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The Impact of Budget Planning and Control Practices on Perceived Project
Success: Evidence from Project Employees in Saudi Arabia

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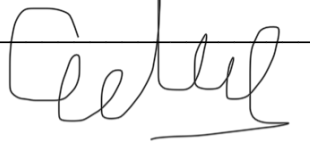
ABSTRACT

This study examined how employee-observed budget planning and control practices relate to perceived project success in Saudi Arabia. A quantitative, cross-sectional survey was completed by 100 eligible respondents from operational, professional, supervisory and managerial roles who had recent exposure to project budgeting or cost control. The instrument measured budget planning and estimation quality, budget monitoring and forecasting, budget change control and corrective response, and multidimensional perceived project success. All 20 questionnaire items matched the approved instrument, all eligible cases were complete, and the composite scales demonstrated acceptable to strong reliability. Multiple regression showed that planning and estimation quality ($B = .237, p = .006$), monitoring and forecasting ($B = .530, p < .001$), and change control and corrective response ($B = .232, p = .008$) each made a significant positive contribution to perceived project success. The combined model explained 49.1% of the variance in the outcome. The planned managerial-versus-non-managerial comparison was not significant ($p = .325$). The findings support a feedback-control interpretation in which credible budget management depends not only on the initial estimate but also on timely information, updated forecasts, evaluated changes, documented decisions and corrective action. The study recommends auditable budget baselines, recurring forecast-at-completion reviews, formal cost-impact gates for changes, clear decision rights and systematic learning from completed projects. Because the design is cross-sectional and perception-based, the findings demonstrate association rather than causation.

Keywords: Budget planning and control; project success; budget monitoring; forecasting; change control; Saudi Arabia

AUTHOR'S DECLARATION

I declare that this thesis is my own academic work and that all ideas, evidence and words derived from other sources have been acknowledged through in-text citation and the reference list. The survey data, analysis and interpretation presented in this thesis are reported honestly and have not been fabricated or manipulated.

Student signature:  Date: **18/07/2026**

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LIST OF ABBREVIATIONS

BPEQ	— Budget Planning and Estimation Quality
BMF	— Budget Monitoring and Forecasting
BCCR	— Budget Change Control and Corrective Response
PPS	— Perceived Project Success
EVM	— Earned Value Management
EAC	— Estimate at Completion
OLS	— Ordinary Least Squares
VIF	— Variance-Inflation Factor
CI	— Confidence Interval
SD	— Standard Deviation
SE	— Standard Error
KSAEMP	— Saudi-Arabia Employment Eligibility Indicator
PROJELIG	— Recent Project-Exposure Eligibility Indicator
JOBGRP	— Managerial/Non-Managerial Job-Level Grouping

CHAPTER ONE: GENERAL FRAMEWORK OF THE STUDY

Chapter One establishes the study background, research problem, objectives, questions, hypotheses, significance, conceptual framework, scope and operational definitions.

1.1 Introduction and Background

Projects convert policy, strategy and investment to the defined outputs, and their performance is in part dependent on the quality of the information provided to authorize and control the work. A project budget is not just a maximum amount of money to be spent. It makes assumptions regarding scope, quantities, resource costs, time, risk, responsibility, and sets a benchmark for future commitments and spending. A realistic, up-to-date baseline can inform allocations and trade-offs. If the project team is weak, issues could only be identified when there are fewer options due to contractual or operational commitments.

The literature on cost over-runs shows the importance of the credibility of the starting budget. Flyvbjerg, Holm and Buhl (2002) have reported systematic underestimation in public works data, and suggested that explanations go beyond random technical error. In subsequent reviews, technical uncertainty, cognitive bias, strategic behaviour and institutional conditions were also singled out as competing or complementary explanations for inaccurate estimates (Cantarelli et al., 2010; Ahiaga-Dagbui and Smith, 2014). These studies are not intended to suggest that all projects are intentionally under budget, but rather that the approved number should not be assumed to be neutral or self-validating.

Budget management is ongoing beyond authorization. The activities of timely recording of commitments, comparison to an approved baseline, updated estimates at completion, disciplined evaluation of proposed changes and corrective action are feedback activities. Earned value and related forecasting research indicates that integrated cost and schedule information can provide insight into variance and enhance forward-looking control, but the usefulness of the technique depends on the quality of the cost and schedule data, the organization's routines and the selection of an appropriate model (Bryde et al., 2018; Batselier and Vanhoucke, 2015, 2017). So, planning accuracy and control practice are related but they are analytically different.

The outcome of interest should also be carefully specified. The traditional project-management evaluation focuses on cost, time and quality, but research on project success has gradually broadened the definition to include objective achievement, stakeholder satisfaction, strategic contribution and benefits over time (Atkinson, 1999; Shenhar et al., 2001; Ika, 2009). Cost compliance is essential but not a measure of success. However, Serrador and Turner (2015) showed that there was a significant relationship between efficiency and success without losing the conceptual distinction between them. This thesis builds on this distinction by measuring success of the project based on scope, schedule tolerance, cost, quality, stakeholder satisfaction, and overall judgement.

The Saudi context is suitable as the country is witnessing large-scale public and private investments delivered through projects in construction, energy, technology, healthcare, manufacturing and services. Delay and cost risks in public construction, oil and gas, infrastructure, building and pipeline environments have been documented in existing Saudi research (Al-Kharashi and Skitmore, 2009; Bin Seddeeq et al., 2019; Alshihri et al., 2022; Al-Gahtani et al., 2023). A lot of that evidence is industry specific and is frequently based on owners, contractors or managerial professionals. A complementary employee-level study can be conducted to determine if observed budget practices are linked to perceived success at a broader level of rank, but not require respondents to reveal confidential monetary items.

1.2 Problem Statement

Even with budgets approved and formal reporting systems in place, organisations can still have weak estimates, slow cost recording, out of date forecasts, undocumented changes and delayed corrective action. These are weaknesses that are consequential because decisions based on an unrealistic starting point or outdated information can escalate manageable uncertainty to unnecessary variance. However, the existence of a procedure does not mean that workers can see it being performed regularly. The question of whether a budget is present is not the only question to ask, but whether planning, monitoring, forecasting and change-control is a credible control cycle.

There is also an evidence-based measurement problem. Baseline and final-cost records need to be maintained at project level for audited budget accuracy to be calculated. A public poll sent through the organization cannot ask each individual for confidential budgets, nor can it expect the lower-level workers to have a grasp of final budgets. If the questionnaire still requires employees to provide an exact accuracy, then the resulting variable would be a combination of knowledge gaps and actual project performance. The current study tackles this risk by measuring practices and perceived outcomes that can be observed, rather than audited financial accuracy.

Saudi empirical studies were focused on construction and infrastructure and are often aimed at ranking the causes of delays or overrun in the reviewed literature. Although that work highlights the significance of planning, estimation, change, resource and coordination risks, it does not directly test a three-part employee-perception model of budget planning and estimation quality, monitoring and forecasting, and change control and corrective response to multidimensional perceived project success. This particular gap will be the basis for a quantitative, cross-sectional study of both managerial and non-managerial employees in Saudi Arabia.

1.3 Research Objectives

1. To analyze the relationship between budget planning and quality of budget estimation and the perceived success of the project among project employees in Saudi Arabia.
2. To investigate the relationship between the practices of budget monitoring and budget forecasting and the perceived project success of project employees in Saudi Arabia.
3. To investigate the correlation between the practices of budget change-control and corrective-response with the project success perceived by project employees in Saudi Arabia.
4. To see how the three factors of budget planning and estimation quality, budget monitoring and forecasting, and budget change control and corrective response work together to predict perceived project success.
5. To see if there is any difference between non-managerial and managerial project employees in their perceptions of project success.

1.4 Research Questions

1. Is there a relationship between budget planning and quality of budget estimation with perceived project success?
2. How is budget monitoring and forecasting related to perceived project success?
3. Are there any relationships between budget change-control and corrective-response practices with perceived project success?
4. How well do the three dimensions of budget management together predict the perceived success of the project?

5. Is there a difference between the non-managerial and managerial respondents in terms of perceived project success?

1.5 Research Hypotheses

H01: There is no statistically significant relationship between budget planning and estimation quality and perceived project success.

H1: The quality of budget planning and estimation is positively associated with perceived project success and the association is significant.

H02: There is no statistically significant relationship between budget monitoring and budget forecasting and perceived project success.

H2: Budget monitoring and forecasting is positively and significantly related to perceived project success.

H03: There is no statistically significant relationship between budget change control and corrective response and perceived project success.

The correlation between budget change control and corrective response to budget changes and perceived project success is positive and significant.

H04: The three budget-management dimensions are not simultaneously correlated with a statistically significant amount of variance in perceived project success.

H4: The three budget-management dimensions can explain a statistically significant proportion of the variance in perceived project success when combined.

H05: There is no significant difference between the mean perceived-project-success scores of non-managerial and managerial respondents.

H5: There is a significant difference in mean perceived-project-success scores between the non-managerial and managerial respondents.

1.6 Significance of the Study

Scientific and theoretical significance of the research.The scientific and theoretical value of the research.

The study links two streams of literature that have been studied separately: cost-estimation and budget-control research, and multidimensional project-success research. It employs a feedback-control logic, with a baseline set, performance tracked, forecasts adjusted and action taken if deviations become material. The model also maintains the distinction between cost efficiency and overall success, minimizing the conceptual confusion of equating a successful project with one that stayed within its original budget.

The design provides evidence of employee level from Saudi Arabia. It is not saying that perceptions equal audited records, but rather it assumes that employees are informed observers of routines they encounter. This provides a measurable and transparent level of analysis and can uncover if there is or is not a common approach to budgeting at all levels. The fifth objective also investigates if there is a difference between how managerial and non-managerial employees interpret success, which aligns with stakeholder dependent interpretations of project outcomes (Davis, 2014).

Practical significance

The three dimensions of predictors are actionable for practitioners. Low planning and estimation scores would focus on scope definition, information currency, explicit assumptions and risk allowances. Limited monitoring and forecasting would suggest that recordings would be delayed, that baseline comparisons would not be made regularly or that estimates at the end of the period would not be updated. Weak change control and corrective response would indicate that proposed changes are not costed, decisions are not documented or variance responses are slow. The study can thus be used to guide process improvement without having to expose sensitive financial information.

1.7 Theoretical Framework and Conceptual Model

The principal lens is the management control and feedback control logic. Control arrangements are contingent on the measurability of output and knowledge of transformation processes, Ouchi (1979) explained. Planning turns scope and assumptions into a baseline, monitoring compares actual or predicted performance against the baseline, change control approves changed commitments, and corrective response attempts to minimize unacceptable deviations. The value of each step determines the value of the subsequent step. Control is impossible without an accurate-looking baseline, and monitoring will be insufficient if the baseline is not detailed or was never intended to cover the scope.

The conceptual model has three related independent variables: budget planning and estimation quality (BPEQ), budget monitoring and forecasting (BMF), and budget change control and corrective response (BCCR). Perceived project success (PPS) is the dependent variable. The core model is represented as follows: $PPS = \beta_0 + \beta_1(BPEQ) + \beta_2(BMF) + \beta_3(BCCR) + \text{error}$. Planned group comparison is based on job level, and experience might be described or introduced as a control only if justified by the final data and theory.

1.8 Scope and Delimitations

The study is restricted to adults who are employed in Saudi Arabia and who have been involved in a project in the last two years, and have observed the budget planning or cost control procedures closely enough to be able to comment on them. Each respondent will answer one of the most recent eligible projects. Multiple sectors and managerial and non-managerial positions will be covered. It will not ask for company names, project names, exact budgets or contract values, profitability or audited final accounts.

The study is cross-sectional and non-probability. It is able to detect patterns of association, prediction and group difference in the obtained sample, but not temporal causality or probability-based national estimates. Self-report measures can be subject to recall, role visibility and common-method variance. These restrictions are overcome by a recent-project reference frame, neutral, practice-focused items, anonymity, separate predictor and outcome sections, and eligibility screening and cautious interpretation.

1.9 Operational Definitions

Budget planning and estimation quality (BPEQ): The employee-reported quality of the budget planning and estimation process: whether the approved budget was based on a clear scope, on realistic current information, and whether assumptions were made and appropriate allowances were made for identified risks and uncertainties; measured by Questions 6-8.

Budget monitoring and forecasting (BMF): timeliness of commitment and expenditure recording by the employee, regular comparison with cost baseline, updating forecast final cost when significant information or variance; measured by Questions 9-11.

Budget change control and corrective response (BCCR): The employee reported assessment of the cost impact prior to the approval of change, documentation of approved budget changes, and timely corrective action following the identification of a variance; measured by Questions 12-14.

Perceived project success (PPS): the respondent's perception of the scope/objective achievement, schedule performance, cost tolerance, quality, stakeholder satisfaction and overall success of the selected project; measured through Questions 15-20.

Managerial respondent: supervisor/team leader, project manager, department manager or a senior manager/executive; the grouping is only used for the planned comparison in Objective 5.

1.10 Chapter Summary

The five objectives, five questions and the paired null/alternative hypotheses were set up in this chapter which defined the research problem. It set a precedent for a public audit of employees at various levels, without the use of confidential audited records. In Chapter Two the literature supporting the constructs and proposed relationships is critically reviewed. Chapter Three then details the design, sampling, instrument, ethical protections and statistical analysis needed to test the model using actual data.

The literature reviewed in this chapter is presented in the following manner:

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The literature reviewed in this chapter critically examines the research that supports the literature on the link between budget planning and control practices and perceived project success. It starts by distinguishing between the independent and dependent constructs and by distinguishing between objective cost accuracy and employee perceptions of the quality of planning. It then discusses the issues of systematic underestimation, technical and behavioural explanations, risk-informed contingency, monitoring and forecasting, change control, multidimensional success and the Saudi context. The review ends with a feedback-control framework, hypothesis development and a very well-defined research gap.

The review combines foundational project-management and organizational-control scholarship with recent peer-reviewed evidence on estimation, forecasting, change governance and the Saudi project environment. Sources were assessed according to their research design, publication quality, relevance to the constructs and limits of transfer to the present cross-sector employee survey.

Evidence was synthesized around mechanisms rather than citation volume. Record-based cost-overrun studies clarify objective performance but do not directly validate an employee-perception scale; forecasting studies illuminate information processes but do not establish causality; and Saudi construction findings require caution when applied to other sectors. These distinctions keep the literature aligned with the claims that the present design can support.

2.2 Conceptual Boundaries of the Independent Variable

Objective budget accuracy may be defined as an exact arithmetic match between approved and final cost. However, the definition is not appropriate as the only independent variable in a survey of public employees because final accounts may be unavailable, projects may not be finished or lower-ranked employees may not be aware of authorized changes. Thus, the present model investigates the budget planning and control practices that can facilitate credible estimates and disciplined cost performance. The result is still perceived project success and no one is asked to provide an exact figure.

The quality of budget planning and estimation includes the basis used to develop the approved budget, including clarity of scope and work requirements, realism and timeliness of the information, visibility of assumptions, and allowance for identified risks and residual uncertainty. These indicators reflect the credibility of the baseline, but do not assert *ex post* accuracy. The items were designed around a primary decision object, although Q7 combines information currency with assumption transparency and should be separated in a future instrument.

Budget monitoring and forecasting issues include: Do you make commitments to costs and expenditures too late to take action? Do you compare performance with the approved budget on a regular basis? Do you update the final budget cost after major information or variance? The construct is not limited to formal earned value management. EVM offers good theoretical and empirical examples, but an eligible respondent could see the same type of routines in enterprise systems, spreadsheets, procurement reports, dashboards and project meetings.

Budget change control and corrective response is about making decisions with information. It includes consideration of the possible cost implications prior to approving a change, recording and explaining approved changes, and responding to the variance in a timely manner. These items are different from the items listed in the legitimate baseline management. A budget change does not necessarily mean a failure; it is a failure of change management that is the issue.

The three dimensions are expected to be correlated as they are part of one management cycle, but they are kept separately for analysis. Poor baseline monitoring, inadequate records, and late detection can be followed by weak responses. Multiple regression can provide an estimate of their unique predictive contributions and variance-inflation and tolerance diagnostics can be used to determine whether respondents are able to make a distinction between them.

2.3 Budget Accuracy, Estimation Error and Behavioural Explanations

In general, the accuracy of a budget means how close the approved baseline estimate is to the actual cost result. Precision is the range or apparent accuracy of an estimate. The difference is important because a narrow range can be consistent and a broad range can be an accurate expression of uncertainty. If the project is finished, a percentage error can be determined using verified records. The approved baseline, however, is a baseline that is built from incomplete information, assumptions and organizational decisions prior to completion. This is why accuracy is partially an ex-post characteristic and quality of estimation is ex ante assessed on the clarity of scope, the freshness of information, the transparency of assumptions and the treatment of risk.

Cost overrun is related to, but not identical with, estimate inaccuracy. A project can cost more than originally planned due to the original scope being underestimated, scope being expanded after approval, prices or quantities changing, productivity dropping or governance allowing commitments to build up. On the other hand, a project can stay within budget by cutting scope and/or quality. A thorough literature search should therefore not be circular in nature, with each project that is over budget being considered a poor estimate and each project that is under budget being considered a success. The present study distinguishes between planning quality, dynamic control and multidimensional success to minimize that error.

The literature contains four major families of explanations. The technical explanations focus on data, the forecasting method, design maturity and uncertainty. Economic explanations focus on incentives, market conditions and resource constraints. Optimistic, anchoring and planning fallacy are psychological explanations. Political explanations: strategic representation, approval incentives. These types can overlap. The practical implication is not that the short survey can diagnose motives, but that observable safeguards (scope of the survey, information available, assumptions and risk allowances stated) can enhance the credibility and transparency of the baseline.

Flyvbjerg, Holm and Buhl (2002) studied cost estimates for public works and demonstrated that systematic underestimation is not random noise. This contribution is relevant because the approved baseline might reflect behavioural or institutional bias, which should be included in the budget-planning construct. The source is thus used to make a particular conceptual choice in the present study and not as a decorative citation. It connects the evidence reviewed to an observable part of the proposed model and explains why this part of the model is predicted to be relevant for project delivery.

The evidence, however, should be limited: it should be about public infrastructure and not about every Saudi project being under-budget and every overrun. The present thesis does not therefore present the same results as obtained in the original study, because the samples and method of analysis were not the same. It utilizes the source to support theory and item content, and then tests the relationship again with the Saudi project employees. This separation prevents the review from becoming a universal claim based on evidence in the context.

A complementary contribution is that by Flyvbjerg, Skamris Holm and Buhl (2003) that identified the scale and prevalence of transport-infrastructure cost overruns in a large comparative dataset. For this thesis, the gaps between the recurrent estimates and the outturns are sufficiently large to warrant the study of baseline quality as a management problem, rather than as an automatic assumption of reliability of the initial figure. The citation is placed here

because it directly tells the meaning or mechanism of the construct being discussed. It also gives a foundation for understanding when formal procedures may not work when their assumptions, data or use are weak.

It has been qualified for the transfer to the proposed model, as transport megaproject evidence is valuable for pattern recognition, but not the same as the mixed sectors and employee perceptions used in this thesis. The appropriate synthesis is therefore conditional: plausible and relevant, but the magnitude and salience of the mechanism may vary in Saudi organizations and among managerial and non-managerial respondents. The survey provides new evidence at that stated level and not that it is a representation of project-account data.

In this stream of literature, Cantarelli et al. (2010) categorized cost overrun explanations into technical, economic, psychological and political. The significance of the study for the current framework is that it provides a multidimensional explanation, thus avoiding the reduction of budget quality to the competence of the estimators. This is a substantive connection, in the sense that it provides a description of how budget information is created, or how it is translated into actions of control, or why the resulting performance should be considered as only a component of project success.

It is also important to recognize that the paper does not claim to prove that one explanation is dominant in all institutional contexts, but rather that it is critical to the use of the source. The thesis is therefore kept neutral in language and does not require the participants to diagnose motives or technical formulas which they may not see. Evidence from the source is not used as a reason to measure or hypothesize, but rather as a basis for the planned empirical test.

The theme is relevant to the analysis by Love, Edwards and Irani (2012) because it challenged only optimist bias or strategic misrepresentation and highlighted the dynamics of project-systems in social infrastructure. In reality, budget error can arise from interaction, rework and evolving decisions, and therefore change control is relevant, in addition to initial estimating. It ensures that the review is not just a statement that budgets are important, but it also outlines the process in which information quality, risk recognition, comparison, authorization or response can be a factor in delivering.

Its explanatory setting is social infrastructure, however, and should be used as a competing lens and not as universal causal proof. This does not render the evidence irrelevant, it sets the boundaries of the inference. The proposed research examines if there is a correlation between employees' perceptions of stronger practices and their perceptions of project success. It does not imply audited savings, national prevalence or clear causality from a cross-sectional perception survey.

Ahiaga-Dagbui & Smith (2014) redefined construction cost overrun as a cognition, a learning and estimation issue instead of a last minute percentage. This contribution is relevant because the learning from previous estimates, and making reasoning transparent, is a key aspect of the organization. Therefore, current information and stated assumptions are observable indicators. The source is therefore used to make a certain conceptual choice, not as a decorative citation, in the present study. It connects the evidence reviewed to an observable aspect of the proposed model and provides an explanation as to why this aspect of the model is likely to be important for project delivery.

The evidence should still be bounded: the conceptual critique does not provide a ready-made cross-sector employee scale, and needs to be operationalized. Therefore, the outcome of the present thesis cannot be reproduced as if the samples and levels of analysis are the same as in the original study. It utilizes the source to back up theory and item material, after which it tests the relationship once again with Saudi project employees. This separation prevents the review from turning every piece of evidence into a blanket statement.

A complementary contribution is given by Odeck (2004) who measured the size and determinants of road construction cost overruns. The estimate-to-actual relationship provides a way of interpreting the meaning of objective budget accuracy and why perception measures

need to be labelled differently for this thesis. The citation is included here because it directly communicates the meaning or mechanism of the construct that is being discussed. It also offers a foundation for understanding the reasons for failure of formal procedures if they are based on inadequate assumptions, data, or use.

The transfer to the proposed model is qualified as it is not possible to equate road-project outturn data with the planning quality measured in the proposed survey by employees. The mechanism is therefore conditional, meaning it is plausible and relevant, but the extent and prominence of it may vary in Saudi organizations and among managerial and non-managerial respondents. The survey provides new evidence at that level, not that it is a replication of project-account data.

Flyvbjerg et al. (2018) synthesised five strong lessons from this literature stream, based on a large transport evidence base, regarding the prevalence, scale and explanation of cost overrun. The study is important for the current framework because decision makers should consider cost risk as an empirical pattern that happens again and again, and they should rely on outside-view evidence that is transparent when assessing baselines. This connection is substantive in nature, it is the explanation of how budget information is created, how it is transformed to control action, or why the resulting performance is only one element of project success.

But, as critical use of the source also requires, it is important to recognize that the synthesis is best for larger investments in transport and should be used to guide, not restrict, expectations for smaller investments in cross-sector projects. The thesis is therefore neutral in terms of language and does not request the participants to make diagnoses of motives or technical formulas that they may not detect. Evidence from the source is used as a basis for reasoning, not as an alternative to the planned empirical test, for measurement, and for hypothesis generation.

The analysis by Love, Ika and Pinto (2024) applies to the theme as it focuses on the management of uncertainty and heuristics in large infrastructure decision-making, rather than formal risk management. From a practical perspective, budget governance should take account of bounded judgement rather than the idea that the more precisely you can calculate, the less uncertainty there will be. It takes the review from a simple statement that budgets matter, and puts it into a process of how information quality, and risk recognition, comparison, authorization or response can impact delivery.

Heuristics, however, may be adaptive or biased, and so the article does not warrant the classification of all estimates based on judgement as "poor practice. This limitation does not make the evidence irrelevant, it is merely the scope of the inference. The proposed research is to determine if employees who see higher practices also experience higher project success. It is not a cross-sectional perception survey that infers audited savings, national prevalence, or unambiguous causality.

2.4 Technical, Managerial and Stakeholder Causes of Cost Variance

Once a budget is approved it is subjected to execution conditions. Cost can be influenced by design development, procurement, labour availability, productivity, inflation, coordination, payment, contractual claims and scope decisions. Some are risks that can be anticipated and should be a part of the baseline; others occur during delivery and should be a factor in forecasting and approved changes. These mechanisms are not differentiated as an 'overrun cause' obscures the managerial process by which a risk becomes a commitment, a variance and finally an outturn.

The importance of stakeholder behaviour lies in the fact that budget information spans organizational lines. Owners specify requirements and approve changes, designers convert requirements into information, contractors price and provide work, procurement authorises funding, finance keeps records of transactions, project teams coordinate the scope, schedule and quality. If one interface fails, late information will occur elsewhere. This is why the

survey is open to all employees that witness relevant routines, not just executives. Data entry, design changes or buying decisions can be made that aren't captured on senior dashboards until after they are operational and technical staff have been notified.

The causal literature is dominated by construction and infrastructure. That concentration provides detailed information on cost formation, but also poses a risk of generalization. In physical, service or organizational-change projects, cost drivers may be more apparent than the quantities, contracts and change orders in construction projects. The thesis does not rely on specific single-idea statements, such as scope basis, current information, risk allowance, timely records, baseline comparison, forecast updating, evaluated change and corrective action, but does not claim that the cost structure is the same in all sectors.

Doloi (2013) studied the role of various key stakeholders in construction cost overruns and project-management failure. This contribution is relevant since performance of the budget depends on coordination and responsibility, not just calculation; relevant people require cost information and authority to act. The source, in this case, is therefore not used to make a decorative citation but to support a particular conceptual choice made by the author. It connects the reviewed evidence to an observable aspect of the proposed model and provides an understanding of how this aspect of the model is expected to be relevant to project delivery.

However, the evidence should be bounded: the relationships of construction stakeholders may be different to other technology, healthcare, financial and other service projects. Thus, the results of the original study are not reproduced as if the samples and levels of analysis were the same as in the present thesis. It applies source to support theory and item content, and retests the relationship with Saudi project employees. This separation ensures that the review will not turn a contextual piece of evidence into a universal statement.

