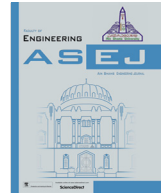




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Construction dispute and contract incompleteness in Nigeria construction industry

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ABSTRACT

This study identifies that the underlying root cause of construction disputes is contract incompleteness caused by bounded rationality and uncertainty. Using the relative importance index (RII) and confirmatory factor analysis (CFA) from SEM AMOS, this study examines the occurrence likelihood and significant effect on dispute occurrence in the contract incompleteness minefield (**ambiguity of contract document (AOD), deficiency of contract document (DOD), inconsistency of contract document (IOD), and defectiveness of contract document (CDD)**), and the manifestation of opportunism (**violation of commitment (VOC), forced renegotiation (FRC), evasion of obligations (EOB), and refusal to adapt to change (RAC)**). A large-scale survey of 350 professionals from the Nigerian construction industry was conducted. The RII result of the highly ranked minefield of the manifestation of contract incompleteness shows the interrelationship between contract incompleteness and dispute occurrence. Likewise, the CFA result significantly affects contract incompleteness on dispute occurrence. Therefore, the need to minimise contract incompleteness in the Nigerian construction industry becomes a pertinent issue to reduce dispute occurrence.

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1. Introduction

Contract incompleteness seems to be the most critical problem in construction projects. Disputes occur during construction projects regardless of how extensive and well-written the construction contracts are [24]. According to Yates [48], it is impossible to create construction contracts that handle every potential problem that may arise during construction; as a result, many construction contracts result in one or both parties filing claims against the other. Construction activities are generally referred to as a leading economic sector since it forecasts an economy's overall path. Also, it contributes significantly to attaining national social-economic development goals by providing shelter, infrastructure,

and job opportunities [16,37]. By their very nature, construction contracts and human nature lead to disputes among the parties involved. Okuntade [36] and Ojo & Babalola [35] stated that the construction industry's dispute nature is so complex that it might impede productivity and escalate to lengthy litigation if not effectively managed. This study examines construction disputes and contract incompleteness in the Nigerian construction industry from the Transaction Cost Theory (TCE) perspective.

1.1. Overview of construction dispute and contract incompleteness

Arcadis [7] defines a dispute as a circumstance in which two parties disagree over the assertion of a contractual right, resulting in a contract decision that becomes a formal dispute and has been traced to arise from many factors. Kumaraswamy [28] stated that a dispute emerges "when the other party rejects a claim or assertion made by one party." Jannadia, Assaf, Bubshait, & Naji [25] linked construction disputes to the method of procurement system adopted in a particular project. Mitropoulos & Howell [31] revealed "uncertainty, contractual problems and opportunistic behaviour" as the primary source of disputes. Brooker [11] examined the use of mediation in resolving disputes and concluded that 72% of disputes were caused by "payment, delay, defect/ quality, and profes-

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sional negligence." Acharya, Lee, & Im [2] highlighted disputes occurring as a result of "differing site condition, errors, and omission in design, local people obstruction, an excessive quantity of works, difference in change order evaluation, double meaning in the specification." Cheung & Yiu [15] described the causes of a dispute to be "management, communication, people and contract documents. Cakmak & Cakmak [13], after a review of relevant studies on various causes and sources of disputes, discovered a level of consistency and thereafter, based on nature and mode of occurrence, categorised them into owner-related, contractor-related, design team-related, contract-related, human behaviour-related, project-related and external factor-related. According to the Arcadis report [7], "poorly drafted or incomplete or unsubstantiated claims, failure to make interim awards or extensions of time and compensations, owner/contractor/subcontractor failing to understand and/or comply with its contractual obligations" were identified as overall dispute causes. Despite extensive research efforts on the causes/sources of disputes, the results are not proportionate because the overall volume of disputes keeps increasing [3-7], and it seems that the underlying root cause has not been addressed.

Yates [46,47] and Cheung & Pang [14] attempt to establish the underlying root cause of disputes and identify disputes from three different approaches: **the subject-matter approach, the diagnostic approach, and the subject and diagnostic approach**. In the subject-matter approach, all issues in disputes must be explicitly stated in all claims. This approach describes, characterises disputes, and links them with contract provisions. Most researchers who adopted this approach argued and concluded that construction disputes occur due to lapses from contract documents [11,27]. In the diagnostic approach, a dispute occurs from the conflicting interest of contract parties. According to Mururu [32], disputes occur due to forming a stance to sustain the conflict. Researchers have identified several causes to be the cause of this approach. Tillett [40] recognised the incompatibility of a party's interest, goal, and needs as the source of disputes. Diekmann & Girard [17] highlighted "people, process and product" as the primary causes of disputes. This approach believes that if the parties' interest in the contract can be satisfied, disputes can be managed effectively. The subject and diagnostic approach combines the two prior approaches to analyse construction disputes. This approach, leaning on Transaction Cost Economic Theory, argues that construction contracts are unavoidably incomplete due to bounded rationality and uncertainty. The study concluded that contract incompleteness and consequence post-contract adjustment, which set the stage for opportunistic behaviour from the parties involved in the project, is the real cause of disputes.

1.2. Transaction cost economy theory (TCE)

This theory enables contracting parties to understand better the causes of conflict and disputes that develop during economic transactions, such as contract incompleteness due to bounded rationality and uncertainty. Karl Llewellyn and Macaulay are credited with the creation of this theory. At the same time, John Commons, Ronald Coase, and Chester Barnard are recognised with substantial contributions in the area of economics and organisational theory. Furthermore, Williamson [42] expounds on the theory and aligns it to the contracting orientation, claiming that any issue framed as a contracting problem may be addressed in transaction cost economising terms. TCE is a well-known theory for explaining the governance structure of economic exchange activities. Nonetheless, scholars have utilised it to investigate and address construction problems such as procurement (Bean, Mustapa, & Mustapa, 2019; Parker & Hartley, 2003; Rajeh, Tookey, & Rotimi, 2013), conflict, and disputes (Aibinu, Ling, & Ofori, 2011; Pang & Cheung [14]; Yates

[46,47]). However, in recent years there has been no research which uses the theory to examine construction disputes.

A contract can be divided into complete and incomplete contracts. A contract is assumed to be complete when it can provide for all eventualities, ensuring no gaps. However, it is impossible to create a contract that addresses every potential problem that may arise during construction because parties are constantly confronted with uncertainty, which necessitates renegotiation, violations, or litigations. Hence, many construction contracts may result in conflict and disputes [8,48].

Williamson [41-43] studied factors that lead to costly transactions and discovered that bounded rationality, uncertainty, informational asymmetry, and opportunism are essential traits. The study proposes Transaction Cost Economic Theory (TCE) to explain the contracting problems. TCE believes that contract incompleteness during the planning stage sets the stage for performance issues during the execution stage. When contingencies arise that are not fully or ambiguously addressed by the contract clauses, one or both of the transaction's parties may act opportunistically by increasing the transaction's cost. TCE suggests that a transaction should be organised in such a way that transaction costs are minimised. Likewise, Yates [46,47] claims that complex contracts are incomplete due to bounded rationality and uncertainty. "A contract is incomplete in the sense that it does not specify unambiguously, at the outset, all the requirements and obligations of the parties in every possible future "state of the world." As a result of contract incompleteness, whenever events/contingencies occur ex-post, which are not fully specified ex-ante, one or both of the parties may behave opportunistically. Such behaviour predictably results in conflicts and disputes. The underlying root cause of disputes, according to the study, is contract incompleteness caused by bounded rationality and uncertainty.

