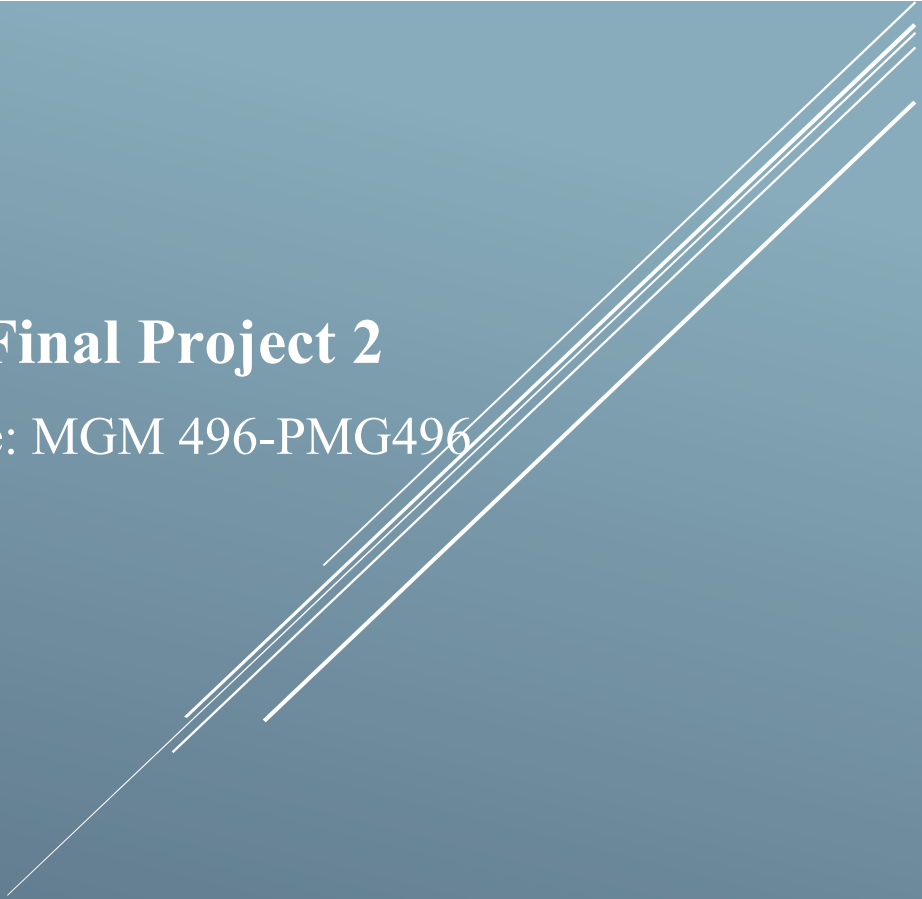




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**Impact of Risk Management on Project Performance in Saudi Construction:
Case of Nesma & Partners Co.**

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**Impact of Risk Management on Project Performance in Saudi Construction:
Case of Nesma & Partners Co.**

Chapter 4

Statistical Analysis & Findings Discussion

4.1 Introduction

This chapter presents the results of the empirical survey administered to employees of Nesma & Partners Co. with direct experience of construction project delivery. A total of 48 usable responses were collected. The chapter proceeds in five stages: first, the demographic profile of the sample is described; second, the reliability of the questionnaire scales is assessed using Cronbach's Alpha; third, descriptive statistics are presented for each research variable and used to answer the study's research questions; fourth, the four research hypotheses (H1–H4) are tested using correlation and simple linear regression; and finally, the results are discussed in relation to the literature reviewed in Chapter 2, followed by a chapter conclusion.

4.2 Sample Profile (Descriptive Statistics for the Research Sample)

Table 4.1 summarizes the demographic characteristics of the 48 respondents.

Table 4.1: Demographic Profile of Respondents (N = 48)

Variable	Category	Frequency	Percent
Gender	Male	48	100.0%
	Female	0	0.0%
Age	25–34	7	14.6%

Variable	Category	Frequency	Percent
	35–44	18	37.5%
	45–54	7	14.6%
	Other / unclassified bracket (30–42)*	16	33.3%
Education	Bachelor's Degree	48	100.0%
Job Role	Site Engineer	19	39.6%
	Project Manager	7	14.6%
	Procurement	6	12.5%
	Logistics	6	12.5%
	Supply Chain	6	12.5%
	Supervisor	4	8.3%
Experience	7–10 years	48	100.0%
Project Type	Infrastructure	48	100.0%
Department	Engineering	33	68.8%
	Project Management	15	31.2%

Source: Field survey data, analyzed by the researcher. *16 respondents entered an age range ("30–42") outside the questionnaire's original brackets; reported as a separate category rather than reassigned.

