EVALUATING OPTIMISM BIAS IN PLANNING PROCESS OF MEGA CONSTRUCTION PROJECTS OF DEVELOPING COUNTRIES

By

SAAD KHAN

(319790)

A thesis submitted in partial fulfillment of

the requirements for the degree of

Master of Science

in

Construction Engineering & Management

Department of Construction Engineering & Management

School of Civil & Environmental Engineering

National University of Sciences & Technology

Islamabad, Pakistan

THESIS ACCEPTANCE CERTIFICATE

Certified that final copy of MS thesis written by Mr. Saad Khan Registration No. 00000319790 of CEM-19 SCEE has been vetted by undersigned, found complete in all respects as per NUST Statutes / Regulations, is free of plagiarism, errors, and mistakes and is accepted as partial fulfillment for award of MS/MPhil degree. It is further certified that necessary amendments as pointed out by GEC members of the scholar have also been incorporated in the said thesis.

Signature: _____

Name of Supervisor: Dr. Khurram Iqbal Ahmed Khan

Date: _____

Signature (HOD): _____

Date:_____

Signature (Dean/Principal): _____

Date:_____

This is to certify that the thesis titled

EVALUATING OPTIMISM BIAS IN PLANNING PROCESS OF MEGA CONSTRUCTION PROJECTS OF DEVELOPING COUNTRIES

submitted by

Saad Khan

(319790)

has been accepted towards the partial fulfillment of the requirements for the degree of Master of Science in Construction Engineering and Management

---

Dr. Khurram Iqbal Ahmed Khan

Assistant Professor

Department of Construction Engineering and Management

School of Civil & Environmental Engineering

National University of Sciences & Technology, Islamabad

Dedicated to

Dedicated to my exceptional parents and adored siblings whose tremendous support and cooperation led me to achieve this milestone.

ACKNOWLEDGMENTS

I would like to express my sincere gratitude and appreciation to Allah, the Almighty, for granting me the strength, knowledge, and guidance throughout my academic journey and for making the completion of this thesis possible.

Next, I extend my heartfelt thanks to my parents, whose unwavering support, encouragement, and sacrifices have been instrumental in shaping my educational path. Their love, belief in my abilities, and continuous motivation have been the driving force behind my success. I am forever grateful for their unwavering presence and unwavering belief in me.

I would also like to acknowledge and thank my teachers, whose expertise, guidance, and valuable insights have played a pivotal role in shaping my understanding of the subject matter. Their dedication, patience, and commitment to imparting knowledge have greatly enriched my learning experience.

To my siblings, I am grateful for their constant encouragement, support, and understanding. Their belief in me and their willingness to lend a helping hand whenever needed have been invaluable.

Lastly, I extend my heartfelt appreciation to my friends, who have been a source of inspiration, motivation, and unwavering support. Their presence, encouragement, and belief in my abilities have provided me with the strength to overcome challenges and pursue excellence.

To all those mentioned above and to the countless others who have contributed to my journey in ways big and small, I am deeply grateful. Your belief in me, encouragement, and support have been indispensable, and I am truly blessed to have you all in my life.

ABSTRACT

Projects play a pivotal role in the development of societies by driving progress and growth. However, the potential benefits of projects are often hindered by challenges such as exceeding budgets, resulting in increased costs and compromised quality. Despite extensive research on project management tools and techniques, there has been limited substantial improvement in project performance statistics. This has led to a scholarly debate exploring alternative solutions that depart from traditional technical reasons for project failures, incorporating concepts from behavioral sciences. This emphasizes the need to consider optimism bias, a psychological effect, as one of the root causes for delays and cost overruns in projects. There is a dire need to assess the level of bias among project participants, rank the causes of project time, cost, and quality failures, and establish a mitigation strategy to address potential delays, cost overruns, and quality failures. By addressing optimism bias and its impact on project performance, this research aims to enhance the understanding of factors affecting project outcomes and contribute to effective project management practices.

Table of Contents

List of Figures

List of Tables

Chapter 1

INTRODUCTION

1.1 OVERVIEW

Sydney Opera House is considered as the epitome of project planning disasters. Originally estimated at $7 Million and scheduled for opening in 1963, a scaled down version of the Opera House was completed in 1973 at a cost of $102 million (1,357% increase in costs). This is one of many examples of mega construction projects full of optimistic, "even unrealistic" predictions (Hall, 1980). The statistics of faulty and inaccurate forecasts of cost time and benefits remain bleak to this day (Buehler et al., 1994). Literature has it well documented that large numbers of mega projects are unsuccessful in terms of time, budget and stakeholders' satisfaction (Hayden Jr, 2004). Moreover, majority of the projects face benefit shortfalls from the planned benefits against their costs (Flyvbjerg et al., 2003). These failures (over-time, over-budget & benefit shortfalls) redefine a project from economically viable to in-viable or failed projects. Vanston and Vanston, (2005) argues that inaccurate data and inappropriate forecasting techniques are the main causes of cost & time overruns and benefit shortfalls. However, empirical analysis of the claim suggests otherwise. Literature observes no improvement in the project performance despite substantial advancement in forecasting and data collection techniques (including Critical Path Method and Program Evaluation and Review Technique among others) for the past 70 years (Flyvbjerg, 2006a). Prater, et al., (2017) suggests that a human behavioral characteristic, Optimism is one substantial cause behind the time delays, cost escalations and benefit short falls.

1.2 INTRODUCTION TO OPTIMISM BIAS

Multiple research efforts conclude that the planned baseline is not a good predictor of the actual project timelines. The most probable reason behind project performance is under-estimation of baselines instead of project execution. In other words, project planners show optimism bias when planning baselines. They exaggerate the benefits and downplay the risks of a project during the planning phase. Optimism Bias is defined as "*a cognitive predisposition found with most people to judge future events in a more positive way than is warranted by actual experience*" (Flyvbjerg, 2006b).

Optimism bias is the inert behavior of human mind. It explains the actual thinking of the human mind. Humans' perception of logical and rational thinking is different from the actual thinking process of the human mind (Prater et al., 2017).

1.3 PROBLEM STATEMENT

The problem statement for this study is twofold. First, there is a need to assess the level of optimism bias among project planners in developing countries. Understanding the extent and impact of optimism bias in these contexts will provide insights into the challenges faced by project planners and the potential risks associated with biased decision-making.

Second, there is a need to identify and propose mitigation strategies that can effectively curb the effects of optimism bias in the planning process of projects in developing countries.

This study aims to address these gaps by examining the level of optimism bias among project planners in developing countries and proposing context-specific mitigation strategies. By doing so, it seeks to contribute to the understanding of optimism bias in

the planning process of projects in developing countries and provide practical recommendations to enhance project decision-making and performance.

1.4 RESEARCH OBJECTIVES

Research Objectives of this study are:

- To identify risks that may cause failure w.r.t Time, Cost and Quality in Construction Projects
- To calculate project planners' optimism bias by recording their response to the identified risks.
- To propose strategies to mitigate the effect of Optimism Bias on mega projects

1.5 SIGNIFICANCE OF STUDY

Globally, investment projections on large scale infrastructure projects (mega projects) were projected at approximately € 2.2 Trillion for 10 years following 2009 (Flyvbjerg et al., 2009a). Immaculate project management is necessary to considering such major investments. However, statistics does not support good track record of project success. There is a considerable management problem in the planning phases of these mega projects. Cost overruns & benefit shortfalls highlights the insufficient funds allocation and unrealistic expectations respectively. This means that the project planners are optimistic. Since the size of the projects and the time and resources investment in the projects are continuously increasing, the incorrect estimation of costs and benefits problem in getting bigger (Flyvbjerg et al., 2009b). There is a dire need to investigate into optimism bias in project management since Kahneman, (2003) suggests that the project failures are direct results of faulty decision-making and fallacy in planning.

1.6 RELEVANCE TO NATIONAL NEEDS

Delays and cost overruns in the construction industry are a global phenomenon and are considered as two of the most persistent problems throughout the world. The delays in construction project and the cost of overruns have many aftereffects. In case of megaprojects, however, the problems are exacerbated manifolds. Delays, cost overruns, benefits shortfalls of mega projects in Pakistan remains a chronic trend. Being a developing country, Pakistan's economy is badly hurt by these cost overruns and benefit shortfalls of mega projects. Planners in the government of Pakistan preferred funding small and medium sized dam projects over other similar large projects. This resulted in time delays, cost overruns and benefit shortfalls in terms of load shedding, floods, and water scarcity issues. This shows misplaced priorities of project planners (in selection of projects) and lack of planning strategies due to optimistic or misrepresented forecasts. Improved forecasts and selection of better suited projects will help decision makers save millions of taxpayer money.

1.7 ORGANIZATION OF THESIS

This study is organized over 5 chapters.

1.7.1 CHAPTER 1

Chapter 1 of the study focuses on introducing the problem of optimism bias in project planning, particularly in the context of developing countries. The chapter defines optimism bias as a cognitive predisposition that leads project planners to underestimate baselines and downplay risks. It identifies the need to assess the level of optimism bias among project planners in developing countries and proposes the objectives of the study. The significance of the study is also highlighted in the chapter.

1.7.2 CHAPTER 2

Chapter 2 of the study provides a comprehensive literature review on optimism bias in project planning. It highlights the importance of construction projects in societal development and discusses the challenges encountered in project development, including time overruns, cost overruns, and quality failures. The chapter reviews existing research on project management, project management tools and techniques, and project failure statistics, emphasizing the persistent issues despite extensive research efforts. It explores different schools of thought explaining project failures, such as the deterministic and behavioral schools of thought, and delves into the integration of behavioral sciences, particularly optimism bias, in project management. The literature review also examines the spatial analysis of research on optimism bias and previous studies conducted on the topic, ultimately identifying the research gap in the context of optimism bias in project planning.

1.7.3 CHAPTER 3

Chapter 3 of the study outlines the research design employed to investigate optimism bias in project planning. The chapter begins by discussing the components of the research design, which include a literature review, a preliminary survey, the Relative Important Index (RII), and the optimism bias survey. The literature review serves as the foundation for understanding the existing knowledge on optimism bias. The preliminary survey helps in identifying key factors influencing project outcomes. The RII is used to determine the relative importance of these factors. The optimism bias survey measures the level of optimism bias among project planners. The chapter also addresses the reliability and validity of the research methods and discusses the measurement of

optimism bias. Overall, the research design chapter establishes the framework and methodology for studying optimism bias in project planning.

1.7.4 CHAPTER 4

Chapter 4 of the study delves into the analysis of respondents and the exploration of optimism bias scores obtained from the survey. The chapter examines the respondents' nationality, qualifications, professional experience, and understanding of optimism bias. It presents the optimism bias scores in relation to time overruns, cost overruns, and quality failures, along with a combined optimism bias score. The analysis includes a breakdown of optimism bias scores based on respondents' nationalities. Additionally, the chapter discusses various mitigation strategies, such as independent assessments, risk analysis, collaborative planning, contingency planning, regular monitoring, and a comprehensive framework. The findings of this chapter contribute to a deeper understanding of optimism bias in project planning and provide insights into potential strategies to address and mitigate its effects.

1.7.5 CHAPTER 5

Chapter 5 concludes the study by summarizing the main findings and implications. It highlights the assessment of optimism bias among project planners in developing countries and the identification of mitigation strategies. The chapter acknowledges the contribution of the study to the existing literature on optimism bias and its limitations, such as sample size and potential biases. It also provides recommendations for future research to further explore and address optimism bias in project planning. Overall, Chapter 5 provides a concise conclusion, underscoring the significance of the study and suggesting avenues for future investigation.

Chapter 2

LITERATURE REVIEW

2.1 IMPORTANCE OF CONSTRUCTION PROJECTS IN SOCIETAL DEVELOPMENT

Civil engineering projects play a crucial role in the development and progress of societies, contributing significantly to the overall infrastructure and enhancing the quality of life for individuals. These projects encompass a wide range of essential infrastructure development, including transportation networks, water supply systems, buildings, and environmental management. Numerous research studies have highlighted the significant positive impacts of civil engineering projects on societal development. For example, a study by (Koźlak, 2017) emphasizes the role of transportation infrastructure projects in stimulating economic growth and improving accessibility. Similarly, Hutton and Chase, (2016) discuss the positive influence of water supply system construction on public health and sustainable development. These examples illustrate the vital importance of civil engineering projects in driving societal development, improving living standards, and fostering economic prosperity. By providing the necessary infrastructure, these projects establish the foundation for sustainable growth and progress within communities.

2.2 CHALLENGES IN PROJECT DEVELOPMENT

Challenges in project development, particularly in terms of cost, time, and quality failures, present significant obstacles to successful project execution. Cost overruns occur when projects exceed their allocated budgets, resulting in financial strain and potential resource constraints. Time delays disrupt project schedules and can lead to missed deadlines and increased expenses. Quality failures encompass deficiencies in

meeting project specifications and standards, leading to subpar deliverables that do not meet stakeholder expectations. These challenges have been extensively studied in the field of project management. For instance, studies by (Flyvbjerg et al., 2018)and (Mahmud et al., 2022) delve into the complexities of cost overruns and their impact on project outcomes. Additionally, research by Gupta and Kumar, (2020) examine the causes and consequences of time delays in project implementation. The work of Belassi and Tukel, (1996) investigates the factors influencing quality failures in construction projects. Addressing these challenges requires proactive planning, effective risk management, and the implementation of robust project control mechanisms to mitigate the adverse effects of cost, time, and quality failures and ensure successful project outcomes.

