Risk Management in Software Development: Case Study in Afghanistan

Ali Mohammad Amiri[1]

Abstract

Software development industry all around the world, particularly in Afghanistan, is still challenging and battling with frustrating "failure" issues. There are many failure reasons including lack of communication among technical team, leadership, customers and stakeholders, lack of technical team, scheduling etc. which will be discussed in my paper in detail. However, scientists in software development industry researched, found, and suggested many models and methodologies and followed by organizations, software experts and managers to mitigate failure factors and increase success elements but still we are the witness of many software projects failure in Afghan industry.

I conducted fieldwork, published questioners, and interviewed lots of data collectors, software engineers, software developers, testers, trainers, software maintainers, and project managers to find potential risks and main reasons of software projects failures in Afghan industries. At the same time, I suggest to software industry to use the software engineering methodologies that are found as stable and result-based in the context Afghanistan.

Keyword: risk, risk management, Failure, software development, Afghanistan.

[1]Dean of Computer Science, Zawul institute of Higher Education
alimohammad.amiri1212@gmail.com

1.Introduction

This paper covered basic issues of software project failure because of risk management overall. Background section mentioned problems and challenges in front of software projects in Afghan industry. In this challenging environment, characterized by limited infrastructure, political instability, and security concerns, effective risk management becomes crucial for project success. The specific context and challenges of the Afghan software development landscape necessitate a comprehensive understanding of risk management practices.

Through a selected software development project in Afghanistan, this case study explores the identification, analysis, and mitigation of risks encountered during the project's lifecycle. By evaluating the implemented risk management strategies, we aim to assess their effectiveness in overcoming uncertainties and achieving project objectives.

The findings from this case study provide valuable insights into the significance of risk management in the Afghan software development context, offering guidance for future projects in similar settings. By understanding the specific risks faced and the strategies employed to address them, stakeholders can develop more effective risk management practices. finally, this case study serves as a valuable resource for data collectors, software engineers, software developers, testers, trainers, and software maintainers, involved in software development projects in Afghanistan and similar contexts.

1.1 Background of the Study

Software development is a very lengthy process. In software development industry, it is believed that design and development of software engineering projects are easy, but, successful implementation of the projects is not trivial (Abe & Sakamura, 2022). Software projects, everywhere particularly in Afghanistan are facing with different bans and barriers and success implementation of software development life cycle (SDLC) needs lots of efforts. As Afghanistan crossed three decades' destructive war and lots almost all of its infrastructure, so

implementation and running of all the projects specially, software engineering projects are so much difficult.

Most of the projects are suspended, delayed and or are failed. There are many reasons which caused the projects to be delayed or even failed. Sometimes, client or end users are not satisfied from the delivered projects. The reasons are that they are not involved in process of software development from beginning till the end. When project is developed and shared with them, the project could not fulfil the customers' needs. Thus, we focused on most of the mentioned problems to guide the readers of this paper to use them for completion and success implementation of the projects in Afghanistan ministries. In Afghanistan, software projects area is divided in two parts: private sectors and public or governmental organizations (ministries). As situation of software projects are a little bit good in private sectors (Abe & Sakamura, 2022), so, I focus on implementation of the software projects in Afghanistan governmental ministries.

As I talked on the barriers against software engineering projects in Afghan industry. In the software project, the barriers are called "risks". This paper is focusing mainly software project Failure risks management in Afghanistan industry.

To manage all stages of software development process, we need to classify them according to SDLC model such as communication, feasibility study, data collection, data analysis, designing, coding or development, integration, testing, training, and maintenance. This topic is selected because many problems exist in implementation of software projects in some of Afghan industry (Castellan Systems, 2022).

1.2 Problem Description

The problems emerged when many software projects were failed in Afghanistan. Based on my experience with the Afghan industry, there are many reasons of failure which are mentioned. Audience of this paper are software people like designers, developers, engineers, and managers. It mostly focused and failure and success factors in a software project management (Boehm,2022).