1.3. Bounded rationality

Williamson [41] explained bounded rationality as human behaviour aiming to make a rational decision. However, he is physically constrained by his ability to evaluate all possible alternative decisions. Thus, it can be described as rationality with a limit. This may take the form of mental and perceptual restrictions or language restrictions. Williamson [44] explains that the "physiological limits take the shape of rate and storage limitations on individuals' abilities to receive, store, retrieve, and process information without error," while the language limit refers to human inability to express their knowledge or ideas in a way that others can understand using words, numbers, or visuals. Once language challenges arise, demonstrations, learning-by-doing, and other techniques may be the only way to achieve understanding. When people's ability to make a fully rational decision is hampered by complexity or uncertainty, bounded rationality becomes an issue [29].

1.4. Uncertainty

In different fields, uncertainty is used to imply different meanings. Uncertainty in decision theory is a state of the decision maker's environment in which he finds it impossible to assign any probabilities to alternative outcomes of an event. In psychology, it implies a state of mind characterised by a deliberate lack of understanding of an event's outcomes [21,34]. According to Galbraith [19], uncertainty is the difference between the amount of information required to do the task and the amount of information already processed by the organisation. Winch [45] and Ranasinghe *et al.* [39] affirm that uncertainty is the lack of information which is essential for a choice to be made at a specific point in time. Generally, many construction projects lack critical information at the beginning, resulting in high uncertainty. From all these definitions,

uncertainty is a circumstance in which a person does not have complete knowledge about or has difficulty understanding a situation.

Moreover, the project cannot be entirely planned in every detail before construction with certainty. Consequently, parties expect problems as the situation unfolds [23]. With construction projects prone to a high degree of uncertainty, there is a need to develop a framework to reduce project uncertainty to reduce the opportunistic behaviour of the parties to the contract.

1.5. Opportunism

Contractual failures are frequently caused by opportunism [10]. When contracts are incomplete, risks of opportunistic behaviour seem high as parties engage in self-interested actions that lead to the economic detriment of others. Cheung & Pang [14] explained that incomplete contracts allow for opportunism to flourish and define opportunism at work as a circumstance in which a person tries to maximise his interest in any situation in which he stands to benefit in some way. The study also found that opportunism can arise at work as a result of the following: (1) misrepresenting facts, behaviours, or effects, (2) altering the results, and (3) misrepresenting the intents. Opportunistic behaviour may lead to post-contractual contract term manipulation to achieve an unanticipated wealth transfer to the other party. Based on the concept of bounded rationality, this was further subdivided into four key categories: **ambiguity of contract document (AOD)**, **deficiency of contract document (DOD)**, **inconsistency of contract document (IOD)**,

and defectiveness of contract document (CDD). While contract incompleteness nurtures problems, opportunism takes the form of **violation of commitment (VOC)**, **forced renegotiation (FRC)**, **evasion of obligations (EOB)**, and **refusal to adapt to change (RAC)**. See Fig. 1.

Consequently, this study examines the likelihood of contract incompleteness and its significant effect on dispute occurrence in the Nigerian construction industry. While the likelihood of occurrence is examined using the Relative Importance Index (RII). The significant effect will be tested using the hypothesis shown in Table 1 and using Structural Equation Modelling (SEM) in this study.

2. Methodology

2.1. Measuring instrument

A questionnaire was adopted from the study of Cheung & Pang [14]. It was further improved to collect the occurrence likelihood of the contract incompleteness minefield and manifestation among construction professionals in Lagos state, Nigeria. Three Hundred and Fifty (350) questionnaires were sent out to construction professionals. Three hundred and nine (309) professionals returned the questionnaire, representing an 88% response rate. The first parts cover the demography features of the sample, as seen in Table 2, while the second part covers the responses to the questions, which are measured using a five-point Likert scale ranging from "1 = strongly disagree" to "5 = strongly agree" [12].

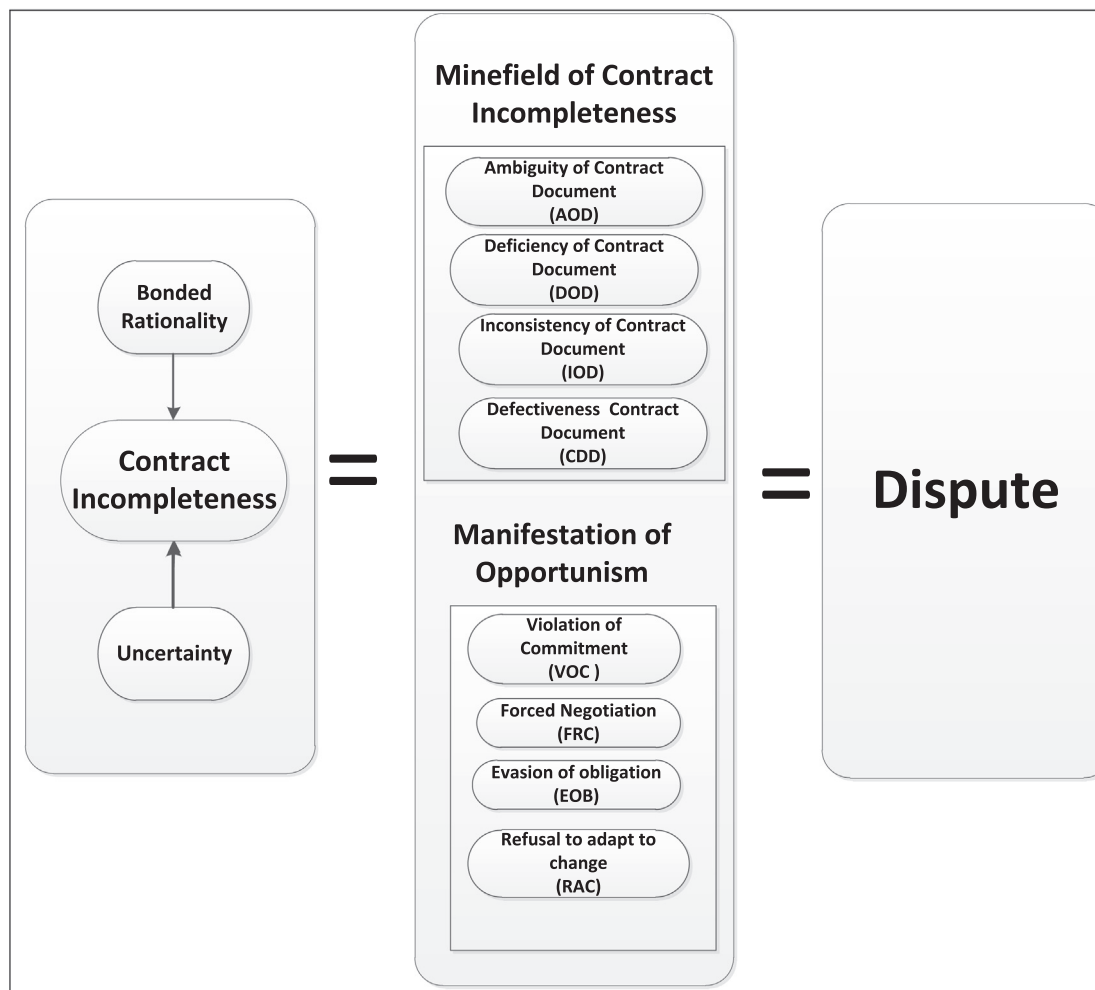


Fig. 1. Causes of Dispute Based on TCE Theory.

