

AGGREGATED DATA TABLES

Supplementary File 3 — Summary Statistics for Peer Review

Cascading Risk–Constraint Dynamics in Public Construction Projects — Nakuru County, Kenya

Source: Field Data (2024) | N = 292 | All data aggregated and anonymised

1. SAMPLE PROFILE AND RESPONSE RATE

Table 1: Survey Response Rate

Category	Distributed	Unreturned	Returned (Valid)	Response Rate (%)
County-Funded Construction Projects	314	22	292	92.9% ($\approx 93\%$)

Source: Field Data (2024). A response rate of $\geq 60\%$ is considered acceptable in social research (Fincham, 2008).

Table 2: Gender Distribution (n = 292)

Gender	Frequency	Percentage (%)
Male	227	77.7%
Female	65	22.3%
Total	292	100.0%

Source: Field Data (2024).

Table 3: Education Level (n = 292)

Education Level	Frequency	Percentage (%)
Secondary School Level	70	24.0%
College Level	122	41.8%
Undergraduate Level	86	29.5%
Post Graduate Level	14	4.7%
Total	292	100.0%

Source: Field Data (2024). 71.3% of respondents held college or undergraduate qualifications.

Table 4: Age Distribution (n = 292)

Age Bracket	Frequency	Percentage (%)
18–25 Years	29	9.9%
26–35 Years	41	14.0%
36–45 Years	113	38.7%
46–55 Years	85	29.1%
Above 55 Years	24	8.3%

Total	292	100.0%
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Source: Field Data (2024). The 36–55 age group comprised 67.8% of respondents.

2. REGRESSION DIAGNOSTICS

Table 5: Normality Test — Skewness and Kurtosis

Variable	Skewness	Kurtosis	Within Normal Range?
Project Performance	-0.209	-0.581	Yes
Operational Risk Management	-0.165	-0.738	Yes
Strategic Risk Management	-0.241	-0.527	Yes
Legal Risk Management	-0.186	-0.615	Yes
Financial Risk Management	-0.272	-0.494	Yes

Source: Field Data (2024). Acceptable ranges: $|Skewness| < 3$; $|Kurtosis| < 10$ (Kline, 2016). Null hypothesis of normality not rejected.

Table 6: Multicollinearity Diagnostics — Tolerance and VIF

Variable	Tolerance	VIF	Problematic? (VIF > 10 = Yes)
Operational Risk Management	0.618	1.618	No
Strategic Risk Management	0.582	1.718	No
Legal Risk Management	0.670	1.493	No
Financial Risk Management	0.595	1.681	No

Source: Field Data (2024). All VIF values below threshold of 10; all Tolerance values above 0.1 (Hair et al., 2019).

Table 7: Autocorrelation — Durbin-Watson Statistic

Model	Durbin-Watson	Acceptable Range	Conclusion
1 (Main Regression)	1.985	1.5 – 2.5	No autocorrelation detected

Source: Field Data (2024). Null hypothesis of no autocorrelation not rejected (Field, 2018).

Table 8: Heteroscedasticity — Breusch-Pagan Test

Test	Test Statistic	Degrees of Freedom	p-value	Conclusion
Breusch-Pagan	2.3214	4	0.6745	Homoscedasticity confirmed (p > 0.05)

Source: Field Data (2024). OLS estimators are BLUE (Gujarati & Porter, 2009).

Table 9: Internal Reliability — Cronbach's Alpha

Construct	No. of Items	Cronbach's Alpha	Threshold (≥ 0.70)	Verdict
Operational Risk Management	10	0.823	0.70	Acceptable
Strategic Risk Management	10	0.781	0.70	Acceptable
Legal Risk Management	10	0.745	0.70	Acceptable
Financial Risk Management	10	0.812	0.70	Acceptable
Project Performance	10	0.835	0.70	Acceptable

Source: Field Data (2024). All values exceed the threshold of 0.70 (Nunnally, 1978).

3. DESCRIPTIVE STATISTICS — COMPOSITE SCORES

Scale: 1.00–1.50 = No Extent; 1.51–2.50 = Small Extent; 2.51–3.50 = Moderate Extent; 3.51–4.50 = Large Extent; 4.51–5.00 = Very Large Extent.