1.3 Research Objectives

The most focused point of this research is to find out all the challenges, problems, and barriers against software projects failure in Afghanistan. This research is trying to help Communicators, Data Collectors, Designers, Developers, Testers,

Software Architects, Project Managers, IT Consultants, Researchers, Sales Representatives, Business Owners, and Customers or Product Owners by finding out the challenges which appear as risks against software projects.

this research clarifies for private and public companies, software developers, freelancers, project managers, and computer scientists the advantages of implementing risk management process and steps in their projects, and the time that should be avoided during that implementation, and that is by evaluating the connection between risk management issue and project success in the selected ministries.

1.4 Research Questions

The proposed research question for this paper is:

"How to manage risks in software project – a case study in Afghanistan?"

1.4 **Scope of the Study**

I decided to focus my research on governmental offices and private offices which are implanting IT and software projects. The reasons are because I have seen many challenges, problems, and barriers against software projects in Afghanistan ministries.

I selected two areas as samples among all the other ones. Government Ministry and Private office as the major IT and software project executer in whole Afghanistan and private office among all the non-ICT ones in the country (Castellan Systems, 2022).

The research mostly focused on the risks which prevent success of the software projects the selected organizations. At the same time, the paper will suggest some solution to better manage software projects in Afghanistan.

2. Risk Management in Software Development

An essential component of software development is risk management, focused on identifying, evaluating, and mitigating potential risks that could hinder project success. It involves a systematic process of recognizing risks, assessing their severity and likelihood, and devising strategies to minimize their impact. Continuous monitoring and control of risks are essential throughout the project lifecycle, with prompt actions taken to address them effectively. Thorough documentation of risks ensures transparency and facilitates informed decision-making. By proactively managing risks, software development teams can optimize project outcomes, delivering top-notch software within the allocated resources and timeline.

2.1. Identify the Risk

Discover, recognize and describe risks that might affect on software projects badly. All the steps of risk identification in software engineering are explained in mythology section (Castellan Systems, 2022). identified that there is not a single reason for the software project failures, according to the three authors there is a list of the risks cause project failure. The possible identified risks are listed as bellow (Boehm ,2022).

- organizational structure.
- Ambitious or vague objectives.
- software that fails to meet the real business needs.
- badly defined system requirements, user requirements and requirements specification.
- the project management process, poor project management.
- software development methodologies, sloppy development practices.
- scheduling and project budget.
- inaccurate estimates of needed resources.
- poor reporting of the project status.
- inability to handle project complexity.
- unmanaged risks.
- poor communication among customers, developers and users.

- use of immature technology.
- stakeholder politics.
- commercial pressures.
- customer dissatisfaction.
- product quality.
- leadership, upper management support.
- personality conflicts.
- business processes and resources.
- Inadequate tracking devices.
- incorrect deadlines

2.2 Analyze the risk

When the possible risks in software projects are identified, then we must determine its consequences and possible occurrence. In this step we must have an understating of nature of the identified risks. in this step, the identified risks are recognized generally into negative and positive categories (Anil, and Thomasson, 2022).

2.3 Stochastic methods in risk assessment

Stochastic methods are used for predicting proclivities of risks in software rejects, such as time-series analysis (for example weather and environment forecasting, risk in implantation stage of software project and ect.) (Abe, J, Sakamura, 2022). Monte Carlo is one of the Stochastic methods which is explained as bellow:

Monte Carlo is a broad class of computational algorithms which rely on repeated random sampling to get numerical results. Their necessary idea is using randomness to solve problems and issues that might be deterministic in principle. According to Vladimira Osakdska, Monte Carlo uses the following matrix to analyze and predict the possible risks in software engineering projects (Vladimíra OSADSKÁ, 2017).

2.4 Evaluate or Rank the Risk

In this step, we must look in detail into the possible risks in software engineering projects. The found risks are categorized into acceptable risks or the risks which is not a big threat in our software

project. And serious risks, the one which is a big threat against our project. This category of the risks can effect on our project and these should be ranked in the list to be handled and controlled (Castellan Systems, 2022).

2.5 Treat the Risk – response planning

After evaluation of the identified risks, all the risks with highest possibility of occurrence should be highlighted, prioritized. a clear operation plan must be prepared to control and monitor the risks. in another word, a mitigation strategy is required to control risk or in some cases, change them to opportunities (Castellan Systems, 2022).

3. **Methodology**

methodology as backbone of the research. As Risk management in software Development in Afghanistan as research target. so, to collect primary data from different department and employees and also based on study of many papers, survey is selected as main methodology.