A complementary contribution is that of Creedy, Skitmore and Wong (2010) who studied risk factors in the delivery of highway-projects and their relationship with cost overrun. In this thesis, the identification of risk should impact contingency and reserve decisions, not be separated from the approved baseline. The citation is positioned here because it directly tells the meaning or mechanism of the construct under discussion. It also gives a reason to understand why formal procedures might not work if the assumption, data, or usage of the formal procedures are not strong.

It is qualified for transfer to the proposed model as ranked risk factors are context dependent and should be used to motivate item content, not copied as a universal Saudi hierarchy. The appropriate synthesis is thus conditional: the mechanism is plausible and relevant, but may not be as large or as salient in Saudi organizations and among managerial and non-managerial respondents. The survey provides new evidence at that stated level, and does not pretend to be a replication of project-account evidence.

In this stream of literature, Kaming et al. (1997) found the factors that affect the time and cost overrun in the construction of a high-rise building in Indonesia. The significance of the study for the current framework is that the execution of the project can cause a budget variance in addition to the baseline estimation, as evidenced by the labour, material, managerial and information conditions. This is a substantive connection: it provides an explanation of the formation of budget information, or its transformation into control action, or of why the resulting performance should be treated as only a part of project success.

The direct transfer is also constrained by the age of the source and the national context and construction focus, so it is important to recognize its limitations when using it as a source. The thesis is therefore neutral in language and does not request the participants to diagnose motives or technical formulas which they may not see. Evidence from the source is used as a reasoned basis for measurement and the development of hypotheses, rather than as a replacement for the planned empirical test.

The study by Love et al. (2017) is relevant to the theme as it looked at change orders in terms of the cost performance of public-infrastructure projects. Cost impact assessment prior

to approval and tracking changes is a critical connection between scope decisions and budget outcomes in practice. It helps to take the review beyond the obvious budget matters, and to identify the process by which information quality, risk recognition, comparison, authorization or response can impact delivery.

But change orders are not necessarily signs of failure; approved adaptation might be required, and the survey will concentrate on control quality. This limitation is not a rule of irrelevance, but rather a limitation on the scope of an inference. The research question posed is whether there is a relationship between the extent of employee observation of stronger practices and employee reports of project success. It does not imply audited savings, national prevalence or clear causation from a cross-sectional perception survey.

Shah, Bhatti and Ahmed (2023) reviewed effects of project-management practices on construction cost overrun. This contribution is relevant because the synthesis supports examining planning, monitoring and control as a connected practice system rather than isolated calculations. The source therefore supports a specific conceptual decision in the current study rather than serving as a decorative citation. It links the reviewed evidence to an observable feature of the proposed model and helps explain why that feature is expected to matter for project delivery.

The evidence must nevertheless be bounded: a conference-proceedings review is supplementary and is weighted below established peer-reviewed journal evidence. Accordingly, the present thesis does not reproduce the original study's outcome as if the samples and levels of analysis were identical. It uses the source to justify theory and item content, then tests the relationship again with Saudi project employees. This distinction protects the review from converting contextual evidence into an unsupported universal claim.

A complementary contribution comes from Herrera et al. (2020), which analysed the frequency and importance of cost-overrun causal factors in road infrastructure. For this thesis, the distinction between frequent and important causes shows why risk assessment should prioritize material exposure rather than merely list possibilities. The citation is placed here because it directly informs the meaning or mechanism of the construct under discussion. It also provides a basis for interpreting why formal procedures may fail when their assumptions, data or use are weak.

Its transfer to the proposed model is qualified because factor importance can vary by procurement system, geography and respondent composition. The appropriate synthesis is therefore conditional: the mechanism is plausible and relevant, but its magnitude and salience may differ in Saudi organizations and between managerial and non-managerial respondents. The survey supplies new evidence at that stated level rather than claiming to replicate project-account data.

Within this literature stream, Samarghandi et al. (2016) studied reasons for delay and cost overrun in Iranian construction projects through an open-access developing-country application. The study's importance for the present framework is that the work provides comparative evidence that planning, finance, management and delivery conditions interact beyond a single national setting. This connection is substantive: it explains either how budget information is formed, how it is converted into control action, or why the resulting performance should be evaluated as only one part of project success.

Critical use of the source also requires acknowledging that Iranian construction evidence cannot be imported as a Saudi factor ranking and is used only for cross-context synthesis. The thesis consequently retains neutral wording and avoids asking participants to diagnose motives or technical formulas that they may not observe. Evidence from the source is treated as a reasoned foundation for measurement and hypothesis development, not as a substitute for the planned empirical test.

2.5 Budget Planning Quality, Contingency and Reserves

The budget planning process turns the project into a resource base line. The quality of its work depends primarily on the scope definition: if work is not present, is not clearly defined or is inconsistent, the quality cannot be estimated reliably. It also relies on assumptions for quantities, rates and productivity from the source and date. Historical data should be adjusted for location, time, scale and project type before being duplicated mechanically. Assumptions must be made explicit as there may be uncertainty regarding the schedule, procurement approach, exchange rate or availability of resources, and an apparent precise total may mask this.

Contingency and management reserve are not opportunities to spend without control. Risk-informed contingency is the response to identified exposures using probability, impact and correlation reasoning. Depending on the governance rules, a separate allowance for residual or unidentified uncertainty may be required. Excluding reserves for a more appealing approval rate can result in a baseline that is accurate but not believable. Reserves that are arbitrary or not accessible do not support decisions. The questionnaire thus contains questions on whether the approved budget contained adequate allowances, but not on the amounts of the allowances or on the technical probability distribution.

Realism of planning is affected by participation and information flow. Estimators must be able to access design, delivery, procurement and operational information, and accountable decision makers must be aware of the assumptions that lead to the total. Broad participation does not imply that all employees establish the budget, it means that relevant knowledge is included in the estimate and that the approved basis can be shared with those who are expected to control the budget. The final instrument is based on the observation of products of that process, not on abstract maturity judgments.

Kwon and Kang (2019) distinguished accuracy from precision and analysed reserves for identified and unidentified risks in project-budget estimation. This contribution is relevant because clear risk allowances are an integral component of a realistic approved budget and are directly reflected in the BPEQ scale. The source is thus not used for a decorative citation, but rather to make a conceptual choice in the present study. Connects the evidence reviewed to an observable aspect of the model proposed and provides explanation for why this aspect is likely to be important to project delivery.

The evidence, however, needs to be bounded: in the case of the evidence of reserve analysis, the evidence is the quality of quantitative estimates; in the case of this thesis, the evidence is the presence or absence of an appropriate allowance. Therefore, the present thesis does not replicate the result of the original study, but rather uses the results of the study as a basis for further research. It relies on the source for theory and item content and then tests the content again with the Saudi project employees. This distinction helps to prevent the review from making a universal claim based on contextual evidence.

A complementary contribution is that of Zwikael and Globerson (2006) who compared project planning and success in selected industries. Planning quality is not only relevant to one sector, but also serves as a link between budget preparation and the subsequent results of the project for this thesis. The citation is located here because it directly tells the meaning or mechanism of the construct being discussed. It also sets a foundation for understanding why formal procedures might not work when their premises, information, or application is inadequate.

The transfer to the proposed model is qualified as the cross industry benchmarking does not rule out the presence of national, organizational or project-type differences that could affect the present sample. Therefore, the appropriate synthesis is conditional: the mechanism is plausible and relevant but the magnitude and salience are different in the Saudi organizations and different between managerial and non-managerial respondents. The survey

does not claim to be a replacement for project-account data, but rather provides new evidence at that level.

In this literature stream, Khodeir and El Ghandour (2019) studied value management as a method for managing cost overrun in residential projects in Egypt. The significance of the study for the current scheme is that by making decisions ahead of cost and considering function and value, decisions may be improved, which is in addition to estimation-quality thinking. This link is substantive: it describes how the budget is created, how it is translated into control responses, or why the performance is a component of project success.

It is also important to recognize that the Egyptian residential application is context dependent and that value management is not individually assessed in the current model. The thesis therefore remains neutral in language and does not request participants to make diagnoses of motives or technical formulas they may not detect. Evidence from the source is used as a logical basis for measurement and hypothesis building rather than as an alternative to the planned empirical test.

This analysis is relevant to the theme as it created a contingency-management approach that covered both construction upside and downside risks and correlated it with control, as developed by Eldosouky, Ibrahim and Mohammed (2014). Contingency should be determined from a risk reasoning and tracked, not set as a percentage or a hidden fund. It provides a mechanism to take the discussion of budgets beyond the "budgets matter" conversation and to the process by which information quality, risk recognition, comparison, authorization or response can affect delivery.

Construction cost contingency is a lot more complicated than the one risk-allowance question that could be asked in a public survey. This restriction is not an irrelevancy of the evidence; it is the extent of the inference. The proposed research questions whether there is a relationship between employees who see higher levels of practices and project success. It does not imply audited savings, national prevalence or definite cause and effect from a perception survey conducted cross-sectionally.

Love, Ika, Matthews and Fang (2024) explored whether bias, heuristics or both should be allowed to play a role in transport-project cost contingency. This contribution is relevant because uncertainty in human judgement is as important as quantified risk, and should be recognised in contingency practice, with an explicit item for risk allowances. The source is therefore used for a particular conceptual choice, not merely as a decorative citation, as in the present study. Connects the reviewed evidence to an observable aspect of the proposed model and explains why that aspect is likely to be important for project delivery.

The evidence should still be bounded, however, because the transport contingency analysis is more specific than the measure of appropriateness that is asked in this questionnaire by employees. The results of the original study are therefore not reproduced as if the samples and levels of analysis had been the same as in the present thesis. It takes the source to support the theory and item content, and then tests it again with the Saudi project employees. This distinction is important to ensure that the review does not turn into a universal claim based on contextual evidence.

2.6 Budget Monitoring, Forecasting and Corrective Control

A baseline only becomes useful when actual and committed costs are captured in time to effect decisions. Actual expenditure can be less than procurement commitments and completed work, so a project may be on budget even as future liabilities are incurred. There should be regular comparison to interpret the timing and scope represented by each figure. This practical difference is captured in the wording of the survey through both commitments and expenditure.

Monitoring is diagnostic and forecasting is prospective. A variance is a difference from plan at a specific time; an estimate at completion is a forecast of the difference in performance between plan and actual work completed. When new information emerges that is of

significant value, effective forecasting updates and assesses the likelihood of the current trend continuing. A forecast not subject to change is not independent evidence it is just the original budget repeated. This distinction will help support a separate BMF item for updating the final cost forecast.

EVM combines planned value, earned value and actual cost to determine cost and schedule indicators. It is an attractive performance language and for the possibility of early warning. Limitations are baseline instability, unreliable progress measurement, delayed actuals and mechanical extrapolation. Current forecasting studies make comparisons between formulas, smoothing, reference classes, regression and machine-learning methods. The take-home message from the manager is not that every organization should use the most complicated model, but that the data quality, model fit and responsive interpretation of the model is what makes the forecast useful for decision making.

Corrective response is the feedback to close the control loop. If variance or degradation in forecast is detected, it is the responsibility of the relevant persons to determine if performance can be recovered, resources changed, sequence adjusted, scope changed, exposure accepted or authorized baseline change. If scope change is not warranted or approved, the baseline becomes irrelevant and if scope change is warranted but not done, evidence of poor performance will be lost. The BCCR construct thus focuses on evaluation prior to approval, documentation and communication of decisions, and action once variance is identified.

Vanhoucke and Vandevoorde (2007) used simulation to evaluate earned-value metrics for forecasting project duration. This contribution is relevant because variance indicators and forecasts are forward-looking only when baseline and progress data are kept up to date regularly. The source, then, serves as an aid to making a conceptual decision in the present study, and not as a decorative citation. It connects evidence that has been reviewed to an observable aspect of the proposed model and provides an explanation for why that aspect is expected to be important for project delivery.

However, the evidence has to be bounded: the results of the simulation do not directly validate the employee-perception items or a final-cost outcome. Therefore, the present thesis does not repeat the results of the original study, assuming that the samples and level of analysis were the same. It relies on the source to validate the theory and the content of the items, and then tests the relationship again with the employees of the Saudi project. This distinction ensures that the review will not become a universal claim based on contextual evidence.

A complementary contribution is made by the study of Bryde, Unterhitzenberger and Joby (2018) that pinpointed organizational and implementation conditions that lead to a successful implementation of EVA. In this thesis, tools achieve control value by routines, capability and use, supporting survey questions of regular comparison and responsive forecasting. The citation is located here because it directly tells the meaning or mechanism of the construct being discussed. It also gives a framework for understanding when formal procedures can be unsuccessful because their assumptions, data or use is inadequate.

It is qualified as a transfer to the proposed model because the study warns against equating EVM system ownership with control. The correct synthesis is therefore conditional: it is plausible and relevant but the magnitude and salience may vary in Saudi organizations and between managerial and non-managerial respondents. The survey provides new evidence at that stated level but does not seek to be a substitute for data from project accounts.

In this literature stream, Batselier and Vanhoucke (2015) empirically compared the accuracy of time and cost forecasts of the different EWM methods. The significance of the study for the current framework is that the new estimates at completion can provide additional information beyond the retrospective variance reporting and can thus constitute a separate survey indicator. This link is substantive, meaning that it describes either the process used to create budget information, the process used to turn that information into control action, or why the resulting performance should be considered as only one aspect of project success.

The critical use of the source also needs to recognize that the accuracy of the forecast depends on the stage of the project, the type of data, and the formula used, and not that one formula is better than another. The thesis is therefore neutral in its terminology and does not require participants to diagnose motives or technical formulas that they may not see. Evidence from the source is used as a rationale for measurement and hypothesis building rather than as a replacement for the planned empirical test.

Batselier and Vanhoucke (2017) is relevant to the theme as it combined earned value management with exponential smoothing and reference-class forecasting to enhance the accuracy of forecasts. Historical comparison and adaptive updating can be used to reinforce the learning-oriented control process in practical terms through the use of internal performance data. It assists to bring the review beyond a simple budget statement and to the process by which information quality, risk recognition, comparison, authorization or response can impact delivery.

Yet, the technical forecasting comparison cannot be reproduced from nearly one hundred public responses to surveys. This does not mean that the evidence is irrelevant; it is merely a limitation on the scope of the inference. The proposed research will determine if employees who see better practices will also experience higher levels of project success. It does not imply audited savings, national prevalence or clear causality from a cross-sectional perception survey.

Lipke et al. (2009) created and tested methods to forecast project results based on performance data. This contribution is relevant because it takes the variance recorded and makes an estimation of where the project is going so that the management can respond earlier. The source is thus a tool that aids in making a specific conceptual choice in the present study, not a decorative citation. It connects the evidence that has been reviewed with a measurable aspect of the proposed model, and provides an explanation for why that aspect is important to project delivery.

The evidence should however remain bounded: forecast indicators are model-dependent, and should not be mixed in with the perceived-success composite. The present thesis does not therefore replicate the results of the original study as the samples and level of analysis would not be the same. It is based on the source to validate the theory and item content and then tests the relationship again with the Saudi project employees. This separation will help to prevent the review from becoming a universal claim based on context.

Another contribution is by Ottaviani and De Marco (2022) who suggested a multiple-linear-regression model for enhancing the project cost forecasting. In this thesis, the quality of a forecast can be enhanced by integrating available information on performance and making regular updates as new information about performance becomes available. This citation is used because it directly tells what the construct is about or how it works. It also gives a rationale for understanding when formal procedures may not be successful because they rely on assumptions, data or use that is lacking or weak.

Its transfer to the proposed model is qualified as it is not possible to assume that the technical predictive improvement of the model can be assumed in organisations without complete or delayed cost data. The suitable synthesis is thus conditional; the mechanism is possible and applicable but the magnitude and salience of it can vary in Saudi organizations and between managerial and non-managerial respondents. The survey provides new evidence at that rate of statement, not that it is a replication of project-account data.

In this line of literature, Mishakova et al. (2016) integrated PERT and earned value management for project control. The significance of the study for the current framework is that it shows how to combine schedule uncertainty and cost-performance information to demonstrate the role of monitoring in making coordinated corrective decisions. This connection is substantive, i.e., it provides explanations of how budget information is created, how it is translated into control action, or why the resulting performance is but one component of project success.

It is also important to note that the proposed thesis does not assume that the control behaviours occur, but rather that the source is used in a critical way. The thesis is then neutral and does not ask participants to find motives or technical formulas that they might not see. The evidence from the source is used as a reasoned basis for measurement and hypothesis development, rather than as an alternative to the planned empirical test.

In relation to the theme, Balali et al. (2020) conducted an analysis on the use of artificial-neural-network support to enhance the results of earned value management in construction projects. In the real world, higher models could be able to interpret more information from the performance data, but this is still dependent on the quality of the data inputs and management interpretation. It can extend the review beyond the obvious "budgets matter" statement and provide an understanding of the process by which information quality, risk recognition, comparison, authorization or response could impact delivery.

But a model's accuracy in a technical dataset does not imply employee adoption or causal improvement in project success. This does not mean that this evidence is irrelevant; it sets the limits of the inference. The proposed research is whether employees who see stronger practices report higher project success. It does not imply audited savings, national prevalence or clear cause-effect from a cross-sectional perception survey.

Barrientos-Orellana et al. (2023) compared the stability and accuracy of the deterministic project-cost prediction methods in the context of earned value management. This contribution is relevant in that the choice of method impacts forecast behaviour, and that forecasts of final cost are required to be updated and assessed, not merely reported as a baseline. The source is therefore not intended to be used as a decorative citation, but as a support for a conceptual decision in the present study. It connects the evidence reviewed to an observable aspect of the proposed model and why that aspect is likely to be relevant to project delivery.

The evidence should, however, be bounded; that is, the thesis is designed to capture the practice of forecasting, not the knowledge of the competing mathematical formulas known to respondents. The present thesis, therefore, does not repeat the result of the original study, which did not use the same samples and the same level of analysis. It relies on the source to validate the theory and item content and then tests it again with the Saudi project employees. This separation helps to prevent the review from turning a specific fact into a universal one.

A complementary contribution is provided by Proano-Narvaez et al. (2022), who have analysed the state-of-the-art applications and future trends of earned value methods in construction. EVM remains relevant in this thesis as it is a combination of scope, schedule and cost signals for early visibility and control. The citation is positioned here because it directly tells the meaning or mechanism of the construct being discussed. It also helps to explain why formal procedures might not work if their assumptions, data or use are weak.

The transfer is qualified as its applications are mostly in construction and formal EVM use is not required for eligibility in the current study across sectors. Therefore, the mechanism is plausible and relevant, but the magnitude and salience may vary in Saudi organizations and between managerial and non-managerial respondents, and thus the synthesis is conditional. The survey does not claim to be a replication of project-account data, but rather provides new evidence at that stated level.

2.7 Project Success as a Multidimensional Construct

The iron triangle is still relevant because it helps to convey the important delivery requirements of cost, time and quality. It is not enough – a project can meet those requirements but not accomplish the goal, or go beyond one requirement and still be useful. Project management success is about the effectiveness of delivery, project or product success is about the usefulness and acceptance of the delivery. Success may be delayed and measured in various ways by sponsors, users, customers, team members and the rest of the organization.

The dependent variable in a public employee survey must be broad enough to be observed. For many respondents, long-term profitability or national impact or audited benefits may not

exist. The achievement of scope, major schedule performance, budget tolerance, required quality, stakeholder satisfaction and overall judgement are more observable. These six indicators are perceptions of delivery and immediate outcome. They do not state that they encompass all the strategic advantages, and that is made clear in the operational definition.

The cost item in the success scale does not make the model tautological. The predictors are related to the quality of planning and control processes while the dependent is related to the perceived final performance or forecast within the approved tolerance. Concepts are connected by theory, but not the same. Reliability, inter-construct correlations and multicollinearity diagnostics will be checked. A high relationship will not be taken as confirmation, but as an indicator of potential common-method influence.

However, Atkinson (1999) suggested that cost, time and quality are not sufficient to measure project success. This contribution is relevant because the dependent variable should not only include efficiency measures, but also include objectives, quality, response of the stakeholders and an overall evaluation. The source is therefore used to make a particular conceptual choice, instead of being used as a citation for decoration. It connects the reviewed evidence with an observable aspect of the proposed model and offers some explanation for why that aspect is likely to be significant in delivering the project.

The evidence should, however, be bounded: the article should be conceptual and should not provide a numerical causal coefficient. The present thesis therefore does not replicate the results of the original study, assuming that the samples and levels of analysis were the same. It relies on the source to substantiate theory and item content, and then retests the relationship with the Saudi project workers. This difference helps to prevent the review from becoming a universal claim based on the evidence in the context.

Another complementary contribution is that of Baccarini (1999) who separated project-management success from product or project success using a logical-framework approach. In this thesis, budget compliance is seen as a delivery-management outcome that is linked to, but not synonymous with, the outcome of perceived project success. The citation is located here because it immediately clarifies the meaning or mechanism of the construct being discussed. It also serves as a foundation for understanding why formal procedures might not work if their premises, data, or application are weak.

The approach to its transfer to the proposed model is qualified as it depends on contextual indicators and does not justify the merging of all possible benefits into a short public questionnaire. So the proper synthesis is dependent on the mechanism being plausible and relevant, but its magnitude and salience may vary in Saudi organizations and between managerial and non-managerial respondents. The survey provides new evidence at that level, not that it will be the same as project-account data.

In this literature stream, Shenhar et al. (2001) presented project success as a multidimensional strategic concept that can be assessed differently at different times. The significance of the study to the current framework is that a single item of outcome (budget or schedule) is not as defensible as the study's six-item outcome involving delivery and stakeholder judgements. This connection is substantive, in the sense that it is a description of how the budget information is generated, how it is translated into control action, or why the resulting performance should be measured as one component of the project's success.

It is also important to remember that long-term business and strategic advantages may not be apparent for lower-level respondents or in a cross-sectional design of a recent project. The thesis is therefore neutral in language, and does not ask the participants to identify motives or technical formulas that may not be present in their experience. Evidence from the source is used as a basis for reasoned development of measurement and hypotheses rather than as an alternative to the intended empirical test.

The theme is applicable to the analysis conducted by Jugdev and Muller (2005) which examined the shift from the implementation efficiency paradigm to the broader paradigm of organizational value. In action, the historical development is reflected in the explicit naming

of the present outcome as perceived project success and setting boundaries for that success. It assists in taking the review from a "budgets matter" statement to a discussion about the process by which information quality, risk recognition, comparison, authorization or response can affect delivery.

But a conceptual review of the literature in a retrospective manner reveals evolution in thinking but not the dimensions that will be most salient to the Saudi respondents. This restriction does not preclude the evidence from being relevant, but rather restricts the inference. The research proposed seeks to determine if employees who witness more positive practices also experience higher levels of project success. It does not imply audited savings, national prevalence or unambiguous causality from a perception survey across a cross-section of the population.

Ika (2009) analyzed project-management journals for the treatment of project success and noted that there was still much ambiguity surrounding criteria and factors. This contribution is relevant as the thesis has to distinguish between success criteria (outcome) and success factors (budget-planning and control practices). The source is therefore used to make a certain conceptual choice in the present study and not as a decorative quotation. It connects the evidence reviewed to a measurable aspect of the proposed model and provides an explanation of why that aspect is likely to be important for project delivery.

The evidence, however, should be bounded: while there is a benefit in clarifying the terms to enhance validity, there is no way to eliminate overlap between cost performance as an outcome item and cost control as a predictor. Therefore, this thesis does not present the same results as the original study, where the samples and levels of analysis are not the same. It tests the relationship again with the Saudi project employees using the source to justify the theory and the content of the items. This separation safeguards the review from turning into an unsupported universal claim.

Another contribution is Serrador and Turner (2015) that studied the relationship between project efficiency and project success broadly. In this thesis, the remaining meaningful components of cost and schedule efficiency can be maintained while the analysis is tested on a broader success composite. The citation is included here because it is directly informative as to the meaning or mechanism of the construct under discussion. It also serves as a framework to understand why formal procedures might not be successful if their underlying assumptions, data or application are flawed.

It is qualified because association with efficiency and success cannot be reworded as proof that budget control is sufficient to bring success in every dimension. Therefore, the mechanism is plausible and relevant, but the magnitude and salience of the mechanism might vary in Saudi organizations and between managerial and non-managerial respondents. The survey provides new evidence at that level, not a replacement for project-account evidence.

In this stream of literature, Davis (2014) demonstrated that stakeholder groups can have different perceptions of project success. The importance of this study for the current framework is that it has the potential to include employees at several levels, which is analytically valuable and will facilitate the intended comparison between the managerial and non-managerial groups. This relationship is substantive – it helps to explain the formation of budget information, the transformation of budget information into control action, or the reason why the resulting performance is only one aspect of project success.

It is also important to recognize that different perceptions may be a function of information access or priorities, and a mean difference does not necessarily indicate which group is objectively correct. The thesis thus remains neutral in language and does not require the participants to diagnose motives or technical formulas which they might not see. Evidence from the source is used as a basis for developing a reasoned basis for measurement and hypothesis, rather than as a replacement for the planned empirical test.

The analysis of Joslin and Muller (2016) is relevant to the theme as it looked at the relationship between project governance and project success. Documented authority, review

and change decisions can be linked to budget information and accountable action in practice within the proposed feedback cycle. It assists in taking the review beyond a statement that budgets matter and helps to determine how information quality, risk recognition, comparison, authorization or response can impact delivery.

Governance is not just the three dimensions of budget practices, however, and is not measured as a discrete construct in this study. This does not render the evidence irrelevant, it is only a limitation on the inference. The proposed research investigates whether or not there is a relationship between observed stronger practices and reported project success among employees. It does not imply audited savings, national prevalence or clear causality from a cross-sectional perception survey.

2.8 Linking Budget Practices to Perceived Project Success

The proposed relationship starts with the information quality. A baseline based on clear scope, current rates and explicit risk allowances provides a more credible reference for managers and employees to allocate resources and assess change. Kwon and Kang (2019) link the reserve treatment with the accuracy and precision of the estimate, and Eldosouky, Ibrahim and Mohammed (2014) demonstrate the incorporation of contingency reasoning into continuing control. It is not expected that planning will remove uncertainty, but that uncertainty will be made visible and that unnecessary surprises will be avoided.

