

# CONSTRUCTION CONTRACTS' PRICING ACCORDING TO CONTRACTUAL PROVISIONS AND RISK ALLOCATION

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**Abstract:** Construction contracts are complicated legal agreements with several terms that must be carefully considered. As a result, it is critical that all parties participating in construction projects understand the relevance of contractual clauses and how they might influence project results. This allows construction professionals to negotiate, draw, and execute contracts that are more successful in achieving their objectives.

In this technical paper, we will examine the importance of contractual provisions in construction contracts, and develop the contract pricing process to according to contractual provisions within the integrated contract management system, which can be partially or fully self-executing and self-enforcing, eliminates the need for intermediaries and makes methods such as demand letters or legal action unnecessary. Digital transformation for high productivity Smart contracts can execute terms automatically when predefined conditions are met, and blockchain technology can ensure that automated tasks are transparent and uncorrupted.

Throughout the paper, we will draw upon existing literature studies and empirical research to illustrate the practical implications of our findings. By providing a comprehensive analysis of the relationship between contractual provisions and construction contract pricing, this paper aims to contribute to a deeper understanding of this critical aspect of the construction industry

**Keywords:** Contract Pricing, project management, Risk Allocation, Contracts Provisions, Digital transformation.

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## 1. GENERAL INTRODUCTION

Building and construction projects are becoming increasingly expensive, complex, and large in scale, making them inherently risky. To reduce unforeseen costs, a strong contract strategy and client comprehension of the project help reduce unforeseen costs.

Construction contracts are fundamental legal agreements that define the terms and conditions under which a construction project will be executed. These contracts establish the rights and obligations of the parties involved, including the owner, contractor, and subcontractors, and provide a framework for managing risks, resolving disputes, and achieving project objectives. Within these contracts, provisions play a critical role in defining the specific terms upon which the project will be executed.

Construction contracts pricing is a crucial aspect of any construction project, as it determines the legal and financial obligations of the parties involved in the agreement. Among the many factors that can impact pricing, contractual provisions play a vital role in defining the terms and conditions under which the project will be executed, including payment terms, change orders, and dispute resolution mechanisms.

One of the primary roles of construction contracts is to allocate risk and obligation among parties. Over the last decade, construction professionals have become more dependent on legal counsel to aid them in identifying, allocating, controlling, minimizing, and mitigating risk during the design and construction process. Despite these risk-control efforts, the business has seen an alarming increase in claims and disputes. Essentially, the increase in claims has resulted in more legal engagement

Every day, the construction industry generates enormous amounts of data. Huge databases that contain data on everything from building models and designs to communications and cost estimates continue to grow as the sector matures. Unfortunately, without the proper tools, accessing these sources can be challenging because they are frequently unstructured. That is why technology developed to use big data, Blockchain and Artificial Intelligence in the building industry is so crucial.

## **2. PROBLEM DEFINITIONS**

- All owners desire high-quality construction at a fair price, but not all of them are eager to share risks or offer incentives to improve construction quality.
- Ineffective contract lifecycle management risks include missed costs, missed commitments, lost income, lost funds, lost contracts, unexpected renewals and expirations, hidden terms that expose a firm to liabilities, and potential general reputation loss.

### **2.1 Gaps in The Literature**

The contract formation process benefits greatly from the project management. Getting the most value out of the resources used is the main goal of project management. completing a project within the specified quality, safety, cost, and schedule limits. But we still didn't have clear vision to determine the risk and the value of each provision in the contract, and its relation with the whole contract

### **2.2 Research Objectives**

- Achieve a fair risk allocation among the construction contract's parties, and the owner will cover the cost of any additional provisions creating an obligation to the contractor.
- Contracts can be used to share risks and/or give incentives to improve building quality.
- Create automated contract workflows to avoid manual procedures and gain real-time process visibility with dashboards and reporting metrics to stay on top of your most essential contract dates.

## **3. LITERATURE REVIEW**

Construction contracts are legally binding agreements between the parties involved in a construction project, including the owner, contractor, and subcontractors. The provisions within these contracts define the terms and conditions under which the project will be executed, dictating the rights and obligations of each party. In this literature review, we will examine several studies that discuss various aspects of construction contracts, including their provisions and the recommended implementation steps.

Academic studies and the experts in the building business keep recommending models and frameworks to ensure proper contract pricing, risk allocation, and administration. (Luo et al., 2019) investigate construction payment automation using a blockchain framework based on smart contracts. A case-based scenario is used to show the suggested framework. (Shojaei et al., 2019) offer a smart contract system that integrates BIM with blockchain. (Hewavitharana et al., 2019) want to investigate how blockchain might address the construction industry's project management views in relation to the rules provided in the Project Management Body of Knowledge. (Ye et al., 2020) investigate a framework for automated billing in the construction industry through the use of BIM and smart contracts. The notion of implementing "BIM contracts" is discussed, as well as features of implementation. (Hamledari et al., 2020) provide a smart contract-based approach for autonomous building progress payments administration. (Badi et al., 2021) want to investigate the characteristics that drive

smart contract adoption in the UK construction sector. A framework is outlined to record and visualise the state of the DAP processes by combining BIM with smart contracts and developing a smart contract system utilising the Business Process Model and Notation (BPMN) (Ye et al., 2022).

According to 2020 Construction Technology report 92% of the construction industry uses smartphone daily for work and the table below is the numbers for 2016 to 2020

Year	Laptop	Tablet	Smart Phone	Smartwatch
2020	83%	65%	92%	12%
2019	83%	64%	93%	17%
2018	80%	62%	93%	10%
2017	78%	57%	68%	11%
2016	84%	67%	97%	11%

5% of respondents said that "all" of their apps were connected, while declaring a severe need for integrations. 34% said they have integrated three or fewer apps.

The following are some of the most important big data technology statistics and trends:

- The market for big data is anticipated to reach \$99.31 billion in 2021.
- Big data enhances a company's likelihood of making better strategic decisions by 69%, according to Forbes. (BARC)
- Businesses using big data analytics reported an 8% rise in sales. (BARC)
- 14% of construction firms wish to use internet analytics more frequently. (Saga)
- 57% of construction organisations desire access to reliable financial and project data, (Saga).
- 97.2% of businesses are investing in big data and AI. (NewVantage)

(Nanayakkara et al., 2019) elicited 57 answers from stakeholders regarding their perspectives on blockchain and smart contract-based activities during the discussion session. There were 18 different points of view found. Table 1 lists the 18 discovered criteria and the number of times they appear. For stakeholders, the most enticing elements are efficiency, trust, fairness, security, transparency, accountability, compliance, and standardization. Table 1 will go through all of the top-ranked criteria.

*Table 1: Most Appealing Factors to Use Blockchain and Smart Contracts in the Construction Industry*

Identifier	Appealing Factors	Number of Occurrences	Rank
AF01	Accessibility	2	6
AF02	Accountability	3	5
AF03	Adaptability	1	7
AF04	Automatic	2	6
AF05	Compliance	3	5
AF06	Decentralisation	1	7
AF07	Economical	2	6
AF08	Efficiency	9	1
AF09	Fair	6	3
AF10	Innovative	1	7
AF11	Reduplication	1	7
AF12	Reliability	2	6
AF13	Security	5	4
AF14	Simplicity	2	6
AF15	Standardisation	3	5
AF16	Transparent	5	4
AF17	Trust	7	2
AF18	Usability	2	6

Provisions for risk allocation among contract parties can appear in a variety of areas other than the total construction cost. (Zakaria et al., 2022) demonstrate that the utilisation of contract agreements such as FIDIC, PAM, and PWD 203A is based on the project owner/employer, project type, project nature, and finance involved. The suggested machine learning models may be used as a decision support tool for construction project managers as well as practitioners in order to progress automation as a cohesive topic of research within the green building sector. (Wang et al., 2019) wanted to examine how businesses may enhance their internal knowledge management (KM) procedures through effective contract management in order to assist construction practitioners in managing contract disputes and adjustments. (Marzouk et al., 2019) aims to use text mining to analyse construction project contracts and graphically analyse project correspondence.

(Ahmadisheykhsarmast et al., 2020) investigate a smart contract system for construction contract payment security. SMTSEC is a unique smart contract payment security technology designed to eliminate or reduce payment difficulties in the construction industry.