3.1 Research Design

The current descriptive research benefits qualitative method to conduct the study (D. A. Dillman, J. D. Smyth, and L. M. Christian). states descriptive research design as a type of research which is primarily concerned with describing the nature or condition and the degree in detail of the existing situation.

3.2 Method Description

A Survey method is one of the most popular methods to collect primary data from individuals. In the other word, it is questioning individuals in a specific area on a topic or collection of topics and then describing their responses in order to achieve specific result. Sometimes, survey method of primary data collection is used to test concepts, reflect behavior of people, determine the level of customer satisfaction, establish segmentation research and a collection of other purposes (D. A. Dillman, J. D. Smyth, and L. M. Christian,2014). This is method is used in two side of studies: quantitative and qualitative. The quantitative aspect is focusing quantity of data and qualitative is

underlying on quality of the collected data. According to the author, survey can be done by one of the following ways:

3.2.1 Sampling Size

From total of 50 designers, developers, managers, and heads of the departments who work are directly involved software projects, 30 were selected.

Survey methods	Description
Questionnaires	It is mostly used to gather large amount of information in a short time. It is useful if number of participants are more than enough.
Interviews	The number of participants is not too much, then we can use from interview in order to collect data from them. In this section, we can talk to one person or a group of people but limited at the same time.
Mail survey	This method, first we con design our questions and then the designed questions could be sent through email to specific group of people to respond them.
Telephone survey	It is a little bit time consuming. Because surveyor calls to each participant and read the questions to them to take their responses.
Social Media	It is one of the recent methods which is used recently in the survey. In this method, first the questions should be designed, then these will be published on the internet to a huge number of participants. The problem with this method is that analyzing of the collected data needs a complex statistical management system to analyze and achieve a result.

3.2.2 Questionnaire:

Questioner in survey method is used to ask specific questions from known research participants. it useful when respondents in the research

are not too much (Briman, A, and Bell, E 2015). In my paper, many papers with specific questions are distributed among the respondents to get a single result in risk management in software development in Afghanistan.

3.2.3 Questionnaire Design:

In the following table, risks divided into two categories; first, type of the risk which bolded and numbered. Second, the risks which are sub categorized. Those are without numbers bellow of the categories (Chaos Reports ,1995).

Each of the following risks in template of risks will be asked from the participants and they are scored in four main categories: Bad, Good, Very Good and Excellent. Bad is the lowest percentage and excellent is the highest level of project success which are implemented in software projects in Afghanistan (Briman, A, and Bell, E 2015).

4. Analysis and Findings

Survey is methodology of this research. Questionnaires, Interviews, Mail survey, Telephone survey and social media are called as ways to do a survey. My interview and questioner results will be presented in this paper. It begins with questioner section of the survey, where I display result of survey which the data is collected from 30 skilled and professional employees of private and governmental office. Questioner section, I have assigned 21 questions to be ranked by the participants. In second section of result, interview result will be presented. In that section, result of an interview which is discussed with some software development experts will be presented.

4.1 Interview Result:

First, I asked from Eng. Abbas Atae to tell me about percentage of failure and success of software projects in the ministry. According to him, there are many software projects which are implemented in the ministry. One of the projects which are faced with failure are websites of Ministry of Higher Education and 10 public universities.

He continued; the websites were developed by a USAID project with a large amount of money, but the project did not continue more than two

years. Abbas Atae mentioned the following issues and risks against the software project:

- ✓ Lack of electricity
- ✓ Lack of permanent internet connection
- ✓ Lack of software and IT expert to control server room
- ✓ Management Problem
- ✓ Weak Coordination
- ✓ Weak commitment
- ✓ inadequate testing and quality assurance

5. Conclusion:

The purpose of this section is to search the root causes of project failures with reliable evidence.to determine whether risk management in software development influences or affects software project success or not and, if yes, then how much.

As a result of the research findings which were conducted by questionnaire distribution and interview with the experts, this research presented an essential participation to the literature by doing research and investigating the effects of risk management in software development on the practical side of project success. I would like to tell the readers that the project's success is not guaranteed by the implementation of a software risk management approach and procedures. When utilized effectively, risk management is a technique that improves project success. However, if you follow the procedures carefully, they can lead you to the success level.

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