Project management and Project control capability	.865	.044	-.249	-.177	.126	-.044	.136
Implementation of IT projects	.799	-.091	-.341	.298	-.184	-.195	.218

Extraction Method: Principal Component Analysis.
a. 7 components extracted.

* Source: Field survey, 2021

The values obtained on the diagonal of the same reproduced correlation matrix cited in the above are presented in the Communalities table in the column labeled extraction. It can be inferred that the extracted components have quite good representation power to the original data.

4.5.5 Factor (Component) Loadings and Factor Scores

The table below shows the rotated component loadings. Five components have been extracted (based on the eigenvalues greater than 1 rule). The loadings explain the relationship (like *correlation*) between the *original variables* and the *extracted factor*, so that they may be interpreted and labeled. The fourth component has positive loadings for both PPM and PSM on the Project implementation.

Table: 4.9 Rotated Component Matrix^a

	Component						
	1	2	3	4	5	6	7
Project procurement management	.190	.192	.239	.167	.889	.088	.197
Project scope management	.112	.194	.872	.210	.255	.051	.228
Project management methodology	.220	.216	.224	.880	.177	.060	.197
Executive commitment	.285	.872	.193	.201	.211	.064	.147
Project risk	.065	.066	.056	.053	.068	.984	.083
Adequate cost estimation and budget	.305	.180	.310	.259	.281	.152	.774
Project management and Project control capability	.491	.478	.448	.377	.085	.231	.079
Implementation of IT projects	.848	.296	.105	.209	.216	.059	.247

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

* Source: Field survey, 2021

The Rotated Component Matrix of Principal Component Analysis (PCA) shows you the factor loadings for each variable. As it is shown in the above table when we move across each row, the factors that each variable loaded on robustly or highly were identified clearly. Whereas, Project procurement management and Project scope management are found to be an overlapping factor (variables loading well on more than one factor). Such occurrence has an implication of the need more subjects than when structure is simple. From the above rotated component matrix result, it can be concluded that most of the variables that measure each of the five components or dimensions that are already extracted in this article. This is simply because almost all of variables considered are well correlated (categorically have a linear relationship) with each of the principal components.

Various researchers' article results revealed different set of or category of factors and level them in terms of dimensions by providing different names. Among others, the following categories or dimensions of variable were found by [15]. Executive commitment dimension is a group of factors towards successful IT project implementation; it incorporates project resources, and vision and mission, and leadership and change management related factors.

4.5.6 Total Variance Explained

As per [27] an excellent factor or component result is one that explains the most variance with a few numbers of factors. Given the Initial Eigenvalues, the first five (5) components or summary scales were meaningful as they have Eigenvalues above 1 (unity). Accordingly, the 1st, 2nd, 3rd, 4th, 5th, 6th and the 7th components found to successfully explain the variance associated with IS/IT project implementation success by 57.394%, 11.521%, 8.621%, 6.661%, 5.699%, 4.566 and 2.882 of respectively and a cumulative total of 97.344%. Whereas, the Extraction Sums of Squared Loadings provides identical information, but it is only based on the extracted factors. The Total Variance Explained analysis result can be found in the annex part.

When we look at the section labeled 'Rotation Sums of Squared Loadings', it can be easily noticed that merely those factors that met your cut-off criterion (extraction method), i.e. five factors with eigenvalues exceeding unity were already selected.

Table 4.10: Interpretation of Output from the Principal Component Analysis Extraction Method

Component	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.592	57.394	57.394	4.592	57.394	57.394	1.235	15.440	15.440
2	.922	11.521	68.915	.922	11.521	68.915	1.234	15.426	30.866
3	.690	8.621	77.536	.690	8.621	77.536	1.216	15.199	46.065
4	.533	6.661	84.197	.533	6.661	84.197	1.142	14.276	60.341
5	.456	5.699	89.896	.456	5.699	89.896	1.069	13.359	73.700
6	.365	4.566	94.463	.365	4.566	94.463	1.067	13.336	87.036
7	.231	2.882	97.344	.231	2.882	97.344	.825	10.308	97.344
8	.212	2.656	100.000						

Extraction Method: Principal Component Analysis.

* Source: Field survey, 2021

The other column named "% of variance" tells us how much of the total variability, i.e. all the variables together, can be accounted for by each of the five factors or summary scales. For instance, factor 1 accounts for 57.394% of the variability in all 7 variables, and the next factors make up 11.521% etc. Based on the rotated component matrix factor loadings, it is tried to characterize each of the factors as to where each variable (the loadings).