Another study by S. T. Ng et al. (2020) investigated the role of force majeure clauses in construction contracts in response to the COVID-19 pandemic. The study found that proper drafting and application of force majeure clauses played a crucial role in mitigating the economic impact of the pandemic on the construction industry

Overall, these studies illustrate the importance of contractual provisions in construction contracts. Clear, concise, and well-drafted provisions can have a significant impact on project outcomes, including reducing disputes, improving project quality, and how the effective automated contract management is also crucial in ensuring compliance with contractual provisions and maximizing project success.

#### 4. RESEARCH METHODOLOGY

##### 4.1 Research Methodology / Approach

This section presents the data analysis part of this paper. The analysis of this paper was done using the statistical package for social sciences (SPSS V. 26) for basic descriptive statistics. Section 4-4-1 deals with frequencies and percentages of the items in the study. Section 4-4-2 presents the descriptive statistics of the items associated with the relative importance index to investigate the importance and the ranking of the selected items in the study. Finally, in section three, the spearman correlation analysis is done to investigate the relationships between the main dimensions and the sub-dimensions.

##### 4.2 Sampling Size and Sampling Technique

The Questionnaire was targeting the Contract Engineers in Egypt with Average 10-12 Years of Experience in the Construction Projects, we have collected a random Sample for 88 Contract Engineers as the analysis shown below in section 8-4

##### 4-3 The Questionnaire

	Email address						
	Current Position / Last Position (Optional)						
	Years of Experience (any clarification are appreciated)						
	Contract Provisions	Construction Contract Main Provisions (Terms and Conditions) Pleas Insert Provision Importance according to Expected Risk درجة اهمية البنود طبقا للمخاطر المتوقعه 1=Very Low 2=Somewhat Low 3=Medium 4=High 5=Very High					
		1	2	3	4	5	
1		Scope Of Work Terms and Conditions	○	○	○	○	○
		Works to be measured & method of measurement	○	○	○	○	○
		Use of Provisional Sums	○	○	○	○	○
		Sufficiency of Tender	○	○	○	○	○
2	Stakeholders Obligation & Relations Terms and Conditions	○	○	○	○	○	
	Subcontractors provisions	○	○	○	○	○	

	Nominated Subcontractors	o	o	o	o	o
	Supply of Drawings and Documents	o	o	o	o	o
	Permanent Works Designed by Contractor	o	o	o	o	o
	Site Operations and Methods of Construction	o	o	o	o	o
	Inspection of Site	o	o	o	o	o
	Transport of Contractor's Equipment or temporary works	o	o	o	o	o
	Transport of Material or Plant	o	o	o	o	o
	Opportunities for Other Contractors	o	o	o	o	o
	Facilities for Other Contractors	o	o	o	o	o
	Contractor to Keep Site Clear	o	o	o	o	o
	Clearance of Site on Completion	o	o	o	o	o
	Engagement of Staff and Labour	o	o	o	o	o
	Returns of Labour and Contractor's Equipment	o	o	o	o	o
	Loss or Damage Due to Employer's Risks	o	o	o	o	o
	Responsibility for Amounts not Recovered	o	o	o	o	o
	Fossils	o	o	o	o	o
	Contractor's Equipment, Temporary Works and Materials; Exclusive Use for the Works	o	o	o	o	o
	Conditions of Hire of Contractor's Equipment	o	o	o	o	o
<b>3</b>	<b>Time Control Terms and Conditions</b>	o	o	o	o	o
	Programs to be Submitted and revised program and Cash flow to be submitted	o	o	o	o	o
	Delays and cost of delay of Drawings	o	o	o	o	o
	Commencement of Works	o	o	o	o	o
	Time for Completion	o	o	o	o	o
	Extension of Time for Completion	o	o	o	o	o
	Contractor to Provide Notification and Detailed Particulars	o	o	o	o	o
	Restriction on Working Hours	o	o	o	o	o
	Rate of Progress	o	o	o	o	o
	Taking –Over Certificate	o	o	o	o	o
<b>4</b>	<b>Quality Control Terms and Conditions</b>	o	o	o	o	o
	Boreholes and Exploratory Excavation	o	o	o	o	o
	Safety, Security and protection of the Environment	o	o	o	o	o
	Care of Works	o	o	o	o	o
	Responsibility to Rectify loss or Damage	o	o	o	o	o
	Failure by Contractor to Submit Drawings	o	o	o	o	o
	Urgent Remedial Work	o	o	o	o	o
	Cost of Remedying Defects	o	o	o	o	o
	Defects Liability Certificate	o	o	o	o	o
	Employer not Liable for Damage	o	o	o	o	o
<b>5</b>	<b>Cost Control Terms and Conditions</b>	o	o	o	o	o
	Monthly Statements	o	o	o	o	o
	Monthly Payment	o	o	o	o	o
	Final Statement	o	o	o	o	o
	Final Payment Certificate	o	o	o	o	o
	Time for Payment	o	o	o	o	o
	Performance Security	o	o	o	o	o
	Advance payment bond	o	o	o	o	o
	Source of performance security and advance payment bond	o	o	o	o	o
	Rates of Exchange	o	o	o	o	o
	Currency Restrictions	o	o	o	o	o
	Cost of Samples	o	o	o	o	o
	Cost of Tests	o	o	o	o	o
	Avoidance of Damage to Roads	o	o	o	o	o
	Quality of Materials, Plant and Workmanship	o	o	o	o	o
	Engineer's Determination where Tests not Provided for	o	o	o	o	o
	Inspection of Operations and Testing	o	o	o	o	o

	Dates for Inspection and Testing	o	o	o	o	o
	Independent Inspection	o	o	o	o	o
	Examination of Work before Covering Up	o	o	o	o	o
	Removal of Improper Work Materials or Plant	o	o	o	o	o
	Default of Contractor in Compliance	o	o	o	o	o
	Substantial Completion of Parts	o	o	o	o	o
	Approval only by Defects Liability Certificate	o	o	o	o	o
	Defects liability Period]	o	o	o	o	o
	Completion of Outstanding Work and Remedying Defects	o	o	o	o	o
	Increase or Decrease of Cost	o	o	o	o	o
	Payment on Termination	o	o	o	o	o
	Payment after Termination	o	o	o	o	o
	Time for Payments	o	o	o	o	o
	Statement at Completion	o	o	o	o	o
	Payment of Retention Money	o	o	o	o	o
	Payment in Event of Release from Performance	o	o	o	o	o
	Payment if Contract Terminated	o	o	o	o	o
<b>6</b>	<b>Variation and and Adjustment Terms and Conditions</b>	o	o	o	o	o
	Variations	o	o	o	o	o
	Instructions for Variations	o	o	o	o	o
	Valuation of Variations	o	o	o	o	o
	Power of Engineer to Fix Rates	o	o	o	o	o
	Variations Exceeding 15 Percent	o	o	o	o	o
<b>7</b>	<b>Risks Terms and Conditions</b>	o	o	o	o	o
	Increased Costs arising from Special Risks	o	o	o	o	o
	Damage to Works by Special Risks	o	o	o	o	o
	Special Risks	o	o	o	o	o
	No Liability for Special Risks	o	o	o	o	o
<b>8</b>	<b>Insurance Terms and Conditions</b>	o	o	o	o	o
	Damage to Persons and Property	o	o	o	o	o
	Third Party Insurance (including Employer's Property)	o	o	o	o	o
	Accident or Injury to Workmen	o	o	o	o	o
	Insurance Against Accident to Workmen	o	o	o	o	o
	Adequacy of Insurances	o	o	o	o	o
	Remedy on Contractor's Failure to Insure	o	o	o	o	o
	Compliance with Policy conditions, Statutes, Regulations	o	o	o	o	o
	Insurance of works and Contractors	o	o	o	o	o
<b>9</b>	<b>Force Majeure Terms and Conditions</b>	o	o	o	o	o
	Outbreak of War	o	o	o	o	o
<b>10</b>	<b>Claims Terms and Conditions</b>	o	o	o	o	o
	Procedure for Claims	o	o	o	o	o
	Notice of Claims	o	o	o	o	o
	Failure to Claim Comply	o	o	o	o	o
	Payment of Claims	o	o	o	o	o
	Claims under Performance Security	o	o	o	o	o
<b>11</b>	<b>Value Engineering Terms and Conditions</b>	o	o	o	o	o
<b>12</b>	<b>Disputes &amp; Arbitration Terms and Conditions</b>	o	o	o	o	o
	Arbitration	o	o	o	o	o
	Failure to Comply with Engineer's Decision	o	o	o	o	o
	Contractor's Failure to Carry Out Instructions	o	o	o	o	o
<b>13</b>	<b>Termination Terms and Conditions</b>	o	o	o	o	o
	Default of Employer	o	o	o	o	o
	Default of Contractor	o	o	o	o	o
	Removal of Contractor's Equipment	o	o	o	o	o
	Missing Required risks provisions (Optional):					
	Comments:					

