MANAGING HUMAN FACTOR IN PROJECT MANAGEMENT FAILURE

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THESIS AND DEFENSE APPROVAL FORM

The undersigned certify that they have read the following thesis, examined the defense, are satisfied with overall exam performance, and recommend the thesis to the Faculty of Engineering and Computer Sciences for acceptance.

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Candidate of **Master of Science in Software Engineering (MSSE)** at the National University of Modern Languages do hereby declare that the thesis **Managing Human Factor in Project Management Failure** submitted by me in partial fulfillment of MSSE degree, is my original work, and has not been submitted or published earlier. I also solemnly declare that it shall not, in future, be submitted by me for obtaining any other degree from this or any other university or institution. I also understand that if evidence of plagiarism is found in my thesis/dissertation at any stage, even after the award of a degree, the work may be cancelled and the degree revoked.

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ABSTRACT

Managing Human Factor in Project Management Failure

The objective of any computer program advancement extend is to convey the program item on time, inside the concurred budget, and with the capabilities anticipated by the client. Shockingly, this objective is seldom accomplished. Understanding human components in program advancement, on the other hand, might offer assistance colossally in coming to this goal contribution. Overview of human coordination challenges that affect software development are presented in this thesis. Everyone wants their project to succeed, but not everyone succeeds. Similarly, because the best-trained managers are not always the most effective, some project managers are regularly more successful than others. Project success and failure are determined by the people who make up the project team. When only one person is involved in a project, it is simple, but when working on a long-term project, scientific principles and methods for software development are required, more people will be involved that straight away leads to project failure as Software failures are caused due to bugs, ambiguities, oversights and misinterpretation of software projects. In this research thesis the failures caused by human factor, identifying all the human factor and then managing human factor by identifying gaps and giving mitigation guidelines will be identified. Failure in software project management has also been highlighted as being dependent on team makeup, team communication, and management team role.

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LIST OF ABBREVATION

SPM	-	Software Project Management
IEEE	-	Institute of Electrical and Electronics Engineers
IT	-	Information Technology
LR	-	Literature Review

ACKNOWLEDGEMENT

First of all, I wish to express my gratitude and deep appreciation to Almighty Allah, who made this study possible and successful. This study would not be accomplished unless the honest espousal that was extended from several sources for which I would like to express my sincere thankfulness and gratitude. Yet, there were significant contributors for my attained success, and I cannot forget their input, especially my research supervisor, Dr. Basit Shahzad, who did not leave any stone unturned to guide me during my research journey.

I shall also acknowledge the extended assistance from the administrations of Department of Software Engineering who supported me all through my research experience and simplified the challenges I faced. For all whom I did not mention but I shall not neglect their significant contribution, thanks for everything.

DEDICATION

This research is dedicated to my beloved parents and teachers throughout my career in education, whose good examples taught me to work hard for my goals, not only to love me unconditionally.

CHAPTER 1

INTRODUCTION

1.1 Overview

Everyone wants Project Success but not everyone gets it. Why certain project managers seem to have more success than others? Managers with the best training aren't usually the most effective. Project managers that put people first—those on their project team, others in their company, and their clients—are more likely to have consistent project success.Today, however, Software Engineering is concerned with figuring out how to create useable software at predictable costs and in a predictable time period. There isn't much to say when the challenges are basic or when only one person is engaged, building software to satisfy their own needs, and we're still a long way from establishing any scientific rules for software development. As a result, today's software engineering focuses on well-tested heuristics for generating software to solve complex problems involving a large number of people, such as users, analysts, programmers, managers, and so on. As a result, the majority of concerns in Software Engineering are associated with human interactions rather than software creation.

A project, by definition, is about creating something new. When something new is introduced into an organization, it produces organizational change.[2]In other words, organizational change is a natural aspect of projects and should be managed as such. What is the purpose of organizational change? It's about human change, to paraphrase President Clinton's presidential campaign slogan.

The majority of software development initiatives are done in groups. As a result, team member disagreements are unavoidable. Many software projects involve a number of different companies, each with its own set of interests. Between software developers and the management team, there is usually a sense of alienation.

In this research human factors will be identified that play vital role in project success and then mitigation strategies will be proposed to overcome the failure of a software project. Mitigation refers to reducing risk of loss from the occurrence of any undesirable event.

1.2 Problem Statement

The human factor is important in every step of software development life cycle. It provides broader view of system and it is expected that if the utilization of human factor can be improved the software development activities become mature and software failure is reduced. At the same time if the human factor is not well focused it may lead to project failure. In this research we will identify the failures caused by human factor and its different attributes and present a strategy to improve the success of software management of a project. [1]

1.3 Research Questions

Two research questions have been proposed.

RQ1: what are different human related factors which can affect project success?

RQ2: what are the mitigation strategies to reduce the failure of a project caused by human factor?

1.4 Aim of the Research

This study will look at all of the human elements that play a part in the development of a project, as well as how those factors might be minimized using various solutions provided by experts.

1.5 Research objectives

These are the following objectives of this research.

1. To review existing studies and critically evaluate the relevance of existing factors in project management failure, and to identify human factors affecting the success of project management in software engineering.
2. To propose a mitigation guideline to remove the challenges to achieve success of project management.

1.6 Thesis Organization

The next chapter, Chapter 02, is a literature review in which all of the facts are presented in detail and backed up by expert studies. This chapter provides Bibliometric analysis, which includes all relevant study details. It illustrates how quantitative and qualitative research is combined in mixed method research. The survey design approach and recommendations are presented in a step-by-step manner. In addition, a focus group is held for qualitative analysis, so all steps are described. The results are discussed in Chapter 04, which includes all of the survey and focus group results.

These findings are then scrutinized one by one.In Chapter 05, the results of both quantitative and qualitative methods are analyzed. A comparison of two approaches is undertaken to identify the reasonable outcomes.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

In this chapter detailed analysis of the previous literature have been done and all the factors are enlisted that have been found by the experts in the past and are going to support the research done in this paper. According to the literature, a lot of work has been done on project management failure, but there are a lot of areas that need to be examined and will be focused on the impact of the human component, which are issues that arise during the project management process.

According to Fredrick Mugambi Muthengi [3], the goal of any software development project is to deliver the software product on schedule, on budget, and with the capabilities that the customer expects. Unfortunately, this objective is rarely met. In software development, it's important to understand the human factor, on the other hand, can be quite beneficial. Human factors are important components that influence the ultimate software system's quality. Internal challenges in the development team also have an impact on the amount of time spent on the development process. In this project, I'm particularly interested in the perspective of organizations. Because software development is such a large and broad topic, several references are provided for those interested in learning more about additional human factor difficulties in software development.

According to “Gezinus J. Hidding and John Nicholas” [13] High I.T. project failure rates are attributed to the previous paradigm, as espoused by organizations such as PMBOK. The following new paradigm was born as a result of discussions with an expert panel: Value-Driven Change Leadership (VDCL). The purpose of this study is to conduct empirical research in order to determine the impact of the new paradigm on I.T. project expenses.

Uncertainty, risk, and rework make fulfilling goals and delivering expected value in complex projects extremely challenging, according to Tyson R. Browning" [4], and standard methods for planning and measuring created value do not account for these aspects. The analogy of a "high jumper" can be used to think about how high a project's "bar" (defined goals) is placed, and hence how difficult and dangerous it will be to fulfil. The percentage of a project's value that is at risk is determined by its capacity to "jump" (clear the bar and fulfil its objectives) (VaR). Project managers may design a project for optimal levels of value, risk, and opportunity by understanding the amounts of each.

Software managers are commonly tasked with overseeing and managing many projects at the same time, according to Iman Attarzadeh and Siew Hock Ow [5]. While some projects were completed successfully, others were delayed, went over budget, or were cancelled. To mention a few issues, this project failed owing to a lack of user interaction, poor planning, inadequate requirements, a lack of resources, and poor cost estimation. To help manage and ensure project success, a variety of project planning and scheduling methodologies are available. To mention a few issues, this project failed owing to a lack of user interaction, poor planning, inadequate requirements, a lack of resources, and poor cost estimation.

According to Emily Winter, Steve Forshaw, and Maria Angela Ferrario [6], human values such as status, social fairness, and financial success have an impact on software development decisions. While some traits are difficult to quantify due to their subjective nature, our research is focused on their impact on software. Contribute to scientific understanding and empirical evaluation of human values by using software engineering. We use social psychology to investigate values as mental representations on three levels: system (L1), personal (L2), and instantiation (L3) (L3). We produce and develop a variety of tools for understanding values at various levels, with a special emphasis on the Values Explorer's invention, development, and use.

Vittal S. Anantatmula [10]developed a project manager performance model that illustrates the As part of this research, The interdependencies between crucial critical components can be utilized as a template for integrating technological systems and tools to efficiently manage

projects. Project managers can use technology to help them manage project teams and projects more effectively. The use of technology to integrate will also aid in the project management life cycle being shortened.

As Sarah Thew and Alistair Sutcliffe [15] established, the VBRE technique is unique in that It is the first paper to provide a taxonomy and analytic method for dealing with socio-political concerns in RE, as a supplement to nonfunctional requirement analysis. By focusing on individual stakeholders' VME, the method incorporates new concerns into the RE process. Building on our previous work on user-centered RE, the assessment of stakeholders' values has implications for RE process management as well as providing input into the establishment of requirements for personalization and customization.

Muhammad Fahimullah, Yasir Faheem and Naveed Ahmad [16] The proposed model offers project managers a decision-making tool to assist them in selecting the best partner for a successful partnership. It allows businesses to develop collaborations in a range of situations. They used a Shapley value-based cooperative game to simulate their strategic interaction for cooperation formation and profit sharing, with the goal of improving the overall payoff provided by an alliance and ensuring a fair allocation among participating firms. Our model gives cooperating businesses equal negotiating power and a fair distribution of resources based on their individual contributions. Despite the fact that collaborative development improves the product's value, not all collaborations succeed.

Eddie Fisher [17] proved that Given the multiple challenges that project managers encounter, It is clear that one area where they can make significant changes is in the management of people. On their own, skills, including their applications, do not produce an effective people project manager. One's actions determine the outcome. Project managers must utilise certain behaviours for each talent to make these skills fully successful. The implementation of these is critical and serves as the catalyst for becoming a great people project manager.

“Xianhai Meng and Paul Boyd” [19] stated that in today's construction industry, project-based relationship management is becoming increasingly important. According to this empirical study, project managers make a major contribution to relationship management in

project environments. The internal relations components is intra-organizational communication and trust.

“Amr Mossalam, Mohamad Arafa” [20] concluded that benefits realisation management has become a significant project driver, and it is becoming more common to judge a project's success based on its benefits rather than its deliverables or traditional time, cost, and scope criteria. According to the researchers' survey, among other practises and systems, there is a notable absence of benefit management techniques adoption at the project level compared to the programme level. A comprehensive governance framework that correctly handles benefits must be in place to put this concept into effect.

“Steve Paton, Damian Hodgson, and Svetlana Cicmil” [21] study the kinds of tensions that arise inside the Project management plays a vital role as a primary carrier of post-bureaucracy. The goal of this research is to look into two different areas of a person's metamorphosis into a project manager: first, what factors influence this transformation; and second, what factors affect this transformation. To assist technical people in making the move to project managers, and to shed light on the conflicts and obstacles I've encountered in my new role.

