Table S1: List of reviewed articles

Articles Selected for Review
(Alinaitwe et al., 2013) (Enshassi et al., 2010) (Park & Papadopoulou, 2012) (Mahamid, 2014) (Rashed & Shaqour, 2014) (Akram et al., 2017) (Alghonamy, 2015) (Alzebdeh et al., 2015) (B & Asadi, 2017) (Seddeeq et al., 2019) (Derakhshanalavijeh & Teixeira, 2016) (Famiyeh et al., 2017) (França et al., 2018) (Kim et al., 2018) (Raju et al., 2017) (Renuka et al., 2018) (Sinesilassie et al., 2018) (Sohu et al., 2018) (Sohu et al., 2019) (Yang & Chen, 2015) (Qalbin et al., 2023) (Akinradewo et al., 2022) (Alshihri et al., 2022) (Alhammadi et al., 2024) (Amini et al., 2023) (Ammar et al., 2022) (Ashtari et al., 2022) (Asiedu & Mkansi, 2023) (Balali et al., 2022) (Berihu et al., 2023) (Daoud et al., 2023) (Ikediashi & Okolie, 2022) (Johnson & Babu, 2020) (Judson & Paul, 2022) (Kamal et al., 2022) (Mahmud et al., 2021) (Kamaruddeen et al., 2020) (Belay et al., 2021) (Obianyo et al., 2022) (Shaikh, 2020) (Sohu et al., 2020) (Taha et al., 2022) (Wang & Ghazali, 2023) (Xie et al., 2022) (Ahmed Marey Alhammadi & Memon, 2020b) (Ahmed Marey Alhammadi & Memon, 2020a) (Annamalaisami & Kuppuswamy, 2021) (Bakri et al., 2021) (Draleti et al., 2024) (Memon et al., 2020) (Esmaeili & Kashani, 2022)

Table S2: Delphi questionnaires

Delphi Questionnaire to Experts (Round-1)

Part One: General Information:

The objective of this part is to capture the respondents' profile in terms of their academic background and experience in managing risks in construction projects.

1.1 Respondent's Profile

1.1.1 Your Academic Status?

☐Diploma

☐Bachelor's Degree

☐Master's Degree

☐Ph.D.

1.1.2 Years of experiences in the construction industry?

☐Less than 5 years

☐5-10 years

☐ 11-15 years

☐16-20 years

☐≥20 years

1.1.3 Your E-mail address (if you are willing to participate in the subsequent rounds)?

_____

2.1 Identification of Risk Factors Causing Cost Overrun

Through extensive literature review and document analysis risk factors causing construction project cost overrun are identified and categorized. Please use the checklist bellow to identify the risk factors which are causing cost overrun to the Ethiopian building construction projects.

No.	Cost Risk Factors
	Management Risk Factors
1.	☐Poor coordination among parties involved in the project

2.	☐Lack of project management experience and skills of the project team
3.	☐Inadequate project planning and scheduling
4.	☐Poor communication among parties involved in the project
5.	☐Poor site management and supervision by the contractor
6.	☐Poor experience of the owner in project management
7.	☐Poor project management such as cost, resource, and risk
8.	☐Delayed decision making by the client
9.	☐Poor contract management
10.	☐Unstable organizational environment
	Technical Risk Factors
11.	☐Design error
12.	☐Design change
13.	☐Lack of consistency between design and specification
14.	☐Insufficient feasibility study before design
15.	☐Design delay
16.	☐Design and project scope complexity
17.	☐Consultant and design team incompetency
18.	☐Poor quantity and cost estimation
19.	☐Poor estimation of activity durations
20.	☐Poor project scope definition
21.	☐Negligence of site visit during bidding
22.	☐Lack of proper professional software
23.	☐Incomplete design and specification
	Construction Risk Factors
24.	☐Rework due to poor workmanship and poor quality of work

25.	☐Rework due to construction mistake or error
26.	☐Temporary delays and interruptions causing cost overrun
27.	☐Adoption of improper or unaccepted construction methods
28.	☐Contractor's incompetency and lack of experience in similar projects
29.	☐Pressure to deliver project on accelerated schedule
30.	☐Making tough decisions by engineers during project implementation
31.	☐Delay in execution of planned activity
32.	☐High level of quality requirement by client
	Resource Related Risk Factors
33.	☐Shortage of skilled labor in the project area
34.	☐Shortage of materials
35.	☐Shortage of equipment
36.	☐Suppliers' monopoly
37.	☐Poor labor productivity
38.	☐Sub-contractors' failure; default of sub-contractors
39.	☐Delay in procurement and delivery of materials
40.	☐High staff turnover
	Site Condition Risk Factors
41.	☐Unforeseen subsurface conditions
42.	☐Unforeseen and differing site conditions
43.	☐Poor site investigations such as geological site survey and soil test
44.	☐Delay in site possession
45.	☐Improper project site or location
	Contractual and Legal Risk Factors
46.	☐Contradictions in documents and ambiguity in contract terms