Table 10: Descriptive Statistics — Operational Risk Management (n = 292)

Survey Item	Mean	SD	Interpretation
Measures to identify risks — contractor performance	2.75	0.829	Moderate Extent
Measures to identify risks — sub-contractor performance	2.82	0.909	Moderate Extent
Measures to identify risks — supplier performance	3.21	0.789	Moderate Extent
Evaluate impact — contractor performance risks	2.69	0.879	Moderate Extent
Evaluate impact — sub-contractor performance risks	2.61	0.849	Moderate Extent
Evaluate impact — supplier performance risks	2.93	0.769	Moderate Extent
Mitigation — contractor-related risks	3.05	0.919	Moderate Extent
Mitigation — sub-contractor-related risks	2.98	0.889	Moderate Extent
Mitigation — procurement-related risks	3.15	0.859	Moderate Extent
Monitor associated operational risks	2.83	0.929	Moderate Extent
COMPOSITE SCORE	2.90	0.862	Moderate Extent

Source: Field Data (2024). Composite score $M = 2.90$, $SD = 0.862$.

Table 11: Descriptive Statistics — Strategic Risk Management (n = 292)

Survey Item	Mean	SD	Interpretation
Proactive identification of evolving regulatory interventions	2.98	0.919	Moderate Extent

Proactive compliance with diverse regulatory requirements	2.75	0.869	Moderate Extent
Foster positive working relations with regulatory bodies	3.25	0.949	Moderate Extent
Examine impact of change requests before implementation	3.19	0.809	Moderate Extent
Proactive management of frequency of change requests	3.32	0.879	Moderate Extent
Stakeholder consultation before implementing change requests	3.09	0.899	Moderate Extent
Stakeholder consultation at project design stage	3.15	1.029	Moderate Extent
Adequate information for decision-making at design stage	3.05	0.969	Moderate Extent
Experienced PM team present at design stage	2.88	1.069	Moderate Extent
Critical stakeholders in agreement with change requests	2.95	1.129	Moderate Extent
COMPOSITE SCORE	3.06	0.952	Moderate Extent

Source: Field Data (2024). Composite score $M = 3.06$, $SD = 0.952$.

Table 12: Descriptive Statistics — Legal Risk Management (n = 292)

Survey Item	Mean	SD	Interpretation
Proactively forecast possible sources of conflicts	3.04	0.919	Moderate Extent
Stakeholder consultation to mitigate disputes leading to litigation	3.20	0.949	Moderate Extent
Proactive measures to prevent disputes escalating to litigation	3.31	0.859	Moderate Extent
Alternative dispute resolution embraced instead of litigation	3.29	0.979	Moderate Extent
Contracts prudently prepared to avoid legal loopholes	3.13	0.919	Moderate Extent
Disputes timely resolved before escalation	3.11	0.889	Moderate Extent
Legal disputes comprehensively resolved to avoid recurrence	3.07	1.049	Moderate Extent
Active monitoring of contract provisions to mitigate breaches	2.91	1.099	Moderate Extent
Root causes of legal disputes investigated	2.96	0.929	Moderate Extent
Continuous monitoring of legal risks	3.12	0.969	Moderate Extent
COMPOSITE SCORE	3.11	0.956	Moderate Extent

Source: Field Data (2024). Composite score $M = 3.11$, $SD = 0.956$.

Table 13: Descriptive Statistics — Financial Risk Management (n = 292)

Survey Item	Mean	SD	Interpretation
Cost estimation undertaken for all projects	2.51	0.779	Moderate Extent
Cost estimations used for financial decision-making	3.35	0.999	Moderate Extent
Adequate expertise for realistic cost estimations	2.64	1.019	Moderate Extent
Robust internal controls to avoid fund misappropriation	3.53	1.059	Large Extent
Projects availed with required funds in timely manner	3.36	0.979	Moderate Extent
Robust approval process for project costs	3.33	1.049	Moderate Extent
Proactive monitoring of project cost expenditures	3.50	0.949	Moderate Extent
Project cost control measures to avoid overruns	3.34	0.989	Moderate Extent
Budget baselines used in cost estimation	3.15	0.999	Moderate Extent
Payments undertaken in timely manner to avoid disputes	2.35	0.969	Small Extent
COMPOSITE SCORE	3.11	0.979	Moderate Extent

Source: Field Data (2024). Composite score $M = 3.11$, $SD = 0.979$. Notable: internal controls $M = 3.53$; timely payments $M = 2.35$.