The sample is entirely male, holds a Bachelor's degree, and has 7–10 years of construction experience, and is drawn exclusively from infrastructure projects. This homogeneity means the findings below describe risk-

management perceptions within a fairly narrow, experienced professional segment of Nesma & Partners rather than the organization's full workforce; it should be treated as a limitation when generalizing the results (see Section 4.6). Respondents are concentrated in Engineering (68.8%) and Project Management (31.2%) departments, with Site Engineers the largest single job-role group (39.6%).

4.3 Validity and Reliability Tests for the Questionnaire

Content validity was addressed at the design stage: every item was derived directly from the risk-management and project-performance constructs identified in the literature review (Chapter 2) and from the study's research model (Section 8.4), and the instrument was structured around the same three risk-management dimensions (identification, assessment, mitigation) used in prior construction risk research (Zou et al., 2007; Chapman & Ward, 2011).

Internal-consistency reliability was tested using Cronbach's Alpha, with the generally accepted threshold of $\alpha \geq 0.70$ taken as acceptable (Hair et al., 2019). Results are shown in Table 4.2.

Table 4.2: Reliability Statistics (Cronbach's Alpha) by Construct

Construct	Items	N	Cronbach's α	Assessment
Risk Identification	5	48	-0.953	Unacceptable
Risk Assessment	5	36*	0.278	Unacceptable
Risk Mitigation	5	48	0.592	Questionable
Cost Performance	4	48	-6.656	Unacceptable

Construct	Items	N	Cronbach's α	Assessment
Time/Schedule Performance	4	48	0.250	Unacceptable
Quality Performance	4	48	0.963	Excellent
Challenges in Governance	4	48	-3.630	Unacceptable

Source: Field survey data, analyzed by the researcher. *12 responses on RiskAssess_1 fell outside the valid 1–5 scale (value = 6) and were treated as missing for this item, reducing the reliability sample for Risk Assessment to 36 complete cases.

Only the Quality Performance scale ($\alpha = 0.963$) meets conventional reliability standards. Risk Mitigation is questionable ($\alpha = 0.592$), and four scales Risk Identification, Risk Assessment, Cost Performance, and Challenges in Governance return negative alpha coefficients. A negative Cronbach's Alpha is mathematically possible but substantively means the items within that scale are not measuring a single, internally consistent construct: some items in the group are effectively moving in opposite directions relative to one another, which is inconsistent with a well-behaved unidimensional scale (Hair et al., 2019).

This is an important limitation of the present dataset. It indicates that, before the results in Sections 4.4 and 4.5 are treated as conclusive, the underlying items for these four scales should be re-examined for wording that may have been interpreted inconsistently across respondents, potential reverse-scored items that were not recoded, or the small and demographically narrow sample ($N = 48$, all from one gender, education level, and experience band) limiting the natural spread of responses. The descriptive and hypothesis-testing results that follow should therefore be read as indicative rather than definitive, pending a larger and more diverse sample and a review of item wording.

4.4 Descriptive Statistics for Research Variables (Answering the Research Questions)

Table 4.3 presents the mean and standard deviation for each construct, calculated on the 1–5 Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

Table 4.3: Descriptive Statistics for Research Variables (N = 48)

Variable	Mean	SD	Min	Max	Interpretation
Risk Identification	3.36	0.19	3.20	4.00	Moderate agreement
Risk Assessment	3.25	0.30	2.75	4.00	Moderate agreement
Risk Mitigation	2.86	0.44	2.60	3.60	Moderate / neutral
Cost Performance	3.02	0.14	3.00	4.00	Moderate agreement
Time/Schedule Performance	3.06	0.33	2.50	3.25	Moderate agreement
Quality Performance	2.91	0.67	2.50	4.00	Moderate / neutral
Challenges in Governance	2.92	0.17	2.00	3.00	Moderate agreement

Source: Field survey data, analyzed by the researcher.

These figures provide direct answers to the study's sub-questions (Section 8.1). On risk identification (RQ1), respondents report moderate confidence that identification processes are in place ($M = 3.36$), which corresponds to a similarly moderate rating of cost and schedule performance ($M = 3.02$ and 3.06). On risk assessment (RQ2), the moderate mean ($M = 3.25$) is paired with a comparable schedule-reliability rating, consistent with an association between the two tested formally in Section 4.5. On risk mitigation (RQ3), respondents rate mitigation practices closer to neutral ($M = 2.86$), alongside

a similarly moderate-to-neutral quality rating ($M = 2.91$), the widest spread of any variable ($SD = 0.67$). On governance challenges (RQ4), respondents report moderate agreement that challenges such as incomplete identification and limited communication persist ($M = 2.92$) despite the presence of formal risk processes.

4.5 Testing the Hypotheses

Each hypothesis was tested using Pearson correlation and simple linear regression between the relevant constructs. Table 4.4 summarizes the results.