47.	☐Deficient contracts with discrepancies and errors
48.	☐Project scope change
49.	☐Variation or change order (addition/ omission)
50.	☐Contractual claims and disputes
51.	☐The lowest bid price award system
52.	☐Inappropriate procurement system and contract type
53.	☐Issuing strict instructions and regulations during crisis
54.	☐Resistance to follow regulations
55.	☐Bureaucracy in tendering method
	Economic and Financial Risk Factors
56.	☐Inflation
57.	☐Funding problems (financial difficulty of client)
58.	☐Fluctuations in currency exchange rate
59.	☐Increase banks loan interest rates
60.	☐Escalation or fluctuation in materials price
61.	☐Delay in payments to the contractor
62.	☐Country's economic instability
63.	☐High transportation costs
64.	☐High bond and insurance rates
65.	☐Increase in equipment and machinery cost
66.	☐Increase in labor costs or wages
67.	☐Contractor's financial difficulty
68.	☐Rebates
69.	☐Tax liability
	Social and Cultural Risk Factors

70.	☐Time and cost required for land acquisition and compensation
71.	☐Differences in culture, language, and religious backgrounds
72.	☐Insecurity and crime (theft, vandalism, kickbacks, and fraudulent practices)
	Governmental and Political Risk Factors
73.	☐Changes in government laws, regulations, and policies affecting the project
74.	☐Political instability of the country
75.	☐Political interferences
76.	☐Delay or refusal of the government bodies in project approval and permit
77.	☐Corruption and bribery
	Environmental and Safety Risk Factors
78.	☐Adverse weather conditions (continuous rainfall, snow, temperature, wind)
79.	☐Force majeure (natural and man-made disasters which are beyond the firm's control, e.g., fire, floods, thunder and lightning, landslide, earthquake, hurricane, etc.)
80.	☐Epidemic illness or disease
81.	☐Difficulty of applying new health and safety standards

Delphi Questionnaire to Experts (Round-2)

1. Identification of Risk Factors Causing Cost Overrun

Please use the checklist bellow to identify the risk factors which are causing cost overrun to the Ethiopian building construction projects.

No.	Cost Risk Factors
	Management Risk Factors
1.	☐Poor coordination among parties involved in the project
2.	☐Lack of project management experience and skills of the project team
3.	☐Inadequate project planning and scheduling

4.	☐Poor communication among parties involved in the project
5.	☐Poor site management and supervision by the contractor
6.	☐Poor experience of the owner in project management
7.	☐Poor project management such as cost, resource, and risk
8.	☐Delayed decision making by the client
9.	☐Poor contract management
10.	☐Unstable organizational environment
	Technical Risk Factors
11.	☐Design error
12.	☐Design change
13.	☐Lack of consistency between design and specification
14.	☐ Insufficient feasibility study before design
15.	☐ Design delay
16.	☐ Consultant and design team incompetency
17.	☐ Poor quantity and cost estimation
18.	☐ Poor estimation of activity durations
19.	☐ Poor project scope definition
20.	☐ Negligence of site visit during bidding
21.	☐ Incomplete design and specification
	Construction Risk Factors
22.	☐ Rework due to poor workmanship and poor quality of work
23.	☐ Temporary delays and interruptions causing cost overrun
24.	☐ Contractor's incompetency and lack of experience in similar projects
25.	☐ Pressure to deliver project on accelerated schedule

26.	☐ Delay in execution of planned activity
	Resource Related Risk Factors
27.	☐ Shortage of skilled labor in the project area
28.	☐ Shortage of materials
29.	☐ Shortage of equipment
30.	☐ Poor labor productivity
31.	☐ Sub-contractors' failure; default of sub-contractors
32.	☐ Delay in procurement and delivery of materials
33.	☐ High staff turnover
	Site Condition Risk Factors
34.	☐ Unforeseen subsurface conditions
35.	☐ Unforeseen and differing site conditions
36.	☐ Poor site investigations such as geological site survey and soil test
37.	☐ Delay in site possession
	Contractual and Legal Risk Factors
38.	☐ Project scope change
39.	☐ Variation or change order (addition/ omission)
40.	☐ Contractual claims and disputes
41.	☐ The lowest bid price award system
42.	☐ Inappropriate procurement system and contract type
	Economic and Financial Risk Factors
43.	☐ Inflation
44.	☐ Funding problems (financial difficulty of client)
45.	☐ Fluctuations in currency exchange rate