Table 1
Hypothesis.

H ₁	There is a significant effect of Ambiguity of Contract Document on Dispute Occurrence.
H ₂	There is a significant effect of Deficiency of Contract Documents on Dispute Occurrence.
H ₃	There is a significant effect of the Inconsistency of Contract Documents on Dispute Occurrence.
H ₄	There is a significant effect of Contract Document Defectiveness on Dispute Occurrence
H ₅	There is a significant effect of Violation of Commitment on Dispute Occurrence.
H ₆	There is a significant effect of Forced Renegotiation on Dispute Occurrence.
H ₇	There is a significant effect of the Evasion of obligation on Dispute Occurrence.
H ₈	There is a significant effect of Refusal to Adapt to Change on Dispute Occurrence.

Table 2
Demography Characteristics of the Sample.

Demography	Frequency	Percentage
Years of Experience		
1-10Years	73	23.6
11-20Years	112	36.2
21-30 Years	65	21.0
31-35Years	41	13.3
Above 35 Years	18	2.5
Certificate		
OND	73	23.6
HND	112	36.2
BSc	65	21.0
MSc	41	13.3
Ph. D	18	5.8
Reg. Body		
QSRBN	56	18.1
ARCON	56	18.1
COBON	48	15.5
COREN	53	17.2
NIESV	44	14.2
PMI	52	16.8

2.2. Data analysis

The coefficient of Cronbach's alpha (CA) was adopted to check the reliability of the measuring instrument. The values derived explain how weakly the items measure the construct. Hence, low values express a weak measure of the construct, while high values imply a much higher measure. The value of CA (α) in a study range within (0, 1). The CA thresholds recommended by authors [22,38] is " $\alpha > 0.9$ Excellent; $\alpha > 0.8$ Good; $\alpha > 0.7$ Acceptable; $\alpha > 0.6$ Suspect; $\alpha > 0.5$ Poor; and $\alpha < 0.5$ Reject.

The validity and reliability of the minefield and manifestation of contract incompleteness were tested using SPSS 25. The output revealed that no item was deleted, as shown in Table 3. Likewise, the 57 items revealed a total coefficient of Cronbach's alpha (α) value of 0.869 Table 4. This meets the acceptable reliability minimum threshold of 0.70. Likewise, it implies that the respondents understood the survey questions and their responses to items were statistically reliable for the study survey with the total sample population size.

Furthermore, a normality test that connotes the data distribution that underpins this research's multivariate data analysis assumptions was carried out. The popular descriptive techniques used to evaluate the normal distribution of the dataset are skewness and Kurtosis. Skewness measures how much a value distribu-

Table 3
Case Processing Summary.

		N	%
Cases	Valid	309	100.0
	Excluded	0	0.0
	Total	309	100.0

a. Listwise deletion based on all variables in the procedure.

Table 4
Reliability Statistics.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.869	0.865	57

tion deviates from symmetric around the mean (toward the right or left). A negative skew to the right is considered negative, while a positive skew to the left is deemed to be positive. On the other hand, Kurtosis estimates the peakedness/flatness (narrow/heavy-tailed) of a distribution. All measures are asymptotically zero for the normal distribution, and non-normality increases as the values shift away from one. The results of the normality test on the data in this analysis are shown in Appendix A, revealing that there is a fair distribution for both latent factors and all the variables in terms of skewness and Kurtosis as there is no value above +/-2.2 as the threshold for normality [20,38]. Consequently, the items are fit for further analysis.

On a five-point Likert scale of 1 to 5, numerical values were given to identify the degree of agreement to the occurrence likelihood of the minefield and the manifestation of contract incompleteness. The five-point Likert scale was translated to a Relative Important Index (RII) for each artefact. The Relative Importance Index (RII) value ranged from 0 to 1; the closer the value to 1, the more its significance. Consequently, for the study, as the value of the artefact increases towards 1, the more likely the occurrence of factors that lead to contract incompleteness. Using formula 1 and the frequency from the respondent, the summary of the RII is calculated in Appendix B and Table 5.

$$RII = \frac{1n_1 + 2n_2 + 3n_3 + 4n_4 + 5n_5}{5N} \tag{1}$$

Where;
 RII = Relative Important Index,
 n1 is the number of respondents who answered "strongly disagrees";
 n2 is the number of respondents who answered "disagrees";
 n3 is the number of respondents who answered "neutral";
 n4 is the number of respondents who answered "agrees."
 n5 is the number of respondents who answered "strongly agrees";

Table 5
Summary of RII and their Ranking.

	RII	Rank
Violation of Commitment	0.852	1
Forced Renegotiation	0.849	2
Inconsistency of Contract Documents	0.845	3
Ambiguity of Contract Documents	0.838	4
Evasion of Obligation	0.817	5
Refusal to Adapt to change	0.765	6
Contract Documents Defectiveness	0.748	7
Deficiency of Contract Documents	0.715	8

N = total number of respondents (being 309 valid in this study).
 To determine the significant effects of causes of disputes from the TCE Theory perspective on the occurrence of disputes in the Nigerian construction industry, a CFA was conducted using Structural Equation Modelling with SEM AMOS. CFA generally presents

model identification and goodness of fit indices to each variable and their observed items. This provides accurate criteria for the measurement model. Consequently, the congeneric measurement model comprises unidimensional constructs, and the cross-loading of the unidimensional constructs is presumed to be zero.