“N Pettersen” [22] presented that although project management is largely a practical subject, its approach should be based on the most accurate representations of reality, and thus on principles that enable greater awareness and foresight of that reality, as well as appropriate action in response to it. Here are a few suggestions, some of which are simple to implement. To begin, a high level of scientific rigour should be encouraged by collecting empirical data in a systematic manner and employing tried and reliable analytical frameworks and precise conceptual definitions. Second, samples may be subjected to more stringent controls. The number of subjects, their geographical origins, functions, hierarchical level, and other factors are all taken into consideration.

“Rumyana Proynova , Barbara Paech , Andreas Wicht , Thomas Wetter” [21] discussed The notion of personal values underpins a technique for assisting the RE process. We want to accomplish two things. He wanted to give the data we'll need to put our strategy into action, such as a library of frequent value-requirement correlations. We are now working on the first set of empirical studies. Simultaneously, we widen our research to include literature on technical acceptability in information systems. We'll use the information from our first round of interviews to develop hypotheses about the relationships between certain values and criteria. We'll collect data from new study participants in subsequent rounds to evaluate our hypotheses.

“Hamed Taherdoost A,B , Abolfazl Keshavarzsaleh” [23] stated that in IT projects, Project managers should actively evaluate if the project can meet all demands and fulfil all acceptability testing criteria mechanisms, as well as the final agreement project manager's title. It could be rejected from the market if it fails to pass the essential user acceptability test as the client's most powerful organism. We anticipate more studies on user approval, as it has conducted multiple investigations and developed a lot of management ways. concentrating on components that influence end-user acceptance in order to boost the project's rate of completion success on a broad scale, especially in new markets such as E-services and Web 2.0.

“Simon Hettrick and Neil Chue Hong” [12] stated that taken separately, None of the achievements indicate a major shift in how academics think about or use research tools. The combined weight of the two accomplishments, however, has improved on four goals that we believe are critical to advancing high-quality software-assisted research. There will be no progress toward any of the objectives until the research community recognizes the importance of research software and the limitations it encounters.

Working with the organisations who most want change can help us harness beneficial friends and drastically increase the impact of the Institute's limited resources. Finally, it is the responsibility of researchers to ensure that the software they use is of acceptable quality for their research, therefore providing the appropriate skills is vital.

“Assem Al-Hajj and Mario M. Zraunig” [24] stated that Project success is a subjective indicator, regardless of the specific success criteria and conditions. Without a sure, none of the activities examined indicate project success. utilizing project management tools and processes Every construction project can benefit from a set of common project success measures, project management methodology is used by the vast majority of project managers. Project management has a positive impact on project success because project management principles and practices are widely used in successful projects. The majority of the projects that were evaluated were successful.

“Andrea L. Lorden, Yichen Zhang, Szu-Hsuan Lin & Murray J” [25] authors stated that in each of the four topics, we looked for components of the three sociotechnical constructs: communication, leadership, and workload. They also point out that the communication, leadership, and workload balance differed by subject, with the specific balance determining the success or failure of quality programmers. They also remark that the right balance of constructions for success varies based on the unique situation within a theme. Change fatigue and the need for change to occur at a moderate speed, which is one of the aims of lean initiatives, were frequently mentioned by health system management. Of course, some safety hazards necessitate immediate and dramatic action, but where practical, the health system manager adopted the tortoise approach to healthcare quality improvement, thinking that slow and steady wins the race.

2.2 Search Process

The search is meticulously carried out in order to retrieve relevant research studies. The research papers are collected using seven electronic databases. To find the information, a list of keywords is utilized to search internet databases. To locate all studies that are linked, the search keywords are employed in a variety of methods.Kitchenham [11] provides guidelines for constructing search strings.

Below are the search terms that were used to discover related research studies.

- Human factors
- Project management failure
- Software failure factor
- Human factor Role

The quality of primary research initiatives is assessed using quality assessment criteria (QAC). The Quality Assessment Criteria (QAC) are a series of research questions that are used to evaluate the quality of a research investigation. Based on the research questions, each study is awarded a score. [37].Dyba et al. provided quality assessment standards in the form of a checklist. As part of the SLR, the major goal of these evaluation criteria is to find and evaluate the most relevant research studies.

2.3 Quality Assessment Criteria

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Dyba et al. provided quality assessment standards in the form of a checklist. As part of the SLR, the major goal of these evaluation criteria is to find and evaluate the most relevant research studies.

2.4 Data Synthesis

Based on empirical support, specified human factor features, and scalability and complexity difficulties, data relating to many project management failure variables will be explored in

this SLR. Preliminary research into the methodologies and aspects described will aid in the resolution of any research concerns. RQ1 will help in finding out different human factors that affect success of a project.RQ2 focuses on how to mitigate these factors to achieve maximum results.

Table *2. 1: Bibliometric Analysis of Human Factors*

No #	Title	Author	Problem	Advantages	Limitations	Year
1	"Human coordination factors in software engineering"	"Fredrick Mugambi Muthengi"	Examine the human variables that influence software development.	It contributes to software development in a variety of settings, including open source and commercial software development projects.	Communication, team makeup, and management roles are not covered in detail.	2014
2	"Reducing I.T. Project Management Failures: A Research Proposal"	"Gezinus J. Hidding, John Nicholas"	formulation of a new paradigm "Value-Driven Change Leadership (VDCL)" to overcome problems in traditional paradigm	Following the VDCL (value driven change leadership) principles increases the chances of a project's success, and following them leads to fewer project failures.	empirical investigation yielded no outcomes.	2009
3	"Planning, Tracking, and Reducing a Complex Project's Value at Risk"	"Tyson R. Browning"	A approach for planning and tracking cost, schedule, and technical performance (or quality) in terms of a project's core value qualities and risks to them is presented.	It distinguishes between four forms of value and two sorts of dangers in general.	The concept takes a different approach to project management, requiring initiatives to demonstrate their value from the start rather than assuming it exists until they fail.	2018
4	"Project Management Practices: The Criteria for Success or Failure"	"Iman Attarzadeh, Siew HockOw"	Identify the factors that influence project success and failure from 50 undergraduate students	There are three types of resolutions for projects. project success, project challenged, project impaired.	Some of the techniques may not be appropriate for certain applications. Techniques are not identified	2008
5	"Advancing the Study of Human Values in Software Engineering"	"Emily Winter, Stephen Forshaw, Lucy Hunt, and Maria Angela Ferrario"	Two key ideas will be presented: first, the relevance of values as separate from, but related to, ethics; and second, the requirement for formal theoretical frameworks for	outlined two ideas for furthering the study of human values in software development	Revealed first findings from a Values Q-Sort tool created to response to these concepts	2019

			values research.			
6	"Measuring Human Values in Software Engineering"	"Emily Winter, Steve Forshaw, and Maria Angela Ferrario"	To aid in the scientific understanding and empirical investigation of human values in software engineering.	Based on social psychology, we investigate values as mental representations on three levels: system (L1), personal (L2), and instantiation (L3) (L3).	Using the tales gathered to supplement the statistical analyses. With the possibility of this method being adopted more widely	2018
7	"Decision-Making in Software Project Management: A Qualitative Case Study of a Private Organization"	"José Adson O. G. da Cunha, Fabio Q. B. da Silva"	In order to increase project management effectiveness, researchers want to learn more about how SPMs make decisions based on how they interpret their work experiences, as well as the antecedents and consequences of such decisions.	The information was processed utilising grounded theory techniques.	Because software projects are inherently uncertain and dynamic, the SPMs concentrate on making, monitoring, and altering decisions based on evidence.	2016
8	"The Role of Technology in the Project Manager Performance Model"	"Vittal S. Anantatmula"	The importance of people-related project performance elements is identified.	To further understand the links between these variables and improve the performance of a project management model, structured personal interviews were undertaken to collect data.	It can be used as a model for integrating technology systems and tools into project management.	2008
9	"Project Manager Leadership Role in Improving Project Performance"	"Vittal S. Anantatmula"	The importance of people-related project performance elements is identified.	A project manager leadership and management model was developed using surveys and organised, personal interviews.	Management actions that are required for defining and monitoring project results have been identified.	2010
10	"Project Manager Skill Development: A Survey of Programs and Practitioners"	"Thomas A. Carbone & Sampson Gholston"	to help project managers bridge the gap between their existing training and the abilities they need	It comprises the results of a poll of current project management practitioners on project management training.	A system for mentoring and coaching newly hired and trained staff must be in place.	2015

11	"Requirements, Human Values, and the Development Technology Landscape"	"Jeffrey C. Carver, Leandro L. Minku, and Birgit Penzenstadler"	to assist developers in determining the present state of development technology	Association rule mining, community detection, and natural-language processing are utilised to create a graph of the development technology ecosystem.	The associated information on the internet is frequently out of current or too fragmented to be easily combined into a larger picture.	2017
12	"Value-based requirements engineering: method and experience"	"Sarah Thew, Alistair Sutcliffe"	Second, case study implementations of RE value analysis in real-world industrial practise, with novices and RE pros evaluating the website and technique.	The validation studies demonstrate how the technique effectively identifies and analyses value-related challenges, demonstrating its acceptance for industrial practitioners.	The small number of case studies poses a threat to validity, limiting the generalizability of our findings.	2017
13	"Collaboration Formation and Profit Sharing Between Software Development Firms"	"muhammad fahimullah, yasir faheem, naveed ahmad"	to increase the total payment generated by an alliance and to distribute it fairly among collaborating companies	Selecting the right partner is critical to cooperatively producing high-quality software products that pay off for businesses.	Second, case study implementations of RE value analysis in real-world industrial practise, with novices and RE pros evaluating the website and technique.	2019
14	"What practitioners consider to be the skills and behaviours of an effective people project manager"	"Eddie Fisher"	People management is one area where project managers may make significant changes.	a deeper understanding of what constitutes a good people project manager in the eyes of practitioners	The study was confined to project managers in the telecommunications, engineering, consulting, and banking industries.	2019
15	"Towards a Systematic Study of Values in SE: Tools for	"Emily Winter, Stephen Forshaw, Lucy Hunt, and Maria Angela	the continuation of existing research into the systematic examination of human values in software engineering	Theoretical framework based on value research in social psychology. Second, we provide tools created in accordance with this paradigm, as well as the	how these technologies could be improved and applied in the SE industry and education	2019