2.2.1 CHALLENGES IN TERMS OF TIME OVERRUNS

Challenges in project development, specifically related to time overruns, pose significant obstacles to the successful completion of projects. Time overruns refer to delays in project schedules and the failure to meet established timelines. These delays can occur due to various reasons, including inadequate project planning, inaccurate estimations, unforeseen changes in project scope, resource constraints, and external factors such as weather conditions or regulatory approvals. Time overruns not only disrupt project schedules but also lead to additional costs, compromised project quality, and strained stakeholder relationships. Numerous studies have investigated the causes and consequences of time overruns in project management. For instance, research by Caffieri et al., (2018) and Othuman Mydin et al., (2014) explores the factors contributing to project delays and the impact on project performance. Additionally, the work of Flyvbjerg et al., (2018) highlights the challenges of accurately estimating project durations. Addressing time overruns requires effective project planning, meticulous

scheduling, proactive risk management, and clear communication among project stakeholders. By identifying and mitigating potential causes of time overruns, project managers can enhance project efficiency, minimize delays, and ensure timely project delivery.

2.2.2 CHALLENGES IN TERMS OF COST OVERRUNS

Particularly in terms of cost overruns, pose significant hurdles to the successful completion of projects. Cost overruns refer to situations where the actual project costs exceed the initial budget estimates. These overruns can occur due to various factors such as inaccurate cost estimations, changes in project scope, unexpected events, inadequate risk management, and ineffective cost control measures. Cost overruns not only strain project budgets but also impact project profitability, resource allocation, and stakeholder satisfaction. Extensive research has been conducted to investigate the causes and implications of cost overruns in project management. For instance, studies by (Flyvbjerg et al., 2013) and Love et al. (2018) explore the factors contributing to cost overruns and their impact on project performance. Additionally, research by (Hoseini et al., 2020) delves into the challenges of accurate cost estimation and effective cost control practices. Mitigating cost overruns requires robust project planning, diligent cost estimation, proactive risk management, and regular monitoring of project expenses. By implementing effective cost control measures, project managers can minimize cost overruns, optimize resource utilization, and improve project outcomes.

2.2.3 CHALLENGES RELATED TO QUALITY FAILURES

Challenges in project development, particularly in terms of quality failures, present significant obstacles to achieving successful project outcomes. Quality failures refer to instances where projects fail to meet the specified standards, requirements, or

expectations, resulting in subpar deliverables. These failures can occur due to various factors, including inadequate quality planning, insufficient quality control measures, poor workmanship, material deficiencies, lack of skilled resources, and ineffective communication. Quality failures can lead to rework, delays, increased costs, compromised project reputation, and dissatisfied stakeholders. Extensive research has been conducted to examine the causes and consequences of quality failures in project management. For example, studies by Belassi and Tukel, (1996) and Egbu and Charles O., (2004) explore the factors influencing quality failures in construction projects. Additionally, research by Motawa and Anumba, (2006) and Hallowell and Gambatese, (2010) investigate the impacts of quality failures on project performance and stakeholder satisfaction. Addressing quality failures requires implementing robust quality management systems, adhering to industry standards and best practices, conducting regular inspections and audits, and fostering a culture of quality within the project team. By emphasizing quality control and assurance measures, project managers can mitigate quality failures, enhance project outcomes, and maintain stakeholder confidence.

2.3 EXISTING RESEARCH ON PROJECT MANAGEMENT

Existing research on project management tools and techniques has played a crucial role in advancing the field of project management. Numerous studies have been conducted to explore various tools and techniques aimed at improving project performance, efficiency, and success. For instance, research by Kerzner, (2017) provides an in-depth analysis of project management methodologies, such as Agile, Waterfall, and Critical Path Method (CPM), highlighting their benefits and limitations. Similarly, studies by Project Management Institute (PMI) (2017) and A Guide to the Project Management Body of Knowledge (PMBOK® Guide) (2017) offer comprehensive frameworks and best practices for project management, covering areas such as scope management, risk

management, and stakeholder engagement. These research contributions have helped project managers and practitioners to gain a deeper understanding of the available tools and techniques and make informed decisions in project planning, execution, and control.

Furthermore, research has also focused on evaluating the effectiveness and adoption of project management software and technologies. For example, studies by (Chih and Zwikael, 2015) and Project Management Software Research (2018) examine the impact of project management software on project outcomes, team collaboration, and communication. These studies provide insights into the features, benefits, and challenges associated with project management software, guiding organizations in selecting and implementing the most suitable tools for their projects. The body of existing research on project management tools and techniques has greatly contributed to the continuous improvement and evolution of project management practices, empowering project teams to enhance project success rates, optimize resource utilization, and achieve project objectives effectively.

2.4 EXISTING RESEARCH ON PROJECT MANGEMENT TOOLS & TECHNIQUES

Existing research on project management tools and techniques has played a crucial role in advancing the field of project management. Numerous studies have been conducted to explore various tools and techniques aimed at improving project performance, efficiency, and success. For instance, research by Kerzner (2017) provides an in-depth analysis of project management methodologies, such as Agile, Waterfall, and Critical Path Method (CPM), highlighting their benefits and limitations. Similarly, studies by Project Management Institute (PMI) (2017) and A Guide to the Project Management Body of Knowledge (PMBOK® Guide) (2017) offer comprehensive frameworks and best practices for project management, covering areas such as scope management, risk

management, and stakeholder engagement. These research contributions have helped project managers and practitioners to gain a deeper understanding of the available tools and techniques and make informed decisions in project planning, execution, and control.

Furthermore, research has also focused on evaluating the effectiveness and adoption of project management software and technologies. For example, studies by (Chih and Zwikael, 2015) examine the impact of project management software on project outcomes, team collaboration, and communication. These studies provide insights into the features, benefits, and challenges associated with project management software, guiding organizations in selecting and implementing the most suitable tools for their projects. The body of existing research on project management tools and techniques has greatly contributed to the continuous improvement and evolution of project management practices, empowering project teams to enhance project success rates, optimize resource utilization, and achieve project objectives effectively.

2.5 PROJECT FAILURE STATISTICS REMAINS BLEAK DESPITE EXTENSIVE RESEARCH

Despite the extensive technical research conducted in the field of project management, project failure statistics continue to be a concern. Various studies have examined project failure rates and identified factors contributing to project failures. For instance, research by Standish Group International, (2009) revealed that a significant number of projects experience challenges or fail to meet their objectives. The study identified factors such as poor communication, inadequate stakeholder engagement, scope creep, and unrealistic expectations as common contributors to project failures. Additionally, a study by Flyvbjerg et al., (2003) highlighted the tendency for cost overruns and schedule delays in large infrastructure projects, further emphasizing the prevalence of project failure.

Furthermore, research by Belout and Gauvreau, (2004) and Shenhar et al., (2001) focused on identifying the underlying causes of project failure. They emphasized issues such as poor project planning, inadequate risk management, lack of leadership, and organizational culture as key factors that contribute to project failures. These studies highlight the importance of addressing both technical and non-technical aspects of project management to mitigate project failure risks.

Despite the efforts to improve project management practices, the statistics on project failure persist. This highlights the need for a comprehensive approach that incorporates not only technical tools and techniques but also factors related to project governance, organizational culture, and human behavior. By considering a holistic perspective and implementing effective project management strategies, organizations can enhance project success rates and minimize the occurrence of project failures.

2.6 SCHOOLS OF THOUGHTS EXPLAINING PROJECT FAILURES

Research on project failure progresses along two distinct schools of thoughts; The Deterministic or Empirical School and Behavioral School of Thought (Chadee et al., 2021).

2.6.1 DETERMINISTIC OR EMPERICAL SCHOOL OF THOUGHT

This school of thought focuses on the investigation of rational causes of cost and time overruns of project planning and management. It uses performance metrics and the respective shortfalls. This rationalistic approach attempts at logic-based planning, formal processes, and analytical techniques for forecasting future outcomes, but with constraint of avoiding uncertainty despite engaging the subjectivism of human mind.

2.6.2 BEHAVIORAL SCHOOL OF THOUGHT

The behavioral school of thought assumes that the root cause of cost overruns is delusion which is based on the project actors' individual biases and strategic miss-representation (the deliberate intent to deceive to gain project acceptance). While it is acknowledged that cost overruns are a wide spreads issue and have garnered considerable interest from stakeholders, the proposed solutions are limited without understanding where this tendency is most pronounced in projects.

2.7 THE UNRESOLVED DEBATE ON IMPROVING COST, TIME, AND QUALITY PERFORMANCES

The unresolved scholarly debate on improving cost, time, and quality performances in projects has led to the recognition of the need for inclusion of behavioral studies. Traditional approaches to project management primarily focused on technical aspects, neglecting the human element and its influence on project outcomes. However, researchers have increasingly emphasized the importance of considering behavioral factors in project management to address the complex challenges associated with cost, time, and quality performances.

Studies such as Turner and Müller, (2005) and Winch, Graham, (2012) have highlighted the limitations of technical approaches and advocated for a broader perspective that integrates behavioral sciences. These studies emphasize the significance of understanding human behavior, decision-making processes, and organizational dynamics in project environments. By incorporating concepts from behavioral sciences, project managers can gain insights into the underlying factors that impact project performance, such as motivation, communication, teamwork, and stakeholder engagement.

Moreover, research by Cicmil et al., (2006) and Thamhain and Wilemon, (1975) explores the potential benefits of integrating behavioral studies in project management. These

studies emphasize the positive impact of incorporating behavioral aspects on project success, risk management, and stakeholder satisfaction. The inclusion of behavioral studies allows project managers to better anticipate and address challenges related to human behavior, thereby enhancing project outcomes and reducing the likelihood of cost, time, and quality failures.

2.8 INTEGRATION OF BEHAVIORAL SCIENCES IN PROJECT MANAGEMENT

The integration of behavioral sciences in project management has emerged as a valuable approach to address the complex dynamics of project environments. Researchers have recognized the significance of understanding human behavior, cognitive processes, and social interactions to enhance project outcomes and mitigate potential challenges. By incorporating behavioral sciences, project managers can gain valuable insights into individual and group behavior, decision-making, motivation, and communication, among other factors that impact project success.

Studies by Geraldi et al., (2011) and Martinsuo and Lehtonen, (2007) emphasize the benefits of integrating behavioral sciences in project management. These studies highlight how insights from psychology, sociology, and organizational behavior can contribute to improved project planning, risk management, and team collaboration. By understanding the cognitive biases and social dynamics that influence project participants, project managers can make informed decisions, foster effective teamwork, and address potential conflicts proactively.

Furthermore, research by Zwikael and Unger-Aviram, (2010) and Raelin, (2016) explores the role of behavioral sciences in enhancing leadership and stakeholder engagement in projects. These studies emphasize the importance of emotional intelligence, leadership styles, and the ability to understand and manage stakeholders'

expectations and interests. Integrating behavioral sciences enables project managers to develop stronger relationships with stakeholders, facilitate effective communication, and align project goals with stakeholders' needs.

2.9 INTERGRATION OF BEHAVIORAL SCIENCES IN PROJECT MANGEMENT: OPTIMISM BIAS

The integration of behavioral sciences, with a particular focus on optimism bias, in project management has emerged as a valuable approach to address the complex dynamics of project environments. Optimism bias refers to the tendency of individuals to be overly optimistic about project outcomes, leading to inaccurate estimations of time, cost, and quality. By incorporating an understanding of optimism bias, project managers can better anticipate and mitigate the potential negative impacts on project performance.

Research by Flyvbjerg et al. (2008) and Kahneman and Tversky, (1979) highlights the role of optimism bias in project management. These studies emphasize how individuals tend to underestimate project durations, costs, and potential risks due to a biased positive outlook. Understanding and addressing optimism bias can help project managers in setting realistic expectations, identifying potential challenges, and implementing effective risk management strategies.

Furthermore, Buehler et al., (1994) explores the impact of optimism bias on project planning and decision-making. These studies highlight how unrealistic optimism can lead to inadequate resource allocation, poor contingency planning, and project failure. Integrating behavioral sciences, including optimism bias, enables project managers to adopt a more balanced and realistic approach in project planning, considering both the potential opportunities and challenges that may arise.

By acknowledging and addressing optimism bias, project managers can make more informed decisions, set appropriate project targets, and establish contingency plans to mitigate potential time overruns, cost overruns, and quality failures.

2.10 CONCEPTUALIZING BIAS LEVELS AMONG PROJECT PARTICIPANTS

Conceptualizing bias levels among project participants is a crucial aspect of understanding the factors that contribute to delays, cost overruns, and quality failures in projects. Research by Flyvbjerg, (2006) and Kahneman, (2003) sheds light on the cognitive biases and judgment errors that individuals may exhibit during project decision-making processes. By examining bias levels among project participants, project managers can gain insights into the subjective perceptions, preferences, and potential blind spots that can influence project outcomes.

Furthermore, studies by (Brockhoff et al., 2016) and Kujala and Artto, (2000) explore the measurement and assessment of bias levels in project contexts. These studies propose methodologies and frameworks for quantifying bias levels among project participants, allowing for a systematic analysis of individual biases and their potential impact on project performance. Understanding the magnitude and distribution of bias levels can assist project managers in identifying areas of potential concern, prioritizing risk mitigation strategies, and making informed decisions to counterbalance biased perspectives.

2.11 SPATIAL ANALYSIS OF RESEARCH ON OPTIMISM BIAS

Research on optimism bias in the context of project management has predominantly focused on developed countries, leaving a significant research gap when it comes to developing countries. While there exists a substantial body of literature exploring optimism bias and its implications in project decision-making and performance, the

majority of studies have been conducted in Western or developed country settings. Limited attention has been given to understanding and addressing optimism bias specifically in the context of developing countries, where unique socio-cultural, economic, and institutional factors may influence project outcomes.

To shed light on this research gap, the present study aims to investigate the presence and impact of optimism bias in project management within developing country contexts. By exploring the specific challenges and dynamics faced by developing countries, the study seeks to provide a comprehensive understanding of how optimism bias operates and manifests in project decision-making processes. The research will employ a mixed-methods approach, combining quantitative surveys and qualitative interviews, to capture both statistical data and rich insights from project participants. The collected data will be analyzed using appropriate statistical techniques and supplemented with thematic analysis to identify patterns and themes related to optimism bias.