#### 4.4 Survey Data Statistical Analysis

##### 4.4.1 Frequencies and Percentages

**Table (4-4-A): Scope of Work Terms and Conditions**

		1		2		3		4		5	
		N	%	N	%	N	%	N	%	N	%
Scope Of Work Terms and Conditions	x1	0	0.0%	1	1.1%	15	17.0%	12	13.6%	60	68.2%
Works to be measured & method of measurement	Q1	1	1.1%	4	4.5%	23	26.1%	39	44.3%	21	23.9%
Use of Provisional Sums	Q2	1	1.1%	9	10.2%	20	22.7%	38	43.2%	20	22.7%
Sufficiency of Tender	Q3	2	2.3%	1	1.1%	26	29.5%	23	26.1%	36	40.9%
<b>Cronbach's Alpha</b>	0.668										
<b>Validity</b>	0.817										

**Table (4-4-B): Stakeholders Obligation & Relations Terms and Conditions**

		1		2		3		4		5	
		N	%	N	%	N	%	N	%	N	%
Stakeholders Obligation & Relations Terms and Conditions	x2	0	0.0%	1	1.1%	26	29.5%	21	23.9%	40	45.5%
Subcontractors provisions	Q4	2	2.3%	10	11.4%	27	30.7%	36	40.9%	13	14.8%
Nominated Subcontractors	Q5	2	2.3%	15	17.0%	19	21.6%	34	38.6%	18	20.5%
Supply of Drawings and Documents	Q6	0	0.0%	12	13.6%	18	20.5%	28	31.8%	30	34.1%
Permanent Works Designed by Contractor	Q7	1	1.1%	14	15.9%	20	22.7%	31	35.2%	22	25.0%
Site Operations and Methods of Construction	Q8	1	1.1%	12	13.6%	22	25.0%	32	36.4%	21	23.9%
Inspection of Site	Q9	0	0.0%	16	18.2%	7	8.0%	40	45.5%	25	28.4%
Transport of Contractor's Equipment or temporary works	Q10	3	3.4%	5	5.7%	30	34.1%	32	36.4%	18	20.5%
Transport of Material or Plant	Q11	1	1.1%	10	11.4%	36	40.9%	20	22.7%	21	23.9%
Opportunities for Other Contractors	Q12	2	2.3%	9	10.2%	32	36.4%	28	31.8%	17	19.3%
Facilities for Other Contractors	Q13	2	2.3%	7	8.0%	41	46.6%	29	33.0%	9	10.2%
Contractor to Keep Site Clear	Q14	0	0.0%	10	11.4%	27	30.7%	39	44.3%	12	13.6%
Clearance of Site on Completion	Q15	1	1.1%	7	8.0%	22	25.0%	38	43.2%	20	22.7%
Engagement of Staff and Labour	Q16	2	2.3%	8	9.1%	20	22.7%	36	40.9%	22	25.0%
Returns of Labour and Contractor's Equipment	Q17	1	1.1%	7	8.0%	40	45.5%	26	29.5%	14	15.9%
Loss or Damage Due to Employer's Risks	Q18	0	0.0%	7	8.0%	17	19.3%	30	34.1%	34	38.6%
Responsibility for Amounts not Recovered	Q19	0	0.0%	6	6.8%	18	20.5%	46	52.3%	18	20.5%
Fossils	Q20	9	10.2%	19	21.6%	16	18.2%	20	22.7%	24	27.3%

Contractor's Equipment, Temporary Works and Materials; Exclusive Use for the Works	Q21	0	0.0%	8	9.1%	15	17.0%	42	47.7%	23	26.1%
Conditions of Hire of Contractor's Equipment	Q22	0	0.0%	9	10.2%	25	28.4%	37	42.0%	17	19.3%
<b>Cronbach's Alpha</b>	0.890										
<b>Validity</b>	0.943										

**Table (4-4-C): Time Control Terms and Conditions**

		1		2		3		4		5	
		N	%	N	%	N	%	N	%	N	%
Time Control Terms and Conditions	x3	0	0.0%	2	2.3%	5	5.7%	35	39.8%	46	52.3%
Programs to be Submitted and revised program and Cash flow to be submitted	Q23	0	0.0%	12	13.6%	18	20.5%	26	29.5%	32	36.4%
Delays and cost of delay of Drawings	Q24	1	1.1%	8	9.1%	8	9.1%	35	39.8%	36	40.9%
Commencement of Works	Q25	0	0.0%	6	6.8%	25	28.4%	22	25.0%	35	39.8%
Time for Completion	Q26	0	0.0%	2	2.3%	10	11.6%	26	30.2%	48	55.8%
Extension of Time for Completion	Q27	0	0.0%	5	5.7%	13	14.8%	25	28.4%	45	51.1%
Contractor to Provide Notification and Detailed Particulars	Q28	0	0.0%	2	2.3%	22	25.0%	34	38.6%	30	34.1%
Restriction on Working Hours	Q29	0	0.0%	6	6.8%	23	26.1%	38	43.2%	21	23.9%
Rate of Progress	Q30	0	0.0%	2	2.3%	18	20.5%	26	29.5%	42	47.7%
Taking –Over Certificate	Q31	0	0.0%	2	2.4%	13	15.3%	36	42.4%	34	40.0%
<b>Cronbach's Alpha</b>	0.867										
<b>Validity</b>	0.931										

**Table (4-4-D): Quality Control Terms and Conditions**

		1		2		3		4		5	
		N	%	N	%	N	%	N	%	N	%
Quality Control Terms and Conditions	x4	0	0.0%	4	4.5%	13	14.8%	30	34.1%	41	46.6%
Boreholes and Exploratory Excavation	Q32	4	4.6%	7	8.0%	27	31.0%	32	36.8%	17	19.5%
Safety, Security and protection of the Environment	Q33	2	2.3%	12	13.6%	21	23.9%	23	26.1%	30	34.1%
Care of Works	Q34	0	0.0%	6	6.8%	28	31.8%	26	29.5%	28	31.8%
Responsibility to Rectify loss or Damage	Q35	1	1.1%	4	4.5%	15	17.0%	35	39.8%	33	37.5%
Failure by Contractor to Submit Drawings	Q36	0	0.0%	2	2.3%	21	24.4%	41	47.7%	22	25.6%



Urgent Remedial Work	Q37	0	0.0%	2	2.3%	21	23.9%	35	39.8%	30	34.1%
Cost of Remedying Defects	Q38	0	0.0%	5	5.7%	18	20.5%	30	34.1%	35	39.8%
Defects Liability Certificate	Q39	3	3.4%	2	2.3%	22	25.0%	20	22.7%	41	46.6%
Employer not Liable for Damage	Q40	0	0.0%	9	10.2%	17	19.3%	31	35.2%	31	35.2%
<b>Cronbach's Alpha</b>	0.777										
<b>Validity</b>	0.881										