	Industry and Education"	Ferrario"		context in which they are used.		
16	"Relationships Between Project Size, Agile Practices, and Successful Software Development"	"Magne Jørgensen"	Agile methodologies are used on both large and small software projects.	Flexible scope and frequent delivery to production, as well as in situations where requirements change often. Agile projects tend to have more skilled providers and clients, which could be a contributing factor.	If agile projects attract more skilled suppliers or clients, this could add to the difference between agile and nonagile projects.	2019
17	"The role of the project manager in relationship management"	"Xianhai Meng, Paul Boyd"	Determine the positions of 18 project managers for internal relationship management (IRM) and 18 project managers for external relationship management (ERM)	Traditional project management, which emphasises planning and control, has been replaced by a new project management approach that emphasises people and collaboration.	The quantity of completed questionnaires and interviews is still insufficient.	2017
18	"The role of project manager in benefits realization management as a project constraint/driver"	"Amr Mossalam, Mohamad Arafa"	to look into the level of awareness and execution of project-level benefits management vs. other organisational governance techniques in various organisations	A real-life situation was presented, detailing how it was planned to implement, how it was implemented, and the problems that were encountered.,	Examples of benefits measurements were proposed as a practical instrument for implementation, and they would play an active part in monitoring the possible project benefits.	2014
19	"Who am I and what am I doing here? Becoming and being a project manager"	"Steve Paton, Damian Hodgson"	to scientifically analyse the nature of tensions that occur within the process of becoming a manager in a post-bureaucratic organisation by focusing on the emergence of project management	It aims to illuminate the conflicts and problems that come with this new role by addressing two aspects of individual transformation into project manager: first, it tries to understand the precise variables that drive the transformation of technical specialists into project	The study method is empirically rich but exploratory, providing suggestions and motivation for future in-depth studies in specific circumstances.	2016

				managers, and second, it tries to understand the precise variables that drive the transformation of technical specialists into project managers.		
20	"What do we know about the Effective project manager?"	"N Pettersen"	to summarize the prerequisites for effective project management	Although project management is mostly an applied profession, its strategies should be founded on the most accurate representations of reality.	Because of the multiple methodological flaws that limit their value, they cannot be considered totally satisfactory..	2010
21	"Use of Personal Values in Requirements Engineering – A Research Preview"	"Rumyana Proynova , Barbara Paech , Andreas Wicht , Thomas Wetter"	to look at stakeholders' broader personal values and attitudes and see how they connect to software needs	present a value elicitation technique that may be used in conjunction with existing requirements elicitation techniques to infer new software requirements concepts and limitations.	acquire data from new study participants to test our hypotheses	2018
22	"Managing Successful IT Project; Marketing Perspective"	"Hamed Taherdoost A,B , Abolfazl Keshavarzsaleh "	When it comes to managing end-user expectations and acceptability, there are several aspects to consider. The final deliverables of IT project marketing are linked to perceptions of service quality and consumer expectations, according to marketing literature.	A comprehensive and in-depth theoretical study was conducted to investigate the research proposal, with an emphasis on user approval, user expectations, and product marketing for the final IT project's product	The project will fail if the system fails to meet stakeholder requirements, expectations, or values.	2015
23	"Measuring the success of the Software Sustainability Institute"	"Simon Hettrick and Neil Chue Hong"	Getting software on the research agenda is a difficult task. Communities who wish to change are aided. Increasing your abilities,	The Policy theme identifies key issues affecting the research community and organizes efforts to raise awareness and find answers to such challenges.	Although the Institute is unable to work with all research software, we can offer our expertise and time to a chosen set of people	2014

			Enhancing software		who will serve as role models for the rest of the community.	
24	"The Impact of Project Management Implementation on the Successful Completion of Projects in Construction"	"Assem Al-Hajj and Mario M. Zraunig"	Without the use of project management tools and processes, none of the surveyed projects show project success.	Although evidence shows that project practitioners may not always use project management tools and procedures to their full potential, the vast majority of project managers use project management methodology.	Implying that there may be a set of universal elements that lead to project success. Factors that have not been identified.	2018
25	"The importance of human skills in project management professional development"	"M. Alam, A. Gale, M. Brown, A.I. Khan"	to shed light on the significance of human skills in project management success, as well as the apparent focus placed on them in higher education	An analysis of the effectiveness of a case study from the British Project Management Professional Development Programme (PMPDP) is presented..	It would be incorrect to extrapolate the case study program's effects to other industries.	2018
26	"Measures of Success: The Role of Human Factors in Lean Implementation in Healthcare"	"Andrea L. Lorden, Yichen Zhang, Szu-Hsuan Lin & Murray J"	Managers must handle the complicated relationship of communication, leadership, and workload.	Three crucial sociotechnical variables identified by the authors as critical to the success of a lean implementation in the healthcare industry are communication, leadership, and workload.	Concerns about safety that need to be addressed right away.	2014
27	"Software Project Management Practices: Failure Versus Success"	"Capers Jones"	Successful projects excel at planning, estimating, change management, and quality control, among other things.	The most crucial software development tactics that lead to success include planning and estimating before the project begins, absorbing changing requirements during the project, and successfully limiting bugs or defects.	A lack of quality control, as well as estimates that did not anticipate or handle change well.	2004
28	"Top ten reasons for	"Jiju Antony, Sandeep	to give Lean and Six Sigma practitioners and researchers	Chief operating officers and senior executives of various	The top 10 factors in this analysis are solely	2018

	process improvement project failures”	Gupta”	with the top 10 reasons for process improvement project cancellation or failure.	companies can use these top ten causes to develop project failure risk mitigation plans and save considerable money associated with project terminations or failures in other conditions.	based on literature and the writers' opinions.	
29	“The Causes of Project Failure”	“jeffrey k. pinto and samuel j. mantel, jr”	to see if three contingency The reasons for project failure were influenced by three factors: 1) how project failure was defined; 2) the type of project being implemented; and 3) the project's life cycle position.	shown empirical support for a multi-dimensional model of project failure that takes into account both internal and external factors.	the findings of the The study's project implementation critical aspects only accounted for roughly 40% of the variance in project failure reasons, according to stepwise regression analysis.	2007
30	“Reasons for Success and Failure in Offshore Software Development Projects”	“Matthias Fabriek, Mischa van den Brand, Sjaak Brinkkemper”	examines both successful and unsuccessful offshore custom software development (CSD) initiatives.	implies that a project manager for a new offshore CSD project should focus on planning and informal mutual adjustment rather than standards in order to be effective.	The successful projects did not highlight the implementation of standards as a major cause for success, and the failing initiatives did not mention it as a major reason for failure.	2008

2.5 Summary

In this chapter first systematic review on project management failure factors have been done. Different Human factors have been identified that are the causes of project management failure. 30 papers have been reviewed from the previous literature that includes Managing People, Managing Project, Resource management, Project Risk Management and Configuration Management. Different areas have been also reviewed to mitigate these factors and strategies have been proposed to be used.

CHAPTER 3

METHODOLOGY

3.1 Introduction

The term "methodology" refers to a thorough, theoretical analysis of the processes utilized in a field of inquiry. It involves a theoretical evaluation of a set of techniques and concepts relevant to a specific subject of study. The phrases paradigm, theoretical model, phases, and quantitative and qualitative techniques are frequently used [40]. The research approach is heavily influenced by the nature of the research issue. In this study, we will validate the criteria that determine project management success. We conducted a literature review before undertaking this study to establish the factors that contribute to project management failure. [33].

3.2 Research Motivation

According to the literature, a lot of work has been done on project management failure, but there are a lot of areas that need to be examined and will be focused on the impact of the human component, which is issues that arise during the project management process.

Existing methods are unable to cover all of the important and necessary aspects of human dynamics. In order to determine the required technical, business, and client elements, an SLR is required. This SLR will aid in the creation of a hybrid solution for producing high-quality software while removing human elements that can impede a project's success. This study provides a thorough examination of the technical, business, and client elements of present methodologies. In addition, parts that are essential but are not supported by current methodologies are reported.

3.3 SLR Protocols

A comprehensive literature review is conducted using kitchen ham criteria. It's "a means of reviewing and understanding all available research relating to a specific research question, topic area, or phenomenon of interest," according to an SLR. [31]To begin, a methodology for doing this SLR is being developed. Figure 1 depicts the examination technique. The review procedure includes seven research phases:

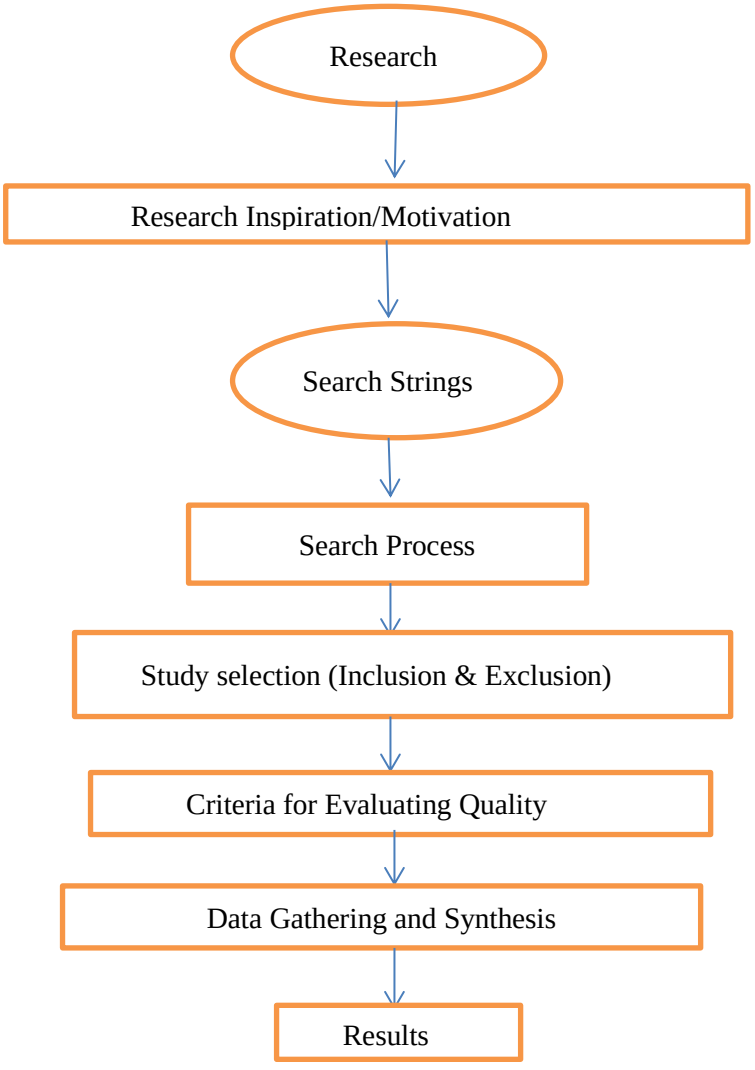


Fig 3.1 Research Phases

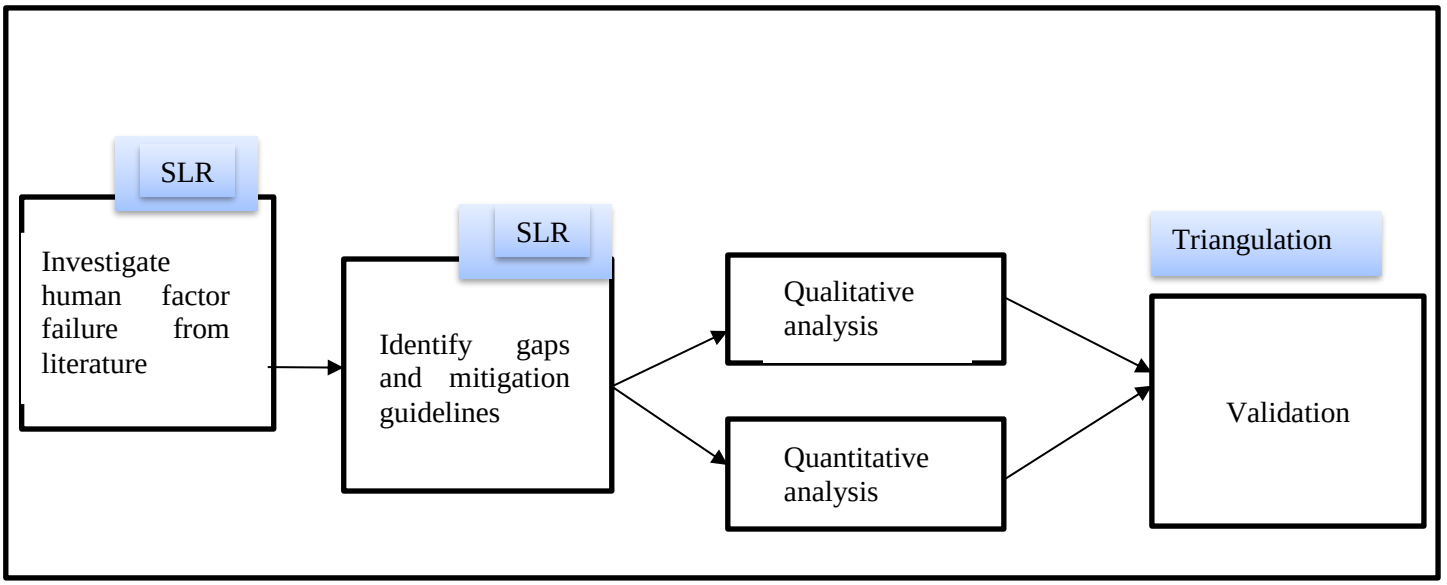
To find out about the research, different electronic databases are used. Figure 1 Examine procedure 33 research that are relevant to the focused problem domain. The study articles, on the other hand, are analysed utilising seven internet databases. ACM, IEEE Xplore digital library, Google search, Wiley interscience, ISI web of knowledge, and Metapress were among the electronic databases analyzed. During the search process, many research studies are developed; however, only the linked research studies must be sorted out. To locate the most relevant publications, the research process is shortened, and filtering is done using pre-defined insertion and deletion criteria.