2.12 PREVIOUS STUDIES ON OPTIMISM BIAS

Optimism Bias has been a subject of discussion of many studies. Dricu et al., (2020) explains the neurophysiological basis of Optimism bias and focuses on the biological aspect of human mind on cognition. The study concludes that optimism bias exist in 80% of population. Al Hasani, (2019) uncovered the causes of optimism bias in transportation projects and focused on European Projects. Flyvbjerg et al., (2002) studies that infrastructure projects spread over 20 countries (developed countries) and suggested that 90% of the projects has experienced cost overruns of more than 28% because of underestimation of costs. Wang et al., (2018) concluded that underestimation of time exacerbates the cost overruns in terms of debt financing vis-à-vis extended construction timelines. Whereas, Dudley and Banister, (2018) suggested that due to inaccurate forecasts due to underestimated costs and overestimated benefits projects with high risk

of time overruns and benefit shortfalls are selected. Taxpayer Alliance, (2007) after surveying over 300 projects and found budget and time overruns due to optimism bias. Similarly, (Chadee et al., 2021) studied the influence of optimism bias on time and cost on construction projects in the context of Caribbean construction industry. The following table summarizes the studies conducted on optimism bias in construction industry.

Sr No	Paper	Optimism Bias in Time and Cost Overruns in Construction sector (Developed Countries)	Optimism Bias in Cost Overruns of Construction sector (Developed Countries)	Optimism Bias Regarding Org. Dynamics	Critical Evaluation of Proper Management Processes	Optimism Bias & Risk-Taking Behaviour of Construction Workers	Optimism Bias in Project Planning & Control	Optimism Bias & Project Termination Decision	Quantifying psychological effects on projects	Optimism bias in British Transport Planning	Optimism Bias in Quality Mgmt.	Systematic Quantitative Literature Review	Optimism Bias and Miss-representation of facts in project perform.	Optimism Bias in Developing Countries
1	The influence of optimism bias on time and cost on construction projects. (Chadee et al., 2021)	✓	✓				✓		✓	✓		✓		
2	Impact of optimism bias regarding organizational dynamics on project planning and control (Son and Rojas, 2011)			✓			✓							
3	How Optimism Bias and Safety Climate Influence the Risk-Taking Behaviour of Construction Workers (Man et al., 2022)			✓		✓								
4	The Effect of Optimism Bias on the Decision to Terminate Failing Projects (Meyer, 2014)							✓				✓		
5	Construction quality in China during transition: A review of literature and empirical examination (Yung and Yip, 2010)				✓							✓		
6	Moving Beyond Optimism Bias and Strategic Mis-representation: An Explanation for Social Infrastructure Project Cost Overruns (Love et al., 2012)		✓							✓				

Sr No	Paper	Optimism Bias in Time and Cost Overruns in Construction sector (Developed Countries)	Optimism Bias in Cost Overruns of Construction sector (Developed Countries)	Optimism Bias Regarding Org. Dynamics	Critical Evaluation of Proper Management Processes	Optimism Bias & Risk-Taking Behaviour of Construction Workers	Optimism Bias in Project Planning & Control	Optimism Bias & Project Termination Decision	Quantifying psychological effects on projects	Optimism bias in British Transport Planning	Optimism Bias in Quality Mgmt.	Systematic Quantitative Literature Review	Optimism Bias and Miss-representation of facts in project perform.	Optimism Bias in Developing Countries
7	Procedures for Dealing with Optimism Bias in Transport Planning (Flyvbjerg et al., 2013)	✵	✵						✵	✵				
8	Performers, trackers, lemmings and the lost: Sustained false optimism in forecasting project outcomes — Evidence from a quasi-experiment (Kutsch et al., 2011)						✵		✵					
9	Delusion and Deception in Large Infrastructure Projects: Two Models for Explaining and Preventing Executive Disaster (Flyvbjerg et al., 2009a)			✵			✵						✵	
10	Optimism bias within the project management context: A systematic quantitative literature review (Yung and Yip, 2010)	✵	✵				✵		✵			✵	✵	
11	The Influence of Optimism Bias on Time and Cost on Construction Projects (Chadee et al., 2021)	✵	✵				✵		✵					

Table 2-1 Summary of Previous Literature on Optimism Bias in Construction Industry

2.13 RESEARCH GAP

(Prater et al., 2017) conducted a comprehensive survey to delve into the spatial analysis of research on optimism bias. Their study aimed to understand the geographic distribution of research studies focused on optimism bias and explore any potential regional biases in research efforts. By examining the literature, they identified that the majority of research on optimism bias is concentrated in developing countries, with a significant emphasis on European countries.

Referencing form previous sections, extensive literature survey conducted in this study highlights the existing gaps and disparities in research on optimism bias. The concentration of research in certain regions suggests a shadow of cloud over the construction industry of developing countries vis-à-vis optimism bias. This highlights the need for a broader geographic representation in future research efforts to ensure a more comprehensive understanding of optimism bias across different countries and regions.

Limited attention has been given to understanding and addressing optimism bias specifically in the context of developing countries, where unique socio-cultural, economic, and institutional factors may influence project outcome. Therefore, this research revolves around optimism bias and its effect on the project planner's performance in developing nations.

Chapter 3

RESEARCH METHODOLOGY

3.1 RESEARCH DESIGN

The workflow diagram of the study is as under:

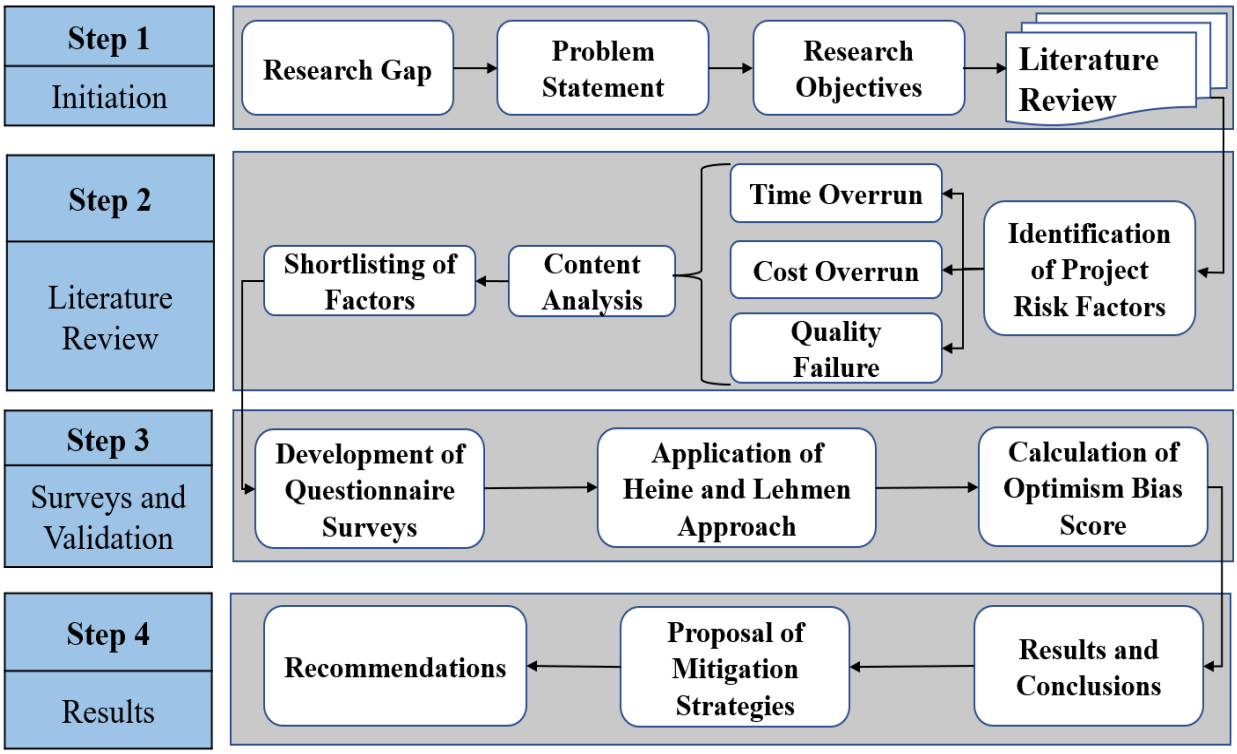


Figure 3-1 Methodology Chart

3.1.1 LITERATURE REVIEW

In order to evaluate Optimism Bias in construction industry of developing nations, the study was divided into 4 stages. In the first stage, a literature review was performed wherein a comprehensive list of 55 project failures were identified in three vis-à-vis Time and Cost overruns and Quality failure factors.

Sr. No.	Time Over Run Factors	Cost Overrun Factors	Quality Failure Factors
1	Strategic Misrepresentation	Under-estimation of completion cost	Poor supervision
2	Political Interference	Fluctuation in market Prices	Defective Materials provided by supplier
3	Frequent Design Changes	Frequent Design Changes	Lack of consultant experience
4	Incomplete Project Documents	Change Orders	Unclear definition of quality
5	Poor Planning Among Stakeholders	Fraudulent Practices	Low Bid
6	Labour disputes / Strikes	Ambiguity in Facts	Unreasonable decision
7	Planning Fallacy	Payment Delays/Lack of Funding	Poorly Defined project Objectives
8	Ambiguity in Facts	Price Escalation	Poorly defined responsibilities
9	Payment Delays/Lack of Funding	Conflict among Parties	Lack of Innovation
10	Decision Making Skills	Resource Shortage	Poor Planning Among Stakeholders
11	Poor Communication	Poor Contract Management	Fraudulent Practices
12	Conflict among Parties	High level uncertainity	Inexperiend Contractor
13	Resource Shortage	Tactical delays	Defective work
14	Poor Contract Management	Theft of materials	Construction Method
15	High level uncertainity	Legal Disputes	Poor Material Management
16	Tactical delays	Reworks	Lack of Specialized Workers & Machinery
17	Deficient site management	Owners' Financial Difficulties	Improper Classification of contractors
18	Weather conditions		Industry Acedemia Linkage
19	Legal Disputes		
20	Reworks		

Table 3-1 : List of Risk Factors Identified in terms of Time, Cost and Quality Failures

3.1.2 PRELIMINARY SURVEY

Following the literature review, the research methodology employed in this study involved the administration of a preliminary questionnaire survey to assess the perceived importance of risk factors. Professionals with expertise in the relevant field were selected as participants. The questionnaire consisted of a comprehensive list of risk factors commonly associated with the construction projects. Participants were asked to rate the importance of each risk factor on a 5- Likert scale, indicating their level of agreement or disagreement with the significance of each factor. The survey was conducted electronically to facilitate efficient data collection.

The research methodology adopted in this study draws on established approaches used in previous research (Smith et al., 2015). By utilizing a questionnaire survey, this study provides a structured and quantitative assessment of the perceived importance of risk factors in project management. This methodology enables a comprehensive understanding of the relative significance of different risk factors, which can contribute to the development of effective risk management strategies in civil engineering projects.

The data collected through the questionnaire survey was then subjected to statistical analysis to determine the relative importance of each risk factor as perceived by the participants. Descriptive statistics such as mean scores and relative scores were calculated to summarize the responses. This allowed for a systematic evaluation of the perceived significance of the identified risk factors in the context of the project.

3.1.3 RELATIVE IMPORTANT INDEX (RII)

A popular and effective ranking technique used by researchers in construction industry is Relative Important Index. The raking was assigned on the basis of descending order of the RII values, the highest being the most important. The equation is as follows:

$$RH = \frac{\sum Wi}{Hxn}$$

3.1.4 OPTIMISM BIAS SURVEY

In the third stage of the research, a questionnaire survey was developed, consisting of four sections. The first section focused on collecting demographic information, including Name, email address, qualification, and years of experience. The second section comprised 55 delay factors grouped under main headings such as Time Overrun Factors, Cost Overrun Factors and, Quality Failure Factors. To assess the presence of optimism bias, the direct method approach was employed, drawing inspiration from the methods

outlined by (Heine and Lehman, 1997) and (Breakwell et al., 2001). The direct approach, which utilized a 5-point Likert scale ranging from -2 to 2, was chosen as it enhances the likelihood of identifying optimism bias among individuals. Participants were asked to rate the likelihood of risk events occurring, and based on their assigned scores, a "bias score" was calculated. A score of "-2" indicated a significantly lower probability than that of an average project manager, "0" represented equal probabilities, and "2" represented a significantly higher probability than that of an average project manager.

A total of two hundred and ten questionnaires were distributed to the target audience. In total a hundred and seven with 50.95% return rate were recorded. This is by enlarge more than that of minimum rate of return of less than 40% recorded by (Moser and Kalton, 2017).

3.2 RELIABILITY AND VALIDITY

In this study, the reliability of the optimism bias among the participant in the construction industry is assessed using Cronbach's α index. To determine the reliability, the study considered the number of variables in our questionnaire and their correlations. A value of α equal to or greater than 0.8 is commonly regarded as indicating strong internal consistency ((Katsiana et al., 2022); (Tavakol and Dennick, 2011)). This study employed Microsoft Excel software to analyze the survey results. An α value of 0.875 was recorded. This validates the reliability of the survey results.

3.3 MEASURING OPTIMISM BIAS

The bias score of an individual response for each risk factor was obtained by summing up the Likert Score and dividing the result by total number of delays in the questionnaire for each section respectively i.e Cost, Time, and Quality. A score > 0 represents presence

of Optimism Bias, a score = 0 indicates no bias and a score < 0 represents pessimistic bias. Subsequently, the average bias score for developing countries was calculated.