46.	☐ Increase banks loan interest rates
47.	☐ Escalation or fluctuation in materials price
48.	☐ Delay in payments to the contractor
49.	☐ Country's economic instability
50.	☐ High transportation costs
51.	☐ Increase in equipment and machinery cost
52.	☐ Increase in labor costs or wages
53.	☐ Contractor's financial difficulty
	Social and Cultural Risk Factors
54.	☐ Time and cost required for land acquisition and compensation
55.	☐ Insecurity and crime (theft, vandalism, kickbacks, and fraudulent practices)
	Governmental and Political Risk Factors
56.	☐ Changes in government laws, regulations, and policies affecting the project
57.	☐ Political instability of the country
58.	☐ Political interferences
59.	☐ Delay or refusal of the government bodies in project approval and permit
60.	☐ Corruption and bribery
	Environmental and Safety Risk Factors
61.	☐ Adverse weather conditions (continuous rainfall, snow, temperature, wind)
62.	☐ Force majeure (natural and man-made disasters which are beyond the firm's control, e.g., fire, floods, thunder and lightning, landslide, earthquake, hurricane, etc.)

Delphi Questionnaire to Experts (Round-3)

1. Please use the checklist bellow to rate the risk factors which are causing cost overrun to the Ethiopian building construction projects.
   (1**=Very low, 2=low, 3=medium, 4=high, 5=very high)**

   a. Probability of occurrence of risk factors causing cost overrun

No.	Cost Risk Factors	1	2	3	4	5
	Management Risk Factors					
1.	Poor coordination among parties involved in the project					
2.	Lack of project management experience and skills of the project team					
3.	Inadequate project planning and scheduling					
4.	Poor communication among parties involved in the project					
5.	Poor site management and supervision by the contractor					
6.	Poor experience of the owner in project management					
7.	Poor project management such as cost, resource, and risk					
8.	Delayed decision making by the client					
9.	Poor contract management					
	Technical Risk Factors					
10.	Design error					
11.	Design change					
12.	Lack of consistency between design and specification					
13.	Insufficient feasibility study before design					
14.	Design delay					
15.	Consultant and design team incompetency					

16.	Poor quantity and cost estimation					
17.	Poor estimation of activity durations					
18.	Poor project scope definition					
19.	Negligence of site visit during bidding					
20.	Incomplete design and specification					
	Construction Risk Factors					
21.	Rework due to poor workmanship and poor quality of work					
22.	Temporary delays and interruptions causing cost overrun					
23.	Contractor's incompetency and lack of experience in similar projects					
24.	Delay in execution of planned activity					
	Resource Related Risk Factors					
25.	Shortage of materials					
26.	Shortage of equipment					
27.	Poor labor productivity					
28.	Sub-contractors' failure; default of sub-contractors					
29.	Delay in procurement and delivery of materials					
	Site Condition Risk Factors					
30.	Unforeseen subsurface conditions					
31.	Unforeseen and differing site conditions					
32.	Poor site investigations such as geological site survey and soil test					
33.	Delay in site possession					
	Contractual and Legal Risk Factors					

34.	Project scope change					
35.	Variation or change order (addition/ omission)					
36.	Contractual claims and disputes					
37.	The lowest bid price award system					
38.	Inappropriate procurement system and contract type					
	Economic and Financial Risk Factors					
39.	Inflation					
40.	Funding problems (financial difficulty of client)					
41.	Fluctuations in currency exchange rate					
42.	Escalation or fluctuation in materials price					
43.	Delay in payments to the contractor					
44.	Country's economic instability					
45.	Increase in equipment and machinery cost					
46.	Contractor's financial difficulty					
	Social and Cultural Risk Factors					
47.	Time and cost required for land acquisition and compensation					
48.	Insecurity and crime (theft, vandalism, kickbacks, and fraudulent practices)					
	Governmental and Political Risk Factors					
49.	Changes in government laws, regulations, and policies affecting the project					
50.	Political instability of the country					
51.	Political interferences					
52.	Corruption and bribery					
	Environmental and Safety Risk Factors					

53.	Adverse weather conditions (continuous rainfall, snow, temperature, wind)					
54.	Force majeure (natural and man-made disasters which are beyond the firm's control, e.g., fire, floods, thunder and lightning, landslide, earthquake, hurricane, etc.)					

b. Impact of risk factors causing cost overrun

(1=Very low, 2=low, 3=medium, 4=high, 5=very high)