3.4 Research Methodology

The outcomes will be conducted using a mixed methodology approach. SLR (Systematic Literature Review) is systematic strategy to collecting secondary data, critically analyzing research studies, and subjectively or quantitatively synthesizing the findings is used in this sort of literature review. These are meant to provide a complete, up-to-date summary of current evidence relevant to a research topic. A systematic literature review is made up of several different tasks. This document breaks down the processes of a systematic review into three main sections: The review will be planned, carried out, and the findings will be reported. In the realm of software engineering, there are seven research steps in the review method.

(i) Formulate research question
(ii) Choose a database for your search.
(iii) Create a search string
(iv) Assemble research papers
(v) Papers are included and excluded based on a set of criteria.
(vi) Assemble literature
(vii) Content study of the literature in a qualitative manner.

FIGURE 3.2 TRIANGULATION APPROACH



The scope is limited to:

1. Identification of all the failures
2. Project management failures in software projects only
3. The extent to which human factor affects the success of the project.

The strategy of gathering and investigating mathematical information is known as quantitative exploration. It can likewise be utilized to search for patterns and midpoints, anticipate. Quantitative research approaches may be used in explanatory, co-relational, or empirical studies [28]. In contrast to quantitative research, qualitative approach doesn't really necessitate the collection and analysis of numerical data for statistical data. Qualitative research is used to learn more about people's perspectives. Theoretical framework, ethnographic, action research, phenomenological study, and research methodology is a systematic are all common approaches.

They have certain similarities, but their goals and perspectives are indeed very different.

3.5 Research Strategy

We will first identify the causes through a literature analysis, then analyses them using a questionnaire survey, and then give a mitigation strategy to address those issues through a focus group.

3.5.1 Quantitative Research

The most common way of gathering and investigating mathematical information is known as quantitative exploration. It tends to be utilized to search for examples and midpoints, expect occasions, investigate causal linkages, and extrapolate results to bigger gatherings. Quantitative exploration approaches might be utilized in graphic, correlational, or test considers. We just need a general point of view of our review factors in graphic examination. We check out the connections between the factors in our review in correlational examination. We search for a circumstances and logical results connection between factors in an exploratory examination. [41]

3.5.2 Qualitative Research

In subjective examination, non-mathematical information is gathered and assessed to more readily get ideas, sentiments, or encounters (e.g., message, video, or sound). It tends to be used to get a more profound comprehension of a subject or to create new examination thoughts.

Models incorporate grounded hypothesis, ethnography, activity research, and phenomenological research.

1. Focus groups: posing questions to a group of people and provoking debate.
2. Surveys: Questionnaires with open-ended inquiries are sent out.
3. Secondary research: Data accumulated through texts, photos, sound or video accounts, and different sources.

3.5.3 Mixed Method Research

"Mixed methods research, which is a conceptual and practical synthesis of qualitative and quantitative research, is the third methodological or research paradigm." [42]

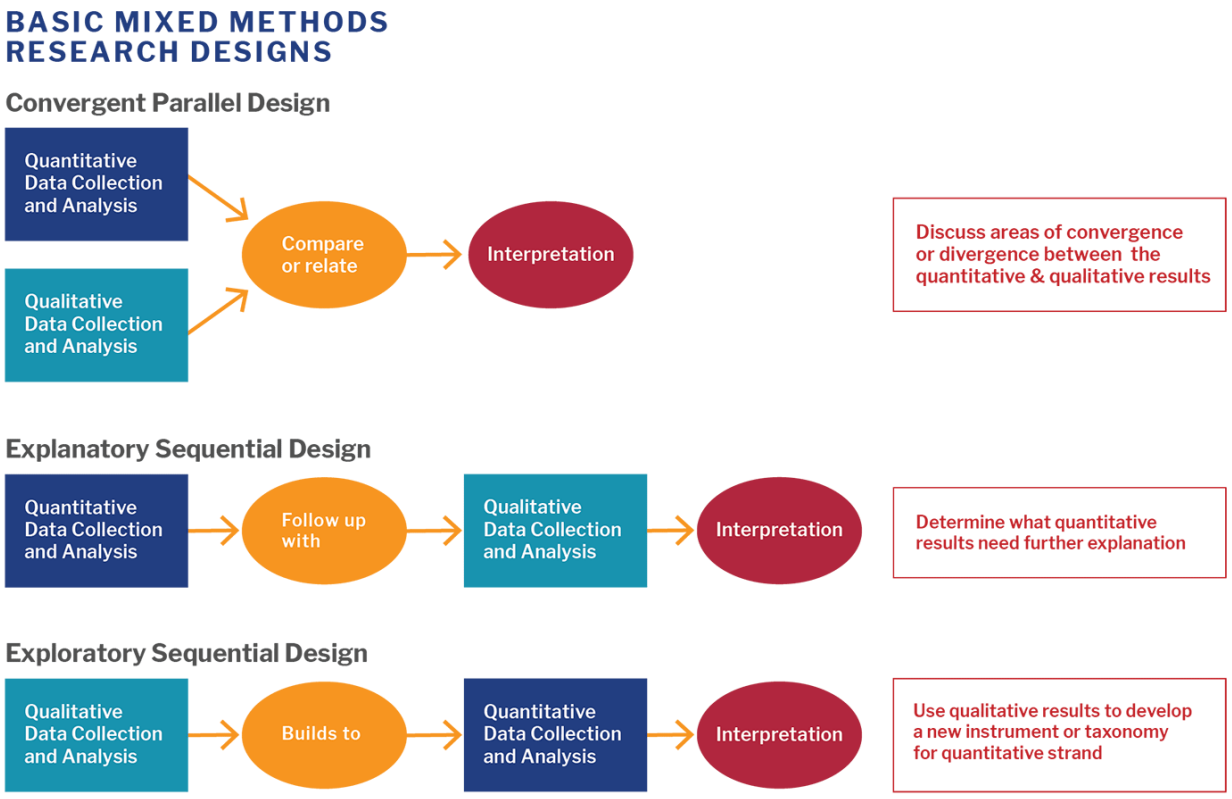


FIGURE 3.3 BASIC MIXED METHODS RESEARCH DESIGNS

A broad research goal can be best handled using a variety of methodologies. This technical briefing explains how the mixed-methods family of empirical software engineering approaches can be formed by combining quantitative and qualitative empirical research methodologies.

3.6 Research Context and Justification

First, we'll do a systematic literature review to identify project success issues,and then, using a questionnaire that we'll distribute to industry and professional responses, we'll develop a list of all of those challenges, as well as a mitigation approach to solve them.To start with, we'll do an efficient writing audit to recognize project achievement issues, and afterward, utilizing a survey that we'll disperse to industry and expert reactions, we'll foster a rundown of those difficulties, just as a relief way to deal with settle them.

3.7 Methods and Respondent's Profiles (Survey)

The major objective of the inquiry is to conduct internal inquiries. The quality of the questionnaire employed has a direct impact on the survey's results and conclusions. The quantitative gathering of a population's behavioral and attitudinal characteristics, which allows for uniform interpretation of the data, is the strength of survey research.

3.7.1 Top-down approach/bottom-up approach

The survey's goal should be specified in the formulations, either as a statement of the desired outcome or as a series of "What, how, and why" questions that break down the problems or concerns of relevance [36]. The research questions go into greater depth about the study's objectives. Van Hersch et al. [37] conducted a survey to learn more about how software architects think in order to "understand the thinking process that industrial software engineering practitioners use while architecting." By comparing it to previous studies, Van Hersch et al. break down the goal into study questions.

3.7.2 Sample Size

A survey of large population of respondents has been conducted; it's not realistically possible to get answers or results from absolutely everyone. So a random sample of individuals has been taken which represented the population as a whole from the field of software. This study will have a sample size of 275 qualified respondents in order to collect answers to all of the questions.

To choose the correct sample size, it is needed to consider a few different factors that affect the research, and gain a basic understanding of the statistics involved. a sample size formula is used to bring everything together and sample confidently, knowing that there is a high probability that the survey is statistically accurate.

Sample size variables:

1- Population size

Defines how many people will be involved in total?

2- Margin of error (confidence interval)

Errors are inevitable – then how much errors can be considered. The margin of error, AKA confidence interval, is expressed in terms of mean numbers. It is defined that how much difference is allowed between the mean number of the sample and the mean number of the population.

3- Confidence level

This is a separate step to the similarly-named confidence interval in step 2. It deals with how confident it is a want to be that the actual mean falls within the margin of error. The most common confidence intervals are 90% confident, 95% confident and 99% confident.

4- Standard deviation

This step asks to estimate how much the responses to be received that will vary from each other and from the mean number. A low standard deviation means that all the values will be clustered around the mean number, whereas a high standard deviation means they are spread out across a much wider range with very small and very large outlying figures.

Necessary Sample Size = (z-score)2 * stdDev * (1-StdDev)/ (margin of errors)2

In this research the assumptions chosen are:

95% confidence level, 5 standard deviation and a margin of error (confidence interval) of +/- 5%.

=((1.96)2 x .5(.5)) / (.05)2

=(2.78x .25) / .0025

=.9604 / .0025

=274.16

275 respondents needed.

3.7.3 Survey Medium

Internet has revolutionized survey research for good. This particular medium is favored so much by the general masses. Basic needs to attempt this online survey include a computer/mobile with an access to the internet. Not only are they cost-effective but also provided services with quality.

To direct overview the medium will be following:

- University
- In person
- Social Media
- Software Organizations

3.7.4 Survey Instrument

The study's outcomes and ends are straightforwardly impacted by the nature of the survey utilized. The quantitative social occasion of a populace's conduct and attitudinal attributes, which considers dependable information translation, is study exploration's center strength.

3.7.5 Response format

The reaction of the respondents will be gathered through various mediums which are following:

- Paper
- Survey monkey

3.8 Focused Group

To migrate from in-person focus groups to virtual focus groups, various changes have been done before the recruiting process begin. It was first decided to pick which internet platform would host the virtual meetings. Because Zoom (Zoom Video Communications) has been widely used from the beginning of the pandemic, I opted to employ it. It was assumed that many participants would be familiar with this tool because of its broad appeal. Furthermore, it was believed that first-time users might simply learn how to utilize the platform.