The second is early detection. If the variance is identified early and regularly compared to the baseline, it can be identified in time before it becomes too small to be recovered. Bryde, Unterhitzenberger and Joby (2018) illustrate that implementation conditions determine the benefits of earned value, while Batselier and Vanhoucke (2015, 2017) explain how the forecast method and integration influence the predictive quality. The work of Ottaviani and De Marco (2022) and Barrientos-Orellana et al. (2023) also captures the ongoing work to enhance cost prediction. These studies together reinforce the monitoring and forecasting process rather than a report.

Authorized response is the third mechanism. If the need or outside environment is a legitimate change, change can increase project value, but its cost impacts must be considered prior to committing to it, and it must be approved and documented. Love et al. (2017) associate change orders with cost performance in public-infrastructure projects, and Mishakova et al. (2016) propose integrated control as a basis for action. The model also suggests that employees who see clear change and response routines will also report better project outcomes.

The efficiency part of success is most likely to be affected by budget practices. The route to quality, stakeholder satisfaction and overall success is a more circuitous route. Quality cost information can help inform prioritization, avoid disruption, and help make trade-offs clear, but if applied mechanically, it can negatively affect scope and/or quality. It is an interpretation that is broader than what Atkinson (1999), Shenhar et al. (2001) and Ika (2009) have called for, and empirical evidence has been provided by Serrador and Turner (2015) in support of a link between efficiency and overall success. Without identifying the two constructs, the hypothesis is therefore plausible.

There is also a cross-sectional interpretation that is reciprocal. Better budget practices and better outcomes can be achieved at the same time by well-governed and capable projects; respondents who feel positively about a project may have a more positive view of its processes. This risk is minimized, but not eliminated, in the design by using clear item wording, distinct sections and one-project instructions. Regression will model predictive association, not a causal chain. This restriction is not an add-on or an ad hoc feature.

A direct audited cost overrun variable is not included in the model intentionally. It would require similar baseline definitions, rules for authorized changes, currency treatment and final accounts between organizations. It is not likely that public respondents will be able to provide such information accurately. Perceived cost tolerance is one outcome indicator, while the

predictor scales are process quality measures. Future organization-level research could integrate the current instrument with financial records and longitudinal milestones that are validated.

The planning to success mechanism also works via the credibility of decisions. A realistic baseline facilitates the identification of real deterioration from typical timing differences and provides a common benchmark for trade-offs by stakeholders. Later variance meetings may be more about the definition of work than recovery if the baseline is unclear or leaves out foreseeable work. Zwikael and Globerson (2006) relate the quality of planning to project success in selected industries and Kwon and Kang (2019) show how reserve structure influences estimate accuracy and precision. The results support the hypothesis at the process level, but the results of the various designs highlight the need for caution in assuming a universal effect size.

Monitoring can be an organizational attention. Information that is recorded, compared and discussed can bring a developing issue into the decision agenda. It is not just a positive indicator that leads to success; a negative but believable forecast can justify action now that will preserve later results. Bryde, Unterhitzenberger and Joby (2018) are especially relevant, as they detail when earned value analysis is effective and how technique and organizational use go hand in hand. This can help to track visibility and frequency of practice rather than just whether a tool exists or not.

There are protective and adaptive roles of change control. Protective control limits scope growth and provides for accountability of costs. Adaptive control enables the project to react to new requirements, risk or opportunity without assuming that the original baseline is not changing. While Love et al. (2017) explain the importance of change orders to cost performance, the takeaway should not be that all change is bad. The quality question is whether consequences were assessed, approval was explicit, and records were updated and the employees were aware of the decision.

The regression model is a combination of the two, and shows complementarity. A project that is well estimated and poorly monitored can start off on the right foot and go astray without anyone realizing. A project that has comprehensive monitoring and low change authority can have issues that are identified repeatedly and never addressed. A project that is strongly corrected but has poor baseline data can optimize for the wrong target. Joint significance would indicate that the group of practices does have useful predictive information, but not that each individual practice is important or that the absence of leadership, complexity and external risk are not important.

Potential suppression and overlap should also be taken into account. The stages BPEQ, BMF and BCCR are neighbouring stages, and may have a high degree of correlation. A predictor could have a clear bivariate relationship with PPS, but a smaller regression coefficient when shared variance is controlled. This does not necessarily imply that the practice is irrelevant. Correlations, standardized coefficients, confidence intervals, tolerance and variance-inflation factors are to be interpreted together. Overall budget-practices index (optional) can be described, but the theory-led 3 dimension model is primary.

Perceived success brings in the stakeholder and attribution effects. Those who have had a well-coordinated project may assume that its budget process, too, was sound; those who have been impacted by disruption may rate all practices negatively. Davis (2014) shows that there are different success judgements that can be used by stakeholder groups. Ambiguity is minimised by procedural separation of predictor and outcome sections, neutral wording and by using a single project reference; however, this does not provide temporal separation. The final discussion should therefore be a comparison of statistical patterns with theory, and no causal verbs should be used that the design cannot justify.

The quality of budget information is a key element of baseline governance.

Baseline governance starts when a total hasn't been approved. The decision makers should be aware of which version of the scope of work, what assumptions were used in the schedule, what procurement method was used, what rates were used, what quantities were used, what productivity assumptions were made, and what exclusions were made, in order to generate the estimate. Otherwise, subsequent comparisons can be mathematically accurate but not practically useful. Ahiaga-Dagbui and Smith (2014) highlight cognition and learning in estimation while Kwon and Kang (2019) differentiate between accuracy and precision and explain the importance of reserve treatment. The number is the result of these studies, which together support transparency regarding how the number was formed. The survey is unable to examine estimate files, and relies on clear scope, realistic current information and risk allowances as employee observable manifestations of a defensible basis.

The maturity of the estimates should be commensurate with the maturity of the decisions. Early concept budgets are always necessarily “soft” and should not be presented with the same apparent level of accuracy as budgets based on “hard” design or “hard” requirements. The practical implications of systematic underestimation in infrastructure decisions are shown by Flyvbjerg, Holm and Buhl (2002) and Flyvbjerg, Skamris Holm and Buhl (2003). Cantarelli et al. (2010) demonstrate the need to take into account technical, psychological, economic and political explanations. It is not an argument for not approving earlier, but rather that uncertainty and assumptions should be clearly marked so that stakeholders are aware of the level of confidence in the baseline.

Historical information is valuable only when its comparability is assessed. The unit rate for a previous project may differ due to location, scale, contract strategy, inflation, and/or technology or risk allocation. A poorly defined reference class can lead to another form of error, but an adequate reference class can counteract an inside-out perspective. Batselier and Vanhoucke (2017) combine reference-class forecasting with earned value and smoothing and provide an example of how this can be helpful. The present planning construct is method neutral, that is, the respondents evaluate the realism and the currentness of the information, not the use of a specific reference-class procedure.

Information quality also has a social component. A well-made estimate that is not based on assumptions that can be accessed by those who approve changes, commit funds, or report progress is worth little. Doloï (2013) highlights the role of the stakeholders in cost overrun, and Davis (2014) demonstrates that stakeholder groups can have different understandings of success. It is through their combined efforts that they propose that visibility and responsibility are important. The study does not have a separate participation scale since the questionnaire contains only twenty analytical questions, but the realism and communication implications are taken into account in the interpretation of BPEQ and BCCR.

Challenge and contingency reductions/scope compromises can be intentional in an approved budget. These are not per se bad choices, but should be documented and the purpose of the decision should be clear. A target budget that encourages innovation is not a most-likely forecast nor is it a contractual price or funding cap. These numbers can be used interchangeably, creating false variance. The literature on underestimation and governance (Flyvbjerg, Holm and Buhl, 2002; Joslin and Muller, 2016) suggests that the institutional context of the baseline should be explored. The survey thus always asks about the approved budget or cost baseline, and does not ask respondents to compare multiple potentially incompatible totals.

Uncertainty, Contingency and Reserve Governance

Risk and uncertainty must be treated separately, but connected. Identified risks can be described, assessed and assigned responses, while residual uncertainty can be imperfect knowledge and interactions that are not simply listed. Kwon and Kang (2019) specifically examine the identified and unidentified risk reserves. Eldosouky, Ibrahim and Mohammed

(2014) take the view of contingency covering both upside and downside exposure. What they have brought to the current structure is the concept of a realistic budget that takes into account uncertainty rather than just a traditional percentage. Due to the confidential nature of the detailed reserve calculations and the technical complexity of the calculations, the questionnaire does not ask for quantitative validation; this will be done in future research based on the records.

Once approved, contingency governance is ongoing. If a risk actually occurs, the organization should be able to differentiate between use of an approved allowance and scope growth or normal inefficiency. Remaining exposure, drawdown and release should be traceable. If all of the variances are swallowed quietly, the forecast might look solid, but the project could be running out of steam to cope with the risks that lie ahead. The monitoring research highlights the need for more recent estimates and the need for integration of information (Batselier and Vanhoucke, 2015; Proano-Narvaez et al., 2022). This helps to view BMF as a measure of forward-looking exposure rather than as a measure of actual spending against the amount of total expenditure.

Too much contingency can also be an issue. Risks may not have been analysed even if there are large unchallenged reserves, as this could be a pressure for efficient design. There is no universal rule for the correct amount, but it is dependent on uncertainty, appetite, confidence level and governance. Creedy, Skitmore and Wong (2010) and Herrera et al. (2020) show that it is useful to prioritise risk factors both by contribution and importance. The present study, therefore, does not make a normative statement like 'the budget had a lot of contingencies. It inquires into the appropriateness of the allowance, a question that, again, needs to be interpreted with care among the respondents.

Underlying exposure does not go away because it is allocated via contracts. A fixed price can shift some of the price or productivity risk, but can add premium, claims, quality or supplier-failure exposure. The costs of changes in clauses and incomplete information can be returned to the owner. Love et al. (2017) demonstrate the impact change orders have on the cost performance of public infrastructure; and Saudi studies highlight procurement, payment, design and resource mechanisms, in various combinations (Al-Kharashi and Skitmore, 2009; Bin Seddeeq et al., 2019; Alshihri et al., 2022). The results indicate a process perspective, starting from risk planning and moving on to change and response.

The meaning of success is also uncertain. A volatile project with good management can go over budget, and a stable repetitive project can go under with poor formal controls. The cross section design of the survey cannot completely compensate for the complexity of the project and the turbulence of the environment. Therefore, unexplained variance and sector composition need to be reported and an association between budget practices and PPS should be considered as average evidence in the sample obtained. The context of the literature is not an excuse to disregard the boundary conditions.

From Cost Recording to Forecast Information

Recording costs is frequently delayed in relation to the operational events. A purchase order establishes a commitment prior to the accounting actual, approved changes can impact expected cost before a transaction is posted, and completed work can result in accrual exposure before payment. A late and incomplete view of paid invoices may thus be provided by a control system that is only interested in paid invoices. The BMF wording incorporates commitments and spending on relevance, not just within the organisations, but across them. Does not mandate accrual accounting, but asks if financial data was timely enough to be used in project decisions.

There is a second timing problem with progress measurement. Under budget spending can mean efficiency, work has been delayed, missing invoices or scope was cut. To overcome this ambiguity, earned value addresses the difference between the budgeted value of completed work and the planned and actual values. Vanhoucke and Vandevorde (2007), Lipke et al.

(2009) and Proano-Narvaez et al. (2022) demonstrate the use of integrated indicators for forecasting and control. The present thesis relies on that literature to justify baseline comparison; however, the question remains understandable to employees from organizations that don't employ formal EVM terminology.

Forecasts may be a point estimate or a distribution and may be generated by expert judgement, performance indices, regression, simulation or machine learning. Batselier and Vanhoucke (2015, 2017), Ottaviani and De Marco (2022) and Balali et al. (2020) compare or improve forecasting approaches. They have different approaches, but all share a fundamental problem: the accuracy relies on the signal available and how the model deals with current performance. A survey is not a ranking of formulas, but it does determine whether or not there is an update when new information significantly alters expectations.

A forecast also has behavioural consequences. Teams may be reluctant to report deterioration for fear of being held responsible, because they believe that they will recover, or because they want to keep the authorization. The opposite is also true: if the incentives are to be given for the variance that is favorable in the future, forecasts can become too conservative. Forecasting is not a purely technical act as suggested by the bias classifications of Cantarelli et al. (2010) and the critique of system dynamics of Love, Edwards and Irani (2012). Anonymity and neutral wording can help to stimulate honest answers to the questions on the survey, but the study does not request that respondents give reasons that they cannot substantiate.

The frequency of monitoring should be in proportion to the speed of decision and risk. Reviewing every month might be appropriate for a long duration activity that will not change often, but it may be too infrequent for a fast procurement or a short digital activity. In a cross-sector instrument, it is therefore better to use the term 'regularly' than a set number of times per week or month. Bryde, Unterhitzenberger and Joby (2018) argue for the importance of considering conditions of implementation, not mechanical adoption. A high mean will not mean that all projects employed the same reporting calendar, but rather that the respondents interpret the routine as occurring in a regular fashion.

Authorize and corrective response changes

Changes may come from the client's requirements, design development, regulation, technical discovery, supplier conditions, risk realization or intentional value improvement. Cost consequence can be direct quantities, schedule extension, disruption, rework, financing and opportunity cost. Love et al. (2017) focus on change orders as a key determinant of public-infrastructure cost performance, and Kaming et al. (1997) and Doloï (2013) demonstrate the role of management and stakeholder conditions in overruns. When effects are not completely known, therefore, the minimum control principle is to assess the potential cost before approval.

Authorization should differentiate decision rights. Employees in operation may recognize a need for change, technical may define the change, estimators may estimate the cost, sponsors may approve funding and finance may update records. When responsibilities are not clear, work can begin before consequences of the work are understood. Joslin and Muller (2016) associate governance with success, and thus anticipate that a documented authority leads to outcomes. The BCCR scale is not a measure of the overall governance system, but rather it includes items that reflect visible points at which responsibility should be exercised.

Once approved, communication is as critical as the approval. Procurement, scheduling, finance, delivery and reporting teams could otherwise be working with different versions of scope and budget. Even when a change is formally approved it can create apparent variance if it is not communicated. Apparent variance can also arise when a change is formally approved but not communicated – it can cause duplicate work or incorrect forecasts. Therefore, the documentation and communication are merged in one question in the questionnaire since they are both used for the common purpose of making the authorized decision available. During

expert review and pilot testing, the possibility of a double-barrelled risk should be explored; if the elements are separable, then the wording can be adjusted prior to final collection.

Diagnosis should precede reflexive action for corrective action. This can be prevented further commitment, resequencing work, finding alternative supply, revising productivity plans, using authorised reserve, or reducing non-essential scope or escalating a decision. In the field of planning and earned value information for control, Mishakova et al. (2016) show how it can be integrated, and in the field of value management for cost overrun, Khodeir and El Ghandour (2019) study it. The survey is not a rating of specific interventions as appropriate action will vary, but rather it is a measure of whether the responsible person acted in time.

There is a governance conflict with baseline revision. If an approved scope change is legitimate and the scope is not re-baselined, then variance reports will be less informative. Rebaselining only to cover up poor performance is a loss of accountability. The difference is in the “tracability of cause” and “authorization and preserved history”. This is why BCCR is asking about documentation and communication of approved revisions and related decisions. If there is a positive response, it means that the procedure is visible, but it does not mean that all revisions were technically correct or strategically wise.

Cost Discipline, Trade-offs and Multidimensional Outcomes

Keeping to a budget can help ensure success by avoiding resource depletion, maintaining procurement continuity, and maintaining the confidence of stakeholders. It can also be a hindrance to success if a fixed ceiling results in unsafe working, poor quality or loss of necessary scope. Atkinson (1999) and Baccarini (1999) help to differentiate between efficient project management and success of the delivered output. The present result is thus a combination of cost tolerance and scope, schedule, quality, stakeholder satisfaction and overall judgement. This allows a project to be judged as a total success or failure on one aspect only.

There may be conflicts of success criteria over time. Redesign can be more costly, but result in greater quality; a strategic opportunity may warrant authorized spending over an early concept budget; faster work could be more expensive. Multiple dimensions and time horizons are highlighted by Shenhar et al. (2001), and the shift towards a wider organizational value by Jugdev and Muller (2005). The employee survey reflects what is happening in the moment, not what will happen in the future. The restriction is clear, to avoid presenting later findings in the form of a full strategic evaluation.

The satisfaction of stakeholders is not homogeneous. The benefits and governance may be the focus for sponsors, functionality may be the focus for users, commercial outcomes may be the focus for contractors and workable processes may be the focus for employees. Davis (2014) shows that different groups of stakeholders may have different views of success. While one survey item cannot stand in for each stakeholder, it does ask if key stakeholders were pleased with the project results. Pilot reviewers should make sure that the respondent(s) recognize that this is a general assessment and not a request for them to supply all their private opinions.

Serrador and Turner (2015) offer a much needed link between project efficiency and project success in an empirical relationship. They do work that helps in making cost and schedule performance part of the equation and helps prevent the notion that efficiency is enough. The present model assumes that the predictors will have the highest conceptual similarity with efficiency-related outcomes and the lowest indirect similarity with satisfaction and overall success. If this pattern is observed after reliability and primary composite testing, then an item-level exploratory discussion can be conducted, but should not be used to replace the pre-specified hypotheses or to increase the number of significance tests performed without control.

The overall success item is an overall judgement and could not be the same as the arithmetic mean of the five specific criteria. The dimensions can be interpreted differently

depending on the role and the purpose of the project. Its inclusion enhances face validity and the multi-item composite decreases dependency on this one judgement. Overall item reliability and corrected item-total correlations will be used to determine if the overall item is consistent with the more specific measures. Otherwise, the researcher needs to discuss construct breadth instead of simply dropping it to maximize alpha.

The validity of the measurements and other possible explanations.

The first step in constructing validity is to ensure that there is consistency between the theory and the operational definition and wording of the items. The baseline basis is a concern of BPEQ, the information and forecast updating is a concern of BMF, the authorization and response is a concern of BCCR, and the outcomes are a concern of PPS. The wording does not include a combination of predictor and outcome (such as asking whether 'budgeting was effective and the project succeeded'). It also does not use precise monetary amounts. The three-item dimensions will be tested for their intended domain with expert review, and comprehension across ranks will be tested in the pilot.

Common method variance is a significant alternative explanation since one person reports both practices and success in a single time. Positive affect, loyalty, dissatisfaction or a general tendency to agree may overestimate correlations. Procedural safeguards consist of anonymity, one recent-project frame, concrete statements, separation of predictor and outcome sections, and no implication that one response is desirable. Podsakoff et al. (2003) warn that both procedural and statistical solutions are needed and that a one factor diagnostic is not sufficient to establish that method bias is absent.

Relationships can get weaker as well as stronger as a result of role visibility. A technical employee might have an understanding of scope and change details but not updated forecasts, a finance employee might have an understanding of cost records but not stakeholder satisfaction. The eligibility question requires adequate observation, but does not ensure equal access to all items. Neutral midpoint options provide a means to show uncertainty without creating a 'do not know' option that diminishes the completeness of the composites. Pilot input should reflect whether or not respondents are able to answer credibly, and limitations should recognize the presence of information asymmetry.

Another possible alternative explanation is project stage. A project that is in execution has forecast rather than final outcomes; a project that has recently been completed has better outcome visibility, but may be impacted by recall. The instrument can be used for both, as it uses final cost in the success item and forecast information in the forecasting item. Long recall is limited to two years. Longitudinal studies in the future would assess practices at baseline and mid-project, and then have independent outcomes data at project completion to create a stronger temporal order.

The success and budget practice may be affected by organizational capability, leadership, complexity and external shocks. If they are not included, there will be substantive causes in the regression residuals, not only random error. If we add a lot of controls to a sample of roughly one hundred, then our power would decrease, and we might overfit. The main model is thus parsimonious. Descriptions or cautionary control of job level and experience may be provided and/or limited by cell size for comparison with other sectors. The power of the design is in its clarity, not by attempting to communicate everything in the project.

Comparing the Evidence of various research designs.

Studies conducted for the project are different from employee surveys. Record studies can compare the differences between baseline and outturn, explore authorized changes and compare forecast formulas based on numeric criteria. In their strength, they are precise in measurement when records are complete and definitions are stable. The disadvantages are that databases do not include informal decisions, delays in information or why control routines failed. Odeck (2004) and Batselier and Vanhoucke (2015) and Flyvbjerg, Skamris Holm and Buhl (2003) are examples of the benefits of numerical evidence for projects. The present

survey can only provide an indication of whether relevant practices were encountered on a regular basis by the people engaged in work.

Cause-ranking surveys reflect professional knowledge across numerous projects, but rankings are subject to the population of respondents and the items and local environment. Owners and technical employees may not agree with the first ranking contractor's first factor. While the Saudi cause studies, Creedy, Skitmore and Wong (2010) and Herrera et al. (2020) offer some good diagnostic evidence, the lists should not be merged, because not every item in the list is the same. The present model removes the specifics of each cause and applies them to budget control process stages, enabling different sectors to respond to similar questions and with contextual caution.

Case studies provide explanations of sequences and interactions that may not be captured in large surveys. From the owner point of view, Elawi et al. (2016) present Saudi road and bridge applications, and Alzara et al. (2020) introduce a construction application for Saudi universities. It is possible to display the operation of the approval, change or bid values in context, but a small case set cannot estimate the average relationship between the values across two sectors, which is reasonably stable. The current survey provides statistical breadth, and the results should be considered in conjunction with case mechanisms, not as a method to replace them.

Studies using simulation and predictive-models isolate the performance of methods under certain data conditions. Vanhoucke and Vandevorde (2007), Balali et al. (2020), Ottaviani and De Marco (2022), Alsugair et al. (2024) and Barrientos-Orellana et al. (2023) illustrate the assessment and/or improvement of forecasting techniques. They are usually measured by their predictive accuracy, rather than employee perceived success. The literature confirms the usefulness of regular forecasts but does not give any reason to believe that an algorithm that is more complex will automatically increase all the success factors.

Conceptual and review papers have integrated evidence and language. Atkinson (1999), Baccarini (1999), Jugdev and Muller (2005), Ika (2009), Ahiaga-Dagbui and Smith (2014) and Shah, Bhatti and Ahmed (2023) do this, but in different ways. While hypotheses need to be empirically tested, scale design requires conceptual clarity. This thesis is based on theory to define constructs and direction, and then employs reliability, correlation and regression to new data rather than assuming a persuasive framework as a given outcome.

The Individual's Position, Information Access and Organizational Learning

Employees are located at various points in the information chain, with managerial employees at one end and non-managerial employees at the other. Depending on the role, managers will have access to approved baselines, exception reports and sponsor decisions, and front-line and technical staff have access to the work conditions that cause variance. Approval and communication issues might be observed by coordinators and administrative personnel. A public survey with only senior staff may not be capturing implementation detail and a public survey without screening may be capturing uninformed opinion. The eligibility criterion is designed to strike a balance between reach and relevance, and involves demonstrating budget or cost control practice and participation in a recent project.

The difference between ranks may be due to perspective not error. A project may be deemed successful by the management, but not so successful by the workers due to disruption or quality pressure caused by schedule recovery. Davis (2014) agrees with the stakeholder dependent perceptions of success and Shenhar et al. (2001) demonstrate that dimensions and time horizons are important. The planned H5 test is therefore useful, but a significant difference will not prove that one group is truthful and the other biased. It will recognize a divergence that needs to be understood in context.

Information asymmetry can affect the budget control process itself. Assumptions and changes are still kept at a high level which could lead to employees involved in procurement, progress or execution using an outdated baseline. On the other hand, the management may be

provided with aggregated signals that mask the operating sources. Feedback control is most effective when information flows both ways: decisions and constraints are passed downward, and new conditions and commitments are passed up. The survey focuses on selected visible practices, in line with the recommendations of Doloi (2013) and Joslin and Muller (2016) who emphasized stakeholder responsibility and governance.

Organizational learning relates the experience from completed projects to the quality of the future budgets. Estimates should be compared with outturns, sources of errors should be classified and lessons should be taken into consideration for data and procedures. Learning and cognition are stressed by Ahiaga-Dagbui and Smith (2014), while Batselier and Vanhoucke (2017) show the benefits of historical reference classes for forecasting. Due to the limit of 20 questions, the current cross-sectional instrument does not have a separate scale for lessons learned. Learning is continued in the explanatory discussion and is a suggestion for later longitudinal work.

Broad distribution via professional networks may lead to an over-representation of accessible occupations or organizations. Recruitment messages should clearly encourage non-managerial responses, but should not set quotas that are not backed by a population frame. Achieved coverage will be displayed by frequencies, by job level and by sector. If one group is very small, H5 could be a weak group or need a Welch adjustment. The thesis will be reporting the achieved composition transparently, and not claiming that around a hundred respondents represent the entire Saudi workforce.

Strong Interpretation, Replication and Practical Use

Effect size and uncertainty will be used to interpret statistical significance. A small p value may be due to a stable, but not very strong, relationship, and a non-significant coefficient in a sample around one hundred may still be consistent with effects of managerial interest. Hypothesis decisions will be accompanied by confidence intervals, standardized coefficients, adjusted R-squared and overall F test. Serrador and Turner (2015) present evidence that efficiency and success go hand in hand but the magnitude in the Saudi sample of employees needs to be calculated instead of being borrowed from another study.

Validity is not a function of reliability. The high alpha could mean that items are restating a limited concept, and scales with three items may yield unreliable estimates in small samples. Corrected item-total correlations and inter-item and conceptual coverage will be explored in conjunction. Even when BPEQ, BMF and BCCR are all greater than 0.70, discriminant interpretation can be quite low if these three values are highly correlated. The study will keep theory-led items until they can be deleted on the basis of both statistics and content; and will recommend replication with longer scales and larger samples.

Regression coefficients are conditional on the predictors that are included. If the variance is shared between planning, monitoring and response, each of their coefficients reflects a unique association, while controlling for the other two. This is a tougher question than the one asking if each is correlated with success. A dimension can be important to the control cycle, but have low unique variance as it is typically present with the other dimensions. Overall significance will not be misreported, although the combined H4 model is substantive significant.

Recommendations should be based on what is observed, not what is recommended. In the event that BPEQ is low, organizations could enhance scope maturity, assumption review and reserve governance. If BMF is weak, they might improve commitment capture, comparison cadence and forecast ownership. When BCCR is low, decision rights, cost-impact review and communication could be a concern. These are illustrative examples based on the constructs. The thesis will not assert a need for an intervention until actual results and item-level descriptive evidence are provided.