No.	Cost Risk Factors	1	2	3	4	5
	Management Risk Factors					
1.	Poor coordination among parties involved in the project					
2.	Lack of project management experience and skills of the project team					
3.	Inadequate project planning and scheduling					
4.	Poor communication among parties involved in the project					
5.	Poor site management and supervision by the contractor					
6.	Poor experience of the owner in project management					
7.	Poor project management such as cost, resource, and risk					
8.	Delayed decision making by the client					
9.	Poor contract management					
	Technical Risk Factors					
10.	Design error					
11.	Design change					
12.	Lack of consistency between design and specification					

13.	Insufficient feasibility study before design					
14.	Design delay					
15.	Consultant and design team incompetency					
16.	Poor quantity and cost estimation					
17.	Poor estimation of activity durations					
18.	Poor project scope definition					
19.	Negligence of site visit during bidding					
20.	Incomplete design and specification					
	Construction Risk Factors					
21.	Rework due to poor workmanship and poor quality of work					
22.	Temporary delays and interruptions causing cost overrun					
23.	Contractor's incompetency and lack of experience in similar projects					
24.	Delay in execution of planned activity					
	Resource Related Risk Factors					
25.	Shortage of materials					
26.	Shortage of equipment					
27.	Poor labor productivity					
28.	Sub-contractors' failure; default of sub-contractors					
29.	Delay in procurement and delivery of materials					
	Site Condition Risk Factors					
30.	Unforeseen subsurface conditions					
31.	Unforeseen and differing site conditions					
32.	Poor site investigations such as geological site survey					

	and soil test					
33.	Delay in site possession					
	Contractual and Legal Risk Factors					
34.	Project scope change					
35.	Variation or change order (addition/ omission)					
36.	Contractual claims and disputes					
37.	The lowest bid price award system					
38.	Inappropriate procurement system and contract type					
	Economic and Financial Risk Factors					
39.	Inflation					
40.	Funding problems (financial difficulty of client)					
41.	Fluctuations in currency exchange rate					
42.	Escalation or fluctuation in materials price					
43.	Delay in payments to the contractor					
44.	Country's economic instability					
45.	Increase in equipment and machinery cost					
46.	Contractor's financial difficulty					
	Social and Cultural Risk Factors					
47.	Time and cost required for land acquisition and compensation					
48.	Insecurity and crime (theft, vandalism, kickbacks, and fraudulent practices)					
	Governmental and Political Risk Factors					
49.	Changes in government laws, regulations, and policies affecting the project					
50.	Political instability of the country					

51.	Political interferences					
52.	Corruption and bribery					
	Environmental and Safety Risk Factors					
53.	Adverse weather conditions (continuous rainfall, snow, temperature, wind)					
54.	Force majeure (natural and man-made disasters which are beyond the firm's control, e.g., fire, floods, thunder and lightning, landslide, earthquake, hurricane, etc.)					

Table S3: Survey results for the third-round Delphi

	EXP1	EXP2	EXP3	EXP4	EXP5	EXP6	EXP7	EXP8	EXP9	EXP10	EXP11	EXP12	EXP13	EXP14	EXP15	EXP16	EXP17	EXP18	EXP19	EXP20	EXP21	EXP22	EXP23	EXP24	EXP25	EXP26
PROBABILITY																										
MANAGEMENT RISK FACTORS																										
1. Poor coordination among parties involved in the project	3	3	5	5	3	4	5	5	5	5	4	5	4	4	4	4	3	3	3	3	4	2	4	3	3	4
2. Lack of project management experience and skills of the project team	2	3	4	4	3	4	3	5	4	4	4	4	4	4	4	4	2	3	3	4	4	1	4	3	4	4
3. Inadequate project planning and scheduling	3	3	5	4	3	4	4	5	4	4	4	4	5	4	4	5	3	4	3	5	3	3	4	4	4	5

4.	Poor communication among parties involved in the project	3	3	4	4	3	4	5	5	4	5	4	5	5	4	4	4	3	3	3	3	3	4	4	3	3	4
5.	Poor site management and supervision by the contractor	3	3	5	3	3	4	4	5	3	4	4	4	5	3	4	5	2	2	3	4	4	3	4	3	4	4
6.	Poor experience of the owner in project management	3	3	4	4	2	4	4	5	3	5	3	2	4	3	4	5	3	3	2	3	3	2	3	4	3	4
7.	Poor project management such as cost, resource, and risk	4	4	3	4	4	4	4	5	4	4	4	4	5	3	5	4	2	4	3	4	4	4	4	4	4	5
8.	Delayed decision making by the client	3	4	3	5	2	4	5	5	5	5	5	5	4	5	5	5	4	4	3	4	4	3	3	3	2	3