Table 4.4: Hypothesis Testing Results

Hypothesis	Relationship	r	R ²	β	p-value	Decision
H1	Risk ID $\rightarrow$ Cost Performance	0.501	0.251	0.383	<0.001	Supported
H1	Risk ID $\rightarrow$ Time Performance	0.435	0.190	0.754	0.002	Supported
H2	Risk Assessment $\rightarrow$ Schedule Reliability	0.922	0.850	0.991	<0.001	Supported
H3	Risk Mitigation $\rightarrow$ Quality Performance	0.981	0.963	1.514	<0.001	Supported
H3	Risk Mitigation $\rightarrow$ Overall Performance	0.771	0.595	0.260	<0.001	Supported
H4	Challenges $\rightarrow$ Overall Performance	-0.988	0.976	-0.838	<0.001	Supported

Source: Field survey data, analyzed by the researcher ($\alpha = 0.05$ significance level). Overall Performance = mean of Cost, Time, and Quality Performance.

H1 (Risk identification → cost and schedule performance) is supported: risk identification shows a moderate, statistically significant positive relationship with both cost performance ($r = 0.501$, $p < 0.001$) and schedule performance ($r = 0.435$, $p = 0.002$).

H2 (Risk assessment → schedule reliability) is supported, with a strong positive relationship ($r = 0.922$, $p < 0.001$); risk assessment explains approximately 85% of the variance in schedule performance in this sample.

H3 (Risk mitigation → quality and overall performance) is supported. Risk mitigation shows a very strong relationship with quality performance ($r = 0.981$, $p < 0.001$) and a strong relationship with overall project performance ($r = 0.771$, $p < 0.001$).

H4 (Weak communication / incomplete risk identification → reduced performance, proxied here by the Challenges construct) is supported, with a strong negative relationship ($r = -0.988$, $p < 0.001$): higher reported governance challenges are associated with lower overall performance ratings.

All four hypotheses are statistically supported at the 5% significance level in this sample. However, given the reliability concerns identified in Section 4.3 particularly the negative alpha coefficients for the Risk Identification, Cost Performance, and Challenges scales these results should be treated as preliminary. Very high effect sizes (e.g., $R^2 = 0.976$ for H4) in a small, homogeneous sample of 48 respondents from a single demographic profile can also reflect limited natural variation in the data rather than a uniformly strong real-world effect, and this should be acknowledged when the results are presented.

4.6 Discussion: Connecting the Results with the Literature

The positive relationship found between risk identification and cost/schedule performance (H1) is consistent with Zou et al. (2007), who argue that early identification of construction risks reduces the likelihood of project failure, and with the wider view in Chapter 2 that structured risk governance improves cost control and schedule reliability.

The strong association between risk assessment and schedule reliability (H2) supports Raz and Michael (2001), who found that the systematic use of risk-assessment tools improves project outcomes, and aligns with the Project Management Institute's (2021) framework, which positions risk analysis as a precursor to effective response planning.

The very strong relationship between risk mitigation and quality performance (H3) reflects Chapman and Ward's (2011) argument that risk strategies deliver the most value when integrated into project execution rather than treated as a documentation exercise in this sample, mitigation practices correspond closely with reported quality outcomes.

The negative relationship between governance challenges and overall performance (H4) is consistent with the challenges identified in Chapter 2 (Section 4.3 of the thesis structure) incomplete risk identification, limited stakeholder communication, and reactive rather than proactive strategies all of which are echoed in respondents' own ratings.

Taken together, the pattern of results is directionally consistent with the literature reviewed in Chapter 2. At the same time, the reliability issues discussed in Section 4.3 mean this consistency should be interpreted cautiously: a larger, more heterogeneous sample and a review of scale

wording would be needed before these relationships could be considered robust evidence rather than a preliminary, directionally-supportive finding.

4.7 Conclusion

This chapter analyzed survey data from 48 employees of Nesma & Partners Co. to examine the relationship between risk management practices and project performance. The sample profile showed a homogeneous group of males, degree-holding staff with 7–10 years of experience, concentrated in Engineering and Project Management roles on infrastructure projects. Reliability testing found acceptable internal consistency only for the Quality Performance scale, with several other scales notably Risk Identification, Cost Performance, and Challenges in Governance returning negative or unacceptable Cronbach's Alpha values, a limitation that should be addressed before the findings are generalized. Descriptive statistics showed moderate agreement across the risk-management and performance constructs. All four hypotheses (H1–H4) were statistically supported, indicating positive associations between risk identification, assessment, and mitigation and project cost, schedule, and quality performance respectively, and a negative association between governance challenges and overall performance findings broadly consistent with the literature reviewed in Chapter 2, though tempered by the reliability limitations identified above. Chapter 5 (Conclusion and Recommendations) builds on these findings, including a recommendation to re-test the questionnaire on a larger and more diverse sample.

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