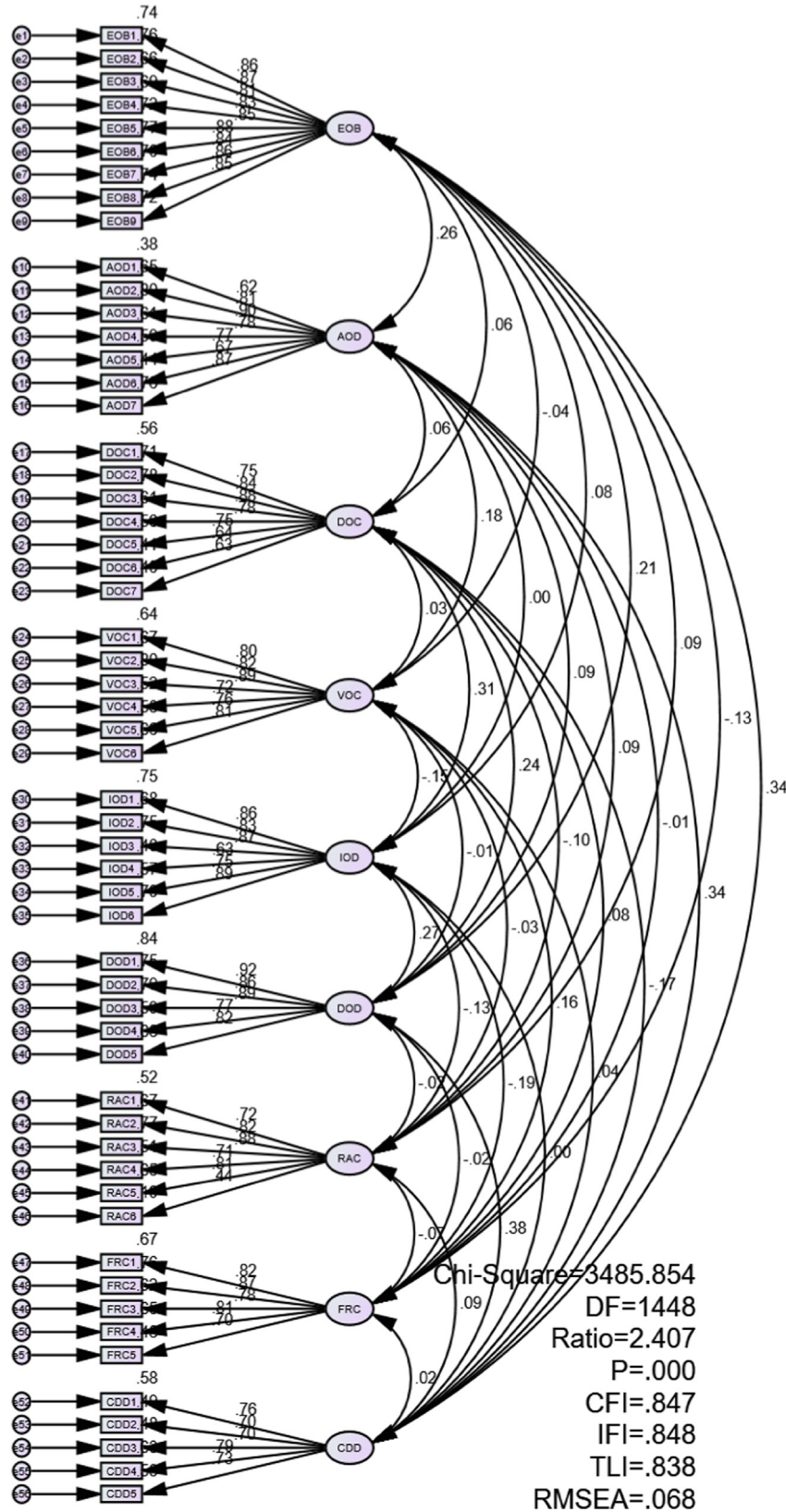


Fig. 2.

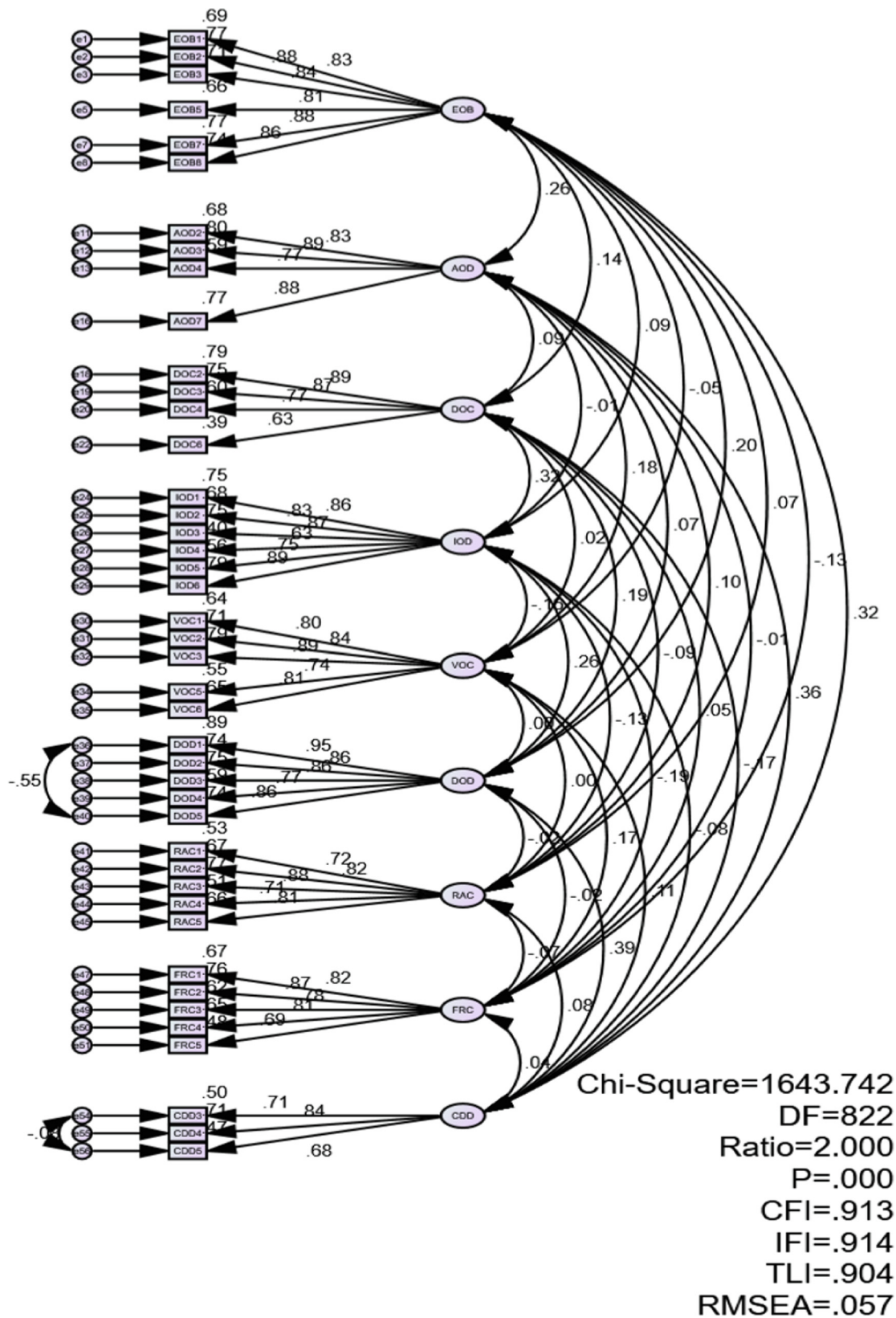


Fig. 3.