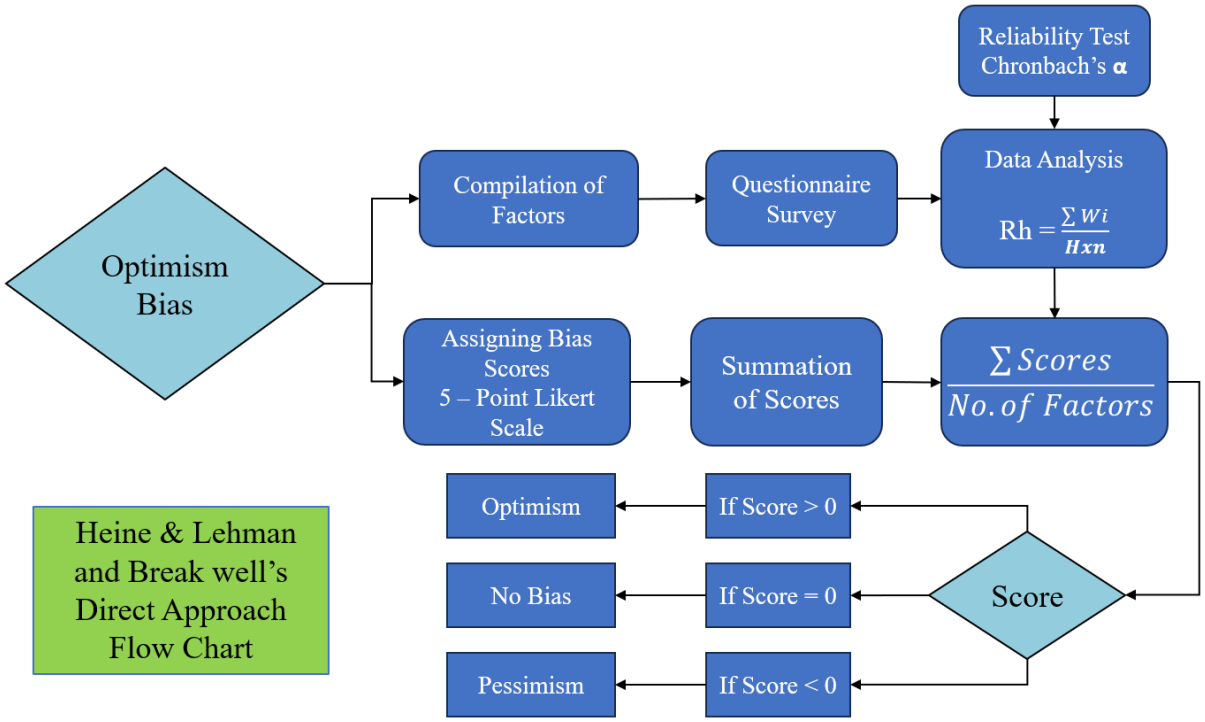


Figure 3-2 Work Flow Diagram of Heine & Lehman Approach (Heine and Lehman, 1997).

Chapter 4

RESULTS AND ANAYLYSIS

4.1 INTRODUCTION

The results of the study shed light on the presence and impact of optimism bias in project planning, particularly in the context of developing countries. Through a comprehensive analysis of data collected from project planners in various developing countries, the study provides valuable insights into the level of optimism bias exhibited by these individuals. The findings reveal the prevalent nature of optimism bias among project planners and highlight the potential risks and challenges associated with biased decision-making in the planning process. Furthermore, the study explores the effectiveness of different mitigation strategies in curbing the effects of optimism bias, offering valuable recommendations for improving project planning practices in developing countries. Overall, these results contribute to a better understanding of optimism bias and its implications in the context of project planning, providing a foundation for more informed and effective decision-making processes in developing countries.

4.2 RESPONDENTS ANALYSIS

Responses submitted by the respondents were analyzed and the following conclusions are drawn. The data was analyzed on the basis of Nationality of respondents, qualification of respondents, their experience and their bias score on multiple levels (individual and national levels).

4.2.1 NATIONALITY OF RESPONDETS

Following the structured methodology, 107 high grade construction professionals from developing countries contributed to this study. The demographic details are given as under:

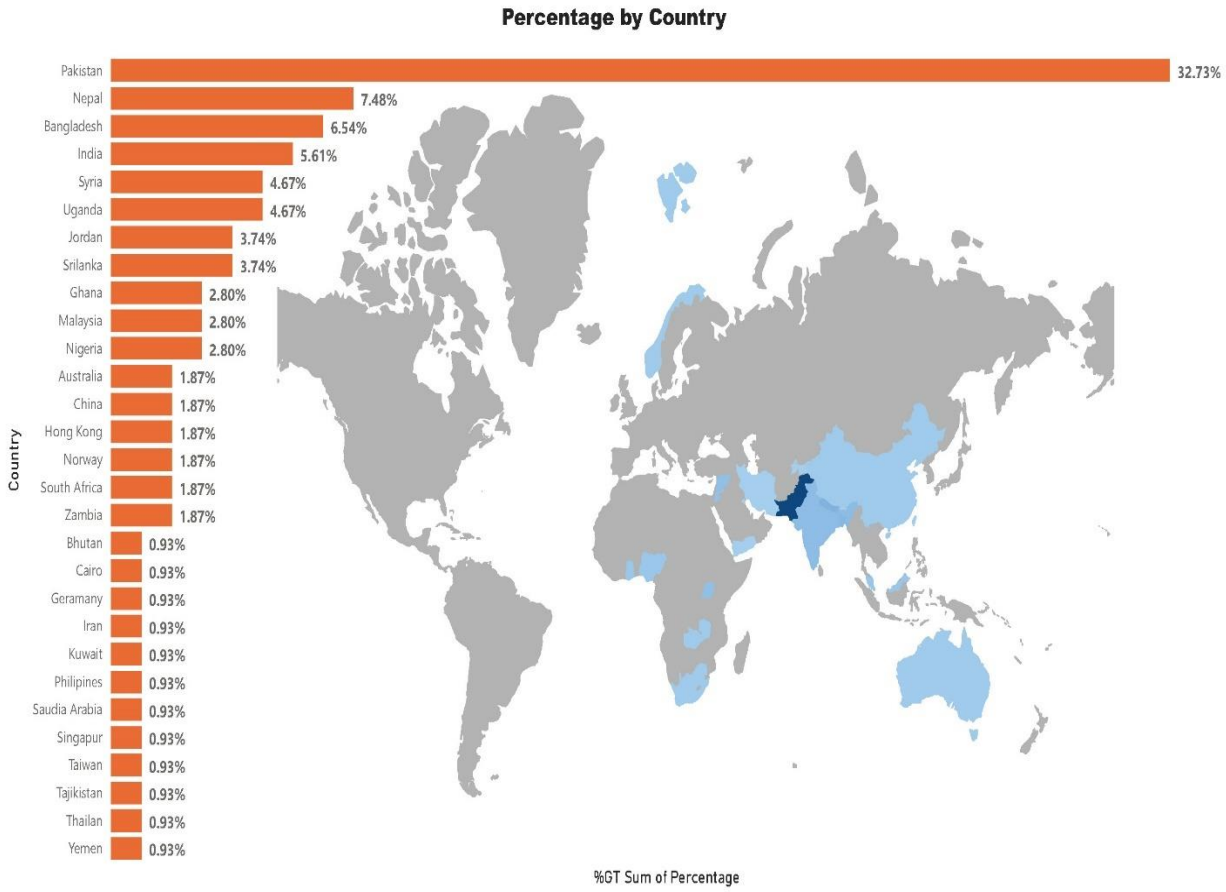


Figure 4-1 Nationality of Respondents

4.2.2 QUALIFICATION OF RESPONDENTS

The qualification details of the respondents are represented by the following donut chart:

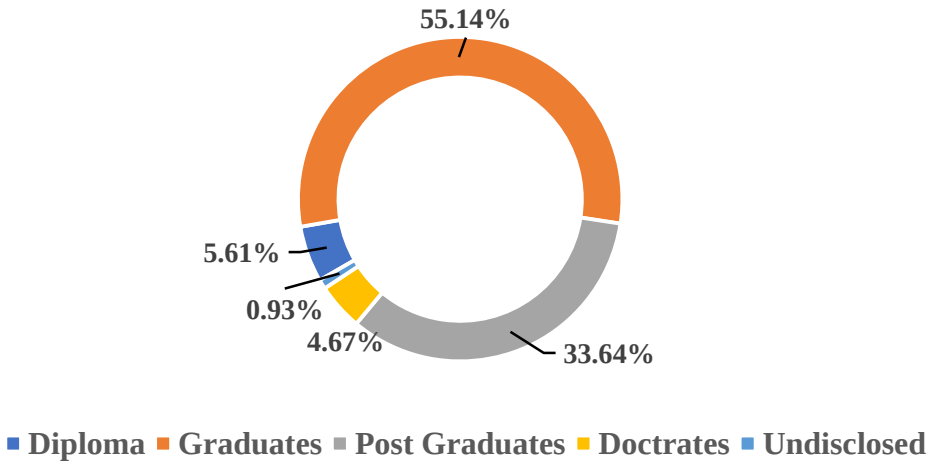


Figure 4-2 Qualification details of Respondents

The majority of the respondents were recorded to be graduates followed by respondents with post-graduation qualification. Together the graduates and post graduates added up to 88.78% of the total sample population recorded. 0.93% of the respondents preferred not to disclose their qualification details.

4.2.3 PROFESSIONAL EXPERIENCE

In terms of professional experience at the time of response, the respondents were grouped in five categories i.e., respondents with professional experience of 0 – 1 years, 2 – 5 years, 6 – 10 years, 11 – 15 years and more than 15 years of experience. The data recorded by the study is as under:

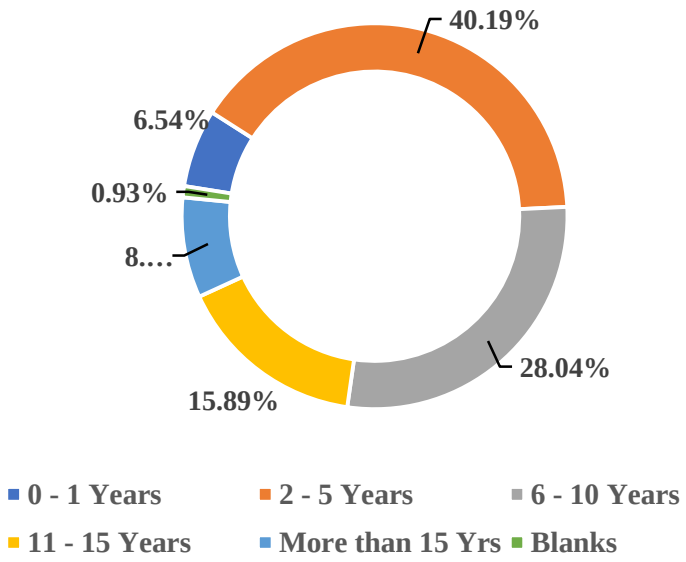


Figure 4-3 No. of years of professional experience of respondents

Again 0.93% of the respondents preferred not to reveal information regarding their professional experience.

4.2.4 UNDERSTANDING OF OPTMISM BIAS

The respondents were asked regarding their understanding of the topic, Optimism Bias. The respondents were grouped in five (05) categories, No understanding, Slight Understanding, Moderate, High and Exceptional Understanding of optimism bias.

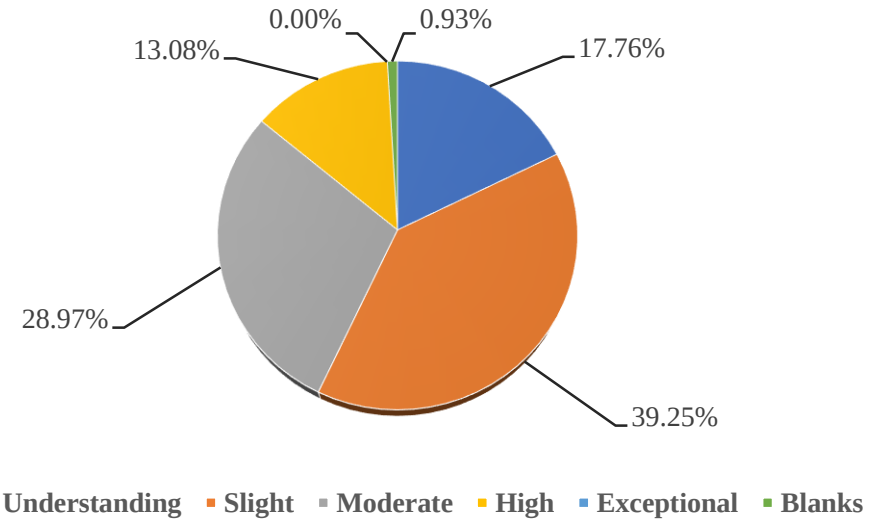


Figure 4-4 Understanding of Optimism Bias among the respondents

More than half of the respondents had no understanding or slight understanding of optimism bias. This time again only 0.93% of the respondents preferred not to answer this question. Another main observation from this data is that none of the respondent thought that they have exceptional knowledge of optimism.

4.3 OPTIMISM BIAS SCORE

Optimism bias scores were calculated both individually and combined for Time Overrun risks, Cost Overrun risks, and Quality failure risks. Optimism Bias scores were also calculated on national level.

4.3.1 OPTIMISM BIAS SCORE WITH RESPECT TO TIME OVERRUN

The first part of second section of the questionnaire investigated the optimism bias score of project participants with respect to Time Overrun. Out of a total 107 participants, seventy-five (75) showed Optimism Bias, ten (10) showed no sign of biasness and the rest (22) showed Pessimistic Bias with respect to Time Overrun factors.

Respondents	Optimism Bias	No Bias	Pessimistic Bias	Total
No. of Respondents	75	10	22	107
Percentage	70.09%	9.35%	20.56%	100%

Table 4-1 Optimism Bias Statistics with respect to Time Overrun Factors

Optimism bias score was also calculated for each individual activity, wherein the project planners were most optimistic over managing the effect of "Risk of Frequent Design Changes" on time overruns. However, the least optimistic behaviour was shown over managing the effect of " Political Interference in Project" by the project team members.