**Table (4-4-E): Cost Control Terms and Conditions**

		1		2		3		4		5	
		N	%	N	%	N	%	N	%	N	%
Cost Control Terms and Conditions	x5	0	0.0%	3	3.4%	8	9.1%	17	19.3%	60	68.2%
Monthly Statements	Q41	1	1.1%	4	4.5%	26	29.5%	24	27.3%	33	37.5%
Monthly Payment	Q42	0	0.0%	6	6.8%	13	14.8%	36	40.9%	33	37.5%
Final Statement	Q43	1	1.1%	3	3.4%	12	13.6%	29	33.0%	43	48.9%
Final Payment Certificate	Q44	1	1.1%	3	3.4%	17	19.3%	21	23.9%	46	52.3%
Time for Payment	Q45	1	1.1%	3	3.4%	22	25.0%	22	25.0%	40	45.5%
Performance Security	Q46	1	1.1%	8	9.1%	22	25.0%	39	44.3%	18	20.5%
Advance payment bond	Q47	1	1.1%	4	4.5%	29	33.0%	37	42.0%	17	19.3%
Source of performance security and advance payment bond	Q48	0	0.0%	10	11.4%	33	37.5%	32	36.4%	13	14.8%
Rates of Exchange	Q49	0	0.0%	6	6.8%	21	23.9%	25	28.4%	36	40.9%
Currency Restrictions	Q50	4	4.5%	2	2.3%	14	15.9%	24	27.3%	44	50.0%
Cost of Samples	Q51	1	1.1%	9	10.2%	37	42.0%	23	26.1%	18	20.5%
Cost of Tests	Q52	1	1.1%	14	15.9%	21	23.9%	30	34.1%	22	25.0%
Avoidance of Damage to Roads	Q53	3	3.4%	5	5.7%	23	26.1%	36	40.9%	21	23.9%
Quality of Materials, Plant and Workmanship	Q54	0	0.0%	4	4.5%	18	20.5%	38	43.2%	28	31.8%
Engineer's Determination where Tests not Provided for	Q55	1	1.1%	8	9.1%	21	23.9%	41	46.6%	17	19.3%
Inspection of Operations and Testing	Q56	0	0.0%	5	5.7%	18	20.5%	44	50.0%	21	23.9%
Dates for Inspection and Testing	Q57	2	2.3%	9	10.2%	26	29.5%	30	34.1%	21	23.9%
Independent Inspection	Q58	0	0.0%	7	8.0%	28	31.8%	30	34.1%	23	26.1%
Examination of Work before Covering Up	Q59	0	0.0%	9	10.2%	26	29.5%	30	34.1%	23	26.1%
Removal of Improper Work Materials or Plant	Q60	0	0.0%	6	6.8%	22	25.0%	39	44.3%	21	23.9%

Default of Contractor in Compliance	Q61	1	1.1%	4	4.5%	20	22.7%	33	37.5%	30	34.1%
Substantial Completion of Parts	Q62	0	0.0%	5	5.7%	25	28.4%	35	39.8%	23	26.1%
Approval only by Defects Liability Certificate	Q63	0	0.0%	4	4.5%	26	29.5%	33	37.5%	25	28.4%
Defects liability Period]	Q64	1	1.1%	4	4.5%	20	22.7%	36	40.9%	27	30.7%
Completion of Outstanding Work and Remedying Defects	Q65	0	0.0%	9	10.2%	20	22.7%	26	29.5%	33	37.5%
Increase or Decrease of Cost	Q66	0	0.0%	5	5.7%	18	20.5%	31	35.2%	34	38.6%
Payment on Termination	Q67	0	0.0%	4	4.5%	28	31.8%	27	30.7%	29	33.0%
Payment after Termination	Q68	2	2.3%	2	2.3%	25	28.4%	35	39.8%	24	27.3%
Time for Payments	Q69	0	0.0%	2	2.3%	17	19.3%	28	31.8%	41	46.6%
Statement at Completion	Q70	2	2.3%	3	3.4%	9	10.2%	38	43.2%	36	40.9%
Payment of Retention Money	Q71	0	0.0%	7	8.0%	17	19.5%	41	47.1%	22	25.3%
Payment in Event of Release from Performance	Q72	1	1.1%	10	11.4%	14	15.9%	24	27.3%	39	44.3%
Payment if Contract Terminated	Q73	0	0.0%	3	3.4%	19	21.6%	24	27.3%	42	47.7%
<b>Cronbach's Alpha</b>	0.951										
<b>Validity</b>	0.975										

**Table (4-4-F): Variation and Adjustment Terms and Conditions**

		1		2		3		4		5	
		N	%	N	%	N	%	N	%	N	%
Variation and and Adjustment Terms and Conditions	x6	0	0.0%	4	4.5%	24	27.3%	27	30.7%	33	37.5%
Variations	Q74	0	0.0%	4	4.5%	13	14.8%	27	30.7%	44	50.0%
Instructions for Variations	Q75	0	0.0%	6	6.8%	18	20.5%	26	29.5%	38	43.2%
Valuation of Variations	Q76	0	0.0%	4	4.5%	10	11.4%	27	30.7%	47	53.4%
Power of Engineer to Fix Rates	Q77	1	1.1%	4	4.5%	14	15.9%	42	47.7%	27	30.7%
Variations Exceeding 15 Percent	Q78	0	0.0%	6	6.8%	15	17.0%	43	48.9%	24	27.3%
<b>Cronbach's Alpha</b>	0.870										
<b>Validity</b>	0.933										

**Table (4-4-G):Risks Terms and Conditions**

		1		2		3		4		5	
		N	%	N	%	N	%	N	%	N	%
Risks Terms and Conditions	x7	0	0.0%	2	2.3%	12	13.6%	42	47.7%	32	36.4%
Increased Costs arising from Special Risks	Q79	2	2.3%	4	4.5%	20	22.7%	30	34.1%	32	36.4%

Damage to Works by Special Risks	Q80	2	2.3%	1	1.2%	14	16.3%	40	46.5%	29	33.7%
Special Risks	Q81	2	2.3%	4	4.7%	16	18.6%	38	44.2%	26	30.2%
No Liability for Special Risks	Q82	2	2.3%	5	5.7%	15	17.2%	33	37.9%	32	36.8%
<b>Cronbach's Alpha</b>	0.925										
<b>Validity</b>	0.962										

**Table (4-4-H): Insurance Terms and Conditions**

		1		2		3		4		5	
		N	%	N	%	N	%	N	%	N	%
Insurance Terms and Conditions	x8	0	0.0%	5	5.7%	22	25.0%	37	42.0%	24	27.3%
Damage to Persons and Property	Q83	4	4.5%	2	2.3%	20	22.7%	37	42.0%	25	28.4%
Third Party Insurance (including Employer's Property)	Q84	1	1.1%	14	15.9%	20	22.7%	28	31.8%	25	28.4%
Accident or Injury to Workmen	Q85	0	0.0%	5	5.7%	21	23.9%	34	38.6%	28	31.8%
Insurance Against Accident to Workmen	Q86	1	1.1%	5	5.7%	18	20.5%	39	44.3%	25	28.4%
Adequacy of Insurances	Q87	3	3.4%	4	4.5%	21	23.9%	36	40.9%	24	27.3%
Remedy on Contractor's Failure to Insure	Q88	3	3.4%	3	3.4%	15	17.0%	39	44.3%	28	31.8%
Compliance with Policy conditions, Statutes, Regulations	Q89	2	2.3%	4	4.5%	20	22.7%	30	34.1%	32	36.4%
Insurance of works and Contractors	Q90	0	0.0%	6	7.0%	18	20.9%	37	43.0%	25	29.1%
<b>Cronbach's Alpha</b>	.875										
<b>Validity</b>	0.935										

**Table (4-4-I): Force Majeure Terms and Conditions**

		1		2		3		4		5	
		N	%	N	%	N	%	N	%	N	%
Force Majeure Terms and Conditions	x9	1	1.1%	4	4.5%	22	25.0%	36	40.9%	25	28.4%
Outbreak of War	Q91	3	3.4%	12	13.6%	15	17.0%	23	26.1%	35	39.8%

**Table (4-4-J): Claims Terms and Conditions**

		1		2		3		4		5	
		N	%	N	%	N	%	N	%	N	%
Claims Terms and Conditions	x10	0	0.0%	6	6.8%	14	15.9%	41	46.6%	27	30.7%
Procedure for Claims	Q92	1	1.1%	8	9.1%	8	9.1%	45	51.1%	26	29.5%
Notice of Claims	Q93	2	2.3%	7	8.0%	20	22.7%	34	38.6%	25	28.4%
Failure to Claim Comply	Q94	4	4.5%	11	12.5%	13	14.8%	24	27.3%	36	40.9%
Payment of Claims	Q95	1	1.1%	7	8.0%	17	19.3%	28	31.8%	35	39.8%
Claims under Performance Security	Q96	0	0.0%	5	5.7%	21	23.9%	45	51.1%	17	19.3%
<b>Cronbach's Alpha</b>	0.856										
<b>Validity</b>	0.925										