The causal factor established in the study is a related latent variable. Nevertheless, such variables may be expressed in various scales and precisions with varying degrees of error [9,18]. Figs. 2 and 3 show the initial and final measurement model, revealing

the relationship between the constructs and their validity. To obtain the discriminant validity of constructs, also known as the measurement model, all redundant components in a construct are removed, leaving only the items that significantly correlate

Table 6
CFA Result & Fit indices.

			Estimate	SE	CR	p
Dispute Occurrence	<—	Evasion of obligation	0.144	0.057	2.512	0.012
Dispute Occurrence	<—	Ambiguity of Contract Documents	0.159	0.076	2.092	0.036
Dispute Occurrence	<—	Deficiency of Contract Documents	0.251	0.067	3.739	***
Dispute Occurrence	<—	Violation of Commitment	0.163	0.050	3.277	0.001
Dispute Occurrence	<—	Inconsistency of Contract Documents	0.055	0.059	0.917	0.359
Dispute Occurrence	<—	Contract Document Defectiveness	0.044	0.058	0.753	0.452
Dispute Occurrence	<—	Refusal to Adapt to Change	0.043	0.104	4.264	***
Dispute Occurrence	<—	Forced Renegotiation	0.113	0.057	1.969	0.049
Category Name		Acceptance Level	Result			
Chisq/df		≤3.0	1.931			
CFI		≥0.90	0.919			
IFI		≥0.90	0.920			
TLI		≥0.90	0.911			
RMSEA		≤0.08	0.55			

Table 7
Convergent Validity.

Code	Construct Item	Factor loading	CR	AVEs
Minefield of Contract Incompleteness				
Ambiguity of Contract Documents				
AOD 1	The scope of work is unclear	Deleted		
AOD 2	The specifications are unclear	0.83		
AOD 3	The rules to evaluate the star rate is unclear	0.89		
AOD 4	Work activities are unclear	0.77	0.907	0.711
AOD 5	Completion milestones are unclear	Deleted		
AOD 6	The maintenance procedure is unclear	Deleted		
AOD 7	The health and safety plan is unclear	0.88		
Deficiency of Contract Documents				
DOD1	There is no commitment to report inconsistency of contract documents	0.95		
DOD2	The drawings provide insufficient details	0.86		
DOD3	The specification of material is inadequate	0.86		
DOD4	The performance specification is inadequate	0.77		
DOD5	There is no statement of resources in the work schedule	0.86	0.934	0.740
DOD6	The guidelines for the preparation and submission of the work schedule are inadequate	Deleted		
DOD7	There is no statement on the building life cycle cost	Deleted		
Inconsistency of Contract Documents				
IOD1	The specification of material is contradictory	0.86		
IOD2	The performance specification is contradictory	0.83		
IOD3	The specified design standard is different from the statutory requirement	0.87		
IOD4	The drawings contradict the specification	0.63	0.918	0.655
IOD5	The safety plan contradicts statutory requirements.	0.75		
IOD6	The architectural, structural, electrical, and mechanical drawings contradict each other.	0.89		
Contract Documents Defectiveness				
CDD1	Over measured items are found in the contract bills of quantities	Deleted		
CDD2	Unnecessary items are found in the contract bills of quantities	Deleted		
CDD3	Some items are missing from the contract bills of quantities	0.71		
CDD4	Items in the contract bills of quantities are being omitted	0.84		
CDD5	There is the duplication of items of work in contract bills of quantities	0.68	0.791	0.560
CDD6	There is a miscalculation in the contract bills of quantities	Deleted		
Manifestation of Opportunism				
Violation of Commitment				
VOC1	The Contractor over-claim the cost entitlement	0.80		
VOC2	The Contractor over-claim the time entitlement	0.84		
VOC3	The Contractor over-claim the costs for progress acceleration	0.89		
VOC4	The Contractor over-claim the loss of profit	Deleted		
VOC5	The Contractor over-claims the variation works	0.74	0.909	0.668
VOC6	The Contractor uses materials not in accordance with the contract.	0.81		
Forced Renegotiation				
FRC1	The Client attempts to renegotiate the terms of the signed contract	0.82		
FRC2	The Client's late handover of the site	0.87		
FRC3	The Client is requesting unrealistic performance expectations.	0.78		
FRC4	The Client refuses to pay the certified amount on the payment certificate	0.81		
FRC5	The Client enforces changes that are outside the initial scope	0.69		
			0.897	0.636
Evasion of Obligation				
EOB1	The Contractor purposely fails to notify potential implications arising from changed orders	0.83		
EOB2	The Contractor purposely fails to notify over measured items in the contract BQ	0.88		
EOB3	The Contractor purposely works below the specified standard	0.84		
EOB4	The Contractor purposely fails to notify under measured items in the contract BQ	Deleted		
EOB5	The Contractor purposely fails to notify omission of items in the contract BQ	0.81		

(continued on next page)

Table 7 (continued)

Code	Construct Item	Factor loading	CR	AVEs
EOB7	The Contractor purposely fails to direct or specify quantities of the materials used	Deleted		
EOB8	The Contractor purposely does not provide an invoice for the material used	0.86		
EOB9	The Client orders extra without providing proper cost reimbursement	Deleted		
			0.940	0.722
	Refusal to Adapt to Change			
RAC1	The Contractor refuses to agree on the valuation methods proposed/used by the Consultant QS according to the contract	0.72		
RAC2	The Contractor refuses to respond to the late design change requested by the Client	0.82		
RAC3	The Contractor refuses to accelerate work progress requested by the Client	0.88		
RAC4	The Contractor refuses to work in a Workmanlike manner	0.71		
RAC5	The Contractor refuses to open work for inspection.	0.81	0.892	0.625

with the construct. As a result, the model in Fig. 3 was trimmed, yielding the following results: Chi-Square = 1643.742, DF = 822, Ratio = 2.000, P = 0.000, CFI = 0.913, IFI = 0.914, TLI = 0.904, and RMSEA = 0.057. The measurement model was estimated for confirmatory factor analysis (CFA) with the primary goal of proving model fit and validity. The goodness of fit was determined to be in accordance with the stated principles, as shown in Fig. 3. Thus, the CFA for this analysis was to see the validity of the construct, establishing the relationship between these factors. This is a test to see if the relevant variables can sufficiently explain the constructs as shown in Table 6 and its convergent validity result as shown in Table 7.

The degree of freedom ratio (*Chisq/df*), comparative fit index (*CFI*), incremental fit index (*IFI*) & (*TLI*), and root mean square error of approximation (*RMSEA*) were used to determine whether the measurement model met the criteria indicating acceptability. Likewise, from Table 8, the average variance extracted (*AVE*) ranges from 0.752 to 0.546, meaning that all values are more than the recommended 0.50 level and have no convergent validity issue [33]. Testing for discriminant validity, the square root of the *AVE* is compared to all inter-factor correlations. The result shows that mean shared variance (*MSV*) is significantly lower than the *AVE* and established discriminant validity for the research. Likewise, all the reflective factors are above 0.6 after screening, the composite reliability (*CR*) was computed, and it shows that the *CR* is above the 0.7 threshold, indicating we have reliability for all constructs [26].