9.	Poor contract management	3	4	5	4	3	3	5	5	4	4	4	5	5	4	5	4	3	4	3	3	5	5	4	4	4	3
TECHNICAL RISK FACTORS																												
10.	Design error	3	4	4	3	3	3	4	5	3	4	4	5	4	4	4	4	2	2	3	3	4	2	4	4	3	3
11.	Design change	4	4	5	3	2	4	4	5	3	4	4	3	5	4	5	4	4	2	3	4	5	3	4	5	5	4
12.	Lack of consistency between design and specification	3	4	3	3	3	4	4	5	3	4	4	3	4	4	4	2	2	2	3	4	2	2	3	3	3	3
13.	Insufficient feasibility study before design	4	3	4	2	2	3	5	5	4	3	4	4	4	4	4	4	4	4	3	4	5	4	4	4	5	4
14.	Design delay	4	4	3	3	2	4	5	5	4	3	5	3	4	4	5	5	4	3	3	3	3	3	4	2	3	4
15.	Consultant and design team incompetency	3	3	3	3	2	3	5	5	4	3	4	3	4	4	3	5	2	3	3	2	3	2	5	3	5	3

16. Poor quantity and cost estimation	5	4	2	3	2	4	5	5	5	4	4	3	4	4	4	5	3	4	4	4	3	4	5	4	5	4
17. Poor estimation of activity durations	4	4	2	3	3	4	5	5	5	3	5	3	5	3	4	5	3	4	4	4	3	3	4	3	4	4
18. Poor project scope definition	2	4	3	3	2	4	5	5	5	3	4	4	5	4	4	4	3	4	3	3	2	2	4	3	5	5
19. Negligence of site visit during bidding	3	4	3	2	2	3	5	5	3	3	4	5	5	5	5	5	1	3	3	4	2	4	3	3	3	4
20. Incomplete design and specification	4	5	5	3	2	4	5	5	3	3	5	5	5	5	5	5	3	3	4	4	2	3	4	3	4	4
CONSTRUCTION RISK FACTORS																										
21. Rework due to poor workmanship and poor quality	3	4	2	3	2	4	3	4	3	3	3	4	3	3	5	4	2	2	3	3	4	2	4	1	5	3

	of work																											
22.	Temporary delays and interruptions causing cost overrun	3	4	3	4	2	4	3	5	4	5	4	4	4	4	4	5	3	2	3	4	4	3	3	2	4	3
23.	Contractors incompetency and lack of experience in similar projects	3	3	4	3	2	4	2	5	3	3	4	3	4	4	3	5	2	2	3	3	2	2	4	2	5	4
24.	Delay in execution of planned activity	3	4	5	4	3	4	5	4	4	3	4	4	4	3	5	5	3	4	3	5	3	4	4	4	4	5
RESOURCE RELATED RISK FACTORS																												
25.	Shortage of materials	4	5	5	5	2	4	5	4	4	5	4	5	5	3	5	5	4	4	4	5	5	2	4	5	4	5
26.	Shortage of equipment	4	5	4	4	2	3	5	4	3	5	4	4	5	3	5	5	5	4	3	5	4	3	4	4	3	5

27.	Poor labor productivity	2	5	3	3	3	4	3	5	4	4	4	4	4	2	5	5	2	3	3	4	5	2	3	4	4	4
28.	Sub-contractors failure; default of sub-contractors	3	4	3	2	2	4	5	4	4	3	4	4	4	3	5	5	2	3	2	3	3	4	4	4	3	3
29.	Delay in procurement and delivery of materials	4	4	3	4	2	4	5	4	4	5	4	5	5	3	5	5	4	4	3	5	5	3	5	4	4	5
SITE CONDITION RISK FACTORS																												
30.	Unforeseen subsurface conditions	4	3	5	3	2	4	3	5	4	4	3	4	4	4	5	4	2	4	2	3	3	2	5	4	4	2
31.	Unforeseen and differing site conditions	4	4	5	3	2	4	3	5	4	4	3	4	4	4	5	4	3	4	2	3	3	2	5	4	4	2
32.	Poor site investigations	4	3	4	3	2	4	5	4	3	4	4	5	5	5	5	4	3	4	2	4	3	4	5	3	4	4