**Table (4-4-K): Value Engineering Terms and Conditions**

		1		2		3		4		5	
		N	%	N	%	N	%	N	%	N	%
Value Engineering Terms and Conditions	x11	0	0.0%	14	19.4%	25	34.7%	23	31.9%	10	13.9%

**Table (4-4-L): Disputes & Arbitration Terms and Conditions**

		1		2		3		4		5	
		N	%	N	%	N	%	N	%	N	%
Disputes & Arbitration Terms and Conditions	x12	2	2.3%	3	3.4%	29	33.0%	37	42.0%	17	19.3%
Arbitration	Q97	3	3.4%	5	5.7%	14	15.9%	32	36.4%	34	38.6%
Failure to Comply with Engineer's Decision	Q98	0	0.0%	7	8.0%	15	17.0%	28	31.8%	38	43.2%
Contractor's Failure to Carry Out Instructions	Q99	0	0.0%	4	4.5%	20	22.7%	25	28.4%	39	44.3%
<b>Cronbach's Alpha</b>	.713										
<b>Validity</b>	0.844										

**Table (4-4-M): Termination Terms and Conditions**

		1		2		3		4		5	
		N	%	N	%	N	%	N	%	N	%
Termination Terms and Conditions	x13	2	2.3%	9	10.2%	12	13.6%	40	45.5%	25	28.4%
Default of Employer	Q100	0	0.0%	5	5.7%	19	21.6%	38	43.2%	26	29.5%
Default of Contractor	Q101	2	2.3%	5	5.7%	23	26.1%	31	35.2%	27	30.7%
Removal of Contractor's Equipment	Q102	0	0.0%	8	9.1%	31	35.2%	33	37.5%	16	18.2%
<b>Cronbach's Alpha</b>	.803										
<b>Validity</b>	0.896										

#### 4.4.2 Descriptive Statistics and relative importance index

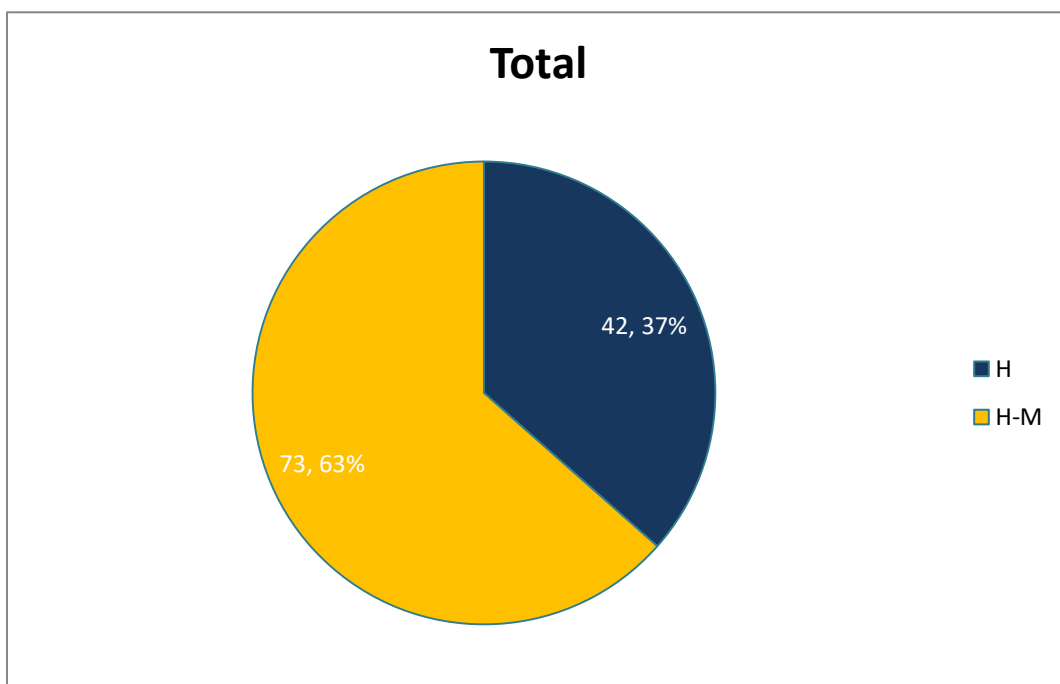
**Table (4-4-N): Descriptive Statistics and relative importance index**

Item	Min	Max	Mean	SD	Skewness	Kurtosis	RII	Ranking by category	Overall ranking	Importance level
x1	2	5	4.49	0.816	-1.259	0.132	0.898	1	2	H
Q1	1	5	3.85	0.878	-0.538	0.247	0.770	3	77	H-M
Q2	1	5	3.76	0.959	-0.541	-0.212	0.752	4	88	H-M
Q3	1	5	4.02	0.982	-0.716	0.134	0.804	2	34	H
x2	2	5	4.14	0.886	-0.375	-1.382	0.828	1	18	H
Q4	1	5	3.55	0.958	-0.413	-0.134	0.710	17	109	H-M
Q5	1	5	3.58	1.069	-0.414	-0.671	0.716	14	106	H-M
Q6	2	5	3.86	1.041	-0.47	-0.962	0.772	4	72	H-M
Q7	1	5	3.67	1.058	-0.372	-0.819	0.734	11	99	H-M
Q8	1	5	3.68	1.023	-0.376	-0.677	0.736	10	98	H-M
Q9	2	5	3.84	1.038	-0.682	-0.643	0.768	6	80	H-M
Q10	1	5	3.65	0.983	-0.499	0.193	0.730	12	102	H-M
Q11	1	5	3.57	1.015	0.013	-0.822	0.714	15	107	H-M

Q12	1	5	3.56	0.993	-0.233	-0.363	0.712	16	108	H-M
Q13	1	5	3.41	0.866	-0.147	0.335	0.682	19	113	H-M
Q14	2	5	3.6	0.865	-0.215	-0.548	0.720	13	104	H-M
Q15	1	5	3.78	0.928	-0.524	-0.064	0.756	7	85	H-M
Q16	1	5	3.77	1.003	-0.646	-0.006	0.754	8	87	H-M
Q17	1	5	3.51	0.897	0.063	-0.266	0.702	18	112	H-M
Q18	2	5	4.03	0.952	-0.641	-0.578	0.806	2	32	H
Q19	2	5	3.86	0.819	-0.512	-0.03	0.772	4	72	H-M
Q20	1	5	3.35	1.356	-0.245	-1.216	0.670	20	115	H-M
Q21	2	5	3.91	0.892	-0.613	-0.21	0.782	3	62	H-M
Q22	2	5	3.7	0.899	-0.249	-0.65	0.740	9	96	H-M
x3	2	5	4.42	0.707	-1.211	1.6	0.884	1	3	H
Q23	2	5	3.89	1.055	-0.489	-0.997	0.778	9	67	H-M
Q24	1	5	4.1	0.983	-1.1	0.639	0.820	6	20	H
Q25	2	5	3.98	0.982	-0.4	-1.085	0.796	8	45	H-M
Q26	2	5	4.4	0.786	-1.131	0.55	0.880	2	4	H
Q27	2	5	4.25	0.913	-0.986	-0.017	0.850	3	7	H
Q28	2	5	4.05	0.829	-0.333	-0.861	0.810	7	31	H
Q29	2	5	3.84	0.869	-0.327	-0.556	0.768	10	80	H-M
Q30	2	5	4.23	0.854	-0.685	-0.673	0.846	4	9	H
Q31	2	5	4.2	0.784	-0.675	-0.135	0.840	5	13	H
x4	2	5	4.23	0.867	-0.895	-0.003	0.846	1	9	H
Q32	1	5	3.59	1.04	-0.552	0.034	0.718	10	105	H-M
Q33	1	5	3.76	1.135	-0.48	-0.806	0.752	9	88	H-M
Q34	2	5	3.86	0.949	-0.216	-1.062	0.772	8	72	H-M
Q35	1	5	4.08	0.913	-0.903	0.602	0.816	2	25	H
Q36	2	5	3.97	0.774	-0.251	-0.528	0.794	6	49	H-M
Q37	2	5	4.06	0.822	-0.361	-0.788	0.812	5	30	H
Q38	2	5	4.08	0.913	-0.624	-0.565	0.816	2	25	H
Q39	1	5	4.07	1.059	-0.97	0.437	0.814	4	28	H
Q40	2	5	3.95	0.982	-0.579	-0.685	0.790	7	53	H-M
x5	2	5	4.52	0.802	-1.649	1.922	0.904	1	1	H
Q41	1	5	3.95	0.982	-0.504	-0.511	0.790	15	53	H-M
Q42	2	5	4.09	0.892	-0.777	-0.083	0.818	9	23	H
Q43	1	5	4.25	0.9	-1.197	1.235	0.850	2	7	H
Q44	1	5	4.23	0.956	-1.04	0.398	0.846	3	9	H
Q45	1	5	4.1	0.971	-0.748	-0.205	0.820	8	20	H
Q46	1	5	3.74	0.928	-0.509	-0.095	0.748	28	92	H-M
Q47	1	5	3.74	0.864	-0.337	0.086	0.748	28	92	H-M
Q48	2	5	3.55	0.883	0.013	-0.684	0.710	33	109	H-M
Q49	2	5	4.03	0.964	-0.541	-0.855	0.806	11	32	H
Q50	1	5	4.16	1.071	-1.36	1.474	0.832	7	17	H
Q51	1	5	3.55	0.97	0.024	-0.626	0.710	33	109	H-M
Q52	1	5	3.66	1.06	-0.341	-0.848	0.732	32	101	H-M
Q53	1	5	3.76	0.994	-0.721	0.421	0.752	26	88	H-M