3.9 Data validation and verification

Data validation is a method for checking the accuracy and quality of your data, typically performed prior to importing and processing. It can also be considered a form of data cleansing. Data validation ensures that your data is complete (no blank or null values), unique (contains distinct values that are not duplicated), and the range of values is consistent with what you expect.
Often, data validation is used as a part of processes such as ETL (Extract, Transform, and Load) where data is moved from a source database to a target data warehouse so that can be joined with other data for analysis. Data validation helps ensure that when you perform analysis, your results are accurate.

Steps to data validation:

1: Determine data sample

Determine the data to sample. If you have a large volume of data, you will probably want to validate a sample of your data rather than the entire set. You'll need to decide what volume of data to sample, and what error rate is acceptable to ensure the success of your project.

2: Validate the database

Before you move your data, you need to ensure that all the required data is present in your existing database. Determine the number of records and unique IDs, and compare the source and target data fields.

3: Validate the data format

Determine the overall health of the data and the changes that will be required of the source data to match the schema in the target. Then search for incongruent or incomplete counts, duplicate data, incorrect formats, and null field values.

Challenges in data validation:

Data validation can be challenging for a couple of reasons:

1. Validating the database is challenging because data is distributed in multiple databases.
2. Validating the data format can be an extremely time-consuming process, especially in large databases and intended to perform the validation manually. However, sampling the data for validation can help to reduce the time needed.

3.10 Summary

This section delves into the survey and focus group processes, as well as the study's purpose, top down and bottom-up methodology, sample size, and survey respondent characteristics. The survey medium, the survey instrument (questionnaire), the survey questions, the response format, and the survey justification and Focused Team For the focused group, the respondent profile is as follows: Size of the Sample Qualitative S, Focus Group, Focus Group Questions.

CHAPTER 4

DATA COLLECTION

4.1 Introduction

Quantitative data has the advantage of efficiently measuring the reactions of numerous people, making statistical aggregation of the data, as well as subgroup comparisons, easier.

The first component of the questionnaire [38] was designed to find out more about the respondent's general background and personal information. The respondents were asked about their current positions at the organisation. The distribution of respondents based on their position in the company we discovered that project manager accounted for 31.6 % of the respondents, Team leads, Designer and Developer accounted for 32.7, 8 and 8.4 % each, and Business analyst accounted for 19.3 percent of the respondents. Respondents were divided into groups based on their position in the organisation is as follows:

Table 4.1 Roles in an Organization

Position in Organization	*Frequency*	*Percent*
Business Analyst	***53***	***19.3***
Project manager	***87***	***31.6***
Team Lead	***90***	***32.7***
Developer	***23***	***8.4***
Designer	***22***	***8***
Total	***275***	***100.0***

Following that, the participants were questioned about their experience with globally dispersed Software Organizations. 42.9 % respondents had more than five years of experience, 14.9 % had more than eight years of experience, 24.7 % had more than two years of experience, and 17.5 % had less than two years of experience, according to our findings.

Table 4.2 The distribution of Responders

Year of experience	***Frequency***	***Percent 100%***
More than 8 years	*41*	*14.9*
More than 5 years	*118*	*42.9*
More than 2 years	*68*	*24.7*
Less than 2 years	*48*	*17.5*
Total	*275*	*100*

4.2 Steps to conduct a survey

The six steps to better survey design are as follows [37]:

Step 1: The survey's goals, how the data will be used, and who the target demographic will be.

First and first, when creating a survey, it is critical that the objectives, or what the survey should discover and collect, be clearly specified. In addition, because changing the questions in the next round jeopardises long-term comparability, the baseline survey should invest heavily in quality question design and testing.

A checklist for commissioning, designing, and performing a perception survey is provided below

a) **Establish the survey's objectives and target audience:**

• Define the objectives and how the results will be used.

• Verify that a perception survey is the right tool for the project (s)

b) **Test and fine-tune the questionnaire:**

• Run a small test group through the survey to see if there are any design flaws.

• Make any necessary changes to the questionnaire.

c) Determine the number of respondents and the manner of data collection:

• Using random sampling or other procedures, select a sample.
• Examine the sample size to see if it permits you to draw meaningful inferences from the data.
• Decide on a data gathering strategy.
• Personal interviews, telephone interviews, and online surveys, as well as email surveys, are all options.
• Using the correct data collection technique will help you increase response rates.

d) Conduct the survey:

• Send follow-up emails to ensure a high response rate; otherwise, the survey's results may be distorted.
• Use skilled interviewers to eliminate the possibility of an unintentional effect on responses.

e) Examine the outcomes:

• Consider the outcomes as emotions rather than facts.
• Take the response rate into consideration.
• If the response rate is poor, consider the number of respondents and how they were chosen in the result analysis.
• Assign paperwork from Steps 1-6 to outcomes, then analyse the results in conjunction with other data sources to generate policy conclusions.

Step 2: Draft study questions

At this point, a letter soliciting participation in the survey could be written. It should identify the survey's purpose, outline the roles of the participants, and explain how anonymity will be maintained. Because a well-written letter can help you raise response rates, the survey cover letter is vital. Due to the low response rate, the survey results are in danger of providing no statistically significant conclusions.

Checklist for drafting good questions:

1. Is the wording of the questions, as well as the order in which they are presented, as impartial as possible, in the sense that they don't infer answers?
2. Do the response options and scales appear to be clear and understandable?
3. Is the target audience capable and informed enough to answer all of the questions?
4. Were any difficult questions included at the end of the survey?
5. Do they make respondents feel more at ease when answering them?
6. Is the questionnaire brief enough for respondents to focus until the end?

Step 3: Test the questionnaire and make any necessary adjustments.

Survey evaluation is crucial for discovering survey design flaws. You may examine how people might understand and answer to the questions by pre-testing the survey with a smaller group of people. Researchers can utilise pilot surveys to spot survey design flaws, such as poorly written questions, and make required changes to the survey.

Step 4: Select the data collection method and respondents

This step tells the procedure chosen and the respondents. If done correctly, generalisations about the opinions of the target group can be derived based on a small number of respondents.

Step 5: Analysing the results

This stage sums up and examinations all overview answers. The outcomes can be introduced in charts and tables, and they can assist with explaining what ends can be drawn from the information.

- Rather than facts, survey results should be viewed as opinions.
- To make sense of your findings, combine them with information from other sources.

4.3 Survey Results

Great practice techniques altogether work on the nature of results while additionally aiding the aversion of missteps. This section diagrams great practice by giving successive, bit by bit guidelines for making an insight review. It's significant to follow the means all put together; you preclude a stage toward the beginning, you will not have the option to return and fix it a short time later. For instance, if overview questions aren't painstakingly created, even the best review results can be destroyed.

Table 4.3 Results of responses from survey

No	Factors	Strongly Agree (2)	Agree (1)	Neutral (0)	Disagree (-1)	Strongly Disagree (-2)	Total (275)
1	Human factors in software development greatly contribute to achieving project goal.	165*2=330	93*1=93	14*0=0	2*-1= -2	1*-2= -2	419
2	Undertaking postponements and disappointments are typically identified with a progression of helpless choices.	81*2= 162	163*1= 163	23*0= 0	5* -1= -5	3*-2= -6	314
3	The decision-making process is largely based on individual cultural background	81*2= 162	130*1= 130	52*0= 0	11*-1 = -11	1*-2= - 2	279
4	The decision-making process is largely based individual on human relations	99*2 = 198	126*1= 126	37*0 = 0	12 *-1= -12	1*-2= -2	310
5	Individual elements such as experience, communication, and negotiation have an impact on the project.	121*2= 242	124*1= 124	26*0= 0	3* -1=-3	1*-2= -2	361
6	Human factor plays a vital role in evaluating the performance of project Management	122*2= 244	120*1= 120	28*0=0	2*-1= -2	3*-2= -6	356
7	Project procedures, human aspects, external challenges, and project-related factors must all be considered in project management.	93*2= 186	133*1= 133	45*0=0	4*-1= -4	0*-2= 0	315
8	The role of human factor in project success varies according to life cycle stage	84*2= 168	131*1= 131	50*0=0	9*-1= -9	1*-2= -2	288
9	The working environment of your organization follows the software development life cycle.	119*2= 138	106*1= 106	43*0=0	6*-1= -6	1* -2= -2	236
10	Human factor handle complex work of different degrees of structure	80*2= 160	145*1= 145	40*0= 0	8* -1= -8	2*-2= -4	293
11	Human factor serves a systematic way of solving complex projects often rapidly	94*2= 188	139*1= 139	36*0= 0	6*-1= -6	0*-2= 0	321
12	Coordination and collaboration are the most important elements that contribute to the projects failure	100*2= 200	124*1= 124	37*0= 0	10*-1= -10	4*-2= -8	306
13	The one factor most often ignored is mostly the most important one	88*2= 176	129*1= 129	49*0= 0	7*-1= -7	2*-2 = -4	294
14	Cost estimation changing during the projects greatly contributes to project failure	110*2= 220	114*1= 114	40*0= 0	8* -1= -8	3*-2= -6	320

Results from Weightage Values

A "weight" is merely a number we assign to a respondent that affects how much their individual responses affect the overall result.

The weighting of a survey sample is one of the most significant parts of it. Each unit of the selected sample is given a weight for the purpose of calculating estimates of population parameters of interest for a specific sample survey. In most cases, the weighing procedure involves three stages:

(i) Get the design weights, which account for sample selection;

(ii) Change the weights to account for nonresponse

(iii) Calibrate the weights so that the estimates match some known population totals.

Weighting a question is an effective approach to gauge responder attitude by giving numbers to each answer option in a question. You can use the figures from your survey responses to figure out how respondents feel and how attached they are to their beliefs.

Weights are particular to the types of matrices and ranking questions we use. You can set your own custom weight for each answer option in the scale with matrix-style questions. A predetermined weight is already allocated to each answer option in a ranking question.

The weights have already been adjusted to the numbered scale for you when it comes to the ranking question type. Typically, respondents are asked to rate a list of items in order of preference, starting with the thing they prefer most and ending with the one they prefer least.

Table 4.4 Accepted or Rejected Result Evaluation

No	**Factors**	**Weightage Values**	**Avg. Weightage Responses**	**Results**
1	Human factors in software development greatly contribute to achieving project goal.	419	1.52	Accepted
2	The majority of project delays and failures are caused by a series of poor decisions.	314	1.14	Accepted
3	The decision-making process is largely based on individual cultural background	279	1.01	Accepted
4	The decision-making process is largely based individual on human relations	310	1.12	Accepted
5	The majority of project delays and failures are caused by a series of poor decisions.	361	1.31	Accepted
6	Human factor plays a vital role in evaluating the performance of project Management	356	1.29	Accepted
7	Project procedures, human aspects, external challenges, and project-related factors must all be considered in project management.	315	1.14	Accepted
8	The role of human factor in project success varies according to life cycle stage	288	1.04	Accepted
9	The working environment of your organization follows the software development life cycle.	236	0.85	Rejected
10	Human factor handle complex work of different degrees of structure	293	1.06	Accepted
11	Human factor serves a systematic way of solving complex projects often rapidly	321	1.16	Accepted

12	Coordination and collaboration are the most important elements that contribute to the projects failure	306	1.11	Accepted
13	The one factor most often ignored is mostly the most important one	294	1.06	Accepted
14	Cost estimation changing during the projects greatly contributes to project failure	320	1.16	Accepted

Average Weightage of the responses have been generated and all the factors were evaluated. The standard value 0.95 has been set. If the average is below the standard value the result is assigned as rejected and if result exceeds the standard value it is considered as accepted.

In this research 14 factors have been evaluated out of which only 1 is rejected and 13 are accepted by the participants.

