

# Project Failure in Software Project Management: Lessons from Software Five Projects

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## Abstract

Software Development normally follow a Project Management Life Cycle. By experience it is known that software projects do succeed but many also fail to achieve set objectives, are completed beyond scheduled time and budgets. It is hypothesized that factors leading to success or failure are determined by the presence and interplay of a series of factors. The factors leading to software project failure have been identified. Some of the factors are poor planning, lack of teamwork, unrealistic budget and ambitious schedule estimations, poor communication, lack of stakeholder's involvement and poor leadership. A survey has been carried out on five software projects from a business process company. Data has been analyzed using SPSS. It has been found that if only one of the factors exists, a software project will fail. An appropriate balance and interplay of factors in the appropriate dose increase chances of success, otherwise the risks of failure are considerably increased.

**Keywords:** Software project management, software project failure, software project success, project factors.

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## I. Introduction

“Software is eating the world” as mentioned by Marc Andreessen and software has become important for the day-to-day running of businesses. Due to increase in competition in the global market, many companies implement software projects to take advantage of new opportunities for their businesses. The software business around the world is worth billions of dollars but not all software projects are successful, leading to loss and even closure of businesses.

All software projects start with the thought that the product will be successful. The project manager's initial goal is to deliver on time and on budget. Although these are the main focus when the project begins, project failure has become a popular thing in the Software Industry during the last few years. Project failure is never due to only one specific reason but there may be other factors contributing to it. Due to the difficult and different processes, software project management is very often affected by many problems, the common ones are poor project management, exceeding of budgets, inability to complete the software development within schedule, the poor quality of the software and many developers lack motivation.

Unrealistic project goals, inaccurate estimation of resources, badly or poorly defined requirements, unmanaged risks, poor communication between customers, users and developers, poor project management, stakeholder politics and commercial pressure are the most common causes of failure in software project (Zahid, et al., 2018). The purpose of this study is to analyse and examine the cases of five software projects for a business process company and determine their success and failure factors, and how can the causes of failure be prevented, managed and controlled concerning new projects.

## II. Literature Review

A temporary endeavour, with a beginning and an end, to create a unique product, service or result is referred to a project according to the PMBOK Guide (2017). A project is unique in the sense that it follows a specific set of operations to fulfil a goal. A project is more manageable when split down into tasks, where some activities can be completed at the same time while others require the completion of other activities before they

can begin (José, *et al.*, 2018). Projects have become important components of many businesses' strategic and operational technologies for a variety of reasons(Soderlund, 2005).

## **2.1 Project Management Overview**

Project management is the use of a variety of tools and methods to manage resources in order to produce, within the restrictions of quality, cost and time, a unique product (Olsen, 1971).The successful completion of a project by sticking to a plan, to the budget and meeting the objectives which are simple and attainable is referred to as project management(Al-Hajj & Mario, 2018).To ensure successful project, engineers, who act as managers, have to evaluate all procedures related to a project, that is, planning, implementation and execution (Seymour & Hussein, 2014).

## **2.2 Software Project Management**

Software engineering is the study of a systematic, organized, quantitative approach to the creation, operation and maintenance of software, according to the Software Engineering Body of Knowledge (SWEBOK) Guide(Bourque & Fairley, 2014). Software engineering is not only about writing computer programs but it is a whole process of using a methodology together with, documentations, estimations and planning done by team members till the project is completed. Each of the processes are inter-related and it impacts the final result though the software project is led by its planning(Stellman & Greene, 2005). The use of a proper Software Development Life Cycle (SDLC) approach should be considered for software projects to be successful. It is important to have knowledge of the whole cycle from gathering the requirements to the end results(Sukhoo, *et al.*, 2005). The choice and application of a software development approach reduces the risk and prevent failures, thus, increasing quality(Marinho, *et al.*, 2014).

Project management in software development, which involves budget, and time estimates, project plan and quality management, comprises of a set of tasks that are important in order for a project to be successful(Ferrucci, *et al.*, 2014).Project management is the same for all types of projects be it an engineering or business project.

## **2.3 Project Success and Failure**

There is a wide range of views concerning project success, but many researchers define the success of a project based on agreement and/or on the disagreement of what appears to be what defines project success(Murphy, *et al.*, 1974),(Gemunden & Lechler, 1997), (Müller & Jugdev, 2012).The major factors contributing to a project success include: soundstakeholders' management, communication, project planning, risk management and quality management, and not following these practices may lead to failure.When the completion time of a project exceeds the planned deadline, budget risks occurand the outputs do not meet the company's performance requirements or the stakeholder's requirements, it is considered to be a failure. Additional costs and delays can be tolerated in some cases if the outputs are accepted by the client(El-sokhn & Othman, 2014). A project failure is due to: poor planning, unrealistic estimates, lack of teamwork and poor leadership.

## **III. Methodology**

In this paper, both quantitativeand qualitative research methods have been used to collect and analyse data. The objective of the study isto analyze the factors that contribute to software project failuresand the study has been conducted based on the information gathered from fivesoftware projects, A, B, C, D and E, from business process company. Questionnaires and interviews have been used to collect data.

## **IV. Data Collection**

The questionnaire contains forty-four closed ended questions to be able to retrieve precise information.The questionnaire consisted of nine sections as detailed below:

**Section I:** This section contains the demographic information such as gender, age group, project, role in the company and experience.