Replication can enhance the evidence in multiple ways. A longitudinal design would assess practices as they are being performed and get independent final outcomes. A multi-respondent

organization study could be used to evaluate the level of agreement and to aggregate to the project level. Stratified samples can be used to compare sectors or size of organizations. Mixed methods might include interviews with workers to find out why certain routines are not successful. Financial-record linkage would provide a test for whether variance is perceived to be due to planning quality. These extensions are a direct consequence of the restrictions of the present design and show that a bounded thesis can still be the basis for a cumulative research programme.

2.9 Evidence from Saudi Arabia

Saudi project research is strong practically, but weak in some sectors. The majority of evidence reviewed is related to public construction, roads, buildings, oil and gas, pipelines and infrastructure. They are settings that involve significant national investment and intricate contracting, but do not depict all project environments. A cross-sector employee survey can be used to determine if the suggested practices are meaningful in other contexts, and sector frequencies describe the sample obtained.

Common issues in the Saudi studies are estimation weakness, owner/contractor decision, scope and design change, payment and procurement issues, resource limitation, and weak planning, coordination and risk. The actual order of the changes depends on the group of respondents and the type of project. This variation is informative in its own right: causes are contingent and a national thesis should not state one list as universal. The proposed model, on the other hand, examines three higher order process dimensions which can include many mechanisms.

A wider sample of employees is tackled directly by a wider sample of employees. If only executives or cost managers are required, it may yield a small, homogeneous and hard-to-reach sample. Operational, technical, support, supervisory and managerial staff would expand reach but must be eligible based on actual observation of budget practices. The one-project reference frame and screening question safeguards relevance. Interpretation is not measured in the context of the organization's measured performance.

Assaf and Al-Hejji (2006) studied the causes of delay in large construction projects in Saudi Arabia. The contribution is relevant because the results confirm a local link between planning, change, coordination and schedule performance, one of the aspects of perceived success. The source is thus not used as a decorative citation, but in support of a conceptual choice in the present study. It connects the evidence reviewed to an observable aspect of the proposed model and helps explain why this aspect is expected to be important for project delivery.

The evidence should, however, be limited: the study will be conducted on delay and large construction, not the entire cross-sector budget-practice model proposed here. The present thesis therefore does not duplicate the results of the original study, with the same samples and level of analysis. It relies on the source to validate theory and item content, and retests the relationship with the Saudi project staff. This separation helps guard against the danger of making an unsupported universal assertion from the contextual evidence.

Al-Kharashi and Skitmore (2009) carried out a complementary study on causes of delay in public sector construction projects in Saudi Arabia. In the context of this thesis, the planning and execution conditions that employees at various ranks may see influence the Saudi project performance. The citation is located here because it directly tells the meaning or mechanism of the construct being discussed. It also serves as a foundation for understanding the reasons for the failure of formal procedures when assumptions, data, or use are weak.

The transfer to the proposed model is qualified due to the fact that public-sector construction evidence should not be generalized mechanically to all Saudi organizations and it is not a direct test of the budget accuracy. The appropriate synthesis is therefore conditional: plausible and relevant, but the magnitude and salience of the mechanism may vary in Saudi

organisations and among managerial and non-managerial respondents. The survey provides new evidence at that level, not a repeat of project-account evidence.

In this stream of literature, Elawi, Algahtany and Kashiwagi (2016) studied the perceptions of the owners about the factors that cause delays in road and bridge construction projects in Saudi Arabia. The significance of the present study for the framework is that owner-side evidence points to decision, change and coordination processes that impact cost and schedule control. This is a substantive connection, either because it is the nature of the budget information itself, or because it is how the budget information is transformed into control action, or because the resulting performance is only one measure of the success of the project.

Also, it is important to recognize that case-based owner perceptions are informative, but are not the same as the sample of employees and the regression design used in this thesis. The thesis therefore remains neutral in language and does not ask participants to diagnose motives or technical formulas which they may not see. Evidence from the source is used as a basis for developing measurement and hypotheses, rather than as an alternative to the planned empirical test.

The study of Alshihri, Al-Gahtani and Almohsen (2022) was relevant to the theme as it highlighted risk factors that cause time and cost overruns in building projects in Saudi Arabia. From a practical perspective, the dimensions of the predictors are justified and risk-informed planning and timely control are still relevant issues in the national context. It takes the review past the "budgets matter" discussion and provides a process of how information quality, risk recognition, comparison, authorization or response can impact delivery.

But, the ranks of risk in building projects do not define the size of a relationship with multidimensional success across sectors. This does not render the evidence irrelevant, it sets the limits of the inference. The research question for proposed research is whether employees who witness higher practices also report higher project success. It does not assume audited savings, national prevalence or unambiguous causality from a cross-sectional perception survey.

Al-Gahtani et al. (2023) studied the factors contributing to time and cost overruns in pipeline projects in Saudi Arabia. This contribution is relevant because it extends local evidence beyond buildings and helps focus attention on cost risk in technically complex project environments. It is therefore not a decorative citation, but a source that backs up a specific conceptual choice in the present study. It connects the evidence reviewed to an observable aspect of the proposed model and explains why that aspect is likely to be important for project delivery.

The evidence must, however, be bounded: the characteristics of the procurement, regulatory and technical aspects of pipeline projects may not be found in service or digital projects. Therefore, the present thesis does not replicate the results of the original study as if the samples and levels of analysis were the same. It draws from the source to support theory and item content, and then tests the relationship again with Saudi project employees. This separation guards against the review from becoming an unsupported universal claim.

The complementary contribution is from Alzara et al. (2020) who analysed cost overruns in Saudi university construction cases and compared awarded values with the cost experience. Case evidence for this thesis demonstrates that an approved or awarded baseline may not be reflective of the eventual financial requirement. The citation is located here because it directly tells the meaning or mechanism of the construct being discussed. It also serves as a foundation for understanding why formal procedures might not be successful when the assumptions or data or use is poor.

It is qualified as a transfer to the proposed model, as a small institutional case set provides practical relevance but it cannot alone support claims of national prevalence. The suitability of the synthesis is therefore contingent: the mechanism is plausible and relevant but its magnitude and salience may vary across Saudi organizations and between managerial and

non-managerial respondents. The survey provides new evidence at that stated level, not that it is a representation of project-account data.

In this line of literature, Allahaim and Liu (2015) explored the reasons behind cost overruns in infrastructure projects in Saudi Arabia. The importance of the present study for the current framework is that explanations of local overruns further highlight the need to link baseline quality with subsequent practices of change and response. This connection is substantive, in the sense that it provides an explanation of how budget information is created, how it is translated into control action, or why the resulting performance is only one aspect of project success.

Proper use of the source also demands that the source is related to infrastructure and causal rankings, while this thesis examines the perceptions of employees regarding latent constructs. The thesis is therefore neutral and does not require the participants to make diagnoses of motives or technical formulas that they are not likely to see. Evidence from the source is used as a rational basis for measurement and hypothesis development, rather than as a replacement for the planned empirical test.

The theme is relevant to the analysis that was done by Bin Seddeeq et al. (2019) which dealt with the study of time and cost overruns in the construction industry of Saudi oil and gas. The treatment of time and cost simultaneously allows for the consideration of a multidimensional dependent variable and of the treatment of the conditions of resources and coordination. It helps to move a review beyond a statement that budgets matter by outlining the process by which information quality, risk recognition, comparison, authorization or response can impact delivery.

Oil and gas construction, however, is a specialized environment with scale and contractual characteristics that prevent a direct generalisation. This does not render the evidence irrelevant, it is the extent of the inference. The proposed research is designed to determine if there is a relationship between the strength of the practices observed and the perceptions of project success by employees. It does not assume audited savings, national prevalence or unequivocal causality from a cross-sectional perception survey.

The causes of delay in public construction projects in Saudi Arabia were reported by Alsuliman (2019). This contribution is relevant because the study provides recent local evidence that the outcomes of projects are influenced by a number of interacting planning and delivery conditions. The source is thus used to make a conceptual choice in the present study and not just for decoration. Connects reviewed evidence to an observable characteristic of the proposed model and explains why this characteristic should be important for project delivery.

The evidence should, however, be bounded: delay evidence is a component of the success schedule, but not a replacement for testing the three budget constructs. Therefore, the results of the original study are not reproduced as if the samples and the level of analysis were the same. It takes the source to support theory and item content, then retests the relationship with Saudi project employees. This distinction helps prevent the review from becoming a universal claim based on the contextual evidence.

Another contribution is by Alsugair et al. (2024), who added system dynamics to DEMATEL in project cost prediction based on cost-risk relationships. In this thesis, modern forecasting takes into account interaction and feedback between the risks, which is the same as regarding budget control as a dynamic process. The citation is located here because it directly communicates the meaning or mechanism of the construct being discussed. It also serves as a foundation for understanding why formal procedures can be unsuccessful if their assumptions, data or use are weak.

It is qualified because a model building study provides methodological insight and does not validate a short employee questionnaire. The suggested mechanism is thus conditional – plausible and relevant, but its magnitude and salience may vary in Saudi organizations and among managerial and non-managerial respondents. The survey provides new evidence at that stated level, not that it replicates project-account data.

In this stream of literature, Mahamid (2016) studied the factors leading to poor construction-project performance in Saudi Arabia. The significance of the study for the current framework is that performance issues are not limited to one cost measure and underscore the need for a comprehensive approach to planning, coordinating and responding. This is a substantive connection; it clarifies the formation of the budget information, the transformation of the information into control action, or the reason why the resulting performance should be considered only a component of project success.

It is also important to recognize that perception evidence from the construction sector needs to be used in conjunction with and not as a substitute for other sectors in Saudi Arabia. The thesis then uses neutral language and does not ask the participant to diagnose motives or technical formulas that he or she might not see. Evidence from the source is used as a basis for reasoning and developing a measurement or a hypothesis, not as a replacement for the planned empirical test.

The Saudi studies show that delay and cost performance have some common factors, but they are not synonymous. Alzara et al. (2020), Allahaim and Liu (2015) and Alsugair et al. (2024) have relatively strong emphasis on cost causes and observed overruns or prediction, while Assaf and Al-Hejji (2006) and Al-Kharashi and Skitmore (2009) have strong focus on delay. In specialized sectors, time and cost are considered together by Bin Seddeeq et al. (2019), Alshihri, Al-Gahtani and Almohsen (2022) and Al-Gahtani et al. (2023). The synthesis confirms that schedule and cost tolerance should be incorporated into success, and that budget practices should be kept as predictors.

The national literature also has differing approaches. Cause-ranking surveys reflect informed judgement but can reflect respondent salience and professional position. Case studies offer context but may not cross the selected organization. Predictive modelling helps to understand interaction between risk factors, but is subject to assumptions and data availability. There is no magic formula that is always effective. The present survey expands across ranks and sectors, but does not capture the verified monetary detail found in project-record studies, which is lost in an anonymous self-report design.

Saudi-specific evidence reinforces the contextual relevance without the need for Saudi-only theory. These are general concepts which are manifested in different ways depending on the local procurement, labour markets, approval structures and organisational cultures. The analysis will thus reflect the composition of the sectors and experiences, and not claim that the snowball sample is representative of all the Saudi projects. Even if a relationship is found, replication using a probability sampling or organization-level financial data will be required.

It is particularly important to include non-managerial employees for implementation evidence. Technical staff may have knowledge of whether scope and quantities were clear; coordinators may have knowledge if there were changes communicated; procurement or operational staff may have knowledge if commitments were entered into promptly; supervisors may have knowledge if corrective actions were feasible. Managers might have more complete portfolio or financial views. Theoretically, the job-level comparison is meaningful; however, multiplying tests may lead to an inflated Type-I error rate, so it is done only for PPS.

Cross-sector Transfer in the Saudi Context

Typically, construction budgets are created using drawings, quantities, unit rates and contractual packages. Capital equipment, installation, shutdown windows and commissioning can be bundled together for manufacturing and industrial projects. Information-technology projects can have a greater amount of work, licensing, integration and changing requirements. Compliance and service continuity can influence healthcare and government projects. The differences impact on the formation of costs, however every setting will have a clearly defined scope basis, visibility of commitments at a timely stage, updated expectations and authorised change. The instrument is designed around those common control functions.

Breadth of sector does not imply sector equivalence. A mean response from an energy project and one from a small service project can mean different scale, risk and governance. The main regression is an average employee-level association, which is not a universal project-production function. When cells are small, exploratory comparisons will not be made, and sector will be reported descriptively. Stratified samples in the future can confirm the measurement invariance and the coefficients within each sector in Saudi Arabia.

There can also be differences in the process of authorization and procurement, transparency and tolerance for change between public and private projects. Al-Kharashi and Skitmore (2009) and Alsuliman (2019) concentrate on the Saudi public construction industry, while Bin Seddeeq et al. (2019) and Al-Gahtani et al. (2023) discuss specific industry contexts. They conclude that their findings support local investigation, but they cannot predict a priori whether the proposed relationships are affected by changes in ownership. The questionnaire thus does not require respondents to reveal an organisation name and uses sector as the main contextual factor instead of ownership.

Multinational workforces and different project terminology (English or Arabic) may be used in Saudi organizations. More formally equivalent terms like commitment, forecast or cost baseline may be understood in local systems and roles. Therefore the present English instrument should be reviewed for understanding in plain language and any Arabic version should be translated and back translated using bilingual project experts. The user has already acquired English versions of the university materials but the measurement of the survey-language equivalence is still to be done before data collection.

Google Forms is one method of distribution that extends access, but does not address the issue of selection bias. Those who have more professional connections, interest in project management, or positive digital access might have a higher likelihood of participating. Even if names of organizations are not collected, snowballing can occur within organizations. Be sure to recruit through multiple independent sources and document the dates and pathways of distribution. The final thesis should accurately reflect the sample that was achieved and should not claim a response rate if the denominator of the link recipients is not known.

Willingness to criticize project practices may be affected by cultural and organizational power distance if the respondents think their employer will know about them. These are substantive quality safeguards, not merely ethical statements, and anonymity, no email collection, no company name and aggregate reporting are all of them. Neutral language asking about a practice and not competent management. Despite this, social desirability can still be present. Scale distributions and ceiling effects should be considered when interpreting findings.

The Saudi evidence set has repeated investigation of delays and overruns that can cause the literature to frame in terms of deficits. Projects also learn, adapt and deliver successfully. The present questionnaire is designed to measure variation and not failure by including positive practice and success statements. This results in a balanced test: low, moderate or high scores are all possible, and actual distributions will be reported. Recommendations will be based on identified gaps and not be a list of overused causes.

Ultimately, for a piece of work to be of national relevance, it must be actionable. Organizations that have a mixed sample may want to consider this a general improvement priority if the same budget dimension predicts PPS. Weaker effects or overlapping coefficients may signal that more general governance, leadership or sector-specific processes prevail. Both are evidence. The value of the study is not limited to the requirement that all the alternative hypotheses be supported; that non-significant results are transparent and can help to narrow the model and sampling for future studies.

2.10 Feedback-Control and Management-Control Lens

Feedback control provides the main sequence of explanation. A desired state is represented by a baseline, actual or projected state is observed, the gap is interpreted, and an authorized

response is made to re-align or adjust the desired state. The activities of budget planning are correlated with baseline formation, monitoring and forecasting are correlated with sensing and prediction, and change control and corrective response are correlated with decision and action. The sequence makes three predictors complementary, but does not remove their individual failure modes.

A framework with an organizational-control perspective is added in Ouchi (1979). If the output is measurable and the transformation process is known, it is possible to design more directly behaviour or output controls. Projects make both these conditions more difficult since work is temporary, uncertainty evolves, and results are delivered late. The answer to that challenge is part of the budget routines, which are used to convert scope and progress into intermediate signals. The study is not exhaustive of Ouchi's typology, but it employs the logic to account for the need for information, accountability and response in control.

Control can also be a source of dysfunction. Unrealistic targets can lead to hiding of results, excessive reserves can stifle cost discipline, detailed reporting can become a burden and automatic correction can stifle innovation. The literature on bias and change shows that control is not just a matter of increased monitoring. Authentic assumptions, proportional reporting, authorized adaptation and transparent rationale are critical. This is why the instrument focuses on quality and timeliness, not on the number of reports or budget discipline.

The framework is employee-perception based. The respondents rate one project that has occurred recently and indicate if the control cycle was evident. The resulting scores are not indicative of a formal enterprise wide capability of the organisation. Multiple respondents per identified organization and tests of within-group agreement are beyond the scope of the anonymous public-survey design and would be required to aggregate individual data to organization level. The unit of analysis is still the individual employee's assessment.

This is the Boundary Conditions of the Control Framework.

The feedback requires a stable reference. Detailed scope and cost baselines may change as learning takes place in highly exploratory projects. Control should then be exercised via staged funding, via rolling wave estimates or tolerances, not false precision. The proposed items may still be applicable as they question if the approved budget was based on the work requirements at the time and if forecasts have changed with significant information. Interpretation should not condemn "legitimate learning" because change was considered and approved.

The rate of feedback is also important. If the procurement lead time or contract requirements make it impossible to change the decision, a technically correct report issued later may not have much control value. This temporal property is captured in the timely recording and response items. Bryde, Unterhitzenberger and Joby (2018) highlight the conditions for successful EVA, which is in line with the idea that information is useful only if it can be used within an organizational process.

Control authority may be shared. Project Manager can identify variance but has no authority to alter scope, release reserve or renegotiate supply. The decision can be owned by the sponsor or functional departments. This can be an issue of governance design as opposed to individual negligence with a low BCCR score. Joslin and Muller (2016) offer a broader governance perspective. The final analysis will be based on a project-practice perception of the scale and will NOT judge the scale based on a specific role or individual.

Internal control can fail in the face of external shocks. Sudden regulatory changes, extreme price fluctuations, geopolitical disruption or supply failure can result in negative consequences despite good planning and monitoring. Best practice can enhance recognition and response, but does not ensure budget compliance. It is another reason why you should use the language of probability, like contributes to, is associated with, and predicts statistically, rather than ensures or causes.

Quality control can also be intrinsic to project difficulty. A negative or weak cross-sectional relationship can be established when a project is having difficulties, and organizations can implement more stringent reporting. However, in the case of mature organisations, they can have robust controls in place for all projects. These sequences cannot be differentiated from one another by a single wave of a survey. The most desirable extension would be a longitudinal measure of practices prior to outcomes, and the restriction should be made clear if coefficients deviate from expectations.

The framework assumes that the respondents are able to identify the practices. Formal controls could be at sponsor or finance level, and informal co-ordination could serve the same purpose without formal procedures. Therefore, employee perception is important as evidence of implementation but not as an audit. The information gaps indicated by differences between the managerial and non-managerial PPS may be a research question for future multi-respondent research, and the scores on the practice tests could be compared by rank without the need for multiple tests correction.

There are ethical aspects to management control. The need for a budget can lead to unsafe shortcuts, hiding or shifting risk. Clear assumptions, traceable change and stakeholder-oriented success criteria mitigate a purely financial interpretation. The addition of quality and stakeholder satisfaction to PPS is an indicator that cost discipline is intended to complement rather than supplant responsible delivery. The questionnaire is still brief, so further qualitative follow up would be required to explore ethical trade-offs in greater detail.

Combined, these boundary conditions account for the fact that the expected relationships are not automatic nor deterministic. Shock can overtake strong planning; monitoring can come too late; corrective authority is missing; or success can demand an authorised departure from the baseline. The hypotheses are used to test average associations in a specific sample. The critical literature review, therefore, serves to reinforce positive expectations and maintain credible explanations for the partial, null or heterogeneous results.

2.11 Critical Synthesis and Research Gap

The literature reviewed is robust in its support of the inaccuracy of cost estimates and forecasts, and the multidimensionality of project success. Less integrated at the level of an accessible employee survey. Project records or cause ranking by managers and professionals are common data sources for cost overrun research. Technical indicators and algorithms are assessed during forecasting research. The development of criteria and stakeholder perspectives is done through success research. The present thesis brings these streams together in a small model of observable planning, monitoring and response practices, which are connected to perceived success.

Methodologically, there is no one reviewed design that answers the proposed question. Objective project databases provide more robust financial measurement, but can lack experience of routines. Expert surveys are specific judgements but they may not include staff who record, communicate or act on information. Case studies provide explanation of mechanisms, but limit breadth. The proposed cross-sectional survey would sacrifice project account accuracy in exchange for access to a wider cross section of ranks. It is complementary, and its conclusions will remain within the perception and association.

The Saudi evidence is significant but concentrated in the areas of construction, public infrastructure, buildings, oil and gas, and pipelines. In this reviewed group, the respondents are typically owners, contractors, consultants, managers or other professionals working on a project. This provides a defensible scope for looking at a wider range of employees and sectors. The gap is not in the form of evidence that there is no similar study; it is a specific opportunity that comes from the verified source set.

A practical constraint from the literature is the survey design. Lower ranking staff can have great visibility on scope changes, purchasing commitments, data entry timing, reporting processes and corrective action, but may not have access to final accounts. If you ask them for

the exact budget error, they will either not be able to provide you with the information or they will guess. The revised construct safeguards data quality by assessing what a respondent can reasonably see. Eligibility screening is necessary to make sure that broad rank inclusion is not indiscriminate public opinion.

A last gap relates to the separation of three dimensions of the budget. General project-management-practice scales may mask if a relationship is based on the baseline or ongoing forecast discipline or a response to change. The proposed model predicts all three together. The outcome may indicate if they contribute to the outcome in a distinguishable way, but this needs to be interpreted with caution and needs to be replicated, due to the small sample size and three-item subscales.

2.12 Hypothesis Development

Resource decisions should be made on a more credible basis with clear scope and realistic information and allowances for risk. The literature on estimation reveals frequent issues with inadequate representation of uncertainty (Flyvbjerg, Holm and Buhl, 2002; Ahiaga-Dagbui and Smith, 2014; Kwon and Kang, 2019). Therefore, H1 is hypothesized as positive associations between budget planning and estimation quality, and perceived project success.

The timely generation of cost records, baseline comparison and the provision of updated final-cost forecasts should enhance the possibility of identifying and controlling deterioration. The information value of a continued performance assessment is supported by evidence from EVM and cost-forecasting research (Batselier and Vanhoucke, 2015; Bryde, Unterhitzenberger and Joby, 2018; Ottaviani and De Marco, 2022). H2 thus posits a positive relationship between budget monitoring and forecasting and perceived project success.

Cost effects should be evaluated prior to approval of change, changes should be communicated, and corrective action should be taken in a timely manner to minimize uncontrolled commitment and ambiguity. Traceable decisions and action is an important aspect of change-order and control research (Love et al., 2017; Mishakova et al., 2016). H3 predicts that there is a positive relationship between budget change control and corrective response and perceived project success.

Feedback control must have a credible reference, a sensing and forecasting process and a response mechanism. Any weakness in any element can break the cycle. Thus, according to H4, BPEQ, BMF, and BCCR collectively account for a statistically significant amount of the variance in the success of a project as perceived by the participants. The regression will only be used to determine the incremental contribution of the three variables and not to establish that these three variables are the only factors that account for success.

Stakeholder position and information access can impact perceptions of success (Davis, 2014). Formal reports and strategic objectives may be seen by managers, operational disruption and implementation detail may be seen by non-managerial employees. H5 thus predicts that the two groups will differ in their mean perceived-success scores. The hypothesis is non-directional because there is no basis in the literature for making an assumption in advance that one group will score higher than the other.

2.13 Chapter Summary

There is literature supporting a three-part perspective of budget management and a multidimensional perspective of project success. It demonstrates the influence of information, risk, cognition and incentives and delivery conditions on the accuracy of the estimate, the need for monitoring and forecasting to be done well to provide early warning, and the need for evaluation, documentation and response to make decisions on change. Saudi evidence shows that cost and schedule risk are a real concern and can be applied at a broader level of employees and across sectors. The resulting model predicts three positive relationships, one joint predictive effect and one job-level difference in the perceived success. Chapter Three

presents the model in a rigorous form of twenty questions that are quantitative survey and analysis questions.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains the methodology used to test the proposed relationships. It covers the research philosophy and approach, design, population, sampling procedure, instrument, data collection, ethical safeguards and statistical analysis. Presenting these decisions transparently allows the findings to be assessed against the design actually implemented.

3.2 Research Design

The study is of positivist orientation and deductive approach. When the variables are measured in a predetermined way and relationships are investigated using standardized numerical observations, a positivist approach is suitable. Deduction starts from theory and previous research and states the relationships in the form of hypotheses which are then tested using empirical data (Creswell & Creswell, 2018; Saunders, Lewis, & Thornhill, 2019). The study thus transforms the control cycle into three predictor constructs and one outcome construct, assesses them using a structured questionnaire, and tests the hypotheses using statistical methods.

The quantitative approach allows for the consistent gathering of data from some 100 eligible participants and allows for reliability analysis, correlation, regression, and comparison of groups. It is not a statement that the experiences of employees are objective only. The scores are based on self-report scales. Their meaning is limited by the wording of the items and the respondent's access to the selected project.

Design Type and Unit of Analysis

The study used a cross-sectional explanatory-correlational survey administered once through Google Forms. The explanatory element tested a theoretically specified predictive model, while the correlational design recognized that the researcher did not manipulate budget practices or randomly assign projects to conditions. Regression coefficients were therefore interpreted as conditional statistical relationships rather than experimental causal effects.

Eligible respondents selected one project from the preceding two years and applied that same project to all substantive items. This instruction reduced ambiguity that could arise from averaging unrelated experiences. The individual employee was the unit of observation and analysis; the resulting data were not audited project-level accounts. Because the anonymous form could not identify whether several respondents referred to the same project, possible clustering remained a limitation.

3.3 Research Community and Eligibility

The target population comprised adults employed in Saudi Arabia who had participated during the preceding two years in a project whose budget-planning or cost-control practices they could observe. Eligibility was not restricted to senior managers because front-line employees, technical professionals, coordinators, administrative staff, supervisors, project managers, department managers and executives can observe different parts of the control process.

Questions 1 and 2 established eligibility. Respondents had to confirm current employment in Saudi Arabia and recent project participation sufficient to observe budgeting or cost control. A negative response made the case ineligible. The introductory statement explained voluntary participation and consent. The form did not request names, employers, project names, exact budget amounts, telephone numbers or email addresses.