Table 14: Descriptive Statistics — Project Size (n = 292)

Survey Item	Mean	SD	Interpretation
Project large relative to other similar county projects	2.37	0.849	Small Extent
Complexity requiring special consideration — procurement	2.43	0.819	Small Extent
Complexity requiring special consideration — financial management	2.37	0.789	Small Extent
Complexity requiring special consideration — stakeholder management	2.43	0.739	Small Extent
Scope requiring special consideration — procurement	2.20	0.769	Small Extent
Scope requiring special consideration — financial management	3.24	0.899	Moderate Extent
Scope requiring special consideration — stakeholder management	3.34	0.829	Moderate Extent
Scope requiring special consideration — technical expertise	3.32	0.919	Moderate Extent
COMPOSITE SCORE	2.71	0.827	Moderate Extent

Source: Field Data (2024). Composite score $M = 2.71$, $SD = 0.827$.

Table 15: Descriptive Statistics — External Environment (n = 292)

Survey Item	Mean	SD	Interpretation
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Regulatory impact on project implementation	3.33	0.959	Moderate Extent
Community relations impact	3.46	0.879	Moderate Extent
Physical environment impact	3.52	0.959	Large Extent
Technological environment impact	3.36	0.929	Moderate Extent
Political environment impact	3.27	1.009	Moderate Extent
Financial environment impact	3.21	1.059	Moderate Extent
COMPOSITE SCORE	3.36	0.966	Moderate Extent

Source: Field Data (2024). Composite score $M = 3.36$, $SD = 0.966$.

4. CORRELATION MATRIX

Table 16: Pearson Correlation Matrix — All Constructs (n = 292)

Variable	1. PP	2. ORM	3. SRM	4. LRM	5. FRM
1. Project Performance (PP)	1.000	.622**	.588**	.571**	.610**
2. Operational Risk Mgmt (ORM)	.622**	1.000	.540**	.497**	.562**
3. Strategic Risk Mgmt (SRM)	.588**	.540**	1.000	.511**	.533**
4. Legal Risk Mgmt (LRM)	.571**	.497**	.511**	1.000	.485**
5. Financial Risk Mgmt (FRM)	.610**	.562**	.533**	.485**	1.000

** Correlation significant at 0.01 level (2-tailed). N = 292 for all pairs. Source: Field Data (2024).

5. REGRESSION ANALYSIS RESULTS

Table 17: Multiple Regression — Direct Effects on Project Performance

Variable	Unstd. B	SE (B)	Std. β	t-value	p-value
Constant	0.743	0.150	—	4.953	< .001
Operational Risk Mgmt (OR)	0.283	0.042	.306	6.738	< .001
Strategic Risk Mgmt (SR)	0.197	0.044	.205	4.477	< .001
Legal Risk Mgmt (LR)	0.175	0.040	.196	4.375	< .001
Financial Risk Mgmt (FR)	0.230	0.045	.233	5.111	< .001

$R^2 = .589$; Adjusted $R^2 = .584$; $F(4, 287) = 102.847$; $p < .001$. Regression equation: $PP = 0.743 + 0.283(OR) + 0.197(SR) + 0.175(LR) + 0.230(FR)$. Source: Field Data (2024).

Table 18: Hierarchical Regression — Moderating Effect of Project Size

Model	R	R ²	Adj. R ²	SE	ΔR^2	ΔF	df1	df2	Sig. F Change
1 — Risk Management only	.768	.589	.584	.490	.589	102.847	4	287	.000
2 — + Project Size	.777	.603	.597	.479	.014	10.145	1	286	.002
3 — + RM $\times$ PS Interaction	.795	.632	.622	.463	.029	5.612	4	282	.000

RM = Risk Management; PS = Project Size. Model 3 explains 63.2% of variance; $\Delta R^2 = .029$ ($p < .001$) confirms significant moderating effect. Source: Field Data (2024).

Table 19: Hierarchical Regression — Moderating Effect of External Environment

Model	R	R ²	Adj. R ²	SE	ΔR^2	ΔF	df1	df2	Sig. F Change
1 — Risk Management only	0.768	0.589	0.584	0.490	0.589	102.847	4	287	0.000
2 — + External Environment	0.781	0.610	0.604	0.475	0.021	15.072	1	286	0.000
3 — + RM $\times$ EE Interaction	0.802	0.643	0.633	0.458	0.033	6.485	4	282	0.000

RM = Risk Management; EE = External Environment. Model 3 explains 64.3% of variance; $\Delta R^2 = .033$ ($p < .001$) confirms significant moderating effect. Source: Field Data (2024).

Note on Data Availability

All data presented in this document are aggregated summary statistics. No individual-level response data are included. Raw individual-level data are not publicly available due to confidentiality assurances given to participants and the Nakuru County Government under the Kenya Data Protection Act, 2019, and NACOSTI research ethics guidelines. Requests for additional outputs may be directed to the corresponding author at kabuetaiyana@gmail.com.