Final result in sequence

Once the factors are evaluated they are then arranged in sequence of their decreasing weightage responses. The factor with highest average weightage response is kept on the top and likewise with Lowest average weightage comes at bottom.

TABLE 4.5 FINAL RESULT OF SURVEY

No	**Factors**	**Weightage Values**	**Avg. Weightage Responses**	**Results**
1	Human aspects in software development play a significant role in meeting project objectives.	419	1.52	Accepted
2	Individual elements such as experience, communication, and negotiation have an impact on the project.	361	1.31	Accepted
3	Human factor plays a vital role in evaluating the performance of project Management	356	1.29	Accepted
	Human factor serves a systematic way of solving complex projects often rapidly	321	1.16	Accepted
5	Cost estimation cha nging during the projects greatly contributes to project failure	320	1.16	Accepted
6	Project procedures, human aspects, external challenges, and project-related factors must all be considered in project management.	315	1.14	Accepted
7	The majority of project delays and failures may be traced back to a succession of poor decisions.	314	1.14	Accepted
8	The decision-making process is largely based individual on human relations	310	1.12	Accepted
9	Coordination and collaboration are the most important elements that contribute to the projects failure	306	1.11	Accepted
10	The one factor most often ignored is mostly the most important one	294	1.06	Accepted
11	Human factor handle complex work of different degrees of structure	293	1.06	Accepted
12	The role of human factor in project success varies according to life cycle stage	288	1.04	Accepted
13	The decision-making process is largely based on individual cultural background	279	1.01	Accepted
14	The working environment of your organization follows the software development life cycle.	236	0.85	Rejected

Cronbach Alpha:

Cronbach's alpha estimates inner consistency, or how intently a gathering of things are identified with each other. It's utilized to sort out how solid a scale is [36]

The presence of a "high" alpha number doesn't demonstrate that the action is one-dimensional. Cronbach's alpha is determined as follows:

$$a = N.C^{-} / v^{-} + (N-1).C^{-}$$

Excel is used to find Cronbach alpha's value:

N= Total Number of questions = 14

∇ = SUM OF VARIENCE = 18. 44

C̄ = VARIENCE OF SUM = 71.03

CRONBACH ALPHA: 0.7815

Low Significance Factors

One factor that is rejected by the respondents is

"**The working environment of your organization follows the software development life cycle"**

This factor is rejected on the basis of organization's working environment as different organizations follow their own rules and principles so depending on individual organization's infrastructure this factor could not be accepted by the respondents, also organizations can mold the SDLC according to requirement of the project

High Significance factors

Total 13 factors out of 14 have been accepted by the respondents that include:

1	Human aspects in software development play a significant role in meeting project objectives.
2	A sequence of poor decisions is to blame for the bulk of project delays and failures.
3	Individual cultural backgrounds have a considerable impact on decision-making.
4	The importance of individual human relationships in the decision-making process cannot be overstated.
5	Individual elements such as experience, communication, and negotiation have an impact on the project.
6	Human factor plays a vital role in evaluating the performance of project Management
7	Project procedures, human aspects, external challenges, and project-related factors must all be considered in project management.
8	The role of human factor in project success varies according to life cycle stage
9	The working environment of your organization follows the software development life cycle.
10	Human factor handle complex work of different degrees of structure
11	Human factor serves a systematic way of solving complex projects often rapidly
12	Coordination and collaboration are the most important elements that contribute to the projects failure
13	The one factor most often ignored is mostly the most important one

Summary

The results of a survey done at different software development houses working in a worldwide setting were reported in this chapter. The survey's goal was to look into the perceived usefulness of literature-based situational factors, determine the perceived influence of human factors to generate the most influential Human factors for project management failure, and look for any new Human factors that contribute to failure of a project.

4.4 Focus Group

The responses to specific questions posed by the researcher/evaluator are investigated. In market research, focus groups are used to better understand people's reactions to products or services, as well as participants' impressions of common experiences. [35]

To migrate from in-person focus groups to virtual focus groups, various changes must be done before the recruiting process can begin. It must be first decided to pick which internet platform would host the virtual meetings. Because Zoom (Zoom Video Communications) has been widely used from the beginning of the pandemic, I opted to employ it. It was assumed that many participants would be familiar with this tool because of its broad appeal. Furthermore, it was believed that first-time users might simply learn how to utilize the platform.

Strongly Agree (2)	Agree (1)	Neutral (0)	Disagree (-1)	Strongly Disagree (-2)

TABLE 4.6 RESULTS FROM FOCUS GROUP DATA.

No.	Factors	P1	P2	P3	P4	P5	P6	P7
1.	Human factors in software development greatly contribute to achieving project goal.	2	0	1	-1	2	2	0
2.	A series of poor judgments is to blame for the bulk of project delays and failures.	0	1	1	2	2	2	2
3.	The decision-making process is largely based on individual cultural background	2	2	0	1	-1	-1	2
4.	The decision-making process is largely based individual on human relations	-2	2	2	0	1	1	1
5.	Individual elements such as experience, communication, and negotiation have an impact on the project.	2	2	2	2	2	2	2
6.	Human factor plays a vital role in evaluating the performance of project Management	2	0	0	0	1	-1	1
7.	Project procedures, human aspects, external challenges, and project-related factors must all be considered in project management.	1	1	-1	-1	0	0	1
8.	The role of human factor in project success varies according to life cycle stage	0	0	-1	1	-1	1	1
9.	The software development life cycle is the bedrock of your organization's operations.	2	2	-2	-2	0	0	0
10.	Human factor handle complex work of different degrees of structure	1	-1	1	-1	0	0	1
11.	Human factor serves a systematic way of solving complex projects often rapidly	1	2	1	1	2	2	2

12.	Coordination and collaboration are the most important elements that contribute to the projects failure	2	2	1	-1	1	-1	-1
13.	The one factor most often ignored is mostly the most important one	2	0	0	-1	1	-1	0
14.	Cost estimation changing during the projects greatly contributes to project failure	2	-2	-2	0	1	1	0

Strongly Agree (2)	Agree (1)	Neutral (0)	Disagree (-1)	Strongly Disagree (-2)

TABLE 4.7 LIKERT SCALE FOR FOCUS GROUP RESPONSES

No.	Factors	P1	P2	P3	P4	P5	P6	P7	Strongly Agree*2	Agree * 1	Disagree*-1	Result	Average Weightage
1.	Human aspects in software development play a significant role in meeting project objectives.	2	2	0	1	-1	-1	2	6	1	-2	5	1.6
2.	A series of poor judgments is to blame for the bulk of project delays and failures.	2	0	1	-1	2	2	0	6	1	-1	6	0.85
3.	The decision-making process is largely based on individual cultural background	2	2	0	1	-1	-1	2	6	1	-2	5	1.6
4.	Individual human relationships play a big role in the decision-making process.	2	2	2	0	1	1	1	6	3	0	9	1.2
5.	Individual aspects of the project, such as experience, communication, and negotiation, have an impact.	2	2	2	2	2	2	2	14	0	0	14	2
6.	Human factor plays a vital role in evaluating the performance of project Management	2	0	0	0	1	-1	1	2	2	-1	3	0.42
7.	Project management must take into account project procedures, human characteristics, external problems, and project-related factors.	1	1	-1	-1	0	0	1	0	3	-2	1	0.14
8.	The role of human factor in project success varies according to life cycle stage	0	0	-1	1	-1	1	1	0	3	-2	1	0.14
9.	The software development life cycle is the foundation of your company's working environment.	2	2	2	2	0	0	0	8	0	0	8	1.14

10.	Human factor handle complex work of different degrees of structure	1	-1	1	-1	0	0	1	0	3	-2	1	0.14
11.	Human factor serves a systematic way of solving complex projects often rapidly	1	2	1	1	2	2	2	8	3	0	11	1.57
12.	Coordination and collaboration are the most important elements that contribute to the projects failure	2	2	1	-1	1	-1	-1	4	2	-3	3	0.42
13.	The one factor most often ignored is mostly the most important one	2	0	0	-1	1	-1	0	2	1	-2	1	0.14
14.	Cost estimation changing during the projects greatly contributes to project failure	2	2	2	0	1	1	0	6	2	0	8	1.14

4.4.1 Results from Focus Group

TABLE 4.8 FINAL RESULTS FROM FOCUS GROUP

No.	Factors	Average weighted	Final Results
1.	Human factors in software development greatly contribute to achieving project goal.	1.6	Accepted
2.	A series of poor judgments is to blame for the bulk of project delays and failures.	0.85	Rejected
3.	The decision-making process is largely based on individual cultural background	1.6	Accepted
4.	The decision-making process is largely based individual on human relations	1.2	Accepted
5.	Individual elements such as experience, communication, and negotiation have an impact on the project.	2	Accepted
6.	Human factor plays a vital role in evaluating the performance of project Management	0.42	Rejected
7.	Project procedures, human aspects, external challenges, and project-related factors must all be considered in project management.	0.14	Rejected
8.	The role of human factor in project success varies according to life cycle stage	0.14	Rejected
9.	The working environment of your organization follows the software development life cycle.	1.14	Accepted
10.	Human factor handle complex work of different degrees of structure	0.14	Rejected
11.	Coordination and collaboration are the most important elements that contribute to the projects failure	1.57	Accepted
12.	Human factor serves a systematic way of solving complex projects often rapidly	0.42	Rejected
13.	The one factor most often ignored is mostly the most important one	0.14	Rejected
14.	Cost estimation changing during the projects greatly contributes to project failure	1.14	Accepted

Average Weightage of the responses have been generated and all the factors were evaluated. The standard value 0.95 has been set. If the average is below the standard value the result is assigned as rejected and if result exceeds the standard value it is considered as accepted.

In focus group 14 factors have been evaluated out of which only 7 factors are rejected and 7 factors are accepted by the participants.

The low significance factors according to focus group are:

1. Delays and failures in projects are frequently the result of a sequence of poor decisions.
2. Human factor plays a vital role in evaluating the performance of project Management
3. Project management methods, human factors, external challenges, and project-related elements must all be considered.The role of human factor in project success varies according to life cycle stage
4. Human factor handle complex work of different degrees of structure
5. Human factor serves a systematic way of solving complex projects often rapidly
6. The one factor most often ignored is mostly the most important one

The accepted or high significance factors according to focus group

1. Human aspects in software development have a significant role in meeting project objectives.
2. The decision-making process is largely based on individual cultural background
3. Individual human relationships play a big role in decision-making.
4. Individual elements such as experience, communication, and negotiation have an impact on the project.
5. The working environment of your organization follows the software development life cycle.
6. The most essential factors that contribute to the project's failure are coordination and teamwork.
7. Cost estimation changing during the projects greatly contributes to project failure.

Analysis

After completion of focus group and survey, if both methods are compared then in first method used that is survey 13 factors were accepted while in the second method 7 factors have been accepted. In survey just one factor is rejected by the participants and in the later method 7 factors are rejected that shows a huge difference between survey and focus group. The rejected factor in the survey method is accepted in focus group. Hence the final result is more clear through focus group as it involves the complete in depth discussions about each and every factor and is supported by seven person from the same level of understanding.

4.5 Summary

The results of a focus group done by different software development house employers in a worldwide setting were reported in this chapter. The focus group's goal was to look into the perceived usefulness of literature-based situational factors, determine the perceived influence of human factors to generate the most influential Human factors for project management failure, and look for any new Human factors that contribute to failure of a project.

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CHAPTER 5

RESULTS AND ANALYSIS

5.1 Introduction

In this chapter, the triangulation approach is used to analyze survey and focus group results. Answers to the research questions have also been supported through literature review that is to mitigate and manage the most important human factor.