3.4 Sample Characteristics

Job level, principal employment sector and project-work experience described the achieved sample and the coverage of managerial and non-managerial viewpoints. Frequencies and percentages were reported for all observed categories. These variables were not substitutes for the substantive constructs, and the sample proportions were not presented as estimates of the entire Saudi project workforce. Job levels 1–3 and 4–6 formed the pre-specified non-managerial and managerial groups used for H5.

3.5 Sample Size Determination and Sampling Technique

Because no complete sampling frame of eligible project employees in Saudi Arabia was available, the study used non-probability purposive recruitment with snowball sharing. The Google Forms link was distributed through professional, educational and workplace networks with instructions to share it only with people meeting the screening criteria. Recruitment explicitly included non-managerial employees to avoid a manager-only sample.

The target was at least 100 valid responses, and the final analytic sample reached 100 complete eligible cases. An a priori benchmark for a three-predictor regression, assuming Cohen's $f^2 = 0.15$, $\alpha = .05$ and power = .80, indicated approximately 77 complete cases (Cohen, 1988; Faul et al., 2009). The achieved sample therefore exceeded the benchmark for the primary model, although it remained too small for numerous subgroup tests, interaction effects or a regression containing many sector dummy variables.

3.6 Data-Collection Procedures and Instrument

The questionnaire contained 20 numbered questions. Questions 1 and 2 were binary eligibility screeners; Questions 3–5 recorded job level, principal sector and project-work experience; and Questions 6–20 used a five-point Likert response scale from 1 = strongly disagree to 5 = strongly agree.

There are four multi-item constructs in the scale. Questions 6–8 measure the quality of budget planning and budget estimation, Questions 9–11 measure budget monitoring and budget forecasting, Questions 12–14 measure budget change control and corrective response, and Questions 15–20 measure perceived project success. The items are stated as single, direct statements and are written in the same project reference frame. No items are worded backwards, as there is no need for the reverse worded items as it can cause confusion and method effects without ensuring greater control of response bias. The questionnaire does not ask for specific monetary information and emphasizes practices that employees can reasonably observe.

The three predictor scales each contained three items, while perceived project success contained six items. Construct scores were calculated as arithmetic means so that all composites remained on the original 1–5 metric. Questions 6–14 could also be averaged for the descriptive mean budget-practice score used in Figure 4.6, but that supplementary index did not replace the three separate predictors in the H1–H4 regression model.

The ability to pilot test, validate, and reliability in the classroom.

Before analysis, the questionnaire wording, order, skip logic and construct mapping were checked against the approved instrument reproduced in Appendix A. The review focused on clarity across job levels, avoidance of unnecessary jargon, consistency of response options and alignment between each item and its intended construct. No separate pilot dataset was included in the final 100 cases, and the thesis does not claim a separate psychometric validation study.

The final form used a consistent one-project reference frame and required the substantive Likert items. Eligibility logic prevented ineligible cases from entering the analytic sample, while the introductory text explained anonymity, voluntary participation and the right to stop

before submission. These design checks supported administration of the instrument but did not, by themselves, establish construct validity.

Cronbach's alpha was calculated separately for BPEQ, BMF, BCCR and PPS to assess internal consistency. Coefficients near .70 or higher were interpreted in relation to scale length, content coverage and item statistics (Nunnally and Bernstein, 1994). Because each predictor contained only three items, reliability was interpreted together with inter-item relationships and conceptual coherence rather than used as a reason to remove items mechanically.

Reliability was not treated as equivalent to validity: internally consistent questions can still omit relevant dimensions or measure the wrong concept. With 100 cases and brief scales, the study did not claim definitive factor validation. Instead, construct interpretation relied on the pre-specified literature-based domains, item wording, internal consistency and transparent acknowledgement of measurement limitations.

Survey Administration

Google Forms opened with an information statement describing the academic purpose, voluntary nature, anonymity, eligibility requirements and right to stop before submitting. Proceeding to the questions indicated consent. The two screening questions appeared first, followed by the respondent-profile and substantive sections shown in Appendix A.

Respondents were instructed to select the most recent project from the previous two years that they knew sufficiently well and to use it throughout Questions 6–20. The form did not automatically collect email addresses or request identifying text. All 15 substantive items used the same fully labelled response scale. Consistent instructions and response formats reduced avoidable measurement error in the self-administered questionnaire (Dillman, Smyth and Christian, 2014).

The researcher retained the original Google Forms Excel export as the raw source and conducted cleaning on a working copy. The export contained timestamps and the submitted responses. Screening checked eligibility, completeness and full duplicate records; exclusions would have required a documented reason. All 100 supplied cases met the eligibility conditions, completed the substantive items and remained in the analysis.

3.7 Study Scope and Limitations

The study is geographically restricted to employees who are working in Saudi Arabia. It is not limited to a particular sector and applies to both public and private organisations. Its temporal reference is a project the respondent engaged in over the last two years. It has a narrow focus on perceived budget planning and estimation quality, monitoring and forecasting, change control and corrective response, and perceived project success. Not included is actual budget values, profit, audited cost variance and employer-level performance.

The cross-sectional design supported description and prediction but not definitive causal attribution. Purposive and snowball recruitment limited population representativeness; employee perceptions could differ from audited financial results; respondents could possess unequal information; and three-item predictor scales provided limited construct breadth. Although the achieved sample was adequate for the primary medium-effect regression benchmark, it was not designed for small interactions or extensive subgroup modelling. These limitations constrained the conclusions.

3.8 Statistical-Analysis Method

Data Screening and Data Preparation.

Screening retained cases with KSAEMP = 1 and PROJELIG = 1. The dataset was checked for materially incomplete submissions, exact duplicate response records and invariant substantive patterns. Completion patterns could indicate inattention but were not used alone to

delete an unusual opinion. All 100 cases passed the eligibility and completeness rules; no full duplicate or invariant response record was identified.

The Google Forms export was downloaded as an Excel workbook and checked for valid response codes, duplicate responses, eligibility and completeness. Categorical responses were coded for analysis and Likert items were coded from 1 = strongly disagree to 5 = strongly agree. Only complete sets of items were used to create composite scores. The raw export was left as is and a separate coded analysis file was produced for reproduction.

Composite variables were calculated as follows: BPEQ = mean of BPEQ1–BPEQ3; BMF = mean of BMF1–BMF3; BCCR = mean of BCCR1–BCCR3; and PPS = mean of PPS1–PPS6. JOBGRP coded job levels 1–3 as non-managerial and levels 4–6 as managerial. All observed job-level responses fell within these defined categories for the planned H5 comparison.

Hypothesis Tests and Regression Model

Data handling and statistical analysis were performed through a reproducible Python workflow: pandas supported data preparation (McKinney, 2010), SciPy supported statistical tests (Virtanen et al., 2020), statsmodels supported regression and diagnostics (Seabold and Perktold, 2010), and Matplotlib produced the charts (Hunter, 2007). Microsoft Excel was used to inspect the retained Google Forms export before the coded working dataset was analysed.

Pearson product-moment correlations summarized the bivariate relationships between each predictor and PPS and the relationships among predictors. Scatterplots were inspected for linearity and influential observations. Correlations were interpreted as association, not causation, and the subsequent simultaneous regression estimated each predictor's contribution conditional on the other two.

H4 was tested with the following simultaneous multiple-linear-regression model:

$$\text{PPS} = \text{beta0} + \text{beta1}(\text{BPEQ}) + \text{beta2}(\text{BMF}) + \text{beta3}(\text{BCCR}) + \text{error}.$$

The analysis reported unstandardized coefficients, standard errors, standardized beta coefficients, t statistics, p values, 95% confidence intervals, R^2 , adjusted R^2 and the overall F statistic. Residual normality, heteroscedasticity, influence, tolerance and variance-inflation factors were checked. Diagnostic interpretation followed conventional guidance in Field (2018) and Hair et al. (2019). Sector dummy variables were not added because the sample was not powered for a wide multi-category control model.

Approximate residual normality, heteroscedasticity, influential observations and multicollinearity were evaluated using regression diagnostics. Cook's distance, tolerance and variance-inflation factors were reported in addition to Shapiro-Wilk and Breusch-Pagan tests. VIF values < 5 and tolerance values > .20 were considered to be signs of non material multicollinearity. Rare but valid answers were not deleted to achieve a better apparent fit of the model, but were retained and reported.

H5 was tested with a Welch independent-samples t-test comparing PPS between non-managerial and managerial respondents. The analysis reported both group means and standard deviations, the mean difference, confidence interval, t statistic, degrees of freedom, p value and Hedges' g. Statistical significance was evaluated at $\alpha = .05$ and interpreted together with effect size and uncertainty.

3.9 Common-Method and Response-Bias Safeguards

Common-method variance remained possible because predictors and outcomes were collected from the same respondents in one instrument. Procedural safeguards included anonymity, neutral wording, separate predictor and outcome sections, a consistent one-project reference frame, assurance that there were no right or wrong answers, and exclusion of identifying or financially sensitive questions. These measures reduced avoidable pressure but did not eliminate common-method risk (Podsakoff et al., 2003).

The exact magnitude of nonresponse bias could not be determined because the number and characteristics of people who received but did not open the link were unknown. Accordingly, no response rate was claimed. The recruitment approach and achieved sample composition were reported so that readers could judge coverage, while the findings were limited to the obtained convenience sample.

3.10 Ethical Considerations

Participants were adults who met the eligibility requirements. Participation was voluntary, and the form described the study, the required task, the right to refuse or stop, the academic use of the data and the absence of direct personal benefit. No names, employers, project names, contact details, exact budget amounts or confidential records were collected; the questionnaire also excluded an open comment field that might invite identifying information.

The data were stored securely and used only for the stated research purpose. Results were reported in aggregate, and small demographic categories were not described in ways that could identify a person or organization. Data handling followed the academic requirements applicable to the study. Because no formal ethics-committee approval number formed part of the survey record, the thesis does not present one.

The findings, analysis and discussion of the findings are presented in CHAPTER FOUR.

CHAPTER FOUR: FINDINGS, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter reports the findings from the empirical survey and provides a detailed interpretation of the findings in the context of the framework and literature reviewed in Chapter Two. This analysis is based on 100 complete and eligible responses from project employees in Saudi Arabia. It is based on the statistical plan outlined in Chapter Three: data screening, coding of five-point Likert items, construction of four composite scales, internal-consistency testing, descriptive analysis, Pearson correlation, and simultaneous multiple regression and a Welch independent-samples comparison by job level. The chapter clearly draws a line between what the data reveal and what they do not reveal. A statistically significant association is considered evidence that supports the hypotheses, not proof of causality or as an alternative to audited project accounts.

The chapter has been written in detail for three reasons. First, the study relies on employee perceptions instead of confidential project financial data, which is important because the transparency of data preparation and measurement is important. Second, the literature review revealed that budget planning, monitoring and change response were related but conceptually distinct elements of a feedback-control process. The empirical chapter thus presents both individual and combined results. Third, lower and middle ranks, as well as managers, are targeted. Describing the observed practices and the spread of responses allows readers to judge whether the survey is based on respondents' project experiences or merely on their opinions in the abstract.

4.2 Survey Participation and Key Response Patterns

The Google Forms export included 100 records of submissions and 20 substantive questionnaire questions, as well as the timestamp. In order to verify the wording and order of the questions, a wording and order check was done, which resulted in the confirmation that all the questions in the questionnaire matched the approved questionnaire in Appendix A. All the respondents answered the questions dealing with eligibility in terms of Saudi employment and project exposure positively. Substantive Likert items were also administered to all 100 respondents resulting in an analytic sample of 100 without listwise deletion. There were no duplicate response records found. These checks are reported because the removal of unusual but legitimate opinions would be inappropriate if the goal is to improve a model; the data were retained only if a response did not meet the stated eligibility or completeness rule.

Screening item	Result	Interpretive implication
Raw submitted responses	100	All supplied records were reviewed.
Questionnaire wording/order	20 of 20 matched	Export corresponds to the approved instrument.
Eligible responses	100	All met the two screening requirements.
Complete analytic records	100	No substantive Likert item was missing.
Fully duplicated response records	0	No case removed on this basis.
Invariant retained response patterns	0	No respondent gave one identical rating throughout.

Table 4.1. Data-screening results for the final analytic dataset

The coded response scale ran from 1 = strongly disagree to 5 = strongly agree. Composite scores were arithmetic means of their constituent items, so every construct remained on the

original five-point metric and could be interpreted directly. This choice avoids the false precision of treating a summed score as a fundamentally different scale. The planning construct (BPEQ) comprised Q6–Q8, monitoring and forecasting (BMF) comprised Q9–Q11, change control and corrective response (BCCR) comprised Q12–Q14, and perceived project success (PPS) comprised Q15–Q20. The formulas below make the calculations explicit.

These pre-specified composite-scoring rules were applied consistently across descriptive, reliability, correlation and regression analyses. A score of 3.60, for example, is interpreted as an average response between neutral and agree on the original five-point scale. No respondent-level identifiers were included in the processed analysis file, preserving the anonymous character of the survey.

Key survey questions: visual overview

Before presenting the composite tests, three key questionnaire items are shown as simple response-distribution charts. They illustrate the employee experience behind the numerical analysis: the quality of estimate information, the updating of final-cost forecasts, and the assessment of cost effects before approval of change. The charts show percentages of the 100 valid respondents. They are descriptive visual summaries, not additional hypothesis tests.

Estimate information and assumptions

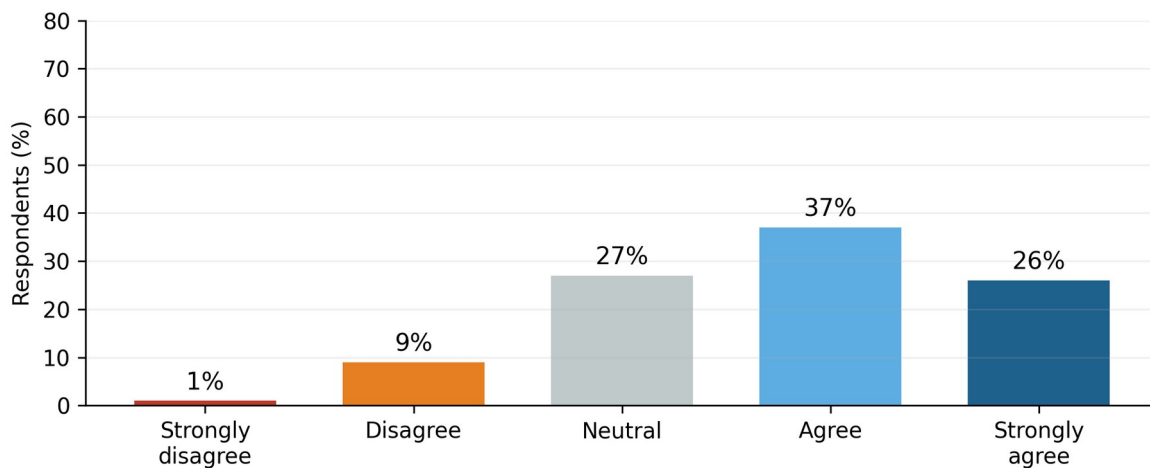


Figure 4.1. Responses to Q7: project cost estimates were based on realistic, current information and clearly stated assumptions.

Sixty-three percent of respondents agreed or strongly agreed with this statement, compared with 10% who disagreed or strongly disagreed. The result gives a direct visual basis for the positive planning-quality result: many respondents experienced estimates as using current information, although the distribution also shows that this practice was not universal.

Forecast updating when conditions change

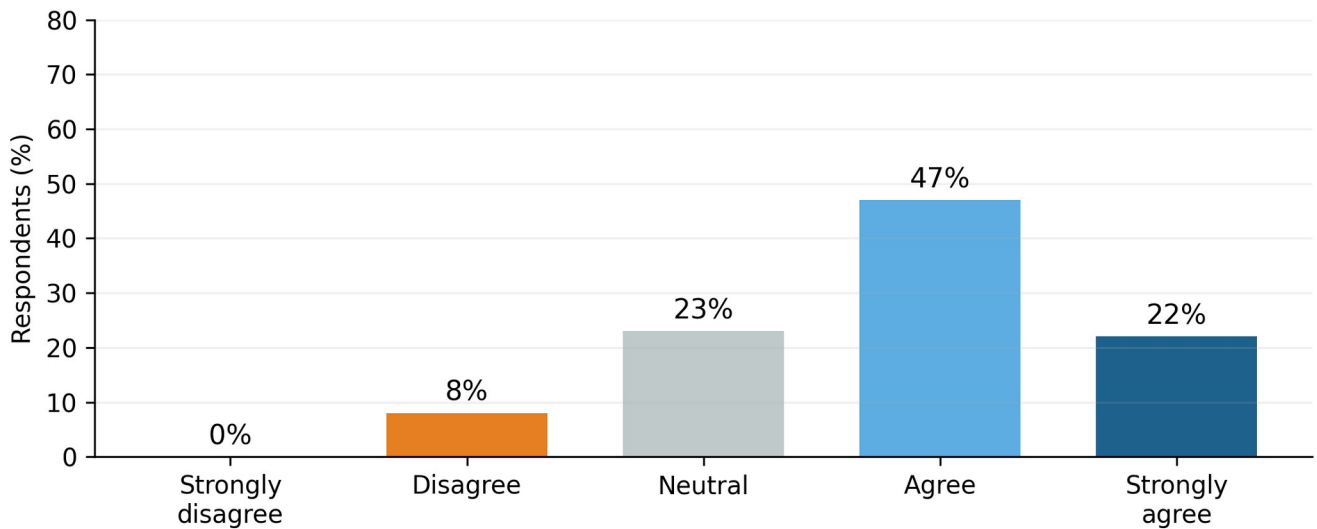


Figure 4.2. Responses to Q11: the forecast of final project cost was updated when significant new information or cost variance emerged.

This was the most positively rated predictor item. Sixty-nine percent agreed or strongly agreed, while 8% disagreed or strongly disagreed. The pattern supports the later finding that monitoring and forecasting were strongly associated with perceived project success.

Pre-approval evaluation of change cost effects

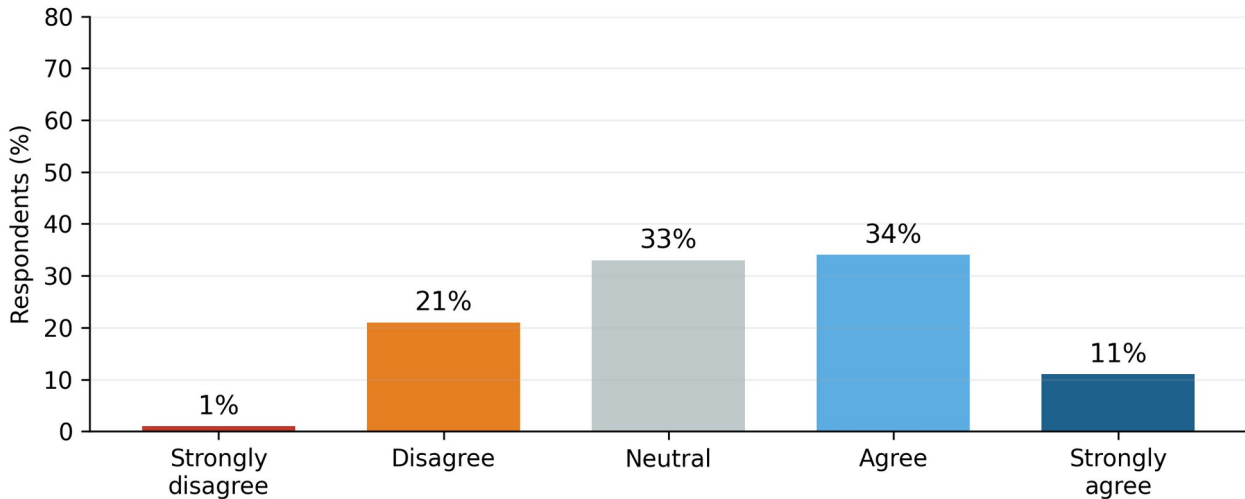


Figure 4.3. Responses to Q12: the potential cost effects of proposed project changes were evaluated before approval.

Only 45% agreed or strongly agreed with this statement, while 22% disagreed or strongly disagreed. This makes pre-approval cost evaluation a clear practical improvement area, even though the wider change-control construct was positively associated with perceived project success.

4.3 Respondent Profile and Project Context

The sample included employees at multiple organizational levels, directly addressing the study's practical constraint that higher-level managers alone would be difficult to reach. Fifty-five respondents were categorized as non-managerial and 45 as managerial for the planned group test. The raw job-level distribution was broader: 13 front-line or operational employees, 21 technical or professional employees, 21 project coordinators or administrative-support employees, 16 supervisors or team leaders, 26 project or department managers and three senior managers or executives. This distribution does not claim representativeness of Saudi employment generally; it shows that the study captured project observers with differing proximity to formal decisions and daily execution.

Job level	n	%	Analytic grouping
Front-line or operational employee	13	13	Non-managerial
Technical or professional employee	21	21	Non-managerial
Project coordinator/administrative support	21	21	Non-managerial
Supervisor or team leader	16	16	Managerial
Project manager/department manager	26	26	Managerial
Senior manager or executive	3	3	Managerial

Table 4.2. Reported job levels and grouping used for the Welch comparison

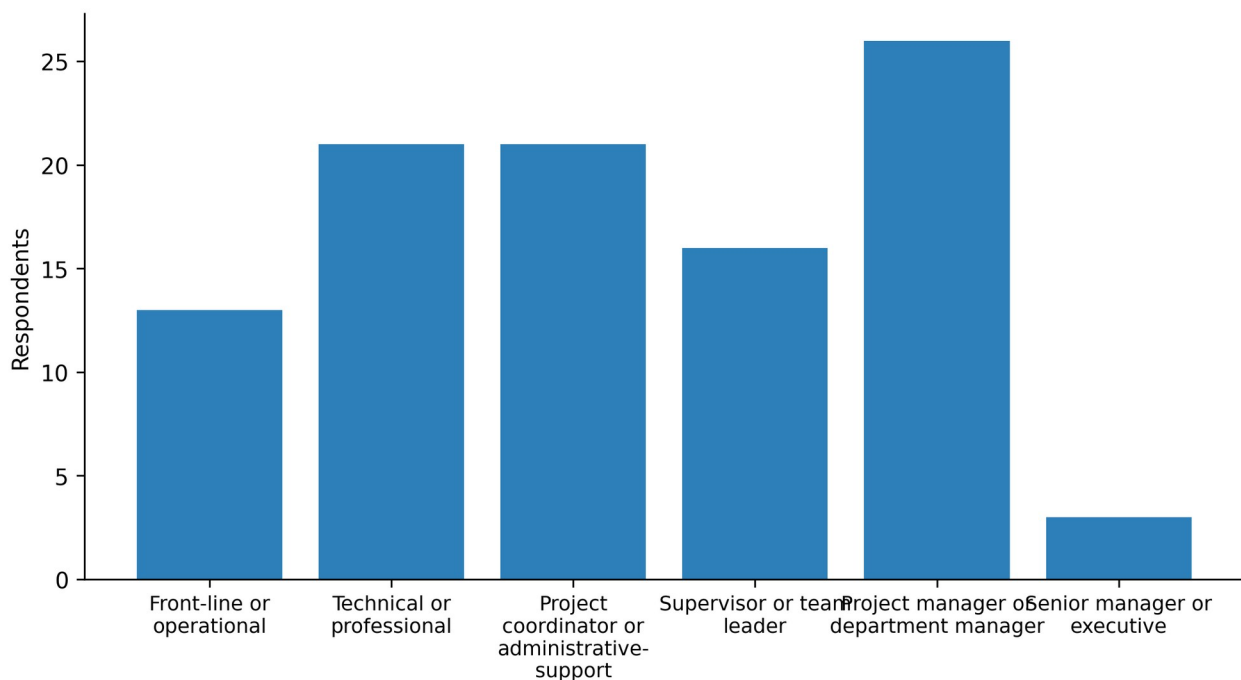


Figure 4.4. Distribution of survey respondents by reported job level.

Construction or engineering accounted for 25% of respondents and manufacturing or industrial operations for 19%. Information and communication technology represented 13%, government or public sector 12%, energy or utilities 10%, financial or professional services

10%, healthcare 9% and other sectors 2%. The sector mix is important when interpreting the results. Much Saudi project-cost literature focuses on construction and infrastructure, whereas the present sample also includes settings where projects may have different procurement arrangements, information systems and success criteria. The study therefore contributes broad practice evidence, while avoiding a claim that one sector's conditions apply unchanged to another.

The inclusion of non-managerial respondents has methodological value. Employees responsible for coordination, technical work, purchase processing, records and operational delivery may observe the timeliness of information and the communication of change even when they cannot access final accounts. The questionnaire was designed around these observable routines rather than asking every respondent to report confidential budget variance. This approach reflects the distinction in Chapter Two between a perception of implemented control practices and an audit of project financial performance. It also explains why the findings are framed as perceived project success and not as independently verified cost accuracy.

4.4 Reliability and Overall Construct Results

Cronbach's alpha was calculated for each multi-item scale as a check of internal consistency. Alpha estimates the extent to which items intended to measure the same construct covary within the sample. The calculation can be expressed as follows, where k is the number of items, σ_j^2 is the variance of item j , and σ^2_{total} is the variance of the combined scale.

The resulting coefficients ranged from .730 to .893. BMF was at the conventional acceptable threshold, while BPEQ and BCCR were above it and PPS was strong. Reliability does not prove validity: a consistent set of questions could still omit an important dimension. However, together with the item wording derived from the literature review and the pre-testing procedures described in Chapter Three, the results provide sufficient support to use the composite scales in the planned analysis. The values are especially reasonable for concise three-item practice scales designed to preserve respondent completion in an online survey.