The detailed optimism bias shown by project team members on time overrun factors are as under:

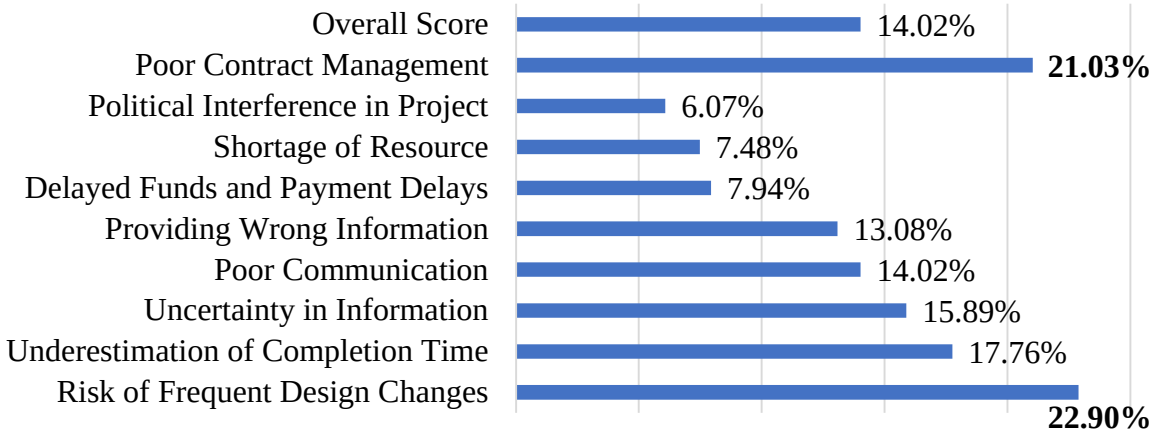


Figure 4-5 Optimism Bias Score of Each Time Overrun Factor

On average the participants of the survey exhibited optimism over managing the probability and severity of the time overrun risk factor with an average score of 14.02%.

4.3.2 OPTIMISM BIAS SCORE WITH RESPECT TO COST OVERRUN

The second part of second section of the questionnaire investigated the optimism bias score of project participants with respect to Cost Overrun factors of Construction projects. Out of a total 107 participants, seventy-one (71) showed Optimism Bias, twelve (12) showed no sign of biasness and the rest (24) showed Pessimistic Bias with respect to Cost Overrun factors.

Respondents	Optimism Bias	No Bias	Pessimistic Bias	Total
Number of Respondents	71	12	24	107
Percentage	66.36%	11.21%	22.43%	100%

Table 4-2 Optimism Bias Score of Each Cost Overrun Factor

Just like time overrun factors, optimism bias score was calculated for each individual activity, wherein the project planners were most optimistic over managing the effect of "Underestimation of Completion Cost" factor on cost overruns. However, the least optimistic behaviour was shown over managing the effect of " Resource Shortage" by the project team members. The detailed optimism bias shown by project team members on cost overrun factors are as under:

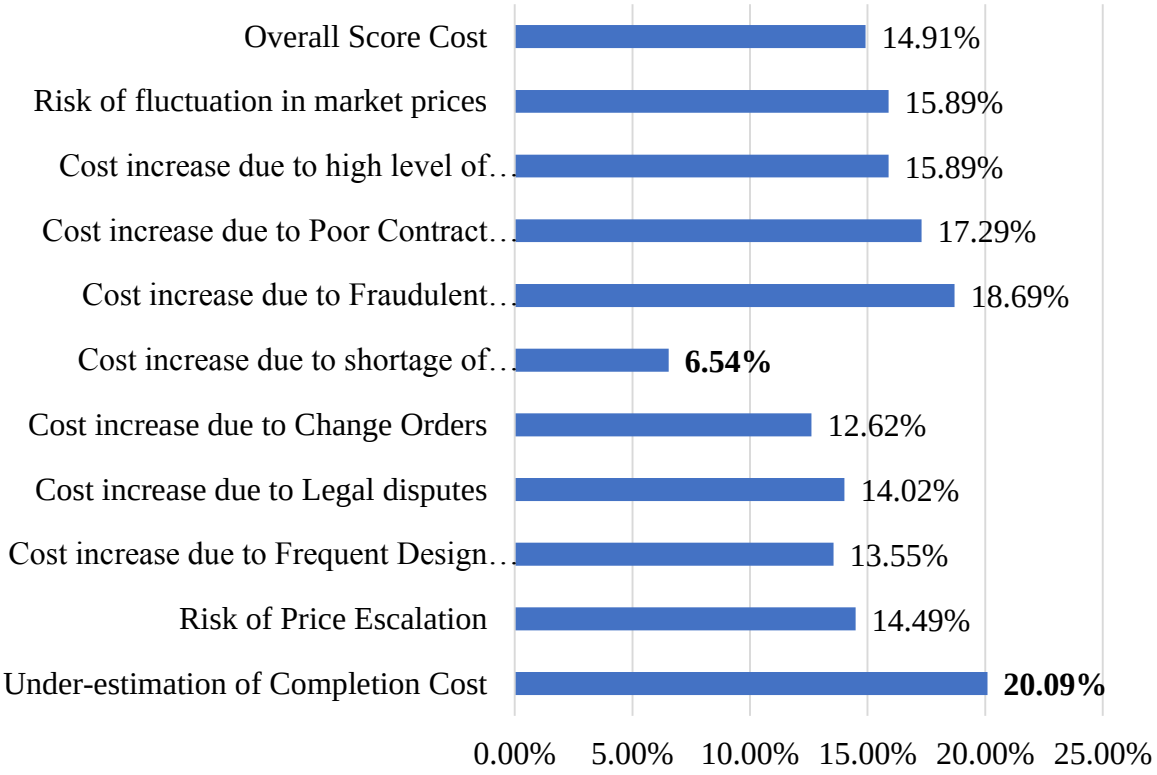


Figure 4-6 Optimism Bias Score of Each Cost Overrun Factor

Similar to the time overrun factor, on average the participants of the survey exhibited optimism over managing the probability and severity of the cost overrun risk factor with an average score of 14.91 %.

4.3.3 OPTIMISM BIAS SCORE WITH RESPECT TO QUALITY FAILURE

The third part of second section of the questionnaire investigated the optimism bias score of project participants with respect to Quality failure factors of Construction projects. Out of a total 107 participants, eighty-five (85) showed Optimism Bias, eight (08) showed no sign of biasness and the rest fourteen (14) showed Pessimistic Bias with respect to Quality failure factors.

Respondents	Optimism Bias	No Bias	Pessimistic Bias	Total
Number of Respondents	85	08	14	107
Percentage	79.44%	7.48%	13.08%	100%

Table 4-3 Optimism Bias Score of Each Cost Overrun Factor

Optimism bias score was also calculated for each individual activity, wherein the project planners were most optimistic over managing the effect of "unavailability/lack of specialized resources" factor on time overruns. However, the least optimistic behaviour was shown over managing the effect of "poor material management" by the participants. The detailed optimism bias shown by project team members on quality failure factors are as under:

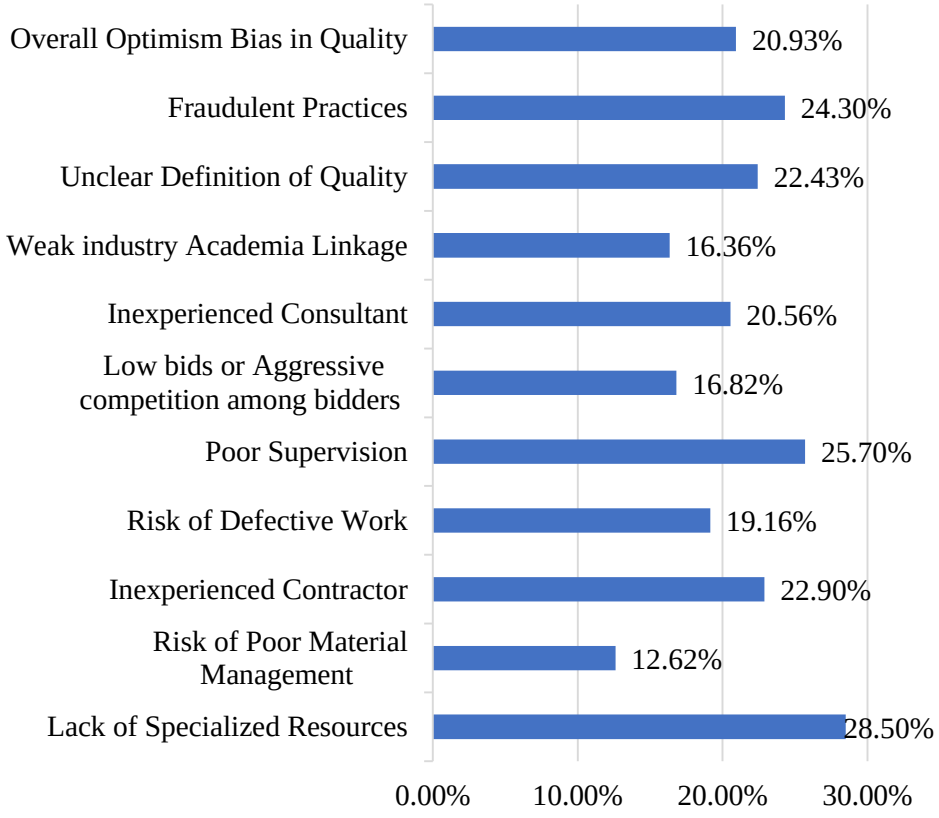


Figure 4-7 Optimism Bias Score of Each Cost Overrun Factor

Similar to the time and cost overrun factors, on average the participants of the survey exhibited optimism over managing the probability and severity of the quality failure factor as well, with an average score of 20.93%.

4.3.4 COMBINED OPTIMISM BIAS SCORE

All, time overrun, cost overrun, and quality failure factors combined were also evaluated.