5.2 Results and Analysis

The triangulation technique is utilized to work on the believability and legitimacy of examination discoveries.

1. Validity relates to how well a research accurately portrays or analyses the notion or concept under investigation, whereas credibility refers to the study's trustworthiness and persuasiveness.
2. Triangulation can help ensure that inherent biases resulting from the use of a single method or observer are addressed in a research effort by combining hypotheses, methodologies, or observers. Triangulation is an attempt to use a variety of methodologies to examine and describe complex human behavior in order to present readers with a more balanced explanation.

3. it's a strategy for validating data that can be utilized in both quantitative and qualitative studies.

Table 5.1 investigations the consequences of the two techniques to find which one yields more exact outcomes.

Table 5.1 COMPARISONS OF RESULTS OBTAINED FROM TRIANGULATION PROCESS

No	Questions	Survey	Focus Group	Validated Values	Final Results
1	Human aspects in software development play a significant role in meeting project objectives.	1.52	1.6	1.52	Accepted
2	A series of poor judgments is to blame for the bulk of project delays and failures.	1.14	0.85	1.14	Accepted
3	The decision-making process is largely based on individual cultural background	1.01	1.6	1.01	Accepted
4	The decision-making process is largely based individual on human relations	1.12	1.2	1.12	Accepted
5	Individual elements such as experience, communication, and negotiation have an impact on the project.	1.31	2	1.31	Accepted
6	Human factor plays a vital role in evaluating the performance of project Management	1.29	0.42	1.29	Accepted
7	Project procedures, human aspects, external challenges, and project-related factors must all be considered in project management.	1.14	0.14	1.14	Accepted
8	The role of human factor in project success varies according to life cycle stage	1.04	0.14	1.04	Accepted
9	The working environment of your organization follows the software development life cycle.	0.85	1.14	0.85	Rejected
10	Human factor handle complex work of different degrees of structure	1.06	0.14	1.06	Accepted
11	Human factor serves a systematic way of solving complex projects often rapidly	1.16	1.57	1.16	Accepted
12	Coordination and collaboration are the most important elements that contribute to the projects failure	1.11	0.42	1.11	Accepted
13	The one factor most often ignored is mostly the most	1.06	0.14	1.06	Accepted

	important one				
14	Cost estimation changing during the projects greatly contributes to project failure	1.16	1.14	1.16	Accepted

By using triangulation process where it compared the results between survey and focus group, it is observed that out of total 14 factors 13 values have been accepted and one value is rejected. Result of triangulation is process is given below:

Low significance factors

There's **one** low significance factor rejected by the respondent.

1: The working environment of your organization follows the software development life cycle.

Reason:

Respondents either didn't get this question or they do not have enough knowledge about SDLC (Software development lifecycle) and the processes involved in SDLC.

High significance factors:

1: Human factors have a big role in accomplishing project goals in software development.

Reason:

Respondent must have understood the term "Human Factor" and have in-depth knowledge about its significance.

2: A sequence of poor decisions is to blame for the bulk of project delays and failures.

Reason:

Respondents have enough experience that's why they have agreed strongly with this factor.

3: The decision-making process is largely based on individual cultural background

Reason:

Respondent have a clear understanding about this and must have experienced such circumstances in their respective organizations

4: The decision-making process is largely based individual on human relations

Reason:

Respondents have enough experience that's why they have agreed strongly with this factor.

5: Individual elements such as experience, communication, and negotiation have an impact on the project.

Reason:

Respondents have sufficient experience, which is why they highly agreed with this factor.

6: Human factor plays a vital role in evaluating the performance of project Management

Reason:

Respondents have a clear awareness of this and are likely to have encountered similar situations in their respective businesses.

7: Project procedures, human aspects, external challenges, and project-related factors must all be considered in project management.

Reason:

The respondent must have a thorough understanding of the term "Human Factor" and its significance and how it affects the project success.

8: The role of human factor in project success varies according to life cycle stage

Reason:

Respondents are well aware of this and are likely to have dealt with comparable problems in their own organizations.

9: Human factor handle complex work of different degrees of structure

Reason:

Respondents have sufficient experience, which is why they highly agreed with this factor.

10: Human factor serves a systematic way of solving complex projects often rapidly

Reason:

The respondent must have a thorough understanding of the term "Human Factor" and its significance and how it affects the project success.

11: Coordination and collaboration are the most important elements that contribute to the projects failure

Reason:

The respondent must have a clear awareness of the phrase "Human Factor," as well as its meaning and impact on project success.

12: The one factor most often ignored is mostly the most important one

Reason:

Respondents have sufficient experience, which is why they highly agreed with this factor.

13: Cost estimation changing during the projects greatly contributes to project failure

Reason:

Respondents have a clear awareness of this and are likely to have encountered similar situations in their respective businesses.

5.3 Proposed Strategies:

The strategies are broad concepts or approaches to achieve the project objectives. It is a general, undetailed plan of actions designed to achieve a major or overall goal, and it may encompass a long period of time in the project. Or it is a plan chosen to bring about a desired future, such as achievement of a goal or solution to the problem. Strategy is more about a designed set of options other than a fixed plan of what will be achieved. And thus other components in the proposal may change or need to be modified based on the progress and situations, but the strategies will remain unchanged in most of the cases since they are not so specific or practical.

Findings from the survey show that human factors include:

- Team Lead
- Business Analyst
- Software Analyst
- Project manager

All these factors are ultimately dependent upon project manager. [39] Hence competence of a project manager is the mitigation plan for managing human factor. So strategies to mitigate the failure rate are provided in Table 5.2.

5.4 Competence of a Project Manager:

The majority of project managers who participated in the survey did so through experience rather

than professional certification, which contradicts Turner and Müller's position that the title "Project Manager" should only be given to individuals who have earned professional credentials.

Competence is the most important trait of a competent project manager. [40] Turner and Muller's (2005) conclusion that the project manager's leadership style and competency have no effect on project success is contradicted by this study.
Around 20% of practitioners belong to a professional project management organization, and they believe that professional certification can help them build competence. These findings suggest that practitioners believe that increasing competence can be accomplished without professional training or through a professional certification procedure, despite research to the contrary. Over three-quarters of those surveyed work in management, with 22.2 percent in senior project managers or project directors.

The participants are between the ages of 25 and 65, and the majority has a bachelor's degree or more (55.6 percent), with only one-third having fewer than five years of project management experience. Despite this, as indicated by their membership in internationally recognized Project Management organizations, the majority of respondents had no recognized project management training. Based on the information acquired, it is feasible to conclude that project management training is not always linked to project success.

The majority of project managers who took part in the study did so through experience rather than through a professional certification procedure, which contradicts Turner and Müller's position that the title "Project Manager" should be limited to those who have received professional qualifications.

For our second question which is how to mitigate these challenges of human factors, SPM provides complete support in a proper way of planning and leading software projects [41]. SPM represents programming project the board. It is the method involved with arranging,

coordinating, managing, and coordinating a product project.

A digital product with no physical form is known as software. Software development is a relatively new industry with little experience in developing software. The majority of software solutions are customized to the needs of the client. The most important issue is that underlying technology advances at such a rapid pace that knowledge learned from one product may not be transferable to another. Because such economic and environmental constraints raise the risk of software development, skilled project management is required.

Computer programming project the executives is particular from conventional venture the board in that product projects have a remarkable life cycle process that requires an assortment of abilities.

5.5 Expert Review

The expert review, also known as expert analysis, heuristic review, or heuristic evaluation, is a type of heuristic evaluation. In contrast to user-centered methodologies like the usability test. It’s a method of research that relies on experts. Multiple experts separately assess the test product in order to uncover the majority of its usability faults.

Expert judgment, on the other hand, frequently demands expertise that isn't readily available within the project team; as a result, consulting with an outside organization or individual who possesses a specific skill set or knowledge base is common. Expertise can be obtained from a variety of sources, including:

• Internal organizational units;
• Consultants;
• Customers and sponsors are examples of stakeholders.;
• Associations of professionals and technicians;
• Subject matter experts (SMEs);

• Industry groups Project management office (PMO); Expert Review

• Suppliers

Expert judgment techniques

Below is an accepted framework for eliciting expert judgment:

- Frame the problem
- Plan the elicitation
- Select the experts
- Train the experts
- Elicit judgments
- Analyze/Aggregate judgment
- Document/communicate results

Procedure to conduct expert Review:

• The activity to be studied was chosen and confirmed.

• Made a list of assertions and questions to consider.

• Selected the experts and requested them to contribute their views, replies, and other information.

• wrote a report and handed it out to everyone.

• Completed a final report

TABLE 5.2 MITIGATION STRATEGIES

No.	Human Factor	Mitigation Strategies	R1	R2	R3	R4	Results Summary
1	Managing People	Scrum Meetings	Assume the role of project manager	Stakeholder communicatio n	Human resource management	Creating a reporting hierarchy, and so forth.	Recommended
2	Managing Project	Program Evaluation Review Technique (PERT)	Defining and setting up project scope	Monitoring progress and performance	Risk analysis at every phase	Act as project spokesperson	Recommended
3	Resource management	Putnam Model, Resource Histogram	Creating a project team to define proper project organisation.	assigning responsibilities to each member of the team	Identifying the resources needed at each step and their availability	When resources are needed, they are requested, and when they are no longer needed, they are de-allocated.	Recommended
4	Project Risk Management	COCOMO MODEL	Experienced personnel are departing the project, while fresh	Changes in the requirements or a misinterpretati on of the	Underestimation of time and resources necessary.	Changes in technology, the environment, and commercial competition	Recommended

			personnel are being hired.	requirements.			
5	Configuration Management	GANTT CHART	Change Control	When a formal change request is made, it is fully documented.	If the previous phase decides to carry out the change request, this phase takes the necessary steps to carry out the modification and, if necessary, conducts a comprehensive revision.	A modification request's impact is measured in terms of the amount of time, money, and effort required. The system's overall impact of the proposed change is investigated.	Recommended

Table 5.3 Results of Expert Review

No	Human Factor	Expert Review
1.	**Managing people**	It is advocated that some software tool that is used internationally be used for the "**Managing people**" difficulty in software development that considerably contributes to the success of a project. Every responder indicated the precise work being performed in each step, and the tool selected is the sum of all four respondents' recommendations.
2.	**Managing projects**	For the "**Managing projects**" challenge in software development that greatly contribute towards the success of a project, it is proposed that some software tool should be used which is being used globally. Every respondent enlisted the specific task being performed in specific phase and then the tool recommended is the combined recommendation of all the four respondents.
3.	**Resource Management**	It is observed that some software tool be used for the "**Resource Management**" difficulty in software development, which contributes considerably to the success of a project. Each responder indicated the precise work being performed in each step, and the tool chosen is the result of the four respondents' aggregate recommendations.

4.	**Project Risk Management**	Some software tool is found to be employed for the "**Project Risk Management**" difficulty in software development, which contributes significantly to the project's success. Each respondent detailed the work that was done in each phase, and the tool chosen was based on the four respondents' combined suggestions.
5.	**Configuration Management**	As a result, we ended our expert evaluation on "**Configuration Management**" by posing these questions to industry specialists with extensive experience working on software projects. Our expert review received excellent feedback on all of our proposed mitigation strategies. As a result, we've compiled a list of recommended replies

Results from Expert Review:

So we concluded our expert review by asking these questions to the experts who have great experience in the industry with software projects. All the responses to our expert review were positive towards our proposed mitigation strategies. So we are summarizing our responses in the form of solution Recommended.