3. Results and discussion

The development of the highly ranked minefield and the manifestation of contract incompleteness will amount to factors that lead to the occurrence of construction disputes. From Table 5, all the *RII* results fall within the significant and strongly significant level of agreement and significance as proposed by Lukuman [30]. This shows that the relatively high occurrence of these factors in the Nigerian construction industry suggests the reasons for the occurrence of construction disputes. Youssef et al. [49] and Koc

and Gurgun [27] highlighted that contract incompleteness/ambiguity factors had been neglected in recent years. There seems to be no evidence of research using the theory to examine construction disputes in Nigeria or elsewhere. However, the assertion of this study that construction disputes occur as a result of contract incompleteness is established by the descriptive statistics result of *RII* and the level of agreement. There is no statistical dispute report published in the country (Olanrewaju and Anavhe, 2014). However, the accumulation of construction cases in the court indicates the growing rate of construction disputes. Love et al. [29] highlighted that the seeds of disputes are usually planted during the design stage but emerge during the construction phase. Similarly, Ilter (2012) emphasised that the prevention of disputes turns out to be one of the most critical processes that determine the performance of a construction project, and it hinges on a sound understanding of dispute occurrence. Consequently, to achieve a step-change in minimising dispute occurrence, there is a need to prevent contract incompleteness at the planning stage to prevent dispute occurrence at the construction stage.

Furthermore, the significant effect of the factors of contract incompleteness on dispute occurrence is tested. The eight (8) factors (ambiguity (*AOD*), deficiency (*DOD*), inconsistency (*IOD*), defectiveness (*CDD*), violation of commitment (*VOC*), forced renegotiation (*FRC*), evasion of obligations (*EOB*), and refusal to adapt to change (*RAC*), causing dispute occurrence were imposed on the model to test their significance effects. The model hypothesised that *AOD*, *DOD*, *IOD*, *CDD*, *VOC*, *FRC*, *EOB*, and *RAC* have direct effects on dispute occurrence. Their standardised statistical significance is shown in Table 8. It was found that there are correlations between all eight factors and dispute occurrence. However, six (6) paths (*AOD*, *DOD*, *IOD*, *CDD*, *EOB*, & *RAC*) out of the eight (8) paths were statistically significant.

It was expected that all the correlated paths would be significant because the minefield of contract incompleteness will yield to the manifestation of opportunism, but this is not the same as respondent opinions in Nigeria. However, the two significant factors of manifestation of opportunism, i.e., evasion of obligation (*EOB*) and refusal to adapt to change (*RAC*), can be taken to explain other insignificant paths of manifestation of opportunism. This is

Table 8 Hypothesis Test Result.

($p < 0.05=*$, $p < 0.01=**$, $p < 0.001=***$)	p	Supported
H ₁ There is a significant effect of Ambiguity of Contract Document (<i>AOD</i>) on Dispute Occurrence (<i>DOC</i>)	*	Yes
H ₂ There is a significant effect of Deficiency of Contract Document (<i>DOD</i>) on Dispute Occurrence (<i>DOC</i>)	*	Yes
H ₃ There is a significant effect of Inconsistency of Contract Document (<i>IOD</i>) on Dispute Occurrence (<i>DOC</i>)	*	Yes
H ₄ There is a significant effect of Contract Document Defectiveness (<i>CDD</i>) on Dispute Occurrence (<i>DOC</i>)	*	Yes
H ₅ There is a significant effect of Violation of Commitment (<i>VOC</i>) on Dispute Occurrence (<i>DOC</i>)	ns	No
H ₆ There is a significant effect of Forced Renegotiation (<i>FRC</i>) on Dispute Occurrence (<i>DOC</i>)	ns	No
H ₇ There is a significant effect of Evasion of obligation (<i>EOB</i>) on Dispute Occurrence (<i>DOC</i>)	*	Yes
H ₈ There is a significant effect of Refusal to Adapt to Change (<i>RAC</i>) on Dispute Occurrence (<i>DOC</i>)	*	Yes

because when there is an evasion of obligation and refusal to adapt to change, the possibility of violation of commitment which may lead to renegotiation of the terms of the contract is very high.

The findings of this research are similar to several kinds of research which have considered contract incompleteness as a whole or individually. Cheung & Pang [14] and Yates [46,47] considered the anatomy of construction disputes and concluded that contract incompleteness is the underlying root cause of dispute. Koc & Gurgun [27] evaluated 27 factors of ambiguity, one of the factors of contract incompleteness, and concluded that these result in disputes on construction projects.

Contract incompleteness has been identified as the most crucial problem in construction projects. *Ambiguity, deficiency, inconsistency, and defectiveness* explain the incompleteness of construction contracts. At the same time, human factors in the form of opportunism manifest through *violation of commitment, forced renegotiation, evasion of obligations, and refusal to adapt to change*. Contract incompleteness and opportunism set the stage for most of the factors that lead to a compensation claim. When consultants cannot provide information on time during construction or the client comes with an unreasonable request, the tendency for construction disputes is high.

4. Conclusion and recommendation

The result of the study successfully illustrates the relationship between contract incompleteness and dispute occurrence in the Nigerian Construction Industry. In this context, our study provides insight based on empirical data on the likelihood of the occurrence of contract incompleteness and its significant effect on disputes occurrence using SEM Amos. The finding shows an occurrence of contract incompleteness in the Nigerian construction industry based on the relative importance index (RII). All indexes indicate a significant and strongly significant level of agreement. Likewise, six of the hypotheses tested show a significant effect on the dispute occurrence. Consequently, the findings show that contract incompleteness is the underlying root cause of construction disputes in Nigeria.

Appendix A

	Descriptive Statistics									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis		
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error	
DOC1	309	3	5	4.20	0.673	-0.263	0.139	-0.813	0.276	
DOC2	309	3	5	4.34	0.668	-0.517	0.139	-0.735	0.276	
DOC3	309	3	5	4.22	0.726	-0.357	0.139	-1.045	0.276	
DOC4	309	3	5	4.36	0.677	-0.584	0.139	-0.724	0.276	
DOC5	309	3	5	3.82	0.717	0.289	0.139	-1.024	0.276	
DOC6	309	3	5	4.27	0.648	-0.331	0.139	-0.714	0.276	
DOC7	309	3	5	4.23	0.689	-0.329	0.139	-0.882	0.276	
AOD1	309	2	5	3.86	0.903	-0.495	0.139	-0.469	0.276	
AOD2	309	2	5	3.63	0.708	-0.709	0.139	0.252	0.276	
AOD3	309	2	5	3.47	0.812	-0.332	0.139	-0.535	0.276	
AOD4	309	2	5	3.35	0.898	-0.233	0.139	-0.994	0.276	
AOD5	309	2	5	3.50	0.710	0.045	0.139	-0.236	0.276	
AOD6	309	2	5	3.70	0.661	-0.742	0.139	0.677	0.276	
AOD7	309	2	5	3.53	0.736	-0.524	0.139	-0.199	0.276	
DOD1	309	2	5	3.82	0.866	-0.401	0.139	-0.445	0.276	

(continued on next page)

As revealed in the literature, most scholars concentrate on clarity and amendments of specific clauses components rather than ambiguity/contract incompleteness. Consequently, all previous efforts have shown that ambiguity/contract incompleteness in construction contracts is under-appreciated in the literature. Therefore, the studies contributed little to the existing literature on exploring the effect of contract incompleteness on dispute occurrence [1,49,50]. Furthermore, this research contributes to the prevention of construction disputes. When contract incompleteness is eliminated, it gives a preventative (rather than a corrective) approach to minimising the incidence of disputes.