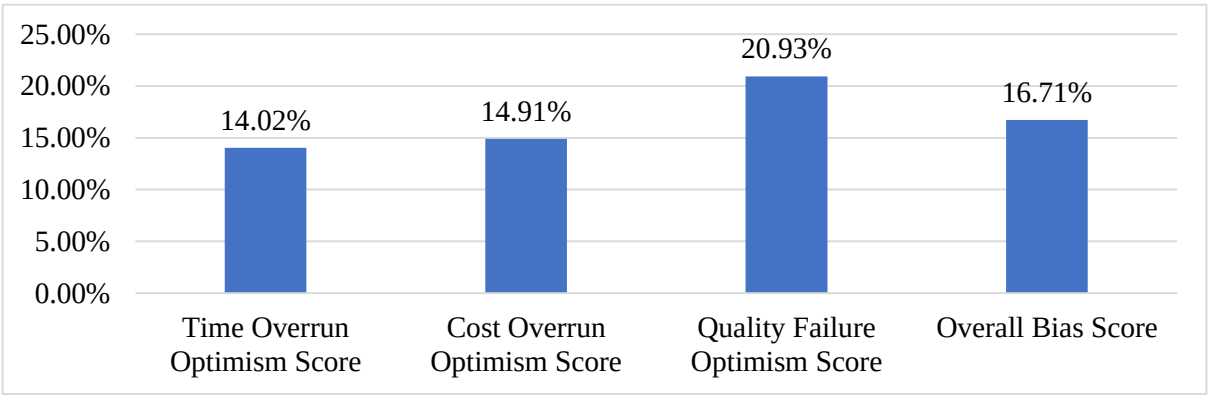


Figure 4-8 Optimism Bias Scores of each category and overall bias score

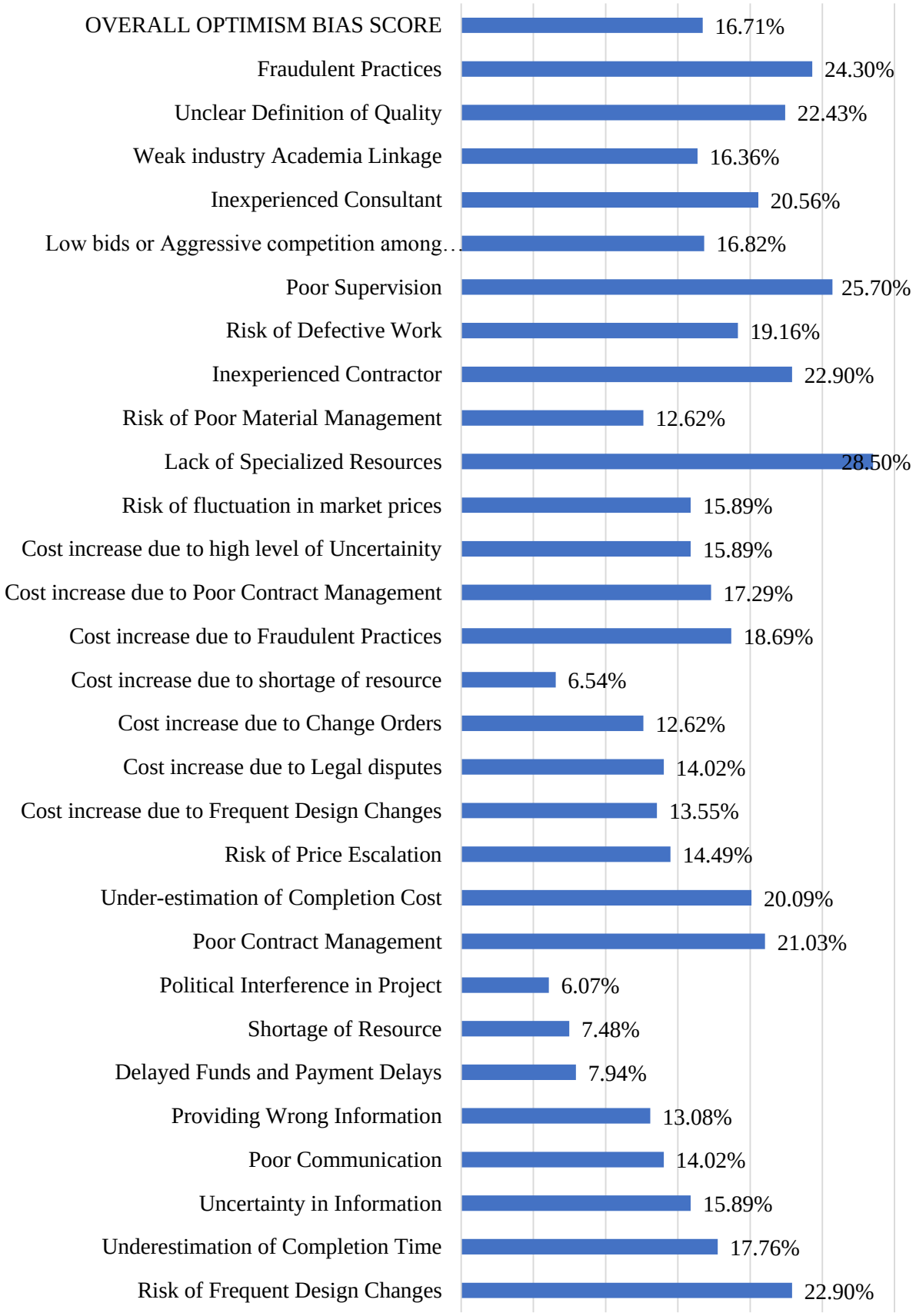


Figure 4-9 Optimism Bias Score for each risk factor and Overall Bias Score

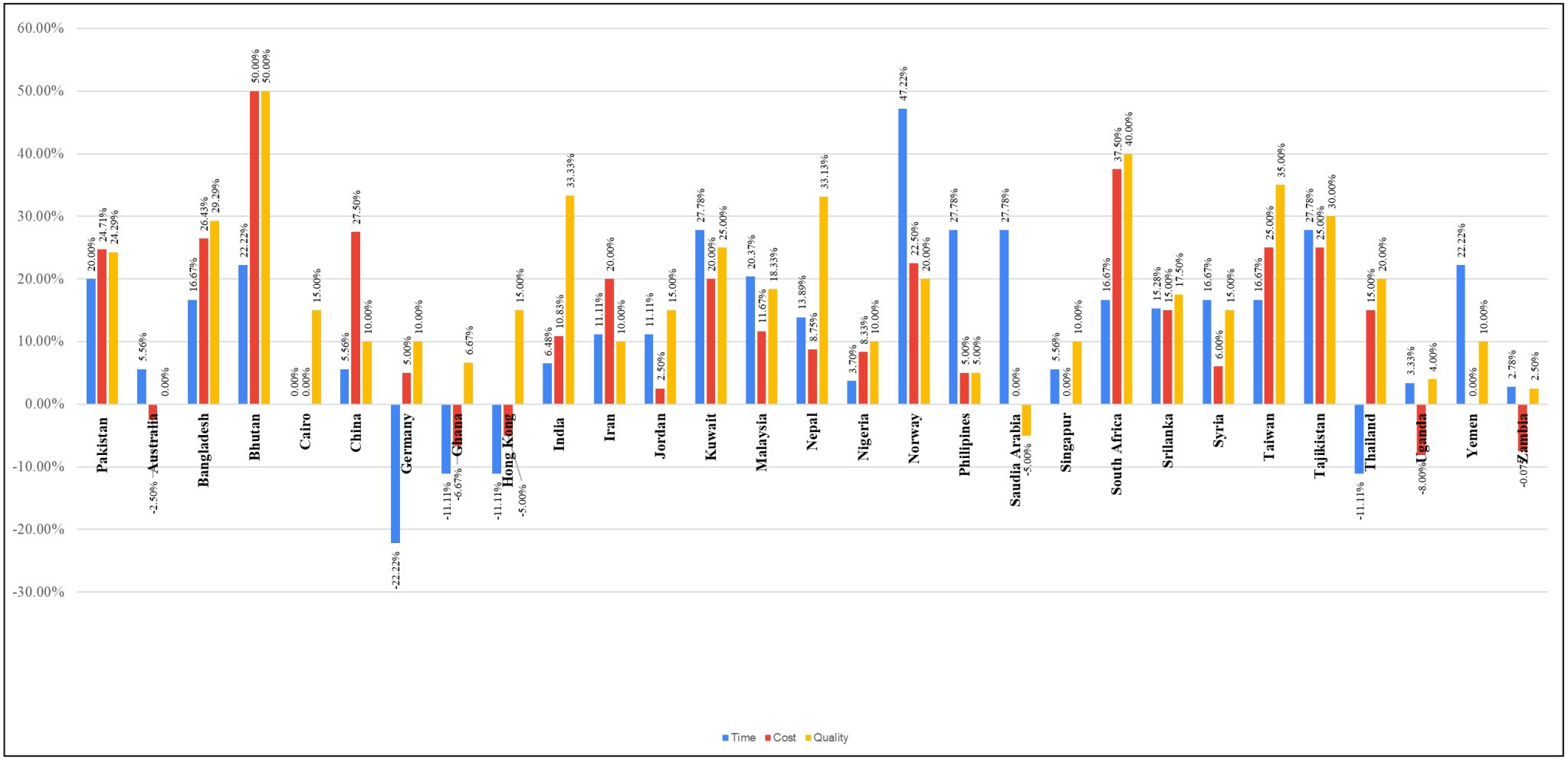
The participants were most optimistic about project quality risk factors followed by project costing and they exhibited least optimism for project timelines.

4.3.5 OPTIMISM BIAS SCORE FOR EACH NATIONALITY

The following table shows the optimism bias score for each participating nationality with respect to time overrun, cost overrun and quality failure factors and their combined score.

Country	Time Overrun Bias Score	Cost Overrun Bias Score	Quality Failure Bias Score
Pakistan	20.00%	24.71%	24.29%
Australia	5.56%	-2.50%	0.00%
Bangladesh	16.67%	26.43%	29.29%
Bhutan	22.22%	50.00%	50.00%
Cairo	0.00%	0.00%	15.00%
China	5.56%	27.50%	10.00%
Germany	-22.22%	5.00%	10.00%
Ghana	-11.11%	-6.67%	6.67%
Hong Kong	-11.11%	-5.00%	15.00%
India	6.48%	10.83%	33.33%
Iran	11.11%	20.00%	10.00%
Jordan	11.11%	2.50%	15.00%
Kuwait	27.78%	20.00%	25.00%
Malaysia	20.37%	11.67%	18.33%
Nepal	13.89%	8.75%	33.13%
Nigeria	3.70%	8.33%	10.00%
Norway	47.22%	22.50%	20.00%
Philipines	27.78%	5.00%	5.00%
Saudia Arabia	27.78%	0.00%	-5.00%
Singapur	5.56%	0.00%	10.00%
South Africa	16.67%	37.50%	40.00%
Srilanka	15.28%	15.00%	17.50%
Syria	16.67%	6.00%	15.00%
Taiwan	16.67%	25.00%	35.00%
Tajikistan	27.78%	25.00%	30.00%
Thailand	-11.11%	15.00%	20.00%
Uganda	3.33%	-8.00%	4.00%
Yemen	22.22%	0.00%	10.00%
Zambia	2.78%	-0.075	2.50%

Table 4-4 Country wise optimism bias score


60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
-10.00%
-20.00%
-30.00%
Pakistan 20.00% 24.71% 24.29%
Australia 5.56% -2.50% 0.00%
Bangladesh 16.67% 26.43% 29.29%
Bhutan 22.22% 50.00% 50.00%
Cairo 0.00% 0.00% 15.00%
China 5.56% 27.50% 10.00%
Germany -22.22% 5.00% 10.00%
Ghana -11.11% -6.67% 6.67%
Hong Kong -11.11% -5.00% 15.00%
India 6.48% 10.83% 33.33%
Iran 11.11% 20.00% 10.00%
Jordan 11.11% 2.50% 15.00%
Kuwait 27.78% 20.00% 25.00%
Malaysia 20.37% 11.67% 18.33%
Nepal 13.89% 8.75% 33.13%
Nigeria 3.70% 8.33% 10.00%
Norway 47.22% 22.50% 20.00%
Philipines 27.78% 5.00% 5.00%
Saudia Arabia 27.78% 0.00% -5.00%
Singapur 5.56% 0.00% 10.00%
South Africa 16.67% 37.50% 40.00%
Srilanka 15.28% 15.00% 17.50%
Syria 16.67% 6.00% 15.00%
Taiwan 16.67% 25.00% 35.00%
Tajikistan 27.78% 25.00% 30.00%
Thailand -11.11% 15.00% 20.00%
Uganda 3.33% -8.00% 4.00%
Yemen 22.22% 0.00% 10.00%
Zambia 2.78% -0.07% 2.50%
Time
Cost
Quality

4.4 MITIGATION STRATEGIES

To propose the possible mitigation strategies for optimism bias in the construction industry, a comprehensive review of relevant literature has been conducted. Scholars such as Branco and Ferreira have emphasized the importance of independent assessments in objectively evaluating project scope, budget, and timeline. Flyvbjerg has contributed valuable insights into risk analysis and its role in identifying and managing project uncertainties. The works of Alrashed and Alrashed, as well as Pauwels, Chua, and De Meyer, have shed light on the significance of collaborative planning in reducing optimism bias through effective communication and alignment of goals. Additionally, Chua, Kog, and Loh, along with Chen, Liu, Zhang, and Huang, have highlighted the importance of contingency planning in mitigating risks and addressing unforeseen events. Furthermore, Culp and Sun and Liu have discussed the significance of regular monitoring in detecting deviations from the project plan and taking corrective actions. These scholarly works provide valuable insights into the strategies that can be implemented to mitigate optimism bias and improve project outcomes in the construction industry.

4.4.1 INDEPENDENT ASSESSMENTS

Independent assessments are crucial in mitigating optimism bias in the construction industry. Studies like Branco and Ferreira, (2018) emphasize the importance of conducting unbiased evaluations of project scope, budget, and timeline. This approach provides a realistic perspective and helps stakeholders make informed decisions based on objective analysis. Nawaz et al., (2019) also highlight the significance of risk management in independent assessments to identify potential challenges and develop appropriate mitigation strategies.

4.4.2 RISK ANALYSIS

Implementing risk analysis practices is essential to address optimism bias. (Flyvbjerg, 2013) argues that evaluating project risks and uncertainties can provide a more accurate understanding of potential pitfalls. (Chen et al., 2023) suggest a method to mitigate optimism bias in construction cost estimates by considering historical data, expert opinions, and project-specific characteristics during risk analysis. By adopting systematic risk assessment processes, stakeholders can identify, prioritize, and manage risks effectively.

4.4.3 COLLABORATIVE PLANNING

Collaborative planning promotes effective communication and coordination among stakeholders, reducing optimism bias. Alrashed and Alrashed, (2021) stress the need for collaboration in construction projects to ensure shared understanding and alignment of goals. Pauwels et al., (2016) advocate for involving diverse perspectives and expertise during planning stages, fostering a comprehensive and realistic project approach. By encouraging collaboration, stakeholders can better evaluate project requirements, constraints, and potential challenges.

4.4.4 CONTINGENCY PLANNING

Contingency planning plays a critical role in mitigating optimism bias by accounting for unforeseen events. Lam and Siwingwa, (2017) emphasize the significance of contingency planning in managing complex projects and mitigating risks that could affect project performance and reputation. Tamošaitienė et al., (2013) propose a multi-attribute decision-making method to assess construction project risks under uncertainty, aiding in the development of effective contingency plans. By identifying potential risks and

preparing appropriate contingencies, stakeholders can better handle unexpected situations and minimize their impact on the project.

4.4.5 REGULAR MONITORING

Regular monitoring allows stakeholders to track project progress and identify any deviations from the plan. (Aulich, 2013) emphasizes the role of communication in construction project management, highlighting the importance of ongoing monitoring to address issues promptly.Wang et al., (2021) propose the use of Bayesian networks for construction project delay analysis, providing a method to monitor and manage project timelines effectively. By monitoring the project closely, stakeholders can detect early warning signs, take corrective actions, and maintain realistic expectations throughout the project lifecycle.

4.4.6 COMPREHENSIVE FRAMEWORK FOR MITIGATING OPTIMISM BIAS

Overall, the combination of independent assessments, risk analysis, collaborative planning, contingency planning, and regular monitoring provides a comprehensive framework to mitigate optimism bias in the construction industry. These strategies enhance decision-making processes, improve project outcomes, and reduce the likelihood of delays, cost overruns, and quality issues.

Chapter 5

CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

In conclusion, this study focused on investigating the optimism bias among construction project members in developing countries and proposed mitigation strategies to address its impact on project outcomes. By examining the unique context of developing countries, the research shed light on the specific challenges faced by project members in these settings and the potential consequences of optimism bias. The study emphasized the need for recognizing and managing optimism bias to enhance project performance, minimize delays, cost overruns, and compromised quality.

Through a comprehensive analysis of data and literature, this research has contributed to the understanding of optimism bias within the construction industry in developing countries. The proposed mitigation strategies provide practical approaches for project stakeholders to address and manage optimism bias effectively. These strategies include independent assessments, risk analysis, collaborative planning, contingency planning, and regular monitoring, all of which play a vital role in promoting realistic decision-making, effective communication, and proactive risk management.

By implementing the recommended mitigation strategies, construction project members in developing countries can enhance their ability to navigate project challenges and achieve more successful outcomes. This research serves as a valuable resource for practitioners, policymakers, and researchers in developing countries, providing insights and actionable measures to improve project management practices and drive positive development in these contexts.