Table 4.11: Component Score Coefficient Matrix

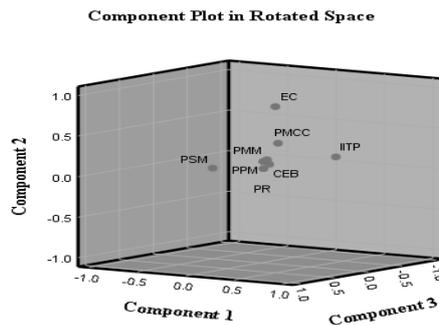
	Component Score Coefficient Matrix						
	Component						
	1	2	3	4	5	6	7
Project procurement management	-.075	.133	-.165	-.052	1.278	-.007	-.361
Project scope management	-.082	-.219	1.202	-.240	-.108	-.070	-.171
Project management methodology	-.264	-.175	-.278	1.312	-.015	-.044	-.120
Executive commitment	-.518	1.357	-.308	-.196	-.054	-.077	.176
Project risk	-.080	-.053	-.074	-.033	-.002	1.012	-.071
Adequate cost estimation and budget	-.239	.011	-.181	-.146	-.250	-.047	1.548
Project management and Project control capability	.427	.093	.415	.079	-.266	.119	-.513
Implementation of IT projects	1.295	-.406	-.115	-.223	-.006	-.081	-.180

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

* Source: Field survey, 2021

The following figure displays the plots of critical (variables) in the rotated factor (component) space. Using other terms, the same figure illustrates how the variables are categorized in the common factor space.

Fig 4.2: Component Plot in Rotated Space



** Source: Field survey, 2021*

The component transformation matrix explains that factor or component 1, 2, 3, 4, 5, 6, and 7 are statistically correlated. Yet, strictly speaking, we do not employ the following component transformation matrix table below for anything, except it is requested orthogonal rotation method (this tells us that factors are not highly correlated with each other). This is, of course, unlike oblique solution that assures that component is correlated each other.

Table 4.12: Component Transformation Matrix

Component Transformation Matrix							
Component	1	2	3	4	5	6	7
1	.437	.431	.419	.405	.362	.201	.334
2	-.076	-.103	-.097	-.118	-.082	.977	-.002
3	-.474	-.481	.422	-.105	.531	-.014	.270
4	.337	.061	-.501	-.528	.575	-.032	.145
5	-.241	.569	.419	-.520	.073	.026	-.408
6	-.360	.179	-.360	.511	.470	.056	-.473
7	.527	-.461	.284	.002	.151	.032	-.636
Extraction Method: Principal Component Analysis.							
Rotation Method: Varimax with Kaiser Normalization.							