Construct	Items	Cronbach's α	Mean	SD	95% confidence interval
Budget planning and estimation quality (BPEQ)	3	.750	3.63	.80	3.47 to 3.79
Budget monitoring and forecasting (BMF)	3	.730	3.73	.70	3.59 to 3.87
Change control and corrective response (BCCR)	3	.776	3.58	.83	3.41 to 3.74
Perceived project success (PPS)	6	.893	3.60	.85	3.43 to 3.77

Table 4.3. Reliability and descriptive statistics for the composite constructs

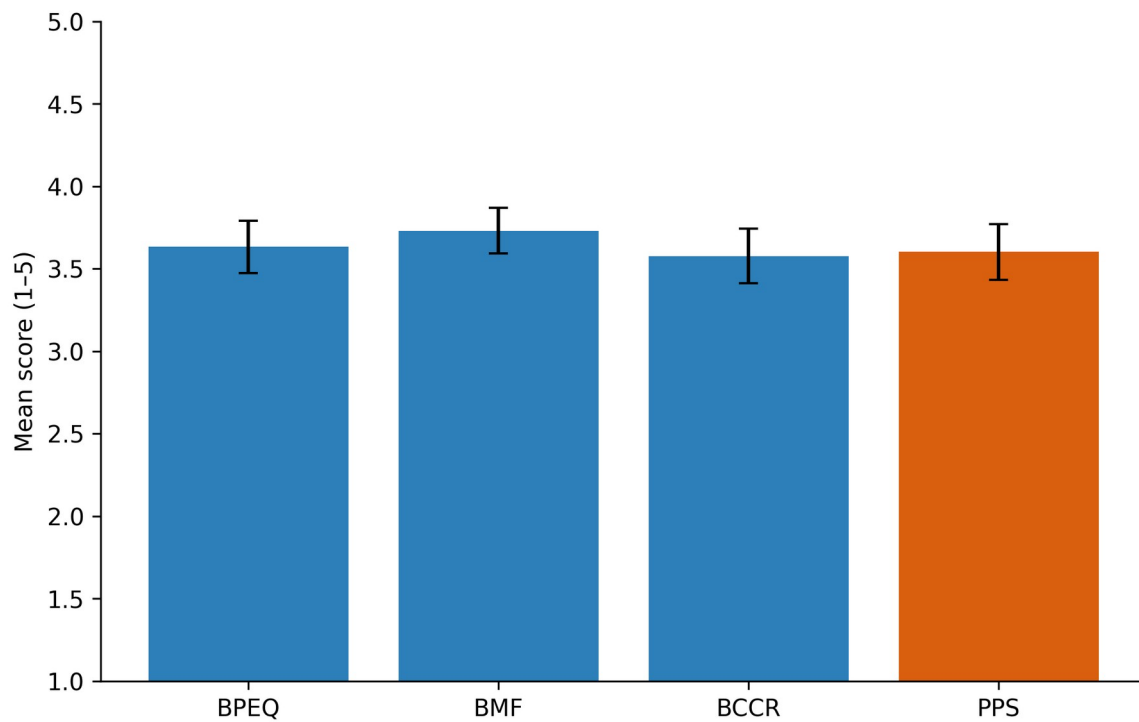


Figure 4.5. Mean construct scores with 95% confidence intervals.

BMF had the highest mean (3.73), indicating that respondents were comparatively positive about the prompt recording of commitments and actual expenditure, regular comparison with the approved baseline and forecast updates when material information emerged. BCCR had the lowest mean (3.58), although it remained above the scale midpoint. This modest difference is substantively plausible: monitoring routines may be visible and recurring, while formal approval, documentation, communication and corrective action depend on authority boundaries and can be more unevenly experienced. The confidence intervals overlap, so the mean ordering is descriptive rather than a test that one construct is definitively higher than another.

4.5 Budget Planning and Estimate Quality in Practice

Composite scores provide a concise measure, but item-level reporting reveals what respondents experienced within each dimension. The BPEQ items addressed whether the approved budget had a clearly defined scope base, whether estimates used realistic current information and explicit assumptions, and whether the budget included appropriate allowances for identified risk and uncertainty. The item means were 3.56, 3.78 and 3.56, respectively. Thus, realistic current information and assumptions received the highest endorsement, while scope clarity and risk allowance were more mixed. This pattern reinforces the literature review's argument that a budget cannot be judged by its total alone; the provenance and uncertainty of the number matter.

Item	Mean	SD	Agree/strongly agree	Disagree/strongly disagree
Q6: Budget based on clearly defined scope/work requirements	3.56	1.01	52%	14%
Q7: Estimates used realistic current information and assumptions	3.78	.97	63%	10%
Q8: Budget included appropriate risk/uncertainty allowances	3.56	.96	53%	12%

Table 4.4. Item-level descriptive results for budget planning and estimation quality

The Q6 result shows that just over half of the respondents agreed that the approved budget rested on clearly defined scope and work requirements, while 14% disagreed. The finding should not be read as evidence that the remaining respondents experienced defective projects; some may have worked on legitimate rolling-wave or exploratory projects where details evolved. Nevertheless, a mean of 3.56 indicates room to improve the explicit translation of scope into a cost baseline. This interpretation is consistent with Flyvbjerg, Holm and Buhl (2002) and Ahiaga-Dagbui and Smith (2014), who show that apparent numerical accuracy is vulnerable when underlying scope, assumptions and judgement are weak or insufficiently visible.

Q7 was the strongest planning item, with 63% agreeing or strongly agreeing that estimates were based on realistic, current information and clearly stated assumptions. This is encouraging because current rates and transparent assumptions are a practical foundation for later forecast comparison. Yet 10% disagreed, and the item standard deviation of .97 demonstrates meaningful variation between respondents. The result therefore supports a nuanced conclusion: many projects were perceived as using credible estimate inputs, but the practice was not universal. Kwon and Kang (2019) distinguish estimate accuracy from precision and emphasize reserve treatment; their work supports the need to examine the informational basis of an estimate rather than infer quality from a single approved total.

Q8 returned to the management of risk and uncertainty. Fifty-three percent agreed that the approved budget contained appropriate allowances, whereas 12% disagreed. The result matters because cost contingency is not simply an arbitrary percentage added to an estimate. It reflects what is known, what remains uncertain, the maturity of scope and the governance of reserve release. The finding is consistent with the Chapter Two discussion of uncertainty: an allowance can improve decision realism, but it can also be misunderstood or silently depleted if it is not linked to risk information and control procedures. In a Saudi cross-sector survey, the present item captures the employee-observable side of this discipline rather than the confidential size of individual reserves.

Taken together, the BPEQ results provide empirical support for the first element of the study's feedback-control lens. Respondents did not report an idealized environment in which all planning conditions were uniformly excellent. Rather, they reported moderately positive practice with identifiable variation in scope definition and risk allowance. That variation becomes important in the correlation and regression analysis because a more credible baseline supplies the reference against which later expenditure, commitments and changes can be interpreted. A budget that is not traceable to scope, current information and uncertainty cannot be fully rescued by later reporting.

4.6 Monitoring, Forecasting and Cost Visibility

The monitoring and forecasting scale assessed the timeliness of recording commitments and actual expenditure, regular comparison with the budget baseline, and updating of the final-cost forecast when significant new information or variance emerged. Its items were the most positively rated of the predictor measures. Their means ranged from 3.65 to 3.83, and the forecast-updating item received the highest mean in the entire predictor set. This provides descriptive evidence that many respondents experienced budget control as a continuing activity rather than a one-time authorization exercise.

Item	Mean	SD	Agree/strongly agree	Disagree/strongly disagree
Q9: Commitments and actual expenditure recorded promptly	3.65	.86	58%	9%
Q10: Cost performance compared regularly with baseline	3.71	.87	56%	6%

Item	Mean	SD	Agree/strongly agree	Disagree/strongly disagree
Q11: Final-cost forecast updated after material information	3.83	.87	69%	8%

Table 4.5. Item-level descriptive results for budget monitoring and forecasting

For Q9, 58% agreed that commitments and actual expenditure were recorded sufficiently promptly. Timeliness is central to the control value of a record: an accurate figure that becomes available after an irreversible procurement or scheduling decision has limited practical value. The 9% disagreement rate and the remaining neutral responses show that information flow was not uniformly experienced. This result supports the argument in the literature review that monitoring should be assessed as a process of obtaining usable feedback, not merely as the existence of financial data. It also reinforces why the questionnaire asked about prompt recording rather than a technical accounting-system name.

Q10 indicates that 56% observed regular comparison between current cost performance and the approved budget or cost baseline, with only 6% disagreeing. Baseline comparison is the bridge between a number created during planning and a decision taken during execution. It can highlight variance, but the presence of a variance does not automatically imply poor performance; a valid interpretation requires awareness of approved changes, timing effects, remaining risk and forecast at completion. The item therefore captures a routine of attention. Bryde, Unterhitzenberger and Joby (2018) emphasize that earned value analysis succeeds only under supporting organizational conditions, a caution that fits the present focus on practice regularity rather than tool adoption alone.

Q11 received the strongest endorsement: 69% agreed or strongly agreed that the final-cost forecast was updated after significant new information or variance. This result is aligned with forecasting research by Batselier and Vanhoucke (2015, 2017), which treats the quality of forward-looking information as dependent on both current performance data and an appropriate forecasting process. The survey does not identify whether a respondent's project used earned value, trend analysis, expert judgement or another method. Its contribution is more fundamental: employees commonly perceived that forecasts were revised when important information changed. In the regression analysis, this continuing information discipline is strongly associated with PPS.

The BMF pattern should nevertheless not be mistaken for a claim of perfectly accurate forecasts. A forecast can be updated frequently yet remain biased if scope, productivity, pricing or risk assumptions are wrong. Conversely, a stable forecast may be credible when the underlying work is stable. The results therefore support the availability and updating of management information, not the universal superiority of a particular technical method. Their strength lies in showing that the practical routines emphasized in the literature are visible to employees across the sample and are related to their assessment of project success.

4.7 Change Governance and Corrective Action

The BCCR scale examined whether proposed changes had their cost effect evaluated before approval, whether approved revisions and decisions were documented and communicated, and whether responsible personnel took timely corrective action after a variance was identified. The item means ranged from 3.33 to 3.71. Q12, concerning pre-approval evaluation of cost effects, was the lowest scoring item among the three predictors. This result deserves detailed attention because it suggests that formal change discipline may be the point at which some projects experience the greatest inconsistency.

Item	Mean	SD	Agree/strongly agree	Disagree/strongly disagree
Q12: Cost effects evaluated before proposed change approval	3.33	.97	45%	22%
Q13: Approved revisions documented and communicated	3.69	.99	56%	11%
Q14: Timely corrective action after a budget variance	3.71	1.04	62%	14%

Table 4.6. Item-level descriptive results for change control and corrective response

Q12 had a mean of 3.33, with 45% agreement and 22% disagreement. This does not establish that changes were approved without analysis in every case, but it shows that the pre-approval cost evaluation routine was less consistently experienced than the other practices. In many projects, a change can originate in technical need, client request, regulatory requirement or operational circumstance. The management issue is not whether all change should be stopped; it is whether the cost implication is visible before a commitment is made. Love et al. (2017) link change orders to cost performance in public infrastructure, and their evidence supports the need for disciplined evaluation rather than informal accumulation of changes.

Q13 suggests a comparatively stronger experience of documented and communicated approvals: 56% agreed or strongly agreed, while 11% disagreed. Documentation creates a trace between the baseline, the approved change and the revised plan. Communication matters because different project actors may otherwise continue working with different assumptions about scope or available funding. The result supports the governance perspective discussed in Chapter Two. Joslin and Muller (2016) show that governance is associated with project success; although the present scale does not measure all governance structures, it captures concrete moments in which authority and information should become visible.

Q14, with a mean of 3.71 and 62% agreement, indicates that respondents often observed timely corrective action once a variance was identified. Corrective action may involve resequencing work, stopping further commitment, revising a forecast, using authorized contingency, changing a procurement route or escalating a decision. The survey intentionally did not ask respondents to rate a single intervention because the appropriate action depends on the project context. Instead, it measured whether responsible personnel acted in time. This is consistent with Mishakova et al. (2016), who present integrated planning and earned-value information as a basis for control action rather than a passive reporting exercise.

The contrast within BCCR is informative. Corrective action received relatively positive ratings, while pre-approval financial assessment of proposed change was weaker. A plausible qualitative interpretation is that organizations may be capable of reacting after a variance becomes visible but less consistent in preventing unassessed commitments at the change-request stage. This inference is not a causal diagnosis, and the survey cannot identify the responsible function. It does, however, identify a practical improvement opportunity: projects should connect technical change requests to cost assessment, authorization and communication before rather than after expenditure patterns deteriorate.

4.8 Perceived Project Outcomes

PPS was deliberately measured as a multidimensional outcome because project success cannot be reduced to final cost alone. The six items covered intended scope and objectives, schedule performance, budget tolerance, quality or performance standards, stakeholder satisfaction and an overall success assessment. The six item means ranged from 3.42 to 3.73. The highest mean related to final or forecast cost remaining within approved tolerance, while the lowest concerned stakeholder satisfaction. The overall pattern is moderate rather than extreme, which is credible for projects facing normal delivery trade-offs.

Item	Mean	SD	Agree/strongly agree	Disagree/strongly disagree
Q15: Intended scope and objectives achieved	3.72	.95	59%	11%
Q16: Major work within schedule/tolerance	3.52	1.09	54%	18%
Q17: Final/forecast cost within budget tolerance	3.73	1.09	57%	15%
Q18: Quality/performance standards met	3.60	1.06	52%	15%
Q19: Key stakeholders satisfied	3.42	1.03	47%	18%
Q20: Overall project successful	3.62	1.08	58%	15%

Table 4.7. Item-level descriptive results for perceived project success

The scope/objective item (Q15) and the cost-tolerance item (Q17) were relatively positive, with means above 3.70. This finding does not imply that all respondent projects met their original budget perfectly. The questionnaire explicitly referred to final or forecast cost within the approved tolerance, recognizing that authorized revisions and risk allowances may be legitimate parts of control. The result therefore aligns with the literature's broader view of success: cost performance is important, but it is interpreted alongside scope, schedule, quality and stakeholder outcomes rather than in isolation.

Schedule performance (Q16) and stakeholder satisfaction (Q19) were lower than the other success items. Eighteen percent disagreed that major work finished within the planned schedule or approved tolerance, and 18% also disagreed that key stakeholders were satisfied. These two results show why a single financial outcome would have been inadequate. A project can retain cost control while stakeholders experience delay, altered expectations or disruption; conversely, an authorized cost increase may protect quality or benefits. Atkinson (1999), Baccarini (1999), Shenhar et al. (2001) and Davis (2014) each provide conceptual support for this multidimensional and stakeholder-sensitive interpretation of project success.

The overall-success item (Q20) had a mean of 3.62, with 58% agreement. It operates as a global synthesis of the preceding dimensions, while the high alpha of the six-item PPS scale indicates that the items move together reasonably strongly in this sample. The result should still be interpreted cautiously: a global employee judgement is valuable evidence about how success is experienced, but it cannot substitute for independently audited benefit realization or customer data. The study's contribution is therefore to connect observable budget-control routines with the broad success judgement of employees who participated closely enough to observe project practice.

4.9 Relationships Between Budget Practices and Project Success

Pearson correlation analysis was used to examine the direction and strength of bivariate linear relationships between the composite variables. The coefficient is calculated from the covariance of X and Y divided by the product of their standard deviations. A positive coefficient indicates that higher values on one construct tend to occur with higher values on the other; it does not establish that one construct causes the other.

Variable pair	r	p value	Interpretation
BPEQ and PPS	.460	< .001	Moderate positive association
BMF and PPS	.627	< .001	Strong positive association
BCCR and PPS	.509	< .001	Moderate positive association
BPEQ and BMF	.373	< .001	Positive related practices
BPEQ and BCCR	.330	< .001	Positive related practices
BMF and BCCR	.478	< .001	Positive related practices

Table 4.8. Pearson correlations among the composite variables

All three hypotheses concerning bivariate association received initial support. BPEQ correlated positively with PPS ($r = .460, p < .001$), indicating that respondents who perceived clearer scope-based and risk-aware budgeting also tended to report stronger project outcomes. BMF produced the largest correlation with PPS ($r = .627, p < .001$), while BCCR also showed a positive relationship ($r = .509, p < .001$). These effect sizes are meaningful in the context of cross-sectional organizational survey research. They show that the constructs are not merely statistically detectable but practically connected in the experience reported by employees.

The inter-predictor correlations were positive but moderate (.330 to .478). This pattern is theoretically expected. A project team that maintains current cost information and forecasts is also likely to have a clearer basis for evaluating changes; similarly, a credible initial budget makes later comparison more meaningful. The correlations do not collapse the constructs into one identical measure. They instead support the feedback-cycle logic developed in Chapter Two: planning supplies a reference, monitoring supplies updated information and change control supplies the response path. The subsequent regression tests whether each construct contributes after the others are considered simultaneously.

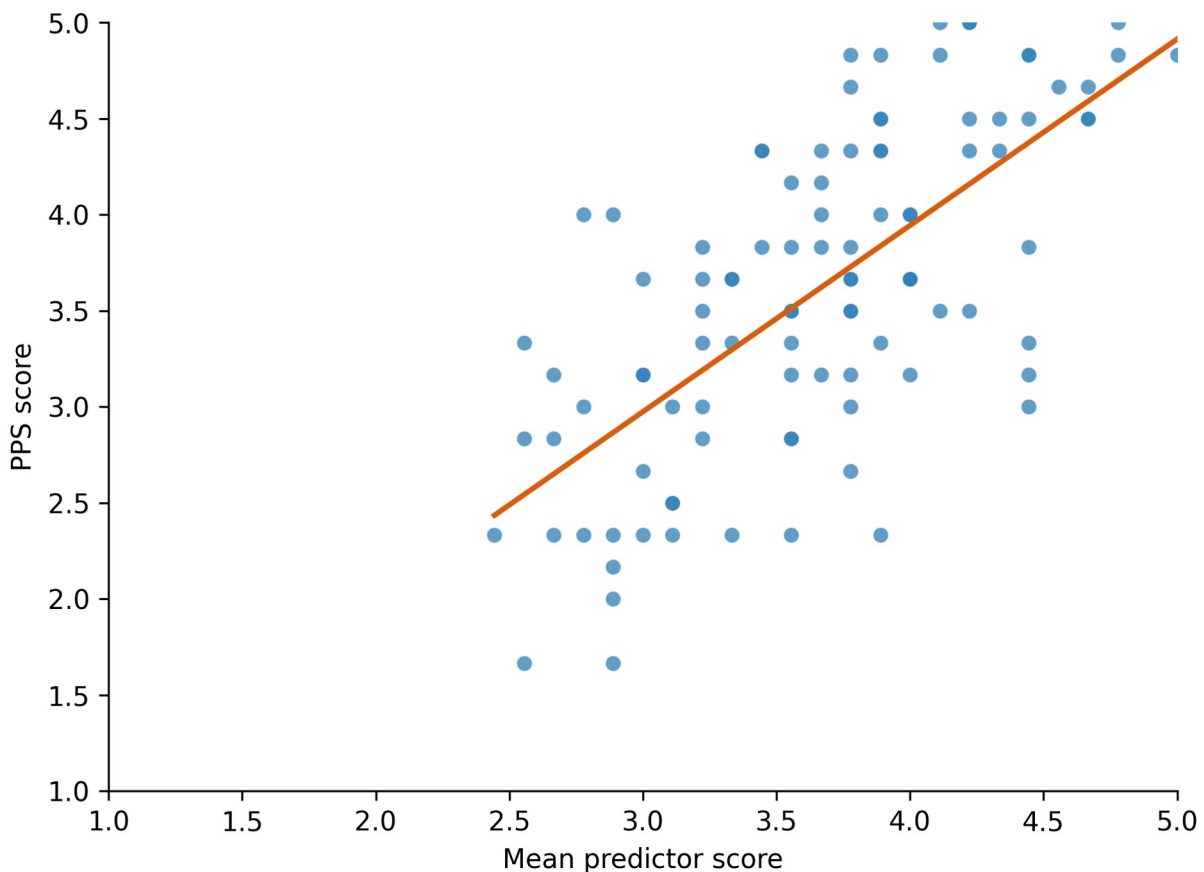


Figure 4.6. Association between the mean budget-practice score and perceived project success.

Combined predictive results

Simultaneous multiple linear regression was used to test the combined model and the three predictor hypotheses. The dependent variable was PPS; the independent variables were BPEQ, BMF and BCCR. The regression equation was specified before results were interpreted as follows.

The model was statistically significant, $F(3, 96) = 30.84, p < .001$. It produced $R^2 = .491$ and adjusted $R^2 = .475$. Thus, the three budget-practice scales jointly accounted for 49.1% of the observed variation in PPS in this sample. The adjusted value remains close to the unadjusted value, indicating that the apparent explanatory power is not primarily an

artefact of adding three predictors to a sample of 100. Cohen's f squared was .964, a large model effect under conventional benchmarks. These statistics provide support for H4 while remaining compatible with the study's non-causal design.

Model statistic	Value	Interpretation
R squared	.491	49.1% of PPS variance explained
Adjusted R squared	.475	Model fit adjusted for predictors/sample
F statistic	30.84	Overall model test
Degrees of freedom	3, 96	Predictors, residual
Model p value	< .001	Model statistically significant
Cohen's f squared	.964	Large model effect

Table 4.9. Overall multiple-regression model predicting perceived project success

Predictor	B	SE	Standardized β	t	p	95% CI for B
Constant	-.067	.388	-	-.17	.864	-.838 to .704
BPEQ	.237	.085	.223	2.79	.006	.068 to .405
BMF	.530	.105	.435	5.06	< .001	.323 to .738
BCCR	.232	.086	.227	2.69	.008	.061 to .403

Table 4.10. Regression coefficients for budget practices predicting perceived project success

H1 was supported. Holding the other two practices constant, a one-point increase in BPEQ was associated with an estimated .237-point increase in PPS ($B = .237$, $p = .006$). H2 was supported and BMF had the largest standardized coefficient ($\beta = .435$, $p < .001$). H3 was supported: BCCR also contributed positively ($B = .232$, $p = .008$). The positive confidence intervals for all three predictors provide the same conclusion as the p values. In the context of the five-point composite scale, the results suggest that planning, continuing information and disciplined response each have a positive relationship with perceived success.

Diagnostic checks did not indicate a material breach of the principal regression assumptions. The Shapiro-Wilk residual test was non-significant ($p = .454$), so the residual distribution did not depart materially from normality. The Breusch-Pagan F-test was non-significant ($p = .205$), providing no evidence of problematic heteroscedasticity. The maximum Cook's distance was .066, well below the conventional value of one, so no single case appeared to dominate the model. Correctly calculated VIF values ranged from 1.20 to 1.39, with tolerances from .72 to .83. These values are well within conventional thresholds and confirm that the moderate inter-predictor correlations did not create a material multicollinearity problem.

Diagnostic	Result	Conclusion
Residual normality	Shapiro-Wilk p = .454	No material departure detected
Heteroscedasticity	Breusch-Pagan F p = .205	No material evidence detected
Influential cases	Maximum Cook's D = .066	No single case dominated model
Collinearity	VIF = 1.20 to 1.39	No material multicollinearity
Tolerance	.72 to .83	Comfortably above .10 threshold

Table 4.11. Regression diagnostic and collinearity checks

4.10 Interpretation of the Main Findings

The support for H1 is consistent with the central argument of the literature review: the approved budget establishes a shared operational reference only when it is grounded in clear scope, realistic information and visible uncertainty. The present coefficient is not a direct test of final-cost accuracy, because respondents were not asked for project accounts. Instead, it shows that employees who recognized these planning conditions also tended to regard their projects as more successful across scope, schedule, cost, quality and stakeholder dimensions. This is a meaningful finding because it connects the technical logic of estimating with the day-to-day organizational experience of project delivery.

The result accords with Flyvbjerg, Holm and Buhl (2002), who demonstrated the consequences of systematic underestimation in major projects, and with Ahiaga-Dagbui and Smith (2014), who argue that cost-estimation shortcomings arise from technical, cognitive and organizational conditions rather than one simple source. The present survey does not replicate their record-based analyses; it complements them by identifying what employees can observe before and during execution. A budget based on unclear work requirements can make later variance difficult to interpret, while a budget that makes assumptions and allowances visible can support a more credible conversation about trade-offs.

The Q7 result gives the most direct practical expression of H1. Respondents were relatively positive that estimates used realistic, current information and clearly stated assumptions. This supports the inference that project teams value estimate transparency. However, the lower Q6 and Q8 means show that scope definition and risk allowance are less consistently experienced. The qualitative implication is not simply to instruct estimators to work harder. Organizations need governance arrangements that record the approved scope version, price basis, exclusions, risk ownership and allowance rationale. Without this information, later forecast updates may appear as unexplained change rather than as a disciplined response to information.

Kwon and Kang (2019) are particularly relevant because they distinguish estimate accuracy from precision and examine the role of reserves. Their work supports the study's treatment of risk allowance as a planning-quality issue rather than a cosmetic contingency percentage. In the Saudi context, where project environments may face procurement, regulatory, market or delivery uncertainty, a transparent allowance can signal mature planning. At the same time, an allowance should not become a substitute for scope clarity or a reservoir used without traceable authorization. The association reported here is therefore best interpreted as evidence for disciplined budget formulation, not for a universal rule that larger contingencies always improve success.

The H1 finding also has a stakeholder dimension. Employees responsible for technical work, procurement, administration or coordination may not create the baseline, but they are affected by the assumptions embedded in it. When scope, rates or risk provisions are unclear, they may receive conflicting instructions or work with outdated limits. When the baseline is communicated clearly, it can align local decisions with project objectives. This interpretation links the planning result to the governance and information-access discussion in Chapter Two.

It also helps explain why the study could obtain useful evidence from lower ranks without requiring them to disclose confidential final accounts.

Monitoring and forecasting

H2 received the strongest empirical support among the three individual predictors. The correlation between BMF and PPS was .627, and its standardized regression coefficient was .435 after planning and change control were considered. This indicates that, within this sample, the practice of recording commitments promptly, comparing cost performance with the baseline and updating forecasts after significant information was particularly closely associated with positive project assessment. The result is compatible with the feedback-control perspective: a baseline has limited value if it is not regularly compared with current conditions and translated into a forward-looking estimate.

The result aligns with Batselier and Vanhoucke (2015, 2017), whose work demonstrates that forecasting quality depends on the use of performance information and appropriate methods. It also aligns with Bryde, Unterhitzenberger and Joby (2018), who stress that earned-value practice depends on organizational conditions rather than automatic technical adoption. The present findings should not be read as evidence that every successful respondent project used earned value or one preferred formula. Instead, they show that employees perceived continuing, timely and responsive information practices, which is the organizational condition that makes any forecasting method useful.