The construction dispute that has ravaged Nigeria's building industry has deprived the country of the benefits that would have been gained, particularly in terms of GDP, employment possibilities, and the creation of social and economic infrastructure. Similarly, the construction industry's poor project delivery performance harms related businesses such as manufacturing, which produces materials utilised in the construction industry. Hence, the need to limit or reduce contract incompleteness to lessen the opportunistic behaviour of contractors becomes a pertinent issue in reducing the occurrence of construction disputes. Therefore, it is concluded that more research should focus on reducing contract incompleteness to reduce dispute occurrence in the industry. This is part of an ongoing PhD research work that aims to develop a conceptual framework to minimise contract incompleteness, which reduces dispute occurrence. The framework is founded on a stance that emphasises a preventative (rather than a corrective) approach to minimising the incidence of disputes. Predicting the occurrence of likely problems and developing a framework to lessen the possibility of their occurrence and potential impact, should they occur (Preventive Approach), will be more helpful.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A (continued)

Descriptive Statistics									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
DOD2	309	2	5	3.78	0.751	-0.303	0.139	-0.099	0.276
DOD3	309	2	5	3.69	0.944	-0.431	0.139	-0.678	0.276
DOD4	309	2	5	3.90	0.691	-0.464	0.139	0.505	0.276
DOD5	309	2	5	3.91	0.699	-0.337	0.139	0.150	0.276
DOD6	309	2	5	3.86	0.642	-0.162	0.139	0.062	0.276
DOD7	309	3	5	4.14	0.719	-0.213	0.139	-1.044	0.276
IOD1	309	3	5	3.81	0.659	0.226	0.139	-0.739	0.276
IOD2	309	2	5	3.61	0.716	0.374	0.139	-0.494	0.276
IOD3	309	2	5	3.60	0.708	0.321	0.139	-0.428	0.276
IOD4	309	2	5	4.03	0.893	-0.408	0.139	-0.897	0.276
IOD5	309	2	5	3.79	0.701	-0.196	0.139	-0.083	0.276
IOD6	309	2	5	3.61	0.688	0.218	0.139	-0.365	0.276
CDD1	309	3	5	4.30	0.741	-0.547	0.139	-1.001	0.276
CDD2	309	3	5	4.26	0.644	-0.306	0.139	-0.699	0.276
CDD3	309	3	5	4.25	0.659	-0.317	0.139	-0.755	0.276
CDD4	309	3	5	4.03	0.797	-0.058	0.139	-1.422	0.276
CDD5	309	3	5	4.32	0.775	-0.617	0.139	-1.076	0.276
CDD6	309	3	5	4.29	0.761	-0.552	0.139	-1.076	0.276
EOB1	309	2	5	4.03	0.797	-0.252	0.139	-0.898	0.276
EOB2	309	2	5	4.12	0.722	-0.340	0.139	-0.521	0.276
EOB3	309	2	5	4.04	0.780	-0.439	0.139	-0.313	0.276
EOB4	309	2	5	4.10	0.727	-0.263	0.139	-0.748	0.276
EOB5	309	3	5	4.13	0.730	-0.200	0.139	-1.102	0.276
EOB6	309	2	5	4.10	0.774	-0.350	0.139	-0.777	0.276
EOB7	309	2	5	4.05	0.765	-0.345	0.139	-0.520	0.276
EOB8	309	2	5	4.09	0.774	-0.418	0.139	-0.519	0.276
EOB9	309	2	5	4.11	0.750	-0.224	0.139	-1.052	0.276
EOB10	309	3	5	4.04	0.782	-0.074	0.139	-1.360	0.276
EOB11	309	3	5	4.14	0.719	-0.213	0.139	-1.044	0.276
EOB12	309	3	5	4.05	0.730	-0.075	0.139	-1.116	0.276
EOB13	309	2	5	4.10	0.749	-0.311	0.139	-0.740	0.276
VOC1	309	2	5	4.04	0.762	-0.326	0.139	-0.510	0.276
VOC2	309	2	5	3.88	0.776	-0.077	0.139	-0.728	0.276
VOC3	309	2	5	3.92	0.801	-0.342	0.139	-0.385	0.276
VOC4	309	2	5	4.06	0.824	-0.565	0.139	-0.266	0.276
VOC5	309	2	5	3.92	0.752	-0.240	0.139	-0.378	0.276
VOC6	309	2	5	3.94	0.723	-0.275	0.139	-0.177	0.276
FRC1	309	2	5	4.13	0.775	-0.566	0.139	-0.189	0.276
FRC2	309	2	5	4.14	0.735	-0.466	0.139	-0.256	0.276
FRC3	309	2	5	3.96	0.856	-0.426	0.139	-0.540	0.276
FRC4	309	2	5	4.07	0.753	-0.256	0.139	-0.798	0.276
FRC5	309	2	5	4.06	0.743	-0.184	0.139	-0.890	0.276
FRC6	309	3	5	4.15	0.677	-0.190	0.139	-0.825	0.276
RAC1	309	2	5	3.83	0.835	-0.269	0.139	-0.526	0.276
RAC2	309	2	5	3.72	0.735	-0.292	0.139	-0.062	0.276
RAC3	309	2	5	3.62	0.850	-0.187	0.139	-0.548	0.276
RAC4	309	2	5	3.75	0.907	-0.361	0.139	-0.613	0.276
RAC5	309	2	5	3.75	0.739	-0.191	0.139	-0.207	0.276
RAC6	309	2	5	3.75	0.725	-0.045	0.139	-0.363	0.276
Valid N (listwise)	309								

Appendix B

Appendix B. Relative Importance Index (RII) Minefield Of Contract Incompleteness and Manifestation of Opportunism