	such as geological site survey and soil test																											
33.	Delay in site possession	4	4	3	3	2	4	5	4	5	5	3	5	5	4	5	4	5	4	3	4	5	2	3	5	3	4	
CONTRCTUAL RISK FACTORS																												
34.	Project scope change	2	4	5	3	2	4	4	5	4	3	3	3	5	4	5	4	2	3	3	3	4	2	4	4	4	4	
35.	Variation or change order (addition/ omission)	4	4	3	4	3	4	5	5	4	4	4	3	5	5	4	5	4	3	3	5	4	1	4	4	4	4	
36.	Contractual claims and disputes	4	5	2	4	3	4	3	5	4	5	4	4	5	4	4	5	3	4	2	3	4	3	4	3	3	3	
37.	The lowest bid price award system	4	4	5	5	1	3	5	5	3	5	4	5	5	3	3	4	3	4	5	5	3	2	3	3	2	5	
38.	Inappropriate procure	3	4	3	4	2	4	3	5	3	4	4	5	5	4	5	4	3	4	4	2	2	4	4	2	1	4	

	ment system and contract type																												
ECONOMIC RISK FACTORS																													
39.	Inflation	5	5	5	5	3	4	5	5	5	5	4	5	5	4	5	4	5	4	4	5	5	2	4	5	3	5		
40.	Funding problems (financial difficulty of client)	5	4	4	5	3	4	5	4	5	5	3	5	5	4	5	4	3	3	4	5	5	1	4	3	2	4		
41.	Fluctuations in currency exchange rate	4	4	5	5	3	4	5	4	4	5	4	5	5	5	5	4	4	4	4	3	5	3	4	5	1	4		
42.	Escalation or fluctuation in materials price	4	5	5	5	3	5	5	4	4	5	4	5	5	4	5	4	5	4	4	3	5	2	5	5	2	5		
43.	Delay in payments to the contractor	5	5	3	3	4	4	5	4	5	5	4	5	5	4	5	5	5	4	4	4	5	3	4	4	2	4		

44.	Country ′s economic instability	5	4	4	5	3	5	5	5	5	5	4	4	5	5	5	5	4	3	4	4	5	3	4	5	1	3
45.	Increase in equipment and machinery cost	4	4	5	5	2	4	5	4	4	5	4	4	5	4	5	5	5	4	3	3	5	4	4	5	1	4
46.	Contractors financial difficulty	4	5	4	5	2	4	5	5	5	5	4	4	5	4	5	5	5	4	3	4	5	3	4	4	1	4
SOCIAL AND CULTURAL RISK FACTORS																												
47.	Time and cost required for land acquisition and compensation	3	5	5	3	1	4	5	4	4	5	3	4	5	4	4	4	5	3	3	4	5	2	4	5	5	3
48.	Insecurity and crime (theft, vandalism, kickbacks, and fraudulent practices	2	5	2	3	2	4	3	4	5	4	3	5	3	3	3	5	3	2	3	4	4	3	4	3	4	3

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GOVERNMENT AND POLITICAL RISK FACTORS

49.	Changes in government laws, regulations, and policies affecting the project	1	4	4	4	2	4	4	4	5	4	3	5	4	5	5	5	3	2	3	2	2	2	4	4	4	2
50.	Political instability of the country	5	5	5	5	2	5	5	4	5	5	4	5	5	5	5	5	4	2	4	4	3	3	4	5	4	3
51.	Political interferences	1	4	4	4	1	4	4	4	5	5	4	5	5	4	5	5	3	2	4	4	2	2	4	4	4	2
52.	Corruption and bribery	2	4	5	4	3	5	3	4	5	4	3	4	5	5	5	5	3	2	4	5	4	4	4	4	4	4

ENVIROMENTAL AND SAFETY RISK FACTORS

53.	Adverse weather conditions (continuous rainfall, snow,	4	4	5	2	2	4	3	4	4	4	4	4	4	4	3	4	3	2	3	4	5	2	4	3	3	2

temperature, wind)																												
54. Force majeure (natural and man-made disasters which are beyond the firm's control, e.g., fire, floods, thunder and lightning, landslide, earthquake, hurricane, etc.)	3	4	1	2	2	4	2	4	3	3	4	5	3	5	4	4	2	2	4	2	2	3	4	2	3	2		
IMPACT																												
MANAGEMENT RISK FACTORS																												
1. Poor coordination among parties involved in the	3	4	5	4	3	4	5	5	5	5	3	4	5	4	5	4	3	3	4	4	3	2	4	3	3	5		

	project																											
2.	Lack of project management experience and skills of the project team	2	4	4	4	2	4	4	5	4	4	3	4	5	4	3	5	5	3	4	4	3	1	4	3	4	4	
3.	Inadequate project planning and scheduling	2	4	3	3	3	4	4	5	4	4	3	3	5	4	4	5	4	4	4	5	3	3	4	4	4	5	
4.	Poor communication among parties involved in the project	3	4	4	4	2	4	4	5	5	4	3	5	5	4	4	5	3	3	4	3	3	4	4	3	3	4	
5.	Poor site management and supervision by the contractor	3	4	5	3	3	4	4	5	4	4	3	4	5	3	4	4	4	3	4	4	3	3	4	3	4	5	