Overall, this study highlights the importance of acknowledging and addressing optimism bias in construction projects in developing countries. By adopting the proposed mitigation strategies, project members can minimize the negative effects of optimism bias, leading to more successful project delivery, improved resource utilization, and ultimately contributing to the sustainable development of these countries.

5.2 ADDITION TO THE EXISTING LITERATURE

This study was able to achieve several important outcomes. Firstly, it provided empirical evidence regarding the presence and extent of optimism bias among project planners in developing countries. By collecting and analyzing data from diverse contexts, the study was able to identify and quantify the level of optimism bias exhibited by these individuals, contributing to a better understanding of the phenomenon in the specific context of project planning in developing countries.

Overall, this study contributed to a deeper understanding of optimism bias in the context of project planning in developing countries and provided valuable insights and recommendations for practitioners and researchers in the field. It advanced knowledge in the area of project management, specifically addressing the unique challenges faced by project planners in developing countries and offering strategies to improve decision-making processes and project performance.

5.3 LIMITATIONS OF THE STUDY

The research findings are limited to the literature review of 30 research papers and 107 responses seeking opinions from project participants representing construction industry of developing nations. The author neither cross referenced optimism bias score of developing countries nor did subject the study to comparative analysis of developed and

developing nations. Also, the author did not account for cultural aspects of individual nations.

5.4 FUTURE RECOMMNDATIONS

One key future recommendation is to further explore optimism bias in developing countries. While this study shed light on optimism bias in project planning within the context of developing countries, it is crucial to continue investigating this phenomenon to gain a more comprehensive understanding. Future research should encompass a wider range of countries and cultural contexts, considering the diverse factors that influence optimism bias. This will help capture the nuances and variations in the manifestation of optimism bias across different regions, enabling a more holistic perspective on its impact on project outcomes.

Also, this study recommends to conduct longitudinal studies to track the persistence and evolution of optimism bias over time. By examining how optimism bias unfolds throughout different stages of the project lifecycle, researchers can better understand its dynamics and impact. Longitudinal studies will provide valuable insights into the long-term effects of optimism bias on project planning and management. Moreover, such studies can inform the development of tailored interventions and strategies to mitigate the negative consequences of optimism bias at different stages of project execution. This approach will enable project planners and managers to make more informed decisions, adapt their strategies, and improve project outcomes.

REFERENCES

Al Hasani, M., 2019. What Causes Optimism Bias in Transportation Projects? Eur. J. Econ. Law Polit. 06. https://doi.org/10.19044/elp.v6no1a6

Alrashed, F., Alrashed, A., 2021. Investigating the factors affecting construction projects success in Saudi Arabia: A fuzzy-based approach. Journal of Engineering, Design and Technology.

Aulich, T., 2013. The role of effective communication in the construction Industry: a guide for education and health clients. Australas. J. Constr. Econ. Build. 13, 92. https://doi.org/10.5130/ajceb.v13i4.3740

Belassi, W., Tukel, O.I., 1996. A new framework for determining critical success/failure factors in projects. Int. J. Proj. Manag. 14, 141–151. https://doi.org/10.1016/0263-7863(95)00064-X

Belout, A., Gauvreau, C., 2004. Factors influencing project success: the impact of human resource management. Int. J. Proj. Manag. 22, 1–11. https://doi.org/10.1016/S0263-7863(03)00003-6

Branco, F.A., Ferreira, P., 2018. Dealing with optimism bias in transport infrastructure planning: A literature review. Transport Reviews, 38(2), 243-261.

Brockhoff, K., Hass, P., Schweiger, G., 2016. Managing cognitive biases in complex projects. International Journal of Project Management, 34(8), 1603-1615.

Buehler, R., Griffin, D., Ross, M., 1994. Exploring the" planning fallacy": Why people underestimate their task completion times. J. Pers. Soc. Psychol. 67, 366.

Caffieri, J.J., Love, P.E.D., Whyte, A., Ahiaga-Dagbui, D.D., 2018. Planning for production in construction: controlling costs in major capital projects. Prod. Plan. Control 29, 41–50. https://doi.org/10.1080/09537287.2017.1376258

Chadee, A., Hernandez, S.R., Martin, H., 2021. The Influence of Optimism Bias on Time and Cost on Construction Projects. Emerg. Sci. J. 5, 429–442. https://doi.org/10.28991/esj-2021-01287

Chen, Y., Ahiaga-Dagbui, D.D., Thaheem, M.J., Shrestha, A., 2023. Toward a Deeper Understanding of Optimism Bias and Transport Project Cost Overrun. Proj. Manag. J. 87569728231180270. https://doi.org/10.1177/87569728231180268

Chih, Y.-Y., Zwikael, O., 2015. Project benefit management: A conceptual framework of target benefit formulation. Int. J. Proj. Manag. 33, 352–362. https://doi.org/10.1016/j.ijproman.2014.06.002

Cicmil, S., Williams, T., Thomas, J., Hodgson, D., 2006. Rethinking Project Management: Researching the actuality of projects. Int. J. Proj. Manag. 24, 675–686. https://doi.org/10.1016/j.ijproman.2006.08.006

Dricu, M., Kress, L., Aue, T., 2020. The neurophysiological basis of optimism bias, in: Cognitive Biases in Health and Psychiatric Disorders. Elsevier, pp. 41–70. https://doi.org/10.1016/B978-0-12-816660-4.00003-9

Dudley, G., Banister, D., 2018. Expertise in decision-making for large infrastructure projects: from UK trunk roads to High Speed Rail 2. Transp. Plan. Technol. 41, 481–496. https://doi.org/10.1080/03081060.2018.1468969

Egbu, Charles O., 2004. Managing knowledge and intellectual capital for improved organizational innovations in the construction industry: an examination of critical success factors. Eng. Constr. Archit. Manag. 11, 301–315. https://doi.org/10.1108/09699980410558494

Flyvbjerg, B., 2013. Quality control and due diligence in project management: Getting decisions right by taking the outside view. Int. J. Proj. Manag. 31, 760–774. https://doi.org/10.1016/j.ijproman.2012.10.007

Flyvbjerg, B., 2006a. From Nobel Prize to Project Management: Getting Risks Right. Proj. Manag. J. 37, 5–15. https://doi.org/10.1177/875697280603700302

Flyvbjerg, B., 2006b. From Nobel Prize to Project Management: Getting Risks Right. Proj. Manag. J. 37, 5–15. https://doi.org/10.1177/875697280603700302

Flyvbjerg, B., Ansar, A., Budzier, A., Buhl, S., Cantarelli, C., Garbuio, M., Glenting, C., Holm, M.S., Lovallo, D., Lunn, D., Molin, E., Rønnest, A., Stewart, A., Van Wee, B., 2018. Five things you should know about cost overrun. Transp. Res. Part Policy Pract. 118, 174–190. https://doi.org/10.1016/j.tra.2018.07.013

Flyvbjerg, B., Bruzelius, N., Rothengatter, W., 2003. Megaprojects and risk: An anatomy of ambition. Cambridge University Press.

Flyvbjerg, B., Garbuio, M., Lovallo, D., 2009a. Delusion and Deception in Large Infrastructure Projects: Two Models for Explaining and Preventing Executive Disaster. Calif. Manage. Rev. 51, 170–194. https://doi.org/10.2307/41166485

Flyvbjerg, B., Garbuio, M., Lovallo, D., 2009b. Delusion and Deception in Large Infrastructure Projects: Two Models for Explaining and Preventing Executive Disaster. Calif. Manage. Rev. 51, 170–194. https://doi.org/10.2307/41166485

Flyvbjerg, B., Glenting, G., Arne, R., 2013. Procedure for Dealing with Optimism Bias in Transport Planning.

Flyvbjerg, B., Skamris, M., Buhl, S., 2002. Underestimating Costs in Public Works Projects: Error or Lie? J. Am. Plann. Assoc. 68, 279–295. https://doi.org/10.1080/01944360208976269

Geraldi, J., Maylor, H., Williams, T., 2011. Now, let's make it really complex (complicated): A systematic review of the complexities of projects. Int. J. Oper. Prod. Manag. 31, 966–990. https://doi.org/10.1108/01443571111165848

Gupta, C., Kumar, C., 2020. Study of Factors Causing Cost and Time Overrun in Construction Projects. Int. J. Eng. Res. 9.

Hall, 1980. Hall: Great planning disasters - Google Scholar [WWW Document]. URL https://scholar.google.com/scholar_lookup?title=Great+Planning+Disasters&author=Hall,+P.&publication_year=1980 (accessed 2.8.22).

Hallowell, M.R., Gambatese, J.A., 2010. Qualitative Research: Application of the Delphi Method to CEM Research. J. Constr. Eng. Manag. 136, 99–107. https://doi.org/10.1061/(ASCE)CO.1943-7862.0000137

Hayden Jr, W.M., 2004. Human systems engineering™: A trilogy, part I: Elephant in the living room. Leadersh. Manag. Eng. 4, 61–71.

Heine, S.J., Lehman, D.R., n.d. Cultural Variation in Unrealistic Optimism: Does the West Feel More Invulnerable Than the East?

Hoseini, E., Van Veen, P., Bosch-Rekveldt, M., Hertogh, M., 2020. Cost Performance and Cost Contingency during Project Execution: Comparing Client and Contractor Perspectives. J. Manag. Eng. 36, 05020006. https://doi.org/10.1061/(ASCE)ME.1943-5479.0000772

Hutton, G., Chase, C., 2016. The Knowledge Base for Achieving the Sustainable Development Goal Targets on Water Supply, Sanitation and Hygiene. Int. J. Environ. Res. Public. Health 13, 536. https://doi.org/10.3390/ijerph13060536

Kahneman, D., Tversky, A., 1979. Prospect Theory: An Analysis of Decision under Risk. Econometrica 47, 263. https://doi.org/10.2307/1914185

Kahneman, D.L. and D., 2003. Delusions of Success: How Optimism Undermines Executives' Decisions. Harv. Bus. Rev.

Katsiana, A., Stalikas, A., Kokkaris, P., Galanakis, M., Georgiou, K., Strimpakos, N., 2022. Cross-Cultural Adaptation and Psychometric Properties of the Greek Vineland Adaptive Behavior Scales, Second Edition: Parent/Caregiver Rating Form (VABS II-Gr). Psychology 13, 1850–1864. https://doi.org/10.4236/psych.2022.1313115

Kerzner, H., 2017. Project management metrics, KPIs, and dashboards: a guide to measuring and monitoring project performance, Third edition. ed. John Wiley & Sons, Inc, Hoboken, New Jersey.

Koźlak, A., 2017. THE ROLE OF THE TRANSPORT SYSTEM IN STIMULATINGECONOMIC AND SOCIAL DEVELOPMENT. Zesz. Nauk. Uniw. Gdań. Ekon. Transp. Logistyka 72, 19–33. https://doi.org/10.5604/01.3001.0010.6873

Kujala, J., Artto, K., 2000. Criteria for project performance in business context. Proj. Manag. 6, 46–53.

Kutsch, E., Maylor, H., Weyer, B., Lupson, J., 2011. Performers, trackers, lemmings and the lost: Sustained false optimism in forecasting project outcomes — Evidence from a quasi-experiment. Int. J. Proj. Manag. 29, 1070–1081. https://doi.org/10.1016/j.ijproman.2011.01.010

Lam, T.Y.M., Siwingwa, N., 2017. Risk management and contingency sum of construction projects. J. Financ. Manag. Prop. Constr. 22, 237–251. https://doi.org/10.1108/JFMPC-10-2016-0047

Love, P.E.D., Edwards, D.J., Irani, Z., 2012. Moving Beyond Optimism Bias and Strategic Misrepresentation: An Explanation for Social Infrastructure Project Cost Overruns. IEEE Trans. Eng. Manag. 59, 560–571. https://doi.org/10.1109/TEM.2011.2163628

Mahmud, A.T., Ogunlana, S.O., Hong, W.T., 2022. Understanding the dynamics of cost overrun triggers in highway infrastructure projects in Nigeria: a systems thinking modelling approach. J. Financ. Manag. Prop. Constr. 27, 29–56. https://doi.org/10.1108/JFMPC-07-2020-0051

Man, S.S., Yu, R., Zhang, T., Chan, A.H.S., 2022. How Optimism Bias and Safety Climate Influence the Risk-Taking Behavior of Construction Workers. Int. J. Environ. Res. Public. Health 19, 1243. https://doi.org/10.3390/ijerph19031243

Martinsuo, M., Lehtonen, P., 2007. Role of single-project management in achieving portfolio management efficiency. Int. J. Proj. Manag. 25, 56–65. https://doi.org/10.1016/j.ijproman.2006.04.002

Meyer, W.G., 2014. The Effect of Optimism Bias on the Decision to Terminate Failing Projects. Proj. Manag. J. 45, 7–20. https://doi.org/10.1002/pmj.21435

Moser, C.A., Kalton, G., 2017. Survey Methods in Social Investigation, 0 ed. Routledge. https://doi.org/10.4324/9781315241999

Motawa, I.A., Anumba, C.J., 2006. The use of case-based reasoning in construction quality management. Automation in Construction, 15(3), 300-311.

Nawaz, A., Waqar, A., Shah, S.A.R., Sajid, M., Khalid, M.I., 2019. An Innovative Framework for Risk Management in Construction Projects in Developing Countries: Evidence from Pakistan. Risks 7, 24. https://doi.org/10.3390/risks7010024

Othuman Mydin, M.A., Sani, N.M., Taib, M., Mohd Alias, N., 2014. Imperative Causes of Delays in Construction Projects from Developers' Outlook. MATEC Web Conf. 10, 06005. https://doi.org/10.1051/matecconf/20141006005

Pauwels, P., Chua, D.K.H., De Meyer, A., 2016. How to manage complex projects: Four lessons from the buildings. MIT Sloan Management Review, 57(3), 75-82.