Items	Description	SD (1)	D (2)	U (3)	A (4)	SA (5)	Total	Total	A*N	RII	Average	Rank
Minefield of Contract Incompleteness												
Ambiguity of Contract Documents												
AOD 1	The scope of work is unclear	0	0	75	744	490	1309	309	1545	0.85	0.838	4
AOD 2	The specifications are unclear	0	0	111	568	650	1329	309	1545	0.86		
AOD 3	The rules to evaluate the star rate is unclear	0	0	219	488	570	1277	309	1545	0.83		
AOD 4	Work activities are unclear	0	0	135	500	695	1330	309	1545	0.86		
AOD 5	Completion milestones are unclear	0	0	306	588	300	1194	309	1545	0.77		
AOD 6	The maintenance procedure is unclear	0	0	99	664	550	1313	309	1545	0.85		
AOD 7	The health and safety plan is unclear	0	0	117	616	580	1313	309	1545	0.85		
Deficiency of Contract Documents												
DOD1	There is no commitment to report inconsistency of contract documents	0	58	189	556	390	1193	309	1545	0.77	0.715	8
DOD2	The drawings provide insufficient details	0	50	243	748	80	1121	309	1545	0.73		
DOD3	The specification of material is inadequate	0	86	291	596	100	1073	309	1545	0.69		
DOD4	The performance specification is inadequate	0	140	240	560	95	1035	309	1545	0.67		
DOD5	There is no statement of resources in the work schedule	0	38	414	528	100	1080	309	1545	0.70		
DOD6	The guidelines for the preparation and submission of work schedule is inadequate	0	34	228	792	90	1144	309	1545	0.74		
DOD7	There is no statement of Building life cycle cost	0	62	291	668	70	1091	309	1545	0.71		
Inconsistency of Contract Documents												
IOD1	The specification of material	0	4	108	464	775	1351	309	1545	0.87		

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Appendix B. Relative Importance Index (RII) Minefield Of Contract Incompleteness and Manifestation of Opportunism												
Items	Description	SD (1)	D (2)	U (3)	A (4)	SA (5)	Total	Total	A*N	RII	Average	Rank
IOD2	is contradictory The performance specification	0	2	81	512	765	1360	309	1545	0.88	0.845	3
IOD3	is contradictory The specified design standard	0	8	75	564	695	1342	309	1545	0.87		
IOD4	is different from the statutory requirement The drawings contradict with the specification	0	2	111	580	630	1323	309	1545	0.86		
IOD5	The safety plan contradicts statutory requirements.	0	0	96	560	682	1341	309	1545	0.87		
IOD6	The architectural, structural, electrical, and mechanical drawings contradicting each other.	0	14	429	496	175	1114	309	1545	0.72		
Contract Documents												
Defectiveness												
CDD1	Over measured items are found in the contract bills of quantities	0	0	306	656	215	1177	309	1545	0.76		
CDD2	Unnecessary items are found in the contract bills of quantities	0	14	429	496	175	1114	309	1545	0.72		
CDD3	Some items are missing from the contract bills of quantities	0	16	423	512	160	1111	309	1545	0.72	0.748	7
CDD4	Items in the contract bills of quantities are being omitted	0	26	240	408	570	1244	309	1545	0.81		
CDD5	There is the duplication of items of works in contract bills of quantities	0	18	264	684	205	1171	309	1545	0.76		
CDD6	There is a miscalculation in the contract bills of quantities	0	16	402	556	140	1114	309	1545	0.72		
Manifestation of												
Oppportunism												
Violation of Commitment												
VOC1	The Contractor over-claim the cost entitlement	0	0	171	444	705	1320	309	1545	0.85		
VOC2	The Contractor over-claim the time entitlement	0	0	150	552	605	1307	309	1545	0.85	0.852	1
VOC3	The Contractor over-claim the costs for progress acceleration	0	10	177	472	635	1294	309	1545	0.84		
VOC4	The Contractor over-claim the loss of profit	0	0	174	488	645	1307	309	1545	0.85		

Appendix B. Relative Importance Index (RII) Minefield Of Contract Incompleteness and Manifestation of Opportunism												
Items	Description	SD (1)	D (2)	U (3)	A (4)	SA (5)	Total	Total	A*N	RII	Average	Rank
VOC5	The Contractor over claims the variation works	0	0	105	528	710	1343	309	1545	0.87		
VOC6	The Contractor uses materials not in accordance with the contract.	0	6	135	492	690	1323	309	1545	0.86		
	Forced Renegotiation											
FRC1	The Client attempts to renegotiate the terms of the signed contract	0	0	156	448	725	1329	309	1545	0.86		
FRC2	The Client late handover of the site	0	0	102	640	575	1317	309	1545	0.85		
FRC3	The Client requesting for unrealistic performance expectations.	0	0	114	624	575	1313	309	1545	0.85	0.849	2
FRC4	The Client refuses to pay the certified amount on payment certificate	0	0	279	452	515	1246	309	1545	0.81		
FRC5	The Client enforcing changes that are outside the initial scope	0	0	177	372	785	1334	309	1545	0.86		
FRC6	The Client refuses to honour the time extension claim submitted by the contractor	0	0	171	416	740	1327	309	1545	0.86		
	Evasion of Obligation											
EOB1	The Contractor purposely fails to notify potential implication arising from changes orders	0	10	234	512	490	1246	309	1545	0.81		
EOB2	The Contractor purposely fails to notify over measured items in the contract BQ	0	6	165	612	490	1273	309	1545	0.82		
EOB3	The Contractor purposely works below the specified standard	0	18	183	592	455	1248	309	1545	0.81		
EOB4	The Contractor purposely fails to notify under measured items in the contract BQ	0	4	183	596	485	1268	309	1545	0.82		
EOB5	The Contractor purposely fails to notify omission of items in the contract BQ	0	0	195	560	520	1275	309	1545	0.83	0.817	5
EOB6	The Contractor purposely fails to adhere to safety regulations.	0	8	198	532	530	1268	309	1545	0.82		

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Appendix B. Relative Importance Index (RII) Minefield Of Contract Incompleteness and Manifestation of Opportunism												
Items	Description	SD (1)	D (2)	U (3)	A (4)	SA (5)	Total	Total	A*N	RII	Average	Rank
EOB7	The Contractor purposely fails to disclose the specifications of the materials used	0	12	195	584	460	1251	309	1545	0.81		
EOB8	The Contractor purposely not provides an invoice for the material used	0	12	183	560	510	1265	309	1545	0.82		
EOB9	The Client orders extra without providing proper cost reimbursement	0	2	207	540	520	1269	309	1545	0.82		
EOB 10	The Client orders extra without granting a justifiable extension of time	0	0	264	580	505	1249	309	1545	0.81		
EOB 11	The Client rejects the Contractor's claims for variation outright without providing reasons	0	0	183	576	520	1279	309	1545	0.83		
EOB 12	The Client rejects outright extension of time claim submitted by the Contractor	0	0	225	576	450	1251	309	1545	0.81		
EOB 13	The Client rejects outright monetary claim submitted by the Contractor.	0	6	189	568	505	1268	309	1545	0.82		
RAC1	Refusal to Adapt to Change The Contractor refuses to agree on the valuation methods proposed/used by the Consultant QS according to the contract	0	50	219	572	340	1181	309	1545	0.76		
RAC2	The Contractor refuses to respond to the late design change requested by the Client	0	30	252	660	225	1167	309	1545	0.76	0.765	6
RAC3	The Contractor refuses to accelerate work progress requested by the Client	0	94	180	580	285	1139	309	1545	0.74		
RAC4	The Contractor refuses to work in a Workmanlike manner	0	20	180	756	250	1206	309	1545	0.78		
RAC5	The Contractor refuses to open work for inspection.	0	16	198	720	275	1209	309	1545	0.78		
RAC6	The Contractor refuses to remove materials not in accordance with the contract.	0	8	228	752	208	1193	309	1545	0.77		

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