The high Q11 mean offers a more precise interpretation. Most respondents agreed that a final-cost forecast was updated when material new information or cost variance emerged. This routine matters because decision makers cannot manage a completed cost variance; they need an estimate of the remaining exposure. A refreshed forecast can prompt action while options remain open, whereas a historical report can merely record a problem after commitment. The result therefore gives practical content to the general claim that monitoring helps project success. It is the conversion of current evidence into a revised expectation, not the mechanical production of a report, that employees appear to associate with better outcomes.

The discussion also needs restraint. A positive association can arise partly because well-run organizations possess both stronger monitoring routines and other unmeasured capabilities, such as competent leadership, supplier relationships, systems integration or organizational learning. The regression model explains a substantial proportion of PPS but not all of it. The present study cannot isolate every alternative explanation. Its contribution is narrower and defensible: in the observed Saudi employee sample, monitoring and forecasting practices were strongly and positively related to perceived project success, even after the other two budget-practice dimensions were considered.

For practice, the result suggests that organizations should focus on the usability of information. Prompt entry of commitments, a regularly maintained cost baseline and a clearly owned forecast-at-completion process may be more valuable than a sophisticated dashboard that is not trusted or acted upon. Managers should also communicate forecast implications to employees who influence purchasing, progress data, technical changes and corrective actions. This recommendation follows directly from the item wording and does not require the thesis to prescribe one software platform or reporting frequency across every sector.

Change control and corrective response

H3 was supported: BCCR had a positive correlation with PPS and remained significant in the simultaneous regression. The result supports the view that change should be governed rather than automatically resisted. Projects may need to change because of client requirements, technical discovery, regulation, safety, price movements or external disruption. The critical question is whether the financial consequence is evaluated before commitment, the authorization is documented and communicated, and responsible personnel act once a variance becomes visible. The present data indicate that employees who observed these routines tended to perceive better project outcomes.

The descriptive pattern adds important nuance. Q12, pre-approval evaluation of cost effects, was the lowest-rated predictor item, whereas Q14, timely corrective action after variance identification, was relatively high. This suggests a possible gap between preventive and reactive practice. Some project environments may mobilize effectively once a cost issue has become apparent but still allow scope or technical change to progress before its full financial implication is assessed. The data do not establish why this happens, but they identify a credible management risk: corrective action can be more costly and constrained after commitment than preventive evaluation before approval.

This interpretation resonates with Love et al. (2017), whose work connects change orders and cost performance, and with Mishakova et al. (2016), who demonstrate the value of integrated control information. The literature does not support treating every change as failure; authorized change can preserve quality, safety, stakeholder value or long-term benefits. The relevant control principle is traceability. A project should distinguish a legitimate authorized revision from unrecorded scope growth, ordinary inefficiency or the drawdown of an approved risk reserve. The BCCR findings support this principle at the level of employee-observed practice.

The Q13 result on documentation and communication further emphasizes that authority alone is insufficient. A sponsor may approve a change, but employees responsible for work packages, procurement or reporting need to know the revised baseline and decision rationale. Otherwise, cost and schedule reports can compare incompatible versions of the plan. This is where the change-control finding connects to the study's broader success measure: documentation can reduce ambiguity, while communication can improve coordinated execution and stakeholder confidence. The relationship with PPS is therefore theoretically coherent even though the survey does not identify every formal governance mechanism.

The practical recommendation arising from H3 is a simple but demanding control gate. Before a change progresses, the responsible team should identify the scope effect, estimate the cost and schedule implication, state the source of funding or reserve, identify the approving authority and communicate the decision to affected roles. After approval, the cost baseline and forecast should be updated. This chain connects the planning, monitoring and response dimensions tested by the study and is more useful than a generic instruction to 'control costs'.

Combined explanatory effect

H4 was supported by the significant overall regression model. The model's R squared of .491 is substantial for a cross-sectional survey of perceived organizational practices, but it should not be overstated. It means that the three measured budget-practice constructs are collectively associated with almost half of the observed variation in PPS in this sample. It does not mean that budget control determines 49.1% of project success in a causal or universal sense. Unmeasured factors such as project complexity, leadership, client behavior, procurement conditions, technology, contract arrangements and external shocks may influence both practices and outcomes.

The absence of material multicollinearity is an important result. The predictor correlations were positive, as theory would expect, but VIF values of 1.20 to 1.39 confirm that the three constructs retained adequate statistical distinction in the regression. This supports the study's decision to separate the baseline, monitoring and response dimensions instead of reducing them prematurely to one undifferentiated 'budget management' score. Conceptually, the results show an integrated system; statistically, they show that each part retains an observable positive contribution within the model.

The coefficients should be interpreted in relation to their measurement. BPEQ captures the credibility of the original reference, BMF captures continuing information and revised expectation, and BCCR captures the evaluation and action path. A project can be weak at any one point: accurate initial planning without timely records can fail to reveal deterioration; frequent monitoring without authority to manage change can become passive reporting;

reactive action without a credible baseline can be poorly targeted. The findings therefore support the feedback-control lens developed in Chapter Two more directly than a narrow numerical-accuracy explanation.

This integrated interpretation has relevance for Saudi organizations across sectors. The literature reviewed in Chapter Two shows that cost and schedule issues are prominent in Saudi construction, infrastructure and industrial settings, but the survey sample also included ICT, healthcare, government, energy and professional services. The common denominator is not a particular industry cost code or contract type. It is the organizational capacity to establish a credible reference, recognize changed conditions and respond through authorized action. The study's cross-sector design is well suited to that process-level conclusion, although sector-specific causal claims would require larger stratified samples.

Employee and managerial perspectives

The fifth hypothesis predicted a difference in PPS between managerial and non-managerial respondents. Welch's independent-samples t-test was used because it does not assume equal variances between the two groups. The test statistic can be expressed as the difference in group means divided by the standard error of that difference. The result was not statistically significant: non-managerial respondents reported $M = 3.68$ ($SD = .79$, $n = 55$), managerial respondents reported $M = 3.51$ ($SD = .92$, $n = 45$), $t(87.37) = .99$, $p = .325$, with a mean difference of .17 and a 95% confidence interval of approximately $-.18$ to $.52$. The effect size was small (Hedges' $g = -.20$ when expressed as managerial minus non-managerial). H5 was therefore not supported.

Group	n	Mean PPS	SD	Welch test result
Non-managerial	55	3.68	.79	$t(87.37) = .99$, $p = .325$
Managerial	45	3.51	.92	Hedges' $g = -.20$ (managerial – non-managerial)

Table 4.12. Perceived project success by broad job-level group

The absence of a significant difference should not be misread as evidence that managers and non-managers have identical access to information or responsibility. The literature, particularly Davis (2014), shows that stakeholder groups can judge success through different criteria. The present result only means that the broad global PPS measure did not differ enough between the two pre-specified groups to reject the null hypothesis in a sample of 100. Employees at different levels may still differ on specific aspects such as scope clarity, communication or schedule pressure, but those were not the planned hypotheses and should be examined in future research with appropriate design and statistical controls.

One interpretation is that the study's focus on observable practices enabled respondents across ranks to form similar broad assessments. A technical employee may observe whether expenditure is recorded and whether a variance prompts action; a project manager may observe the same process from a different decision level. Another interpretation is that project success is a shared organizational experience when outcomes are visible to the team. The result supports the methodological decision to include lower ranks, because their responses did not create an obviously incompatible outcome pattern. However, it does not remove the need for future multi-informant designs that compare perceptions within the same project.

4.11 Integrated Discussion and Practical Meaning

This section deepens the interpretation of the statistical findings by returning to the concrete practices captured in the questionnaire. Quantitative results identify patterns of association and average response, but management action requires understanding what those patterns mean in the work of preparing, controlling and revising a project budget. The interpretation is structured around twelve practical themes that connect individual items, composite results, the feedback-control framework and the literature reviewed in Chapter

Two. These themes are not additional hypothesis tests. They are an evidence-informed explanation of how the supported relationships may operate in project settings.

Scope Definition as the Starting Point of Control

The result for Q6, which measured scope-based budget formation, had a mean of 3.56 on the five-point scale. 52% of respondents selected agree or strongly agree, whereas 14% selected disagree or strongly disagree. This distribution is neither a claim of uniform excellence nor a sign of universal failure. It indicates that the practice was present for many respondents but unevenly experienced across the projects represented in the sample. The dispersion in the item responses is analytically valuable because it supplies the variation needed to examine why some respondents associated their project environment with stronger success outcomes than others.

The operational meaning of scope definition lies in a stable link between the authorized work breakdown and the budget baseline. Respondents did not need access to confidential contract values to judge whether this practice was visible in their project. Their answers therefore provide employee-level evidence about the quality of the management process, not an audit opinion on the numerical accuracy of final accounts. This distinction is central to interpreting the result without overstating what the survey measured.

The evidence base helps explain why the item matters. Flyvbjerg, Holm and Buhl (2002) and Ahiaga-Dagbui and Smith (2014) show, in different settings, that project outcomes depend on the quality of information, treatment of uncertainty, governance and response. Those studies do not prove that the same mechanism operated identically in every Saudi response. They do, however, support the theoretical expectation that stronger scope definition should accompany more credible control and more positive assessments of delivery.

For management, the finding points to a concrete review: record scope inclusions, exclusions, quantities and approval dates. Weak performance on this practice may originate in unclear ownership, unavailable data, fragmented systems, time pressure or poor communication; the survey cannot determine which cause applied to each respondent. The result is therefore best used to identify where a project should investigate its process rather than to prescribe one remedy without diagnosis.

Within the statistical model, this item contributed to the broader BPEQ construct. Its result should not be interpreted as a guaranteed change in PPS from improving one question in isolation. Project controls operate as a connected cycle: planning creates the reference point, monitoring updates knowledge, change control authorizes response and outcome measures capture the resulting delivery experience. The regression estimates average conditional associations across that system, not a mechanical one-item effect.

Application also depends on context: engineering scope packages, digital backlogs and service-process deliverables require different levels of documentation. The cross-sector Saudi sample supports a general principle of credible, timely and visible control, but not a single workflow for every organization. Sector-specific research using larger samples, objective project records and multiple informants would be needed to translate this principle into detailed thresholds and causal performance standards.

Current Information and Estimate Credibility

The result for Q7, which measured realistic current information and stated assumptions, had a mean of 3.78 on the five-point scale. 63% of respondents selected agree or strongly agree, whereas 10% selected disagree or strongly disagree. This distribution is neither a claim of uniform excellence nor a sign of universal failure. It indicates that the practice was present for many respondents but unevenly experienced across the projects represented in the sample. The dispersion in the item responses is analytically valuable because it supplies the variation needed to examine why some respondents associated their project environment with stronger success outcomes than others.

The operational meaning of current information and stated assumptions lies in rates, quantities, productivity expectations and external conditions that can be traced to their source. Respondents did not need access to confidential contract values to judge whether this practice was visible in their project. Their answers therefore provide employee-level evidence about the quality of the management process, not an audit opinion on the numerical accuracy of final accounts. This distinction is central to interpreting the result without overstating what the survey measured.

The evidence base helps explain why the item matters. Kwon and Kang (2019) and Zwikael and Globerson (2006) show, in different settings, that project outcomes depend on the quality of information, treatment of uncertainty, governance and response. Those studies do not prove that the same mechanism operated identically in every Saudi response. They do, however, support the theoretical expectation that stronger current information and stated assumptions should accompany more credible control and more positive assessments of delivery.

For management, the finding points to a concrete review: date the estimate basis, identify data owners and record material assumptions. Weak performance on this practice may originate in unclear ownership, unavailable data, fragmented systems, time pressure or poor communication; the survey cannot determine which cause applied to each respondent. The result is therefore best used to identify where a project should investigate its process rather than to prescribe one remedy without diagnosis.

Within the statistical model, this item contributed to the broader BPEQ construct. Its result should not be interpreted as a guaranteed change in PPS from improving one question in isolation. Project controls operate as a connected cycle: planning creates the reference point, monitoring updates knowledge, change control authorizes response and outcome measures capture the resulting delivery experience. The regression estimates average conditional associations across that system, not a mechanical one-item effect.

Application also depends on context: inflation-sensitive construction estimates and fast-changing technology estimates require different update cycles. The cross-sector Saudi sample supports a general principle of credible, timely and visible control, but not a single workflow for every organization. Sector-specific research using larger samples, objective project records and multiple informants would be needed to translate this principle into detailed thresholds and causal performance standards.

Risk Allowance and Honest Uncertainty

The result for Q8, which measured risk and uncertainty allowance, had a mean of 3.56 on the five-point scale. 53% of respondents selected agree or strongly agree, whereas 12% selected disagree or strongly disagree. This distribution is neither a claim of uniform excellence nor a sign of universal failure. It indicates that the practice was present for many respondents but unevenly experienced across the projects represented in the sample. The dispersion in the item responses is analytically valuable because it supplies the variation needed to examine why some respondents associated their project environment with stronger success outcomes than others.

The operational meaning of risk and uncertainty allowance lies in explicit treatment of identified threats and residual uncertainty without disguising uncertainty as precision. Respondents did not need access to confidential contract values to judge whether this practice was visible in their project. Their answers therefore provide employee-level evidence about the quality of the management process, not an audit opinion on the numerical accuracy of final accounts. This distinction is central to interpreting the result without overstating what the survey measured.

The evidence base helps explain why the item matters. Kwon and Kang (2019) and Eldosouky, Ibrahim and Mohammed (2014) show, in different settings, that project outcomes depend on the quality of information, treatment of uncertainty, governance and response.

Those studies do not prove that the same mechanism operated identically in every Saudi response. They do, however, support the theoretical expectation that stronger risk and uncertainty allowance should accompany more credible control and more positive assessments of delivery.

For management, the finding points to a concrete review: link allowances to named risks, ownership rules, drawdown authority and review dates. Weak performance on this practice may originate in unclear ownership, unavailable data, fragmented systems, time pressure or poor communication; the survey cannot determine which cause applied to each respondent. The result is therefore best used to identify where a project should investigate its process rather than to prescribe one remedy without diagnosis.

Within the statistical model, this item contributed to the broader BPEQ construct. Its result should not be interpreted as a guaranteed change in PPS from improving one question in isolation. Project controls operate as a connected cycle: planning creates the reference point, monitoring updates knowledge, change control authorizes response and outcome measures capture the resulting delivery experience. The regression estimates average conditional associations across that system, not a mechanical one-item effect.

Application also depends on context: contingency governance should reflect project scale, contract structure and the organization's risk appetite. The cross-sector Saudi sample supports a general principle of credible, timely and visible control, but not a single workflow for every organization. Sector-specific research using larger samples, objective project records and multiple informants would be needed to translate this principle into detailed thresholds and causal performance standards.

Timely Recording of Commitments

The result for Q9, which measured prompt recording of commitments and actual expenditure, had a mean of 3.65 on the five-point scale. 58% of respondents selected agree or strongly agree, whereas 9% selected disagree or strongly disagree. This distribution is neither a claim of uniform excellence nor a sign of universal failure. It indicates that the practice was present for many respondents but unevenly experienced across the projects represented in the sample. The dispersion in the item responses is analytically valuable because it supplies the variation needed to examine why some respondents associated their project environment with stronger success outcomes than others.

The operational meaning of prompt recording of commitments and expenditure lies in cost information becoming visible before procurement and delivery decisions are irreversible. Respondents did not need access to confidential contract values to judge whether this practice was visible in their project. Their answers therefore provide employee-level evidence about the quality of the management process, not an audit opinion on the numerical accuracy of final accounts. This distinction is central to interpreting the result without overstating what the survey measured.

The evidence base helps explain why the item matters. Bryde, Unterhitzenberger and Joby (2018) and Ouchi (1979) show, in different settings, that project outcomes depend on the quality of information, treatment of uncertainty, governance and response. Those studies do not prove that the same mechanism operated identically in every Saudi response. They do, however, support the theoretical expectation that stronger prompt recording of commitments and expenditure should accompany more credible control and more positive assessments of delivery.

For management, the finding points to a concrete review: define cut-off times, integrate purchase commitments and assign responsibility for late entries. Weak performance on this practice may originate in unclear ownership, unavailable data, fragmented systems, time pressure or poor communication; the survey cannot determine which cause applied to each respondent. The result is therefore best used to identify where a project should investigate its process rather than to prescribe one remedy without diagnosis.

Within the statistical model, this item contributed to the broader BMF construct. Its result should not be interpreted as a guaranteed change in PPS from improving one question in isolation. Project controls operate as a connected cycle: planning creates the reference point, monitoring updates knowledge, change control authorizes response and outcome measures capture the resulting delivery experience. The regression estimates average conditional associations across that system, not a mechanical one-item effect.

Application also depends on context: high-volume procurement projects may need system integration, while smaller projects may rely on disciplined spreadsheet controls. The cross-sector Saudi sample supports a general principle of credible, timely and visible control, but not a single workflow for every organization. Sector-specific research using larger samples, objective project records and multiple informants would be needed to translate this principle into detailed thresholds and causal performance standards.

Baseline Comparison as Organizational Attention

The result for Q10, which measured regular comparison with the approved baseline, had a mean of 3.71 on the five-point scale. 56% of respondents selected agree or strongly agree, whereas 6% selected disagree or strongly disagree. This distribution is neither a claim of uniform excellence nor a sign of universal failure. It indicates that the practice was present for many respondents but unevenly experienced across the projects represented in the sample. The dispersion in the item responses is analytically valuable because it supplies the variation needed to examine why some respondents associated their project environment with stronger success outcomes than others.

The operational meaning of regular baseline comparison lies in periodic comparison of actual and committed cost against the currently authorized baseline. Respondents did not need access to confidential contract values to judge whether this practice was visible in their project. Their answers therefore provide employee-level evidence about the quality of the management process, not an audit opinion on the numerical accuracy of final accounts. This distinction is central to interpreting the result without overstating what the survey measured.

The evidence base helps explain why the item matters. Vanhoucke and Vandevoorde (2007) and Bryde et al. (2018) show, in different settings, that project outcomes depend on the quality of information, treatment of uncertainty, governance and response. Those studies do not prove that the same mechanism operated identically in every Saudi response. They do, however, support the theoretical expectation that stronger regular baseline comparison should accompany more credible control and more positive assessments of delivery.

For management, the finding points to a concrete review: agree a review rhythm, reconcile approved changes and explain material variances. Weak performance on this practice may originate in unclear ownership, unavailable data, fragmented systems, time pressure or poor communication; the survey cannot determine which cause applied to each respondent. The result is therefore best used to identify where a project should investigate its process rather than to prescribe one remedy without diagnosis.

Within the statistical model, this item contributed to the broader BMF construct. Its result should not be interpreted as a guaranteed change in PPS from improving one question in isolation. Project controls operate as a connected cycle: planning creates the reference point, monitoring updates knowledge, change control authorizes response and outcome measures capture the resulting delivery experience. The regression estimates average conditional associations across that system, not a mechanical one-item effect.

Application also depends on context: comparison frequency should follow decision speed and risk rather than a universal monthly rule. The cross-sector Saudi sample supports a general principle of credible, timely and visible control, but not a single workflow for every organization. Sector-specific research using larger samples, objective project records and multiple informants would be needed to translate this principle into detailed thresholds and causal performance standards.

Updating the Forecast of Final Cost

The result for Q11, which measured forecast revision after material information, had a mean of 3.83 on the five-point scale. 69% of respondents selected agree or strongly agree, whereas 8% selected disagree or strongly disagree. This distribution is neither a claim of uniform excellence nor a sign of universal failure. It indicates that the practice was present for many respondents but unevenly experienced across the projects represented in the sample. The dispersion in the item responses is analytically valuable because it supplies the variation needed to examine why some respondents associated their project environment with stronger success outcomes than others.

The operational meaning of updated final-cost forecasting lies in turning current performance and new information into a forward-looking estimate. Respondents did not need access to confidential contract values to judge whether this practice was visible in their project. Their answers therefore provide employee-level evidence about the quality of the management process, not an audit opinion on the numerical accuracy of final accounts. This distinction is central to interpreting the result without overstating what the survey measured.

The evidence base helps explain why the item matters. Batselier and Vanhoucke (2015, 2017) and Ottaviani and De Marco (2022) show, in different settings, that project outcomes depend on the quality of information, treatment of uncertainty, governance and response. Those studies do not prove that the same mechanism operated identically in every Saudi response. They do, however, support the theoretical expectation that stronger updated final-cost forecasting should accompany more credible control and more positive assessments of delivery.

For management, the finding points to a concrete review: assign forecast ownership, document assumptions and refresh the estimate after material change. Weak performance on this practice may originate in unclear ownership, unavailable data, fragmented systems, time pressure or poor communication; the survey cannot determine which cause applied to each respondent. The result is therefore best used to identify where a project should investigate its process rather than to prescribe one remedy without diagnosis.

Within the statistical model, this item contributed to the broader BMF construct. Its result should not be interpreted as a guaranteed change in PPS from improving one question in isolation. Project controls operate as a connected cycle: planning creates the reference point, monitoring updates knowledge, change control authorizes response and outcome measures capture the resulting delivery experience. The regression estimates average conditional associations across that system, not a mechanical one-item effect.

Application also depends on context: the appropriate forecast method may range from expert judgement to EVM or regression depending on data maturity. The cross-sector Saudi sample supports a general principle of credible, timely and visible control, but not a single workflow for every organization. Sector-specific research using larger samples, objective project records and multiple informants would be needed to translate this principle into detailed thresholds and causal performance standards.

Evaluating Change Before Commitment

The result for Q12, which measured cost-effect assessment before change approval, had a mean of 3.33 on the five-point scale. 45% of respondents selected agree or strongly agree, whereas 22% selected disagree or strongly disagree. This distribution is neither a claim of uniform excellence nor a sign of universal failure. It indicates that the practice was present for many respondents but unevenly experienced across the projects represented in the sample. The dispersion in the item responses is analytically valuable because it supplies the variation needed to examine why some respondents associated their project environment with stronger success outcomes than others.

The operational meaning of pre-approval evaluation of change cost lies in making financial and schedule consequences visible before a technical or client change becomes a

commitment. Respondents did not need access to confidential contract values to judge whether this practice was visible in their project. Their answers therefore provide employee-level evidence about the quality of the management process, not an audit opinion on the numerical accuracy of final accounts. This distinction is central to interpreting the result without overstating what the survey measured.

The evidence base helps explain why the item matters. Love et al. (2017) and Joslin and Müller (2016) show, in different settings, that project outcomes depend on the quality of information, treatment of uncertainty, governance and response. Those studies do not prove that the same mechanism operated identically in every Saudi response. They do, however, support the theoretical expectation that stronger pre-approval evaluation of change cost should accompany more credible control and more positive assessments of delivery.

For management, the finding points to a concrete review: require a cost-impact note, funding source and approval authority before implementation. Weak performance on this practice may originate in unclear ownership, unavailable data, fragmented systems, time pressure or poor communication; the survey cannot determine which cause applied to each respondent. The result is therefore best used to identify where a project should investigate its process rather than to prescribe one remedy without diagnosis.

Within the statistical model, this item contributed to the broader BCCR construct. Its result should not be interpreted as a guaranteed change in PPS from improving one question in isolation. Project controls operate as a connected cycle: planning creates the reference point, monitoring updates knowledge, change control authorizes response and outcome measures capture the resulting delivery experience. The regression estimates average conditional associations across that system, not a mechanical one-item effect.

Application also depends on context: emergency, regulated and agile settings may require different gates, but each still needs traceable authorization. The cross-sector Saudi sample supports a general principle of credible, timely and visible control, but not a single workflow for every organization. Sector-specific research using larger samples, objective project records and multiple informants would be needed to translate this principle into detailed thresholds and causal performance standards.

Documentation and Communication of Revisions

The result for Q13, which measured documentation and communication of approved revisions, had a mean of 3.69 on the five-point scale. 56% of respondents selected agree or strongly agree, whereas 11% selected disagree or strongly disagree. This distribution is neither a claim of uniform excellence nor a sign of universal failure. It indicates that the practice was present for many respondents but unevenly experienced across the projects represented in the sample. The dispersion in the item responses is analytically valuable because it supplies the variation needed to examine why some respondents associated their project environment with stronger success outcomes than others.

The operational meaning of documentation and communication of revisions lies in ensuring that teams work from the same authorized scope, budget and forecast after a decision. Respondents did not need access to confidential contract values to judge whether this practice was visible in their project. Their answers therefore provide employee-level evidence about the quality of the management process, not an audit opinion on the numerical accuracy of final accounts. This distinction is central to interpreting the result without overstating what the survey measured.

The evidence base helps explain why the item matters. Joslin and Müller (2016) and Ouchi (1979) show, in different settings, that project outcomes depend on the quality of information, treatment of uncertainty, governance and response. Those studies do not prove that the same mechanism operated identically in every Saudi response. They do, however, support the theoretical expectation that stronger documentation and communication of revisions should accompany more credible control and more positive assessments of delivery.

For management, the finding points to a concrete review: maintain a decision log, version the baseline and notify affected work-package owners. Weak performance on this practice may originate in unclear ownership, unavailable data, fragmented systems, time pressure or poor communication; the survey cannot determine which cause applied to each respondent. The result is therefore best used to identify where a project should investigate its process rather than to prescribe one remedy without diagnosis.

Within the statistical model, this item contributed to the broader BCCR construct. Its result should not be interpreted as a guaranteed change in PPS from improving one question in isolation. Project controls operate as a connected cycle: planning creates the reference point, monitoring updates knowledge, change control authorizes response and outcome measures capture the resulting delivery experience. The regression estimates average conditional associations across that system, not a mechanical one-item effect.

Application also depends on context: communication channels can vary, but the revised control position must reach those who commit resources. The cross-sector Saudi sample supports a general principle of credible, timely and visible control, but not a single workflow for every organization. Sector-specific research using larger samples, objective project records and multiple informants would be needed to translate this principle into detailed thresholds and causal performance standards.