5.6 Summary

The consequences of the review and center gathering are broke down in this part to approve question no 1.The discoveries of the two strategies are thought about, and the predominant qualities are utilized as the last decision in a triangulation interaction. According to the triangulation procedure, 13 factors were accepted and one was rejected, implying that 13 factors had high relevance and one had low significance. The validated triangulation process difficulties are then reviewed in order to discover the best solution and improve it. Question number two is verified by an expert evaluation, with SPM (software project management) guidelines being recommended as the best answer to the difficulties.

CHAPTER 6

CONCLUSION AND FUTURE WORK

6.1 Introducti

The fundamental focal point of this exploration is to distinguish the best answers for moderate the difficulties in overseeing human factor in project the executive's disappointment. So research is partitioned into two inquiries.

The first question was to identify the human factor in project management failure so to resolve this question we did a systematic literature review from literature to find all the associated human factors. 30 papers have been included from which we concluded that 5 basic fields that manage human factor that includes:

- Managing people
- Managing project
- Resource management
- Project Risk management
- Configuration management

These challenges are validated by survey and focus group. Survey is being held from industry people to validate the challenges and to validate survey focus group is conducted from experts.

To attain the research goal, tactics were devised, one of which was the establishment of targets that, when completed, would endeavor to incrementally fill gaps in the knowledge boundaries and realize the research goal.

Second research question to be answered was to manage that human factor. In this question mitigation strategies are proposed by using software project management techniques for each challenge and to validate mitigation strategies expert review is conducted from industry by the

experts having 6 years plus experience in project management field. The proposed mitigation strategy is validated through expert reviews by recommending the strategy.

6.2 Summary of Contribution

1. The researchers will easily find the human factors that are involved in a project and then managing that human factor in project management failure.
2. This study provides all the human factors of a project so in future it will be helpful to review any of them.
3. The mitigation strategies provided will be helpful in managing the human factor and to achieve success of a project.

6.3 limitations

External forces over which the researcher has no control are referred to as limitations. They are defects, conditions, or effects that are beyond the control of the researcher and limit your strategy and outcomes.

1. Out of all human factors project manager is the main focus in this research as this research supports that all the human factors are ultimately controlled by the project manager and is one of the most important factor that have been discussed.
2. Due to covid-19 environment survey and focus group is conducted online and could not be conducted physically.

6.4 Future Work

In this section, frequent ways are described to expand the existing work, techniques and judgments. It contains useful research data and provides researchers with indications about fresh study topics or ideas.

Due to a lack of time, many additional tweaks, testing, and experiments have been postponed (For example, real-data experiments are typically quite time consuming, taking days to finish a single run). Future research will focus on a more in-depth look at certain systems, new ideas for evaluating different approaches, or just plain curiosity.

Future work may include:

1: Mitigation plan for all other human factors other than project manager.
2: Individual Implementation of the each strategy through case study or some other method to give accuracy in statistical form.

REFERENCES

[1] A. Cocchia, *Smart and Digital City: A Systematic Literature Review. In: Dameri R., Rosenthal-Sabroux C. (eds) Smart City.* 2014.

[2] H. Tsoukas and R. Chia, "<Tsoukas and Chia - On organizational becoming - rethinking organizational change.pdf>," *Organ. Sci.*, vol. 13, no. 5, pp. 567–582, 2002.

[3] F. M. Muthengi, "Human Coordination Factors in Software Development," *Int. J. Educ. Res.*, vol. 2, no. 5, pp. 447–454, 2014, [Online]. Available: www.ijern.com.

[4] T. R. Browning, "Planning , Tracking , and Reducing a Complex Project ' s Value at Risk," vol. 50, no. 1, pp. 1–15, 2018, doi: 10.1177/8756972818810967.

[5] I. Attarzadeh, "Project Management Practices : The Criteria for Success or Failure," vol. 1, pp. 234–241, 2008.

[6] E. Winter, S. Forshaw, and M. A. Ferrario, "Measuring Human Values in Software Engineering," pp. 10–13, 2018.

[7] E. Winter, S. Forshaw, L. Hunt, and M. A. Ferrario, "Advancing the Study of Human Values in Software Engineering," *2019 IEEE/ACM 12th Int. Work. Coop. Hum. Asp. Softw. Eng.*, pp. 19–26, 2019, doi: 10.1109/CHASE.2019.00012.

[8] J. Adson, O. G. Cunha, F. Q. B. Silva, F. J. S. Vasconcellos, and H. P. De Moura, "Decision-Making in Software Project Management : A Qualitative Case Study of a Private Organization," pp. 26–32, 2016.

[9] V. S. Anantatmula, "Project Manager Leadership Role in Improving Project Performance," vol. 22, no. 1, pp. 13–22, 2010.

[10] V. S. Anantatmula, "The Role of Technology in the Project Manager Performance Model," no. March, 2008, doi: 10.1002/pmj.

[11] T. A. Carbone and S. Gholston, "Project Manager Skill Development: A Survey of Programs and Practitioners," vol. 9247, no. November, 2015, doi: 10.1080/10429247.2004.11415252.

[12] B. Kitchenham, O. Pearl Brereton, D. Budgen, M. Turner, J. Bailey, and S. Linkman, "Systematic literature reviews in software engineering - A systematic literature review," *Inf. Softw. Technol.*, vol. 51, no. 1, pp. 7–15, 2009, doi: 10.1016/j.infsof.2008.09.009.

[13] G. J. Hidding, D. Ph, J. Nicholas, and D. Ph, "Reducing I . T . Project Management Failures : A Research Proposal," pp. 1–10, 2009.

[14] J. C. Carver, L. L. Minku, and B. Penzenstadler, "Requirements , Human Values , and the Development Technology Landscape," no. February, pp. 13–15, 2017.

[15] S. Thew and A. Sutcliffe, "Value-based requirements engineering : method and experience," *Requir. Eng.*, vol. 23, no. 4, pp. 443–464, 2018, doi: 10.1007/s00766-017-0273-y.

[16] N. Ahmad, "Collaboration Formation and Profit Sharing Between Software Development Firms : A Shapley Value Based Cooperative Game," *IEEE Access*, vol. 7, pp. 42859–42873, 2019, doi: 10.1109/ACCESS.2019.2908459.

[17] E. Fisher, “What practitioners consider to be the skills and behaviours of an effective people project manager,” *JPMA*, vol. 29, no. 8, pp. 994–1002, 2011, doi: 10.1016/j.ijproman.2010.09.002.

[18] A. G. Chofreh *et al.*, “Journal Pre-proof,” 2019, doi: 10.1016/j.jclepro.2019.118655.

[19] X. Meng and P. Boyd, “ScienceDirect The role of the project manager in relationship management,” *Int. J. Proj. Manag.*, vol. 35, no. 5, pp. 717–728, 2017, doi: 10.1016/j.ijproman.2017.03.001.

[20] A. Mossalam and M. Arafa, “The role of project manager in benefits realization management as a project constraint / driver,” *Hous. Build. Natl. Res. Cent.*, 2015, doi: 10.1016/j.hbrcj.2014.12.008.

[21] R. Proynova, “Use of Personal Values in Requirements Engineering – A Research Preview Use of Personal Values in Requirements Engineering – A Research Preview,” no. September 2018, 2010, doi: 10.1007/978-3-642-14192-8.

[22] N. Pettersen, “What do we know about the effective project manager ?,” vol. 9, no. 2, pp. 99–104, 1991.

[23] H. Taherdoost and A. Keshavarzsaleh, “Managing Successful IT Project ; Marketing Perspective,” pp. 144–153.

[24] A. Al-hajj and M. M. Zraunig, “The Impact of Project Management Implementation on the Successful Completion of Projects in Construction,” no. March, 2018, doi: 10.18178/ijimt.2018.9.1.781.

[25] A. L. Lorden *et al.*, “Measures of Success : The Role of Human Factors in Lean Implementation in Healthcare,” vol. 6967, 2017, doi: 10.1080/10686967.2014.11918394.

[26] E. T. Rother, “Systematic literature review X narrative review,” *ACTA Paul. Enferm.*, vol. 20, no. 2, pp. 7–8, 2007, doi: 10.1590/s0103-21002007000200001.

[27] J. Antony, “Top ten reasons for process improvement project failures,” 2018, doi: 10.1108/IJLSS-11-2017-0130.

[28] J. K. Pinto and S. J. Mantel, “The Causes of Project Failure,” vol. 3, no. 4, 1990.

[29] M. Fabriek, M. Van Den Brand, and F. Harmsen, “Reasons for Success and Failure in Offshore Software Development Projects,” 2008.

[30] A. Bryman, “Integrating quantitative and qualitative research: How is it done?,” *Qual. Res.*, vol. 6, no. 1, pp. 97–113, 2006, doi: 10.1177/1468794106058877.

[31] O. Celo, D. Braakmann, and G. Benetka, “Quantitative and qualitative research: Beyond the debate,” *Integr. Psychol. Behav. Sci.*, vol. 42, no. 3, pp. 266–290, 2008, doi: 10.1007/s12124-008-9078-3.

[32] J. W. Creswell, “Mixed-Method Research: Introduction and Application,” p. 1999, 1995.

[33] J. J. Hox and H. R. Boeije, “Data Collection, Primary vs. Secondary,” *Encyclopedia of Social Measurement*. pp. 593–599, 2004, doi: 10.1016/B0-12-369398-5/00041-4.

[34] J. A. Krosnick, “Questionnaire design,” *Palgrave Handb. Surv. Res.*, pp. 439–455, 2017, doi: 10.1007/978-3-319-54395-6_53.

[35] G. Walter, M. Cleary, and J. M. Rey, “Want to know how to conduct a survey but too afraid to ask? A step-by-step guide,” *Australas. Psychiatry*, vol. 7, no. 5, pp. 258–261, 1999, doi: 10.1046/j.1440-1665.1999.00215.x.

[36] I. Ercan, B. Yazici, D. Sigirli, B. Ediz, and I. Kan, “Examining cronbach alpha, theta, omega reliability coefficients according to the sample size,” *J. Mod. Appl. Stat. Methods*, vol. 6, no. 1, pp. 291–303, 2007, doi: 10.22237/jmasm/1177993560.

[37] “638d450455234453fed4c417e35e98c4.pdf.” .

[38] N. Carter, D. Bryant-Lukosius, A. Dicenso, J. Blythe, and A. J. Neville, “The use of triangulation in qualitative research,” *Oncol. Nurs. Forum*, vol. 41, no. 5, pp. 545–547, 2014, doi: 10.1188/14.ONF.545-547.

[39] L. Fernando Capretz, “Bringing the human factor to software engineering,” *IEEE Softw.*, vol. 31, no. 2, pp. 0–2, 2014, doi: 10.1109/MS.2014.30.

[40] L. Crawford, “Profiling the Competent Project Manager,” no. January 2009, pp. 3–15, 2000.

[41] J. L. Oréfice, F. Oréfice, R. A. Costa, D. Calucci, and R. C. Filho, “New imaging techniques,” *Intraocular Inflamm.*, pp. 251–264, 2016, doi: 10.1007/978-3-540-75387-2_17.

[42] F. Prati *et al.*, “Expert review document on methodology, terminology, and clinical applications of optical coherence tomography: Physical principles, methodology of image acquisition, and clinical application for assessment of coronary arteries and atherosclerosis,” *Eur. Heart J.*, vol. 31, no. 4, pp. 401–415, 2010, doi: 10.1093/eurheartj/ehp433.