6.	Poor experience of the owner in project management	3	3	4	4	2	4	3	5	3	5	3	3	4	4	3	4	4	3	4	5	3	4	3	3	3	3	
7.	Poor project management such as cost, resource, and risk	4	5	5	4	3	4	4	5	5	4	3	4	5	3	4	4	5	4	4	5	4	3	5	4	4	5	
8.	Delayed decision making by the client	4	5	3	5	2	4	5	5	5	5	4	5	5	5	5	4	4	4	5	5	4	4	5	3	3	4	
9.	Poor contract management	2	5	5	4	3	3	5	5	5	4	4	5	5	4	5	4	4	4	4	4	4	3	5	3	4	4	
TECHNICAL RISK FACTORS																												
10.	Design error	4	5	3	2	2	3	5	5	3	4	4	4	3	4	4	5	4	2	5	5	3	2	4	3	3	5	
11.	Design change	4	5	5	3	2	4	5	5	4	4	4	3	3	4	5	5	3	2	4	4	4	3	4	4	5	4	
12.	Lack of consistency between	3	5	5	3	3	4	4	5	3	4	4	4	4	4	4	5	3	2	4	4	2	2	3	2	3	4	

	design and specification																											
13.	Insufficient feasibility study before design	4	4	4	2	3	3	5	5	3	4	4	4	4	4	5	5	4	4	3	5	4	3	4	3	5	4
14.	Design delay	5	5	3	3	2	4	5	5	4	4	4	3	3	4	5	5	4	4	4	3	3	3	4	2	3	4
15.	Consultant and design team incompetency	4	4	3	3	3	3	4	5	4	4	3	3	4	4	4	4	3	3	3	3	3	2	4	3	5	5
16.	Poor quantity and cost estimation	4	5	2	3	4	4	5	5	5	4	4	4	5	3	4	4	3	4	5	5	3	3	4	4	5	5
17.	Poor estimation of activity durations	4	5	3	3	3	4	5	5	5	4	4	4	5	3	4	4	3	4	5	5	2	3	4	2	4	4
18.	Poor project scope definition	2	4	3	3	3	4	4	5	5	4	4	4	5	4	4	4	3	4	5	4	2	2	4	3	5	4

19.	Negligence of site visit during bidding	4	4	2	2	2	3	4	5	3	4	4	5	5	5	4	4	4	3	4	4	2	3	4	4	3	3
20.	Incomplete design and specification	4	4	3	3	3	4	5	5	3	4	4	5	5	4	4	4	4	3	4	5	1	4	4	4	4	4
CONSTRUCTION RISK FACTORS																											
21.	Rework due to poor workmanship and poor quality of work	3	4	3	2	3	4	3	5	3	3	3	4	3	4	5	5	4	2	4	4	4	2	4	3	5	4
22.	Temporary delays and interruptions causing cost overrun	4	5	2	3	2	4	4	5	5	5	3	3	4	4	5	5	3	2	4	5	2	3	4	3	4	3
23.	Contractors incompetency and lack of experien	4	4	4	4	3	4	3	5	3	3	3	3	4	4	5	5	4	2	4	4	2	2	4	3	5	5

	ce in similar projects																											
24.	Delay in execution of planned activity	3	5	3	5	2	4	4	5	4	3	3	5	5	3	5	5	4	4	4	5	3	3	3	4	4	4
RESOURCE RELATED RISK FACTORS																												
25.	Shortage of materials	4	5	5	5	2	4	5	5	5	5	4	5	4	4	5	5	4	4	4	5	5	2	4	5	4	5
26.	Shortage of equipment	4	5	4	4	2	3	5	5	3	5	4	4	5	3	5	5	5	4	4	5	4	4	4	5	3	5
27.	Poor labor productivity	4	5	2	3	2	4	5	5	4	3	4	4	4	3	5	5	3	3	4	4	4	3	4	4	4	4
28.	Sub-contractors failure; default of sub-contractors	4	5	2	3	2	4	5	5	4	3	3	4	4	4	5	5	3	3	4	4	3	4	4	4	3	3
29.	Delay in procurement and delivery of	5	5	3	4	3	4	5	5	5	5	4	5	5	4	5	5	3	4	4	5	4	3	4	4	4	4