Q54	2	5	4.02	0.844	-0.513	-0.382	0.804	12	34	H
Q55	1	5	3.74	0.916	-0.554	0.023	0.748	28	92	H-M
Q56	2	5	3.92	0.82	-0.492	-0.119	0.784	18	60	H-M
Q57	1	5	3.67	1.025	-0.409	-0.397	0.734	31	99	H-M
Q58	2	5	3.78	0.928	-0.171	-0.916	0.756	25	85	H-M
Q59	2	5	3.76	0.959	-0.221	-0.927	0.752	26	88	H-M
Q60	2	5	3.85	0.865	-0.361	-0.494	0.770	24	77	H-M
Q61	1	5	3.99	0.928	-0.683	0.09	0.798	14	43	H-M
Q62	2	5	3.86	0.873	-0.258	-0.723	0.772	23	72	H-M
Q63	2	5	3.9	0.872	-0.224	-0.85	0.780	20	65	H-M
Q64	1	5	3.95	0.909	-0.662	0.209	0.790	15	53	H-M
Q65	2	5	3.94	1.01	-0.501	-0.912	0.788	17	57	H-M
Q66	2	5	4.07	0.907	-0.609	-0.55	0.814	10	28	H
Q67	2	5	3.92	0.913	-0.212	-1.083	0.784	18	60	H-M
Q68	1	5	3.88	0.92	-0.653	0.582	0.776	22	68	H-M
Q69	2	5	4.23	0.84	-0.692	-0.577	0.846	3	9	H
Q70	1	5	4.17	0.913	-1.37	2.269	0.834	6	16	H
Q71	2	5	3.9	0.876	-0.537	-0.273	0.780	20	65	H-M
Q72	1	5	4.02	1.083	-0.825	-0.4	0.804	12	34	H
Q73	2	5	4.19	0.895	-0.689	-0.695	0.838	5	14	H
x6	2	5	4.01	0.916	-0.39	-0.97	0.802	5	38	H
Q74	2	5	4.26	0.877	-0.959	0.025	0.852	2	6	H
Q75	2	5	4.09	0.955	-0.672	-0.642	0.818	3	23	H
Q76	2	5	4.33	0.854	-1.15	0.573	0.866	1	5	H
Q77	1	5	4.02	0.871	-0.9	0.973	0.804	4	34	H
Q78	2	5	3.97	0.85	-0.623	-0.04	0.794	6	49	H-M
x7	2	5	4.18	0.751	-0.647	0.109	0.836	1	15	H
Q79	1	5	3.98	0.994	-0.816	0.32	0.796	4	45	H-M
Q80	1	5	4.08	0.871	-1.146	2.14	0.816	2	25	H
Q81	1	5	3.95	0.944	-0.935	0.936	0.790	5	53	H-M
Q82	1	5	4.01	0.994	-0.968	0.628	0.802	3	38	H
x8	2	5	3.91	0.866	-0.364	-0.581	0.782	6	62	H-M
Q83	1	5	3.88	1.004	-1	1.14	0.776	7	68	H-M
Q84	1	5	3.7	1.084	-0.378	-0.905	0.740	9	96	H-M
Q85	2	5	3.97	0.89	-0.433	-0.652	0.794	3	49	H-M
Q86	1	5	3.93	0.907	-0.714	0.343	0.786	5	59	H-M
Q87	1	5	3.84	0.993	-0.826	0.634	0.768	8	80	H-M
Q88	1	5	3.98	0.971	-1.112	1.416	0.796	1	45	H-M
Q89	1	5	3.98	0.994	-0.816	0.32	0.796	1	45	H-M
Q90	2	5	3.94	0.886	-0.508	-0.427	0.788	4	57	H-M
x9	1	5	3.91	0.905	-0.579	0.108	0.782	1	62	H-M
Q91	1	5	3.85	1.189	-0.714	-0.593	0.770	2	77	H-M
x10	2	5	4.01	0.864	-0.678	-0.046	0.802	1	38	H
Q92	1	5	3.99	0.928	-1.035	0.868	0.798	3	43	H-M
Q93	1	5	3.83	1.008	-0.681	0.028	0.766	6	84	H-M

Q94	1	5	3.88	1.211	-0.827	-0.391	0.776	4	68	H-M
Q95	1	5	4.01	1.011	-0.774	-0.187	0.802	1	38	H
Q96	2	5	3.84	0.801	-0.39	-0.15	0.768	5	80	H-M
x11	2	5	3.4	0.959	0.088	-0.906	0.680		114	H-M
x12	1	5	3.73	0.893	-0.518	0.57	0.746	4	95	H-M
Q97	1	5	4.01	1.045	-1.075	0.775	0.802	3	38	H
Q98	2	5	4.1	0.959	-0.768	-0.438	0.820	2	20	H
Q99	2	5	4.13	0.92	-0.616	-0.76	0.826	1	19	H
x13	1	5	3.88	1.015	-0.891	0.317	0.776	2	68	H-M
Q100	2	5	3.97	0.864	-0.481	-0.429	0.794	1	49	H-M
Q101	1	5	3.86	0.996	-0.647	0.051	0.772	3	72	H-M
Q102	2	5	3.65	0.885	-0.054	-0.724	0.730	4	102	H-M



#### 4.4.3 Correlation Analysis

Table (4-4-O): Spearman correlation for and related items

		Scope of Work Terms and Conditions
Scope of Work Terms and Conditions	Correlation Coefficient	1.000
	Sig. (2-tailed)	
	N	88
Works to be measured & method of measurement	Correlation Coefficient	-0.099
	Sig. (2-tailed)	0.360
	N	88
Use of Provisional Sums	Correlation Coefficient	0.011
	Sig. (2-tailed)	0.920
	N	88
Sufficiency of Tender	Correlation Coefficient	.249*
	Sig. (2-tailed)	0.019
	N	88

**Table (4-4-P): Spearman correlation for Stakeholders Obligation & Relations Terms and Condition and the related items**