** Source: Field survey, 2021*

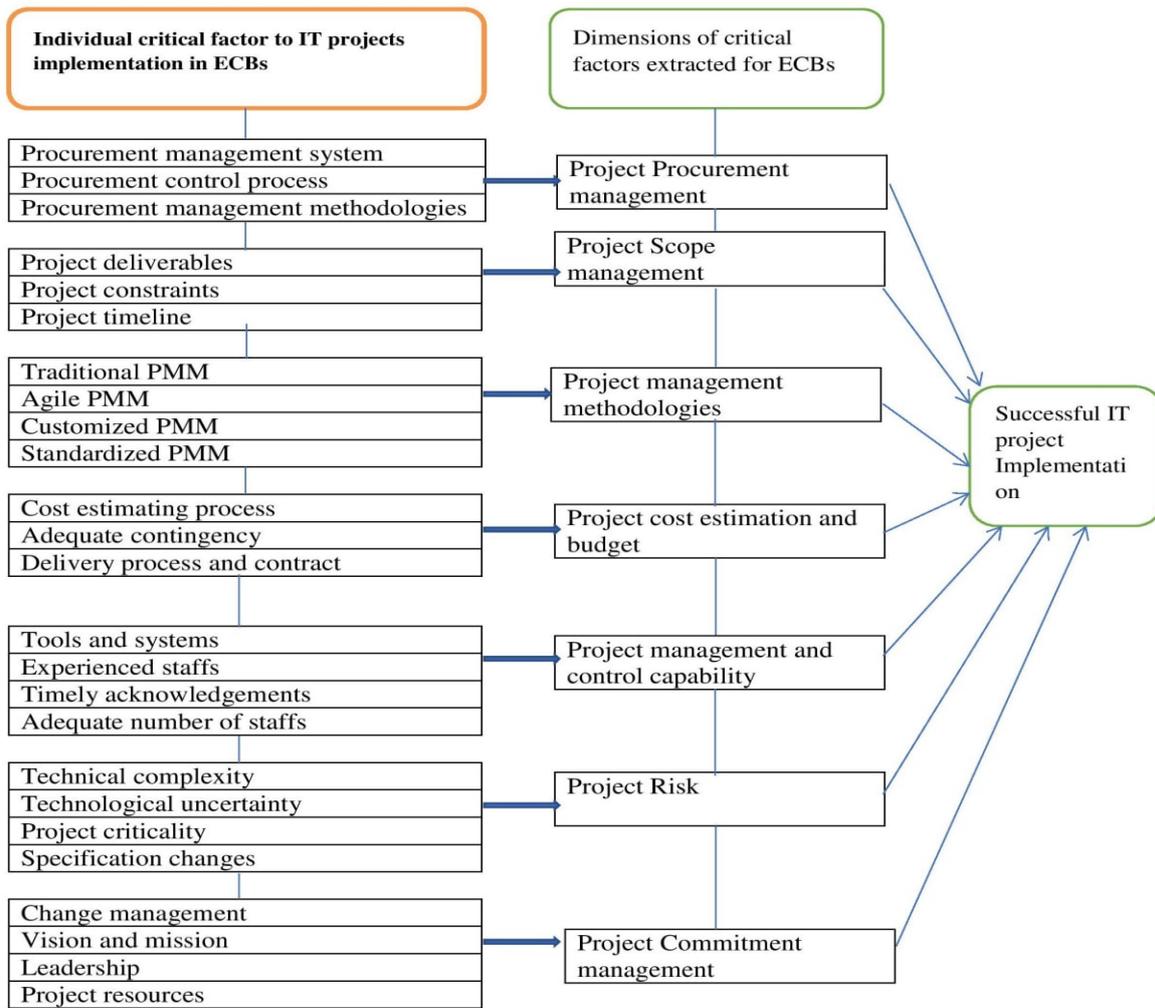
4.7 Discussion of the Results

In this part, the main findings of the data presented in the previous sections were discussed in detail. Some of the key findings of the research were presented and have augmented with results of similar research endeavors in other settings.

4.8 The Model Developed for this article

The following figure shows the diagrammatic representation of IT projects implementation critical factors that was constructed by the researcher regards to the eighteen 7 individual critical success factors and seven (7) extracted principal components that has been explored or identified by the detailed analysis result of this article.

Fig 3: Model developed for the article



* Source: Field survey, 2021

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions of the article

In today's IT-assisted business environment, the financial industry as a whole and commercial bank in particular, cannot afford to fall behind in the rapidly changing business landscape. That is, in response to a request to improve a company's operating processes. This article explores a variety of evidences that are thought to be useful to scholars, professionals, and IT project implementers who are interested in learning more about critical factors for the successful implementation of IT projects.

Given the above points in place, different critical factors have been identified and then analyzed by this article that was believed to matter to the successful implementation of IT projects. In doing so, principal component analysis, including descriptive and other related statistical econometric analysis methods were used. For the same intention the paper analyzes the data gathered from only those employees who have been participated in any IT projects implementation tasks at different position in ECBs and then their respected judgments were computed and analyzed and ranked for the purpose of extracting those factors. And most importantly the overall research data or information gathered were found to be valid or significantly passed all statistically and/or econometrically tests. After different level of detailed analysis, the following conclusions are already made:

Respondents were asked simply to select the top four critical factors that they believed are most associated with successful implementation of IT project in ECBs from their IT project implementation experience within the Banks. From this single question and using simple descriptive article the top most critical factors were discovered. Accordingly, two of critical factors, Project procurement management and Project scope management alone found to be the top two critical factors by their commutative percentage of 68%; followed by 5 critical factors (Project management methodology, executive commitment, Project cost estimation and budget, project risk and project management and control capability). The above five critical factors selected by respondents as a top four critical factors make the above percentage to grow to 97%.

Whereas, regards to the result obtained from the detailed survey questionnaire 50 (fifty) question items using Principal Component Analysis's descriptive statistics based mean computes of each factor i.e. given the 5-point Likert scale Project risk, Project scope management, project procurement management and cost estimation and budget turned out to be the top four critical factors.

Whereas, as per the result obtained from Principal Component Analysis's (PCA's) rotated component matrix the result obtained was found to be consistent with the concluding remark forwarded by [19], resemble to other organizational IT systems. What makes

this article's result consistent is that the PCA's based component or dimensions or group of CSFs extraction method revealed that among the seven extracted major components, merely one of the is found to be technological.

5.2 Recommendations

Based on the empirical findings of this article, the specific comments of the respondents and the researcher's own observation working at the organization for more than a decade and the objectives of the article the following recommendations are provided. These recommendations are believed to help that the banking industry to fully succeed IT projects implementation and as a result increase commercial banks performance in all functional units relative to this system. In order to improve the success of upcoming projects, the researcher recommends the following points. The commercial banks: -

- ◆ The banks need to focus in the areas improving technological infrastructure, business processes and information systems alignments and fitness towards each other.
- ◆ Project procurement management was found to be on the top of all other critical factors and suggested to be a proper move toward s achieving major objectives of successful implementation of IT project implementation. So, it is better for the banks to plan the procurement early helps to have available resource before the activity commences. This contributes completion of the project as per the schedule.
- ◆ It is better for the banks have to know or needs to be informed regards to what really matters most towards a successful IT projects implementation.
- ◆ Top management should strengthen supporting the project from the very beginning and should inform and motivate employees of the company in all stages of IT project implementation.
- ◆ Banks should employ a set of proactive estimating strategies to scope, plan, and constrain their projects' circumstances, as well as to improve their cost and budget estimation practices, decrease and mitigate risks, and boost their project success rate.

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