	materials																											
SITE CONDITION RISK FACTORS																												
30.	Unforeseen subsurface conditions	4	4	3	3	3	4	3	5	4	3	3	4	4	4	5	5	3	4	4	5	2	2	4	3	4	4
31.	Unforeseen and differing site conditions	4	4	3	3	2	4	3	5	4	3	3	4	4	4	5	4	4	4	4	5	3	3	4	4	4	4
32.	Poor site investigations such as geological site survey and soil test	4	4	4	3	2	4	4	5	3	3	4	5	5	5	5	4	4	4	4	5	2	2	5	3	4	4
33.	Delay in site possession	4	5	3	3	2	4	5	5	5	5	3	5	5	4	5	4	4	4	4	5	5	4	4	5	3	4
CONTRCTUAL RISK FACTORS																												
34.	Project scope change	2	4	5	4	3	4	5	5	4	3	4	4	4	4	4	4	4	3	3	4	5	2	4	3	4	4

35.	Variation or change order (addition/ omission)	5	5	4	4	2	4	5	5	5	4	4	3	3	5	5	4	3	4	3	5	5	1	4	5	4	3
36.	Contractual claims and disputes	5	5	3	4	2	4	3	5	4	4	4	4	4	4	5	4	2	4	3	3	4	3	5	3	3	3
37.	The lowest bid price award system	5	4	5	5	1	3	5	5	3	5	4	5	5	4	5	4	3	4	5	4	2	2	4	3	2	4
38.	Inappropriate procurement system and contract type	4	5	3	5	2	4	5	5	3	4	4	5	5	4	5	4	3	4	4	2	2	4	4	3	1	3
ECONOMIC RISK FACTORS																												
39.	Inflation	5	5	5	5	3	4	5	5	5	5	4	5	5	4	5	4	4	4	5	5	5	2	4	5	3	4
40.	Funding problems (financial difficulty of	5	5	3	4	2	4	5	5	5	5	3	5	4	5	5	5	5	3	4	5	5	3	5	3	2	4

	client)																											
41.	Fluctuations in currency exchange rate	5	5	5	5	3	4	5	5	4	5	4	5	4	5	5	4	4	4	4	3	5	2	4	5	1	3
42.	Escalation or fluctuation in materials price	5	5	5	5	4	5	5	5	5	5	4	5	5	4	5	5	5	4	4	5	5	4	5	5	2	4
43.	Delay in payments to the contractor	5	5	3	3	3	4	5	5	5	5	4	5	4	4	5	5	4	4	5	4	5	3	5	4	2	4
44.	Country's economic instability	5	5	4	5	4	5	5	5	5	5	4	4	4	5	5	4	5	3	4	4	5	2	5	5	1	4
45.	Increase in equipment and machinery cost	5	4	5	5	3	4	5	5	3	5	4	4	4	4	5	5	5	4	4	5	5	1	4	4	1	4
46.	Contractors financial difficulty	3	5	3	4	2	4	5	5	5	5	4	4	4	4	5	5	4	4	4	4	5	3	5	4	1	5

SOCIAL AND CULTURAL RISK FACTORS

47.	Time and cost required for land acquisition and compensation	4	4	5	2	2	4	5	5	4	5	4	4	4	4	5	5	3	3	4	4	5	2	4	5	5	4
48.	Insecurity and crime (theft, vandalism, kickbacks, and fraudulent practices)	2	5	1	3	3	4	3	5	5	4	3	5	3	4	5	5	3	2	4	5	4	1	4	4	4	4

GOVERNMENT AND POLITICAL RISK FACTORS

49.	Changes in government laws, regulations, and policies affecting the project	1	4	3	4	3	4	4	5	4	4	3	5	4	5	5	5	3	2	4	2	3	2	5	5	4	3

50.	Political instability of the country	5	5	5	5	2	5	5	5	4	5	4	5	4	4	5	5	5	2	4	5	4	4	4	5	4	4
51.	Political interferences	1	4	3	4	2	4	5	5	5	4	4	5	4	4	5	4	4	2	4	4	4	3	5	4	4	3
52.	Corruption and bribery	2	4	5	4	2	5	5	5	5	4	3	4	3	4	5	4	4	2	4	5	5	2	4	4	4	4
ENVIROMENTAL AND SAFETY RISK FACTORS																											
53.	Adverse weather conditions (continuous rainfall, snow, temperature, wind)	4	4	5	2	2	4	3	5	4	3	4	4	4	4	4	4	3	2	4	5	5	2	5	3	3	3
54.	Force majeure (natural and man-made disasters which are beyond the firm's control, e.g., fire, floods,	4	4	1	2	3	4	3	5	3	3	3	5	3	5	5	4	4	2	4	3	1	4	4	3	3	3

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