		Stakeholders Obligation & Relations Terms and Conditions
Stakeholders Obligation & Relations Terms and Conditions	Correlation Coefficient	1.000
	Sig. (2-tailed)	
	N	88
Subcontractors provisions	Correlation Coefficient	.322**
	Sig. (2-tailed)	0.002
	N	88
Nominated Subcontractors	Correlation Coefficient	0.024
	Sig. (2-tailed)	0.824
	N	88
Supply of Drawings and Documents	Correlation Coefficient	0.170
	Sig. (2-tailed)	0.113
	N	88
Permanent Works Designed by Contractor	Correlation Coefficient	.264*
	Sig. (2-tailed)	0.013
	N	88
Site Operations and Methods of Construction	Correlation Coefficient	.284**
	Sig. (2-tailed)	0.007
	N	88
Inspection of Site	Correlation Coefficient	.345**
	Sig. (2-tailed)	0.001
	N	88
Transport of Contractor's Equipment or temporary works	Correlation Coefficient	0.144
	Sig. (2-tailed)	0.180
	N	88
Transport of Material or Plant	Correlation Coefficient	0.100
	Sig. (2-tailed)	0.352
	N	88
Opportunities for Other Contractors	Correlation Coefficient	0.114
	Sig. (2-tailed)	0.291
	N	88
Facilities for Other Contractors	Correlation Coefficient	0.080
	Sig. (2-tailed)	0.459
	N	88
Contractor to Keep Site Clear	Correlation Coefficient	0.013
	Sig. (2-tailed)	0.902
	N	88
Clearance of Site on Completion	Correlation Coefficient	0.132
	Sig. (2-tailed)	0.219
	N	88
Engagement of Staff and Labour	Correlation Coefficient	0.140
	Sig. (2-tailed)	0.194
	N	88
Returns of Labour and Contractor's Equipment	Correlation Coefficient	0.152
	Sig. (2-tailed)	0.156
	N	88



Loss or Damage Due to Employer's Risks	Correlation Coefficient	0.039
	Sig. (2-tailed)	0.720
	N	88
Responsibility for Amounts not Recovered	Correlation Coefficient	0.092
	Sig. (2-tailed)	0.394
	N	88
Fossils	Correlation Coefficient	-0.010
	Sig. (2-tailed)	0.926
	N	88
"Contractor's Equipment, Temporary Works	Correlation Coefficient	0.053
	Sig. (2-tailed)	0.626
	N	88
and Materials; Exclusive Use for the Works"	Correlation Coefficient	0.114
	Sig. (2-tailed)	0.292
	N	88

**Table (4-4-Q): Spearman correlation for Conditions of Hire of Contractor's Equipment Terms and Condition and the related items**

		Conditions of Hire of Contractor's Equipment
Conditions of Hire of Contractor's Equipment	Correlation Coefficient	1.000
	Sig. (2-tailed)	
	N	88
Time Control Terms and Conditions	Correlation Coefficient	0.045
	Sig. (2-tailed)	0.674
	N	88
"Programs to be Submitted and revised program	Correlation Coefficient	0.119
	Sig. (2-tailed)	0.270
	N	88
and Cash flow to be submitted"	Correlation Coefficient	-0.023
	Sig. (2-tailed)	0.835
	N	88
Delays and cost of delay of Drawings	Correlation Coefficient	-0.011
	Sig. (2-tailed)	0.921
	N	86
Commencement of Works	Correlation Coefficient	-0.090
	Sig. (2-tailed)	0.404
	N	88
Time for Completion	Correlation Coefficient	0.103
	Sig. (2-tailed)	0.337
	N	88
Extension of Time for Completion	Correlation Coefficient	0.113
	Sig. (2-tailed)	0.293
	N	88
Contractor to Provide Notification and Detailed Particulars	Correlation Coefficient	0.131
	Sig. (2-tailed)	0.222
	N	88
Restriction on Working Hours	Correlation Coefficient	0.194
	Sig. (2-tailed)	0.076
	N	85

**Table (4-4-R): Spearman correlation for Rate of Progress Terms and Condition and the related items**

		Rate of Progress
Rate of Progress	Correlation Coefficient	1.000
	Sig. (2-tailed)	
	N	88
Taking –Over Certificate	Correlation Coefficient	0.059
	Sig. (2-tailed)	0.587
	N	87
Quality Control Terms and Conditions	Correlation Coefficient	0.113
	Sig. (2-tailed)	0.296
	N	88
Boreholes and Exploratory Excavation	Correlation Coefficient	0.033
	Sig. (2-tailed)	0.757
	N	88
Safety, Security and protection of the Environment	Correlation Coefficient	0.021
	Sig. (2-tailed)	0.849
	N	88
Care of Works	Correlation Coefficient	-0.018
	Sig. (2-tailed)	0.866
	N	86
Responsibility to Rectify loss or Damage	Correlation Coefficient	0.039
	Sig. (2-tailed)	0.722
	N	88
Failure by Contractor to Submit Drawings	Correlation Coefficient	0.108
	Sig. (2-tailed)	0.315
	N	88
Urgent Remedial Work	Correlation Coefficient	0.049
	Sig. (2-tailed)	0.649
	N	88
Cost of Remedying Defects	Correlation Coefficient	0.181
	Sig. (2-tailed)	0.092
	N	88

**Table (4-4-S): Spearman correlation for Defects Liability Certificate Terms and Condition and the related items**

		Defects Liability Certificate
Defects Liability Certificate	Correlation Coefficient	1.000
	Sig. (2-tailed)	
	N	88
Employer not Liable for Damage	Correlation Coefficient	0.124
	Sig. (2-tailed)	0.251
	N	88
Cost Control Terms and Conditions	Correlation Coefficient	0.168
	Sig. (2-tailed)	0.118
	N	88
Monthly Statements	Correlation Coefficient	0.124
	Sig. (2-tailed)	0.250
	N	88
Monthly Payment	Correlation Coefficient	0.180
	Sig. (2-tailed)	0.093
	N	88
Final Statement	Correlation Coefficient	0.155
	Sig. (2-tailed)	0.151
	N	88

Final Payment Certificate	Correlation Coefficient	0.197
	Sig. (2-tailed)	0.066
	N	88
Time for Payment	Correlation Coefficient	.262*
	Sig. (2-tailed)	0.014
	N	88
Performance Security	Correlation Coefficient	.240*
	Sig. (2-tailed)	0.024
	N	88
Advance payment bond	Correlation Coefficient	0.151
	Sig. (2-tailed)	0.162
	N	88
"Source of performance security	Correlation Coefficient	.279**
	Sig. (2-tailed)	0.009
	N	88
and advance payment bond"	Correlation Coefficient	0.204
	Sig. (2-tailed)	0.056
	N	88
Rates of Exchange	Correlation Coefficient	0.149
	Sig. (2-tailed)	0.167
	N	88
Currency Restrictions	Correlation Coefficient	0.128
	Sig. (2-tailed)	0.233
	N	88
Cost of Samples	Correlation Coefficient	0.032
	Sig. (2-tailed)	0.765
	N	88
Cost of Tests	Correlation Coefficient	.241*
	Sig. (2-tailed)	0.024
	N	88
Avoidance of Damage to Roads	Correlation Coefficient	0.115
	Sig. (2-tailed)	0.287
	N	88
Quality of Materials, Plant and Workmanship	Correlation Coefficient	0.133
	Sig. (2-tailed)	0.216
	N	88
Engineer's Determination where Tests not Provided for	Correlation Coefficient	.210*
	Sig. (2-tailed)	0.049
	N	88
Inspection of Operations and Testing	Correlation Coefficient	0.159
	Sig. (2-tailed)	0.140
	N	88
Dates for Inspection and Testing	Correlation Coefficient	0.006
	Sig. (2-tailed)	0.959
	N	88
Independent Inspection	Correlation Coefficient	0.094
	Sig. (2-tailed)	0.381
	N	88
Examination of Work before Covering Up	Correlation Coefficient	0.189
	Sig. (2-tailed)	0.078
	N	88
Removal of Improper Work Materials or Plant	Correlation Coefficient	0.157
	Sig. (2-tailed)	0.144
	N	88
Default of Contractor in Compliance	Correlation Coefficient	.295**
	Sig. (2-tailed)	0.005
	N	88
Substantial Completion of Parts	Correlation Coefficient	0.048