**Section II:** This section contains questions about the requirements analysis of the project.

**Section III:** This section contains information about how effectively stakeholder involvement were managed.

**Section IV:** This section contains questions about the communication management in the project.

**Section V:** This section contains questions to assess the team members participation in the project.

**Section VI:** This section contains questions about project management and the planning process.

**Section VII:** This section contains questions about project estimations such as budget, schedule, and effort.

**Section VIII:** This section contains questions about the testing and peer review processes.

**Section IX:** This section contains questions on the overall project performance.

#### **4.1 Pilot Testing**

A pilot test of the questionnaire was carried out on 20 employees. After the pilot test, changes were made to the questionnaire. Some questions that were similar or irrelevant were removed. Certain questions had to be rephrased and those questions with the options for free answers had to be removed and re-formulated for accurate answers. Some questions were confusing according to the respondents and after the pilot test these questions were simplified.

Due to the COVID-19 situation, all the employees were working from home, all the interviews had been conducted via call meeting on Microsoft Teams. Similar questions like the questionnaire were asked but with more open-ended answers.

#### **4.2 Sample Size and Selection**

The sample size has been determined using the Roasoft sample size calculator with a margin error of 5%, a confidence level of 95% and a population of 215. The sample size taken, based on the calculation, is 139

#### **4.3 Reliability and Validity**

The Cronbach's Alpha coefficient is more than 0.7 for all the sections, hence it can be deduced that all the questions are reliable. The P-values which are less than 0.05 were obtained, proved that the results are significant. The critical values for the Pearson's Correlation Coefficient,  $r$ , are above 0.106 showing that the questions are all valid.

### **V. Data Analysis**

Data analysis have been performed using SPSS version 22.64% of the respondents are males and 36% of them are females. 18.0% of them are between 20 and 25 years old, 54% between 26 and 31 years old, 21.6% between 32 and 46 years old and 6.5% above 46 years old. 38.8% of them have 2 to 5 years of experience, 41.7% have 6-10 years of experience and 19.4% have more than 20 years of experience. Among the 139 staff, 6 of them are senior project managers, 10 of them are project manager, 13 of them are team leaders, 57 of them are software developers and 53 of them are software consultants.

31 employees have worked on project A, 38 of them on project B, 29 of them on project C, 15 of them on project D and 26 of them on project E.

65% of the respondents have not received full requirement data at the beginning of the project while 19% are not sure. Only 16% have responded positively, out of 139 respondents. This indicates that the initiation phase of the projects is incomplete as all requirements of a project are gathered in the initiation before moving on to the next phase of the project.

58% of the respondents are of the view that most of the time the clients, themselves, are not sure of what they need as requirements for their software. 75% of them make use of a requirement process tool.

74% of the respondents, indicate that there are frequent modifications in the initial requirements. If complete requirements are not provided during the initial phase, it is obvious that changes will occur during other phases of the project.

Furthermore, 62% of respondents indicate that changes are made later in the project are rarely documented in the formal specifications or technical documents. It can be deduced that with frequent changes, it becomes cumbersome to modify the formal documents for each and every change. This procedure is sometimes overlooked by team members, which might complicate the search for modifications during the maintenance phase. 56% of the respondent are not satisfied with the change management process. Changes (11%) in the execution phase are common but not as recurring. It is quite rare to experience new changes during the execution phase.

Meeting with stakeholders are not held very often in the projects but occasionally and the involvement of stakeholders in projects is also not too high. The most used methods of communication is "Written Documents, Emails, Teams chat, Informal talk". 57% of the respondent show that they do not communicate well within a project.

67.4% of the respondents claim that there is no planned communication strategy for the projects they are involved. Only 48.9% of the respondents agrees that they like to work in a team and there are often

misunderstandings among team members concerning the requirements. 61.6% of the respondents agree that the workload is fairly distributed among themselves.

38% of the respondents state that top management are rarely involved projects and 15% of them mention that top management are never involved but to management ensures that projects are under control most of the time. All of the 5 software projects are using project management tools to do the planning.

Approximately, half of the respondents, agrees that a good risk planning has been carried in the projects. 66.2 % of the respondents state that project monitoring is only done once in a while and 10.6% state that it is done rarely.

More than 50% of the respondents think that resource and budget estimations have not been Based on the data, it can be found that the estimation was underestimated. Resource estimation and Budget estimation had a very low calculated correctly. 11.8% of the have the same view about schedule estimation. 31.5%, 39.4% and 59.8% of them are neutral about resource, budget and schedule estimations.

25.18 % of the respondents claim they have not done test reviews while 30.22% of them seem to not be aware of the test review. Almost all the 5 software projects fail due to one factor but their clients agree to continue till the projects end. The success factor for projects B and D are the highest 72.4% and 73.7% respectively compared to the other projects which are quite low, that is, 8%, 5% and 3.9%. A success factor above 70% does not mean that the project is successful. Projects B and D have been better managed due to the use of an agile methodology.

According to the survey, more than 50% of the respondents claim that the initiation phase and the planning phase are the most challenging phases as these two phases are the longest ones, where the team members attention is required. If these two phases are done right, a project can be saved from failure.

## **VI. Conclusion**

With the increasing number of software project failure, this study explored how different factors of software project management influences software project determining failure or success, with an ultimate goal of finding efficient solution to reduce the number of software project failures. This study was carried out to identify the causes of software project failures in the IT industry in Mauritius. Software project failure is dependent on many variables or combinations of variables. The study has been based on five different software development projects in one company. The factors affecting a software project and that may contribute to failure that have been identified are: poor requirements gathering, poor project planning, lack of stakeholder's involvement, lack of teamwork, unreasonable estimates and poor communication level in the project. If these factors could be addressed on time, the success factor of a project could be considerably. The name of the company and titles of the software projects have not been disclosed due to security and data protection. The study has been limited to only 215 employees but a more reasonable feedback could have been obtained if all the employees of the company and related clients had been involved. Other factors like situational factors, culture, society and political factors could have been considered. These could form the basis for future research.

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