Timely Corrective Action

The result for Q14, which measured response after a budget variance is identified, had a mean of 3.71 on the five-point scale. 62% of respondents selected agree or strongly agree, whereas 14% selected disagree or strongly disagree. This distribution is neither a claim of uniform excellence nor a sign of universal failure. It indicates that the practice was present for many respondents but unevenly experienced across the projects represented in the sample. The dispersion in the item responses is analytically valuable because it supplies the variation needed to examine why some respondents associated their project environment with stronger success outcomes than others.

The operational meaning of timely corrective action lies in converting detected variance into a proportionate response while options remain available. Respondents did not need access to confidential contract values to judge whether this practice was visible in their project. Their answers therefore provide employee-level evidence about the quality of the management process, not an audit opinion on the numerical accuracy of final accounts. This distinction is central to interpreting the result without overstating what the survey measured.

The evidence base helps explain why the item matters. Mishakova et al. (2016) and Bryde et al. (2018) show, in different settings, that project outcomes depend on the quality of information, treatment of uncertainty, governance and response. Those studies do not prove that the same mechanism operated identically in every Saudi response. They do, however, support the theoretical expectation that stronger timely corrective action should accompany more credible control and more positive assessments of delivery.

For management, the finding points to a concrete review: set escalation thresholds, decision owners and follow-up dates for corrective measures. Weak performance on this practice may originate in unclear ownership, unavailable data, fragmented systems, time pressure or poor communication; the survey cannot determine which cause applied to each respondent. The result is therefore best used to identify where a project should investigate its process rather than to prescribe one remedy without diagnosis.

Within the statistical model, this item contributed to the broader BCCR construct. Its result should not be interpreted as a guaranteed change in PPS from improving one question in isolation. Project controls operate as a connected cycle: planning creates the reference point, monitoring updates knowledge, change control authorizes response and outcome measures capture the resulting delivery experience. The regression estimates average conditional associations across that system, not a mechanical one-item effect.

Application also depends on context: corrective action can involve resequencing, procurement, contingency use or escalation depending on project conditions. The cross-sector Saudi sample supports a general principle of credible, timely and visible control, but not a single workflow for every organization. Sector-specific research using larger samples, objective project records and multiple informants would be needed to translate this principle into detailed thresholds and causal performance standards.

Scope, Schedule and Cost Outcomes

The result for Q15–Q17, which measured the joint outcome pattern of scope, schedule and budget tolerance, had a mean of 3.66 on the five-point scale. 57% of respondents selected agree or strongly agree, whereas 15% selected disagree or strongly disagree. This distribution is neither a claim of uniform excellence nor a sign of universal failure. It indicates that the practice was present for many respondents but unevenly experienced across the projects represented in the sample. The dispersion in the item responses is analytically valuable because it supplies the variation needed to examine why some respondents associated their project environment with stronger success outcomes than others.

The operational meaning of scope, schedule and cost outcomes lies in judging delivery across the interdependent constraints rather than treating budget alone as success. Respondents did not need access to confidential contract values to judge whether this practice was visible in their project. Their answers therefore provide employee-level evidence about the quality of the management process, not an audit opinion on the numerical accuracy of final accounts. This distinction is central to interpreting the result without overstating what the survey measured.

The evidence base helps explain why the item matters. Atkinson (1999), Baccarini (1999) and Serrador and Turner (2015) show, in different settings, that project outcomes depend on the quality of information, treatment of uncertainty, governance and response. Those studies do not prove that the same mechanism operated identically in every Saudi response. They do, however, support the theoretical expectation that stronger scope, schedule and cost outcomes should accompany more credible control and more positive assessments of delivery.

For management, the finding points to a concrete review: review approved tolerances together with delivered scope and schedule consequences. Weak performance on this practice may originate in unclear ownership, unavailable data, fragmented systems, time pressure or poor communication; the survey cannot determine which cause applied to each respondent. The result is therefore best used to identify where a project should investigate its process rather than to prescribe one remedy without diagnosis.

Within the statistical model, this item contributed to the broader PPS construct. Its result should not be interpreted as a guaranteed change in PPS from improving one question in isolation. Project controls operate as a connected cycle: planning creates the reference point, monitoring updates knowledge, change control authorizes response and outcome measures capture the resulting delivery experience. The regression estimates average conditional associations across that system, not a mechanical one-item effect.

Application also depends on context: authorized trade-offs differ across sectors, so the meaning of tolerance should be documented at project level. The cross-sector Saudi sample supports a general principle of credible, timely and visible control, but not a single workflow for every organization. Sector-specific research using larger samples, objective project records and multiple informants would be needed to translate this principle into detailed thresholds and causal performance standards.

Quality and Stakeholder Satisfaction

The result for Q18–Q19, which measured quality/performance and stakeholder satisfaction, had a mean of 3.51 on the five-point scale. 50% of respondents selected agree or strongly agree, whereas 17% selected disagree or strongly disagree. This distribution is neither a claim of uniform excellence nor a sign of universal failure. It indicates that the

practice was present for many respondents but unevenly experienced across the projects represented in the sample. The dispersion in the item responses is analytically valuable because it supplies the variation needed to examine why some respondents associated their project environment with stronger success outcomes than others.

The operational meaning of quality and stakeholder satisfaction lies in recognizing that conformance and stakeholder experience can diverge from financial efficiency. Respondents did not need access to confidential contract values to judge whether this practice was visible in their project. Their answers therefore provide employee-level evidence about the quality of the management process, not an audit opinion on the numerical accuracy of final accounts. This distinction is central to interpreting the result without overstating what the survey measured.

The evidence base helps explain why the item matters. Davis (2014) and Ika (2009) show, in different settings, that project outcomes depend on the quality of information, treatment of uncertainty, governance and response. Those studies do not prove that the same mechanism operated identically in every Saudi response. They do, however, support the theoretical expectation that stronger quality and stakeholder satisfaction should accompany more credible control and more positive assessments of delivery.

For management, the finding points to a concrete review: define quality evidence and identify whose satisfaction is being assessed. Weak performance on this practice may originate in unclear ownership, unavailable data, fragmented systems, time pressure or poor communication; the survey cannot determine which cause applied to each respondent. The result is therefore best used to identify where a project should investigate its process rather than to prescribe one remedy without diagnosis.

Within the statistical model, this item contributed to the broader PPS construct. Its result should not be interpreted as a guaranteed change in PPS from improving one question in isolation. Project controls operate as a connected cycle: planning creates the reference point, monitoring updates knowledge, change control authorizes response and outcome measures capture the resulting delivery experience. The regression estimates average conditional associations across that system, not a mechanical one-item effect.

Application also depends on context: users, sponsors, regulators and delivery teams may apply different success criteria and should not be collapsed uncritically. The cross-sector Saudi sample supports a general principle of credible, timely and visible control, but not a single workflow for every organization. Sector-specific research using larger samples, objective project records and multiple informants would be needed to translate this principle into detailed thresholds and causal performance standards.

Overall Success as an Integrated Employee Judgement

The result for Q20, which measured overall perceived project success, had a mean of 3.62 on the five-point scale. 58% of respondents selected agree or strongly agree, whereas 15% selected disagree or strongly disagree. This distribution is neither a claim of uniform excellence nor a sign of universal failure. It indicates that the practice was present for many respondents but unevenly experienced across the projects represented in the sample. The dispersion in the item responses is analytically valuable because it supplies the variation needed to examine why some respondents associated their project environment with stronger success outcomes than others.

The operational meaning of overall perceived success lies in integrating the respondent's judgement of scope, schedule, cost, quality and stakeholder outcomes. Respondents did not need access to confidential contract values to judge whether this practice was visible in their project. Their answers therefore provide employee-level evidence about the quality of the management process, not an audit opinion on the numerical accuracy of final accounts. This distinction is central to interpreting the result without overstating what the survey measured.

The evidence base helps explain why the item matters. Shenhar et al. (2001) and Jugdev and Müller (2005) show, in different settings, that project outcomes depend on the quality of information, treatment of uncertainty, governance and response. Those studies do not prove that the same mechanism operated identically in every Saudi response. They do, however, support the theoretical expectation that stronger overall perceived success should accompany more credible control and more positive assessments of delivery.

For management, the finding points to a concrete review: use the global rating alongside dimension-specific evidence rather than as a substitute for it. Weak performance on this practice may originate in unclear ownership, unavailable data, fragmented systems, time pressure or poor communication; the survey cannot determine which cause applied to each respondent. The result is therefore best used to identify where a project should investigate its process rather than to prescribe one remedy without diagnosis.

Within the statistical model, this item contributed to the broader PPS construct. Its result should not be interpreted as a guaranteed change in PPS from improving one question in isolation. Project controls operate as a connected cycle: planning creates the reference point, monitoring updates knowledge, change control authorizes response and outcome measures capture the resulting delivery experience. The regression estimates average conditional associations across that system, not a mechanical one-item effect.

Application also depends on context: an employee judgement is informative but remains distinct from audited benefits realization or customer evidence. The cross-sector Saudi sample supports a general principle of credible, timely and visible control, but not a single workflow for every organization. Sector-specific research using larger samples, objective project records and multiple informants would be needed to translate this principle into detailed thresholds and causal performance standards.

Implications for the feedback-control framework

Information quality: The findings show that information quality has to be maintained across the life of the project. The initial budget is an information product; so are the commitment record, the estimate at completion and the approved change notice. A weakness at any point can reduce the meaning of the next point. This helps explain why all three predictors were significant in the regression. The organization is not simply measuring cost; it is maintaining a coherent account of what the project is expected to deliver, what it has committed and what it now expects to require.

Timing: The item results repeatedly point to the importance of time. Recording, comparison, forecast updating, change evaluation and corrective action are useful only if they occur while a decision remains possible. Timing is not a single calendar rule. It depends on procurement lead time, work-package duration, contractual commitments and the speed at which external conditions change. The implication is that organizations should define review frequency in relation to decision urgency rather than rely blindly on a monthly or quarterly reporting ritual.

Authority: The change-control findings demonstrate that information and authority need to meet. Employees may identify a variance or technical change, but another person may own the cost baseline, reserve or approval right. When these roles are disconnected, data can be accurate yet action delayed. The study's result supports clear responsibility matrices, escalation paths and thresholds for sponsor or management intervention. Such governance turns a cost report into a control mechanism rather than a record of events already beyond project influence.

Communication: The non-significant job-level difference in overall PPS does not remove the importance of communication. It may instead suggest that broad success is experienced across levels when relevant information is shared. Communication needs to flow downward as approved budgets, changes and decisions, and upward as commitments, progress, risks and emerging technical issues. A control system is weak when a senior report appears coherent

but the employees who create or use the data still work from obsolete scope and cost assumptions.

Learning: The results concern current perceptions, but their practical value increases when organizations learn from completed work. Differences between planned assumptions, current forecasts, authorized changes and final outcomes can be classified and fed into future estimates. This learning loop addresses the estimation concerns raised by Ahiaga-Dagbui and Smith (2014) and the reference-class logic discussed by Batselier and Vanhoucke (2017). It also prevents the survey findings from becoming a one-off diagnostic rather than an input into improving organizational capability.

4.12 Chapter Summary and Hypothesis Outcomes

The extended analysis confirms that the numerical findings are not isolated statistical outputs. They form a coherent narrative across item responses, composite reliability, bivariate association, regression results and the feedback-control literature. Planning quality was positively associated with PPS because it makes the cost baseline intelligible; monitoring and forecasting were strongly associated with PPS because they create timely forward-looking information; and change control was positively associated with PPS because it connects information to authorization and action. The specific item pattern also identifies a practical priority: pre-approval evaluation of change cost effects was less positively experienced than the other core routines.

The chapter does not claim that budget practices are the only determinants of success or that a survey can establish causality. It does demonstrate a robust association between the integrated budget-control practices observable to employees and their assessment of project outcomes. This is exactly the contribution intended by the study: to complement the record-based cost-overrun literature with employee-level evidence about how budget control is experienced across organizational ranks and sectors in Saudi Arabia. The next chapter converts that evidence into conclusions and actionable recommendations while preserving the study's methodological boundaries.

Summary of hypothesis decisions

Hypothesis	Empirical test	Result	Decision
H1	BPEQ regression coefficient	$B = .237, p = .006$	Supported
H2	BMF regression coefficient	$B = .530, p < .001$	Supported
H3	BCCR regression coefficient	$B = .232, p = .008$	Supported
H4	Overall regression model	$R^2 = .491, F(3,96) = 30.84, p < .001$	Supported
H5	PPS by job level	Welch $p = .325$	Not supported

Table 4.13. Summary of hypothesis decisions

The empirical chapter provides a coherent picture. Budget planning and estimation quality, monitoring and forecasting, and change control and corrective response were each positively associated with perceived project success. Their combined model was significant and substantively strong, and its diagnostics were acceptable. The only unsupported hypothesis concerned the broad job-level difference in PPS. The next chapter converts these findings into conclusions, practical recommendations, limitations and directions for further research. It retains the central boundary throughout: the evidence supports association and informed managerial learning, not causal proof or a claim that survey perceptions replace project records.

CHAPTER FIVE: CONCLUSIONS, RECOMMENDATIONS AND FUTURE RESEARCH

5.1 Introduction

This chapter brings to a close the study regarding the objectives and research hypotheses. It then provides recommendations based on the empirical results, outlines the main limitations and suggests avenues for future research. The limitations are appropriate: the evidence is from a cross-sectional online survey of employees that have recently been exposed to a project in Saudi Arabia, and the result is perceived project success, not an audited financial result.

5.2 Conclusions by Research Objective

The first goal was to explore the relationship between budget planning and the quality of the budget estimation and perceived project success. The positive BPEQ coefficient confirms the finding that the employees who saw scope-based budgeting, realistic current information and appropriate risk allowance tended to report better project outcomes. The second goal was monitoring and forecasting. This is the strongest individual association, and confirms that there is a strong link between timely recording, baseline comparison and revision of forecasts and positive employee assessment of project success. The third goal was related to change control and corrective response. This important positive correlation suggests that the cost-effect evaluation, the documented approvals, the communication and the timely action are part of the same wider control system.

The fourth aim was to explore the joint explanatory power of the three dimensions of budget practice. The model accounted for 49.1% of the variation in the PPS and met the main diagnostic criteria. Thus, the study ends with the conclusion that budget management is a continuous feedback process rather than a single estimation process. The fifth objective investigated the difference between managerial and non-managerial employees in terms of PPS. The planned test was not significant. The study does not conclude that there is no significant difference between these two groups in terms of their experiences with information access or their detailed experiences, only that their broad success rate is not significantly different in the present sample.

5.3 Practical Recommendations

1. Establish approved budget as a decision baseline. All budget approvals should include scope version, pricing date, rate source, quantities, assumptions, exclusions, risk allowance and approval authority. This directly solves the issue of the BPEQ findings and assists later users in determining whether a change is authorized or a variance against the wrong baseline.
2. Implement a regular forecasting-at-completion process. A current forecast should be informed by commitments, actual expenditure, remaining-work assumptions and material new information, and should have a named owner, and a defined escalation path. The BMF results indicate that a live and updated information is more useful than a historical report.
3. Have a formal cost-impact gate for proposed changes. The project team should determine the scope, cost, schedule, risk and funding implications of a change, document the approving authority, update the appropriate baseline and communicate the decision prior to the change being committed. This is a priority improvement area due to the lower Q12 result.

4. Relate corrective action to decision rights. Variance reports should highlight who may be able to authorise use of reserve, resequence work, alter procurement, negotiate scope or escalate to a sponsor. Information and authority need to be integrated and not separated, if timely action is to be taken.
5. Pass on control information to project workers across levels. Staff can spot the emergence of commitments and changes in operational, technical, administrative and coordination roles. A clear communication loop can help to enhance data quality and minimize reliance on stale assumptions in everyday tasks.
6. Develop organisational learning from estimates and outcomes. At the end of the project, the organization should review and reconcile approved assumptions, forecasts, approved changes and actual results; identify the causes of variance; and revise estimating databases, risk registers and control procedures for future projects.

5.4 Theoretical Contribution

The study is a contribution to the literature of project control because it operationalizes budget management as three dimensions that are observable by the employees: planning and estimation quality, monitoring and forecasting, and change control and corrective response. The results corroborate with the feedback-control lens that was developed during the literature review. Planning is a reference, monitoring is a source of information on the changing status of the project, and change control is a source of a response that is authorized. The significant combined model indicates that this process-level framing can be applied in understanding perceived project success in a Saudi employee sample. The contribution does not supplant the project-record studies, but it provides an explanation of how control routines are experienced in practice, which is complementary to the numerical cost-overflow analysis.

5.5 Study Limitations

First, the cross-sectional design does not allow for temporal order or causality to be established. Better outcomes projects can engender more positive views of their budgeting processes, and better processes can lead to better outcomes. Secondly, predictor and outcome data were obtained from the same respondent and survey time. Common-method association cannot be completely eliminated, although some concerns are mitigated by distinct construct sections and neutral wording and eligibility screening. Third, the PPS scale is not based on audited budget, schedule, benefit or customer data, but rather on perceived multidimensional success. Fourthly, the online convenience sample of 100 is not a probability sample of all the Saudi organizations or sectors. Fifth, the job level grouping may mask variation by role, project phase, sector, organization or decision authority.

These restrictions are not meant to detract from the conclusions, but rather to specify how conclusions may be used. The study should be viewed as a piece of evidence of practices in budget control and success as perceived by employees in a defined sample. It is most useful for asking questions about management and for informing better designs in the future. It should not be used to suggest that an individual project will be successful if it uses one measured routine, and should not be interpreted as a guide to the financial success of a named organisation.

5.6 Directions for Future Research

Future research should collect larger stratified samples in different sectors, sizes of the organizations, contract types and different stages of the projects in Saudi Arabia. Longitudinal designs might assess the quality at baseline and early monitoring before final outcomes are available, enabling sequence to be clarified. Multi-informant designs could gather responses from multiple role participants to the same project, and distinct individual perception from project-level practice. Researchers should also use a combination of survey data and objective

data like approved budgets, estimates at completion, change logs, contingency use, schedule data and outturns. These designs would enable more robust tests of the mechanisms proposed by the present results.

Further research could investigate the reasons pre-approval cost assessment of changes was the least positively rated predictor item. Qualitative interviews with project managers, engineers, estimators, procurement personnel, and sponsors may be able to identify the main barriers as data availability, authority, time pressure, contract arrangements, systems integration, and/or organizational culture. Other research may also examine the mediating role of digital project controls, earned-value maturity, governance clarity and organizational learning in the relationship between budget practices and project success.

5.7 Final Conclusion

The evidence leads to a practical conclusion: effective budget management is not the production of one approved number. It is a continuing discipline built on explicit assumptions, current information, visible uncertainty, timely recording, updated forecasts, evaluated changes, documented authorization and responsive action. Employees who reported stronger exposure to these practices also reported greater project success. Saudi organizations should therefore strengthen the full feedback loop and make its information and decisions accessible to the employees responsible for delivery.

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APPENDIX A: FORMAL QUESTIONNAIRE

Study Title

The Impact of Budget Planning and Control Practices on Perceived Project Success: Evidence from Project Employees in Saudi Arabia

Participant Information and Instructions

You are invited to participate in an academic study about project budget-planning and control practices. Participation is voluntary and anonymous. The questionnaire does not request your name, employer, project name, actual budget amount, or other confidential information. You may stop before submitting the form. By proceeding, you confirm that you have read this statement and voluntarily agree to participate.

If you have worked on more than one project during the previous two years, select the one most recent project that you know sufficiently well. Answer Questions 6-20 with reference to that same project.

Section A: Eligibility and Respondent Characteristics

Question 1. Are you currently employed in Saudi Arabia?

- Yes
- No

Form instruction: If No, thank the person and end the questionnaire.

Question 2. During the past two years, have you participated closely enough in a project to observe its budget-planning or cost-control practices?

- Yes
- No

Form instruction: If No, thank the person and end the questionnaire.

Question 3. Which option best describes your current job level?

- Front-line or operational employee
- Technical or professional employee
- Project coordinator or administrative-support employee
- Supervisor or team leader
- Project manager or department manager
- Senior manager or executive
- Other

Question 4. In which principal sector do you currently work?

- Construction or engineering
- Manufacturing or industrial operations
- Energy or utilities
- Information and communication technology
- Healthcare
- Government or public sector
- Financial or professional services
- Other

Question 5. How much project-work experience do you have?

- Less than 1 year
- 1-3 years
- 4-6 years

- 7-10 years
- More than 10 years

Section B: Budget Planning and Estimation Quality

For each statement, select one response:

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Question 6. The approved budget for this project was based on clearly defined scope and work requirements.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Question 7. The project's cost estimates were based on realistic, current information and clearly stated assumptions.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Question 8. The approved budget included appropriate allowances for identified risks and uncertainty.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Section C: Budget Monitoring and Forecasting

Question 9. The project's cost commitments and actual expenditure were recorded sufficiently promptly.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Question 10. The project team regularly compared current cost performance with the approved budget or cost baseline.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Question 11. The forecast of the project's final cost was updated when significant new information or cost variance emerged.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Section D: Budget Change Control and Corrective Response

Question 12. The potential cost effects of proposed project changes were evaluated before approval.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Question 13. Approved budget revisions and related decisions were documented and communicated to relevant employees.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Question 14. When a budget variance was identified, responsible personnel took timely corrective action.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Section E: Perceived Project Success

Question 15. The project achieved its intended scope and principal objectives.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Question 16. The project completed its major work within the planned schedule or approved schedule tolerance.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Question 17. The project's final or forecast cost remained within the approved budget tolerance.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree

- Strongly agree

Question 18. The project met its required quality or performance standards.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Question 19. Key stakeholders were satisfied with the project's outcomes.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Question 20. Overall, the project was successful.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

APPENDIX B: DATA CODING, ANALYTIC WORKFLOW AND REPRODUCIBILITY

B.1 Variable Coding

KSAEMP (Question 1): 0 = No; 1 = Yes.

PROJELIG (Question 2): 0 = No; 1 = Yes.

JOBLVL (Question 3): 1 = Front-line/operational; 2 = Technical/professional; 3 = Project coordinator/administrative support; 4 = Supervisor/team leader; 5 = Project/department manager; 6 = Senior manager/executive; 7 = Other.

SECTOR (Question 4): 1 = Construction/engineering; 2 = Manufacturing/industrial; 3 = Energy/utilities; 4 = ICT; 5 = Healthcare; 6 = Government/public; 7 = Financial/professional services; 8 = Other.

PROJEXP (Question 5): 1 = Less than 1 year; 2 = 1-3 years; 3 = 4-6 years; 4 = 7-10 years; 5 = More than 10 years.

BPEQ1-BPEQ3 (Questions 6-8), BMF1-BMF3 (Questions 9-11), BCCR1-BCCR3 (Questions 12-14), and PPS1-PPS6 (Questions 15-20): 1 = Strongly disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree.

B.2 Data Preparation and Case Selection

The original Google Forms Excel export was retained as the raw source. Cases were eligible when respondents confirmed Saudi employment and recent sufficient project exposure. All 100 submitted cases met these criteria and completed all substantive Likert items. No full duplicate records were found, and no eligible response was removed because it was unusual or inconvenient.

Composite scores were calculated as the arithmetic mean of all items in each construct: BPEQ = Q6–Q8; BMF = Q9–Q11; BCCR = Q12–Q14; and PPS = Q15–Q20. The managerial grouping for the planned comparison coded job levels 1–3 as non-managerial and levels 4–6 as managerial.

The working analysis dataset contained non-identifying numeric values, construct scores and grouping variables derived from the retained Google Forms Excel export. Analyses were performed on a working copy so that the original export remained unchanged.

B.3 Analytical Tools and Reproducibility

The reported analyses were produced with Python using pandas, SciPy, statsmodels, Matplotlib and seaborn. Microsoft Excel was used to inspect the Google Forms export. The workflow created the processed numeric variables, statistical tables, diagnostic results and caption-free charts reported in Chapter Four.

Cronbach's alpha was computed separately for BPEQ, BMF, BCCR and PPS. The analysis reports the number of items, valid cases, alpha coefficient and descriptive statistics. Reliability was interpreted alongside item content and the study's theoretical framework, not as evidence of validity by itself.

B.4 Descriptive Statistics and Correlations

Frequencies and percentages summarized job level and sector. Means, standard deviations, observed range and 95% confidence intervals summarized the composite scores. Pearson correlations estimated the direction and strength of the bivariate associations among BPEQ, BMF, BCCR and PPS.

For H1–H3, the interpretation considered direction, standardized magnitude, confidence interval and p value. A statistically significant p value alone was not treated as evidence of a practically important relationship.

B.5 Regression and Diagnostic Checks

A simultaneous ordinary least squares regression model predicted PPS from BPEQ, BMF and BCCR. The analysis reported unstandardized coefficients, standardized beta coefficients, standard errors, t tests, p values, 95% confidence intervals, R squared, adjusted R squared, F statistic and Cohen's f squared.

Residual normality, heteroscedasticity, Cook's distance, tolerance and VIF were checked. The analysis retained valid cases and reported diagnostics transparently. No response was removed simply because it influenced a model.

B.6 Job-Level Comparison

A Welch independent-samples t-test compared PPS between the non-managerial and managerial groups. The report includes group sizes, means, standard deviations, mean difference, Welch t statistic, degrees of freedom, p value, 95% confidence interval and Hedges' g effect size.

B.7 Decision Rules and Reproducibility

H1–H3 were supported when the corresponding regression coefficient was positive and $p < .05$. H4 was supported when the overall regression model was significant. H5 was supported only if the two job-level groups differed significantly on PPS. The retained Google Forms Excel export served as the raw source, and the coding rules above define how the reported constructs and tests were reproduced.

The job-level comparison used Welch's independent-samples t-test because it does not require equal population variances. The reported result included group sizes, means, standard deviations, the mean difference, confidence interval, test statistic, degrees of freedom, p value and Hedges' g.

The mean difference was calculated as non-managerial minus managerial. The effect-size sign was reported in the opposite direction—managerial minus non-managerial—and is labelled accordingly in Chapter Four. Non-significance was interpreted as insufficient evidence of a group difference, not proof that the groups were identical.

B.8 Interpretation Boundaries

Positive and statistically significant coefficients were interpreted together with standardized magnitude and confidence intervals. The significant overall model did not make every individual predictor significant automatically, and the non-significant H5 result was not rewritten as evidence of exact equality. All conclusions remained limited to associations in the obtained cross-sectional convenience sample.