	Sig. (2-tailed)	0.658
	N	88
Approval only by Defects Liability Certificate	Correlation Coefficient	0.014
	Sig. (2-tailed)	0.897
	N	88
Defects liability Period]	Correlation Coefficient	0.175
	Sig. (2-tailed)	0.103
	N	88
Completion of Outstanding Work and Remedying Defects	Correlation Coefficient	0.136
	Sig. (2-tailed)	0.206
	N	88
Increase or Decrease of Cost	Correlation Coefficient	.364**
	Sig. (2-tailed)	0.000
	N	88
Payment on Termination	Correlation Coefficient	.310**
	Sig. (2-tailed)	0.003
	N	88
Payment after Termination	Correlation Coefficient	.313**
	Sig. (2-tailed)	0.003
	N	87
Time for Payments	Correlation Coefficient	0.120
	Sig. (2-tailed)	0.267
	N	88
Statement at Completion	Correlation Coefficient	0.153
	Sig. (2-tailed)	0.154
	N	88

**Table (4-4-T): Spearman correlation for Payment of Retention Money Terms and Condition and the related items**

		Payment of Retention Money
Payment of Retention Money	Correlation Coefficient	1.000
	Sig. (2-tailed)	
	N	88
Payment in Event of Release from Performance	Correlation Coefficient	.248*
	Sig. (2-tailed)	0.020
	N	88
Payment if Contract Terminated	Correlation Coefficient	0.189
	Sig. (2-tailed)	0.078
	N	88
Variation and Adjustment Terms and Conditions	Correlation Coefficient	0.130
	Sig. (2-tailed)	0.228
	N	88
Variations	Correlation Coefficient	-0.077
	Sig. (2-tailed)	0.475
	N	88
Instructions for Variations	Correlation Coefficient	0.190
	Sig. (2-tailed)	0.076
	N	88

**Table (4-4-U): Spearman correlation for Valuation of Variations Terms and Condition and the related items**

		Valuation of Variations
Valuation of Variations	Correlation Coefficient	1.000
	Sig. (2-tailed)	
	N	88
Power of Engineer to Fix Rates	Correlation Coefficient	0.105
	Sig. (2-tailed)	0.329
	N	88

Variations Exceeding 15 Percent	Correlation Coefficient	0.072
	Sig. (2-tailed)	0.511
	N	86
Risks Terms and Conditions	Correlation Coefficient	0.049
	Sig. (2-tailed)	0.655
	N	86
Increased Costs arising from Special Risks	Correlation Coefficient	0.077
	Sig. (2-tailed)	0.476
	N	87

**Table (4-4-V): Spearman correlation for Damage to Works by Special Risks Terms and Condition and the related items**

		Damage to Works by Special Risks
Damage to Works by Special Risks	Correlation Coefficient	1.000
	Sig. (2-tailed)	
	N	88
Special Risks	Correlation Coefficient	0.119
	Sig. (2-tailed)	0.271
	N	88
No Liability for Special Risks	Correlation Coefficient	.228*
	Sig. (2-tailed)	0.033
	N	88
Insurance Terms and Conditions	Correlation Coefficient	0.055
	Sig. (2-tailed)	0.612
	N	88
Damage to Persons and Property	Correlation Coefficient	0.155
	Sig. (2-tailed)	0.150
	N	88
Third Party Insurance (including Employer's Property)	Correlation Coefficient	0.197
	Sig. (2-tailed)	0.066
	N	88
Accident or Injury to Workmen	Correlation Coefficient	0.136
	Sig. (2-tailed)	0.206
	N	88
Insurance Against Accident to Workmen	Correlation Coefficient	0.069
	Sig. (2-tailed)	0.525
	N	88
Adequacy of Insurances	Correlation Coefficient	.270*
	Sig. (2-tailed)	0.012
	N	86

**Table (4-4-W): Spearman correlation Remedy on Contractor's Failure to Insure Terms and Condition and the related items**

		Remedy on Contractor's Failure to Insure
Remedy on Contractor's Failure to Insure	Correlation Coefficient	1.000
	Sig. (2-tailed)	
	N	88
Compliance with Policy conditions, Statutes, Regulations	Correlation Coefficient	0.094
	Sig. (2-tailed)	0.382
	N	88

**Table (4-4-X): Spearman correlation Remedy on Insurance of works and Contractors Terms and Condition and the related items**

		Insurance of works and Contractors
Insurance of works and Contractors	Correlation Coefficient	1.000
	Sig. (2-tailed)	
	N	88
Force Majeure Terms and Conditions	Correlation Coefficient	0.106
	Sig. (2-tailed)	0.326
	N	88
Outbreak of War	Correlation Coefficient	0.135
	Sig. (2-tailed)	0.209
	N	88
Claims Terms and Conditions	Correlation Coefficient	0.173
	Sig. (2-tailed)	0.106
	N	88
Procedure for Claims	Correlation Coefficient	.223*
	Sig. (2-tailed)	0.037
	N	88
Notice of Claims	Correlation Coefficient	.230*
	Sig. (2-tailed)	0.031
	N	88

**Table (4-4-Y): Spearman correlation Remedy on Payment of Claims Terms and Condition and the related items**

		Payment of Claims
Payment of Claims	Correlation Coefficient	1.000
	Sig. (2-tailed)	
	N	88
Claims under Performance Security	Correlation Coefficient	0.093
	Sig. (2-tailed)	0.391
	N	88
Value Engineering Terms and Conditions	Correlation Coefficient	0.065
	Sig. (2-tailed)	0.546
	N	88
Disputes & Arbitration Terms and Conditions	Correlation Coefficient	0.106
	Sig. (2-tailed)	0.325
	N	88

**Table (4-4-Z): Spearman correlation Remedy Arbitration Terms and Condition and the related items**

		Arbitration
Arbitration	Correlation Coefficient	1.000
	Sig. (2-tailed)	
	N	88
Failure to Comply with Engineer's Decision	Correlation Coefficient	0.177
	Sig. (2-tailed)	0.099
	N	88
Contractor's Failure to Carry Out Instructions	Correlation Coefficient	0.150
	Sig. (2-tailed)	0.164
	N	88
Termination Terms and Conditions	Correlation Coefficient	0.060
	Sig. (2-tailed)	0.580
	N	88

## 5. CONCLUSIONS

Construction Contracts is not only a Legal Documents, it is a Project Management tools and techniques which should be used during the project life cycle to manage the construction projects, monitor, and control project management process as follows:

1. Scope of Work and project Charter as per Scope of Work provisions
2. Communication Plan as per Stakeholder Obligation and Relations Provisions
3. Time Management Plan as per Time Control Provisions
4. Quality Management Plan as per Quality Control Provision
5. Cost Management Plan Cost Control Provisions
6. Change Management Plan as per
  - a. Variation and Adjustment Provisions
  - b. Claims Provisions
7. Risk Management Plan
  - a. Risk Provisions
  - b. Insurance Provisions
  - c. Force Majeure Provisions
8. Closing
  - a. Termination Provisions
  - b. Closing Provisions

And to insure avoid risks due to ineffective contract lifecycle

- Construction Contracts should ensures that all parties involved are informed when changes are made and may agree on the contents, which will lower the costs associated with litigation because it is simple to identify where errors are made., ensure a fair allocation of risks among the construction contract's parties, and the owner will bear the expense of any new provisions that impose obligations on the contractor.
- To improve the quality of construction, use contracts to share risks and/or offer incentives.
- Develop automated contract workflows to replace human processes, and use dashboards and reporting metrics to see how the process is progressing in real time. This will help you maintain track of the deadlines for your most crucial contracts.
- Project management is a vital component of contract strategy, and it's necessary that the Client is updated on any developments.

## 6. RECOMMENDATIONS FOR FUTURE RESEARCHES

While significant research has been conducted on construction contracts, there are still several areas where further research could be valuable. Here are some recommended future research areas:

- how integrated platforms and applications can streamline the process of drafting, negotiating, and executing construction contracts. This could involve evaluating the effectiveness of existing software solutions and identifying areas for improvement. For example, researchers could examine whether integrated platforms are more effective than traditional methods of contract negotiation and implementation, such as using separate software tools for project management, accounting, and legal document management.
- Another potential area of focus could be examining the impact of data security and privacy concerns on the implementation of integrated platforms. As more construction companies adopt digital tools, the need to protect sensitive data becomes increasingly important.

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