Prater, J., Kirytopoulos, K., Ma, T., 2017. Optimism bias within the project management context: A systematic quantitative literature review. Int. J. Manag. Proj. Bus. 10, 370–385. https://doi.org/10.1108/IJMPB-07-2016-0063

Raelin, J., 2016. Leadership-as-Practice: Theory and Application.

Shenhar, A.J., Dvir, D., Levy, O., Maltz, A.C., 2001. Project Success: A Multidimensional Strategic Concept. Long Range Plann. 34, 699–725. https://doi.org/10.1016/S0024-6301(01)00097-8

Smith, S.M., Nichols, T.E., Vidaurre, D., Winkler, A.M., Behrens, T.E.J., Glasser, M.F., Ugurbil, K., Barch, D.M., Van Essen, D.C., Miller, K.L., 2015. A positive-negative mode of population covariation links brain connectivity, demographics and behavior. Nat. Neurosci. 18, 1565–1567. https://doi.org/10.1038/nn.4125

Son, J., Rojas, E.M., 2011. Impact of Optimism Bias Regarding Organizational Dynamics on Project Planning and Control. J. Constr. Eng. Manag. 137, 147–157. https://doi.org/10.1061/(ASCE)CO.1943-7862.0000260

Standish Group International, 2009. Chaos Summary 2009: The 10 laws of chaos. Standish Group Int. 1–4. Standish Group International, 2009.

Tamošaitienė, J., Zavadskas, E.K., Turskis, Z., 2013. Multi-criteria Risk Assessment of a Construction Project. Procedia Comput. Sci., First International Conference on Information Technology and Quantitative Management 17, 129–133. https://doi.org/10.1016/j.procs.2013.05.018

Tavakol, M., Dennick, R., 2011. Making Sense of Cronbach's Alpha. Int. J. Med. Educ. 2, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

Thamhain, H.J., Wilemon, D.L., 1975. Conflict management in project life cycles. Sloan Management Review.

Turner, J.R., Müller, R., 2005. The Project Manager's Leadership Style as a Success Factor on Projects: A Literature Review. Proj. Manag. J. 36, 49–61. https://doi.org/10.1177/875697280503600206

Vanston, J.H., Vanston, L.K., 2005. Testing the tea leaves: evaluating the validity of forecasts. IEEE Eng. Manag. Rev. 33, 77–77. https://doi.org/10.1109/EMR.2005.25178

Wang, L., Xue, X., Zhao, Z., Wang, Z., 2018. The Impacts of Transportation Infrastructure on Sustainable Development: Emerging Trends and Challenges. Int. J. Environ. Res. Public. Health 15, 1172. https://doi.org/10.3390/ijerph15061172

Wang, P., Fenn, P., Wang, K., Huang, Y., 2021. A Bayesian belief network predictive model for construction delay avoidance in the UK. Eng. Constr. Archit. Manag. 29, 2011–2026. https://doi.org/10.1108/ECAM-10-2020-0873

Winch, Graham, 2012. Managing Construction Projects.

Yung, P., Yip, B., 2010. Construction quality in China during transition: A review of literature and empirical examination. Int. J. Proj. Manag. 28, 79–91. https://doi.org/10.1016/j.ijproman.2009.03.003

Zwikael, O., Unger-Aviram, E., 2010. HRM in project groups: The effect of project duration on team development effectiveness. Int. J. Proj. Manag. 28, 413–421. https://doi.org/10.1016/j.ijproman.2009.09.005

APPENDICES

Appendix – 1

Preliminary Questionnaire Form

Evaluating Optimism Bias in Decision Making Process of Mega Construction Projects

Dear Respondent,

This survey is being carried out as part of my MS research titled : **"Evaluating Optimism Bias in Decision Making Process of Mega Construction Projects"**.

Optimism bias is a cognitive bias that causes someone to believe that they themselves are less likely to experience a negative event. It is also known as unrealistic optimism or comparative optimism.

The aim of this research is to identify factors that cause project failure with respect to Time, Cost & Quality. Further in this study, these identified factors will be used to highlight and measure optimism bias. The study also aims to study the impacts of optimism bias on the planning of mega projects on a later stage.

This elementary survey comprises of Four sections:
1. Respondent's information
2. Importance of the factors causing Time overruns
3. Importance of factors Causing Cost Overruns
4. Importance of factors causing Quality Failures

This elementary questionnaire survey will help to identify the importance of the factor causing overruns. The main part of this research study relies on this questionnaire survey.

Please be assured that the data will only be used for the study purpose and no personal information will be disclosed at any forum.

Please remember to click submit at the end.

Your contribution towards this research is highly appreciated. In case of any inquiry, please feel free to contact.

Kind Regards,
Engr. Saad Khan
Post Graduate Student
School of Civil and Environmental Engineering (SCEE),
National University of Sciences & Technology (NUST), H-12, Islamabad.
Email: saadkhan.cem19@student.nust.edu.pk

* Indicates required question

Respondent's Particulars

Due to privacy measures, the "Email of Responder" field is kept optional.

1. Email of Responder

_____

2. Country of Residence *

_____

3. Qualification *

Mark only one oval.

- ◯ Diploma
- ◯ Graduate
- ◯ Post- Graduate
- ◯ Doctrate

4. Years of Experience *

Mark only one oval.

- 0 - 1 Years
- 1 -5 years
- 5 - 10 Years
- 10 - 15 years
- > 15 Years

5. Organization Role *

Mark only one oval.

- Client
- Consultant
- Contractor
- Supplier
- Sub Contractor
- Academia

6. Understanding of Optimism Bias *

Mark only one oval.

- No Understanding
- Slight
- Moderate
- High
- Exceptional

Time Overrun Factors

A total of 20 factors causing Time Overruns have been identified from the body of knowledge. To what extent do you think the following factors contribute to time in construction projects?

7. Please select the right option *

Mark only one oval per row.

	Negligible	Low	Medium	High	Very High
Frequent Design Changes					
Poor Communication					
Strategic Misrepresentation					
Planning Fallacy					
Resource Shortage					
High Level Uncertainity					
Legal Disputes					
Weather Conditions					
Payment Delays/ Lack of Funds					
Reworks					
Decision Making Skills					
Poor Contract Mangement					
Labor Disputes					
Conflict among parties					
Political Interference					
Poor planning among stake holders					
Deficient site Management					
Ambiguity in Facts					
Incomplete Project Documents					
Tactical Delays					

Cost Overrun Factors

A total of 17 factors causing Cost Overruns in construction projects have been identified from the body of knowledge. To what extent do you think the following factors contribute to Cost in construction projects?

7. Please select the right option *

Mark only one oval per row.

	Negligible	Low	Medium	High	Very High
Frequent Design Changes	◯	◯	◯	◯	◯
Poor Communication	◯	◯	◯	◯	◯
Strategic Misrepresentation	◯	◯	◯	◯	◯
Planning Fallacy	◯	◯	◯	◯	◯
Resource Shortage	◯	◯	◯	◯	◯
High Level Uncertainity	◯	◯	◯	◯	◯
Legal Disputes	◯	◯	◯	◯	◯
Weather Conditions	◯	◯	◯	◯	◯
Payment Delays/ Lack of Funds	◯	◯	◯	◯	◯
Reworks	◯	◯	◯	◯	◯
Decision Making Skills	◯	◯	◯	◯	◯
Poor Contract Mangement	◯	◯	◯	◯	◯
Labor Disputes	◯	◯	◯	◯	◯
Conflict among parties	◯	◯	◯	◯	◯
Political Interference	◯	◯	◯	◯	◯
Poor planning among stake holders	◯	◯	◯	◯	◯
Deficient site Management	◯	◯	◯	◯	◯
Ambiguity in Facts	◯	◯	◯	◯	◯
Incomplete Project Documents	◯	◯	◯	◯	◯
Tactical Delays	◯	◯	◯	◯	◯

Cost Overrun Factors

A total of 17 factors causing Cost Overruns in construction projects have been identified from the body of knowledge. To what extent do you think the following factors contribute to Cost in construction projects?

8. Please select the right option *

Mark only one oval per row.

	Negligible	Low	Medium	High	Very High
Frequent Design Changes					
Under estimation of completion cost					
Price Escalation					
Resource Shortage					
High level of uncertainity					
Reworks due to errors					
Change Orders					
Legal Disputes					
Payment Delays/ Lack of funding					
Poor Contract Management					
Farudulent Practices					
Conflict Among Parties					
Fluctuation in market prices					
Ambiguity in Information					
Tactical Delays					
Theft of Material					
Owners Financial Difficulties					

Quality Failure Factors

A total of Eighteen (18) factors causing poor quality in construction projects have been identified from the body of knowledge. To what extent do you think the following factors contribute to quality failure in construction projects?

9. Please select the right option. *

Mark only one oval per row.

	Negligible	Low	Medium	High	Very High
Poor Material Management					
Lack of Specialized Workers & Machinery					
Inexperienced Contractor					
Poor Supervision					
Low Bid or Agressive Competetion among Bidders					
Poorly defined Project Objectives					
Lack of Innovation					
Defective Work					
Fraudulent Practices					
Poor Planning Among Stakeholders					
Poor Choice of Construction Methodology					
Defective Materials Provided by Supplier					
Lack of Consultant's Experience					
Unclear Definition of Quality					
Improper Classification of Contractors					
Weak Industry Academia Linkage					
Unreasonable Decisions					
Poorly Defined Responsibilities					

Appendix – B

Evaluating Optimism Bias in Decision Making Process of Mega Construction Projects

Dear Respondent,

This survey is being carried out as part of my MS research titled : "**Evaluating Optimism Bias in Decision Making Process of Mega Construction Projects**".

This research aims to quantify the Optimism Bias in exhibited by project planners and managers. The respondents are requested to rate the likelihood of the delay events, both negative and positive occurring. The study also aims to study the impacts of optimism bias on the planning of mega projects on a later stage.

This survey comprises of Five sections:
1. Respondent's information
2. Likelihood of occurrence of Time Overruns Risk
3. Likelihood of occurrence of Cost Overruns Risks
4. Likelihood of occurrence of Quality Failures Risks
5. Input from respondents regarding mitigation factors and other input

This questionnaire survey will help the researcher to evaluate the optimism bias of project team members and quantify the level of optimism bias in the construction industry of developing countries.

Please be assured that the data will only be used for the study purpose and no personal information will be disclosed at any forum.

Please remember to click submit at the end.

Your contribution towards this research is highly appreciated. In case of any inquiry, please feel free to contact.

Kind Regards,
Engr. Saad Khan
Post Graduate Student
School of Civil and Environmental Engineering (SCEE),
National University of Sciences & Technology (NUST), H-12, Islamabad.
Email: saadkhan.cem19@student.nust.edu.pk

* Indicates required question

Respondent's Information / Bio-data

1. Name of Respondent *

2. Email of Respondent

3. Country of Residence *

4. Qualification

Mark only one oval.

- ◯ Diploma
- ◯ Graduate
- ◯ Post Graduate
- ◯ Doctrate

5. Years of Experience

Mark only one oval.

- ◯ 0-1 Years
- ◯ 2-5 Years
- ◯ 6-10 Years
- ◯ 11-15 years
- ◯ > 15 years

6. Understanding of Optimism Bias

Mark only one oval.

- ◯ No Understanding
- ◯ Slight
- ◯ Moderate
- ◯ High
- ◯ Exceptional

A total of 09 Risk Factors causing Time Overruns have been listed below. Keeping in view your ability to manage these risks, to what extent do you think these risks will affect your project as compared to an average fellow engineer.

7. To what extent can you manage the following risk as compared to an average fellow colleague.

Mark only one oval per row.

	Exceptionally Better	Better	Average	Worse	Far Worse
Risk of Frequent Design Changes	◯	◯	◯	◯	◯
Underestimation of Completion Time	◯	◯	◯	◯	◯
Uncertainty in Information	◯	◯	◯	◯	◯
Poor Communication	◯	◯	◯	◯	◯
Providing Wrong Information	◯	◯	◯	◯	◯
Delayed Funds and Payment Delays	◯	◯	◯	◯	◯
Shortage of Resource	◯	◯	◯	◯	◯
Political Interference in Project	◯	◯	◯	◯	◯
Poor Contract Management	◯	◯	◯	◯	◯

A total of 10 Risk Factors causing Cost Overruns have been listed below. Keeping in view your ability to manage these risks, to what extent do you think these risks will affect your project as compared to an average project.

8. To what extent can you manage the following risk as compared to an average fellow colleague.

Mark only one oval per row.

	Exceptionally Better	Better	Average	Worse	Far worse
Under-estimation of Completion Cost					
Risk of Price Escalation					
Cost increase due to Frequent Design Changes					
Cost increase due to Legal disputes					
Cost increase due to Change Orders					
Cost increase due to shortage of resource					
Cost increase due to Fraudulent Practices					
Cost increase due to Poor Contract Management					
Cost increase due to high level of Uncertainity					
Risk of fluctuation in market prices					

A total of 10 Risk Factors causing Quality Failure in projects have been listed below. Keeping in view your ability to manage these risks, to what extent do you think these risks affect your project as compared to an average engineer.

9. To what extent can you manage the following risk as compared to an average fellow colleague. *

Mark only one oval per row.

	Exceptionally better	Better	Average	Worse	Far Worse
Lack of Specialized Resources	◯	◯	◯	◯	◯
Risk of Poor Material Management	◯	◯	◯	◯	◯
Inexperienced Contractor	◯	◯	◯	◯	◯
Risk of Defective Work	◯	◯	◯	◯	◯
Poor Supervision	◯	◯	◯	◯	◯
Low bids or Aggressive competition among bidders	◯	◯	◯	◯	◯
Inexperienced Consultant	◯	◯	◯	◯	◯
Weak industry Academia Linkage	◯	◯	◯	◯	◯
Unclear Definition of Quality	◯	◯	◯	◯	◯
Fraudulent Practices	◯	◯	◯	◯	◯

10. Kindly share share your views on identifying optimism bias and possible mitigation strategies. *