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A Conceptual Model for Risk Factors in Tender Process Affecting on Contract Implementation Stage in Oil and Gas PFPS Using SEM.

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Abstract: *Tender process (TP) of onshore oil and gas Production Facilities Projects (PFPs) in Yemen has been plagued with Risk Factors (RFs) affecting the contract implementation stage. Especially, final project objectives. This study aims to propose and develop an Integrated Conceptual Model (ICM) for (RFs) in the (TP) in onshore oil and gas (PFPs), this model called (MRTPI). Data were collected from the literature review and questionnaire. The analyses using Structural Equation Modelling (SEM). The results show that the (MRTPI) goodness of fit.*

The findings of this study help practitioners gain an in-depth understanding of (RFs) in the (TP) affecting the implementation stage and how to select suitable defense strategies to reduce risk causes and effects. Moreover, to enable project teams to manage risks and make the decision to support the contracting authority in the (TP) and implementation stage, as well as, provide a useful reference for a researcher in oil and gas (PFPs).

Keywords: *Defense Strategies, Oil and Gas, Risk Factors, Tender Process, Yemen.*

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I. Introduction

Oil and gas (PFPs) are subject to more risks than many other projects due to increasing project complexity, unique, intensified international involvement and different size ([1], [2]). In Yemen, oil and gas projects are subject to more risks ([3], [4]). Such has shown the risk exposure at the highest level during the (TP) ([5], [6], [7], [4]). The (TP) in oil and gas involves three distinct phases: tender preparation, tendering (client and contractor) and tender evaluation ([8], [9]).

According to [4], the oil and gas (PFPs) are of these projects in Yemen, which are subjected to more risks than other projects during the (TP). The (RFs) during the (TP) has an effect on the next phase (implementation phase). Risk in the (TP) may have one or more factors, and it may have one or more effects. The effects in contracts implementation phase are lowering quality, conflicts, claims, time and cost overrun, poor project, dispute, negotiation, lawsuit, total desertion, litigation, and abandonment ([10], [11], [12], [13], [14], [15], [16], [17], [18], [7]). It is very important to identify the (RFs) in the (TP), which affect the implementation phase ([6], [7]).

AL-Yafeai et al. [4] investigated and identified the (RFs) in (TP) of oil and gas (PFPs) in Yemen as follows : Management Risk (MR), Engineering Risk (ER), Financial & Economic Risk (FER), Governmental Policy Risk (GPR), Organizational Risk (OR), Risk of Planning & Estimate (PER), Health , Safety, Environmental , and Quality Risk (HSEQR), Culture Risk (CULR) and Contractual & Legal Risk (CLR). These risks and others should be allocated appropriately between parties. A contractual framework is a mechanism to allocate risks between contracting parties through contracting strategies, delivery methods, contract price arrangements, and drafting contract provisions [19].

The selection of contracting strategy appropriately in the early stage is a key factor that determines the entire project and is important for the implementation stage, and consequently, the success of the project ([1], [2], [20], [21]). The reduced cooperation and collaboration experienced among the parties causes increased project risk, as well as, the development of adversarial relationships, which may lead to reduced quality, schedule overruns, change orders, claims, and litigation ([22], [23]).

The choice of a delivery method affects the apportionment of risks between the parties, during contract implementation, using distinctive procedures to reduce risk and improve project performance [24]. The selection of the type of contract price arrangements specifies the degree of risk that depends on the size and value of the project and is important in decreasing the cost overrun, schedule delay and quality expectation. It also reduces the misunderstanding in design and specification issues during (TP) ([25], [7]).

According to [26], the parties allocate risks in the project by contract clauses. The oil and gas projects need a flexible contractual framework to balance the high level of risk and uncertainties shared by contracting parties, as well as minimize potential claims, disputes, and litigation costs during the contract implementation stage [27]. Sections ([28], [29], [30]) state that the one-sided attitude to the risk allocation, unfair transfer of risks and imposing the risk by force in the early stages lead to adopting defensive strategies such as lowering the work quality, imposing extensive contingency charges, conservative design, claim, dispute and litigation. These defensive strategies may lead to project delay, project cost overrun and poor quality.

The objectives of this study are to (1) identify the (RFs) effects in contract implementation stage; (2) propose appropriate strategies to reduce (RFs) in the planning stage; (3) propose appropriate strategies to reduce effects of (RFs) in the contract implementation stage; (4) study the relationships between (RFs), their effects, and proposed strategies; and (5) develop (MRTPI) for the above-mentioned. The (SEM) technique is adopted in this study, because it has been considered as one of the most suitable techniques for analyzing the relationships among variables, and helps to propose the integrated conceptual model related to these relationships ([31], [32],[33]).

II. Literature review

Oil and gas (PFPs) in Yemen are subject to risk in the (TP), the (TP) includes tender preparation, tendering (client and contractor) and tender evaluation ([8], [9]). (RFs) in these processes are presented by [4] as (MR, ER, FER , GPR, OR , PER , HSEQR , CULR, and CLR). They have one or more effects in the next stage (contracts implementation stage) if it occurs. The effect of (RFs) on the contract implementation stage, related to oil and gas projects, has not been thoroughly studied. There are just a few studies that have focused on (RFs) affecting the contracts implementation stage in this sector of projects. Thus, there is a need for identifying the effect on the contract implementation stage.

According to [34], there is a considerable similarity between oil and gas projects and construction projects. Hence, the relevant literature discussed effects (RFs) in (TP) on the contract implementation stage. The literature of the construction projects has been reviewed, together with the literature on Oil and Gas projects, with the prime aim to produce a list of effects caused by (RFs), which are surveyed among oil and gas project teams as shown in table 1. Thus, there is a need for determining the most important effect of risk factors on the contract implementation in oil and gas (PFPs). This is one of the gaps this study attempts to fill ([35], [36]).

The (RFs) in (TP) should be allocated appropriately between contracting parties [19]. One-sided attitude to the risk allocation in the early stages leads to adopting defensive strategies in (TP) and implementation stage. These defensive strategies may not lead to meeting the project objectives ([28], [29], [30]).

To study the relationships between (RFs), their effects, and proposed strategies, the (SEM) technique is used. This relationship is the basis of the conceptual model that is proposed and developed in this study.

SEM is one of the newest methods of multivariate data analysis developed specifically to overcome the limitations experienced in the previous methodology. Moreover, it is one of the most suitable techniques for analyzing the relationships among variables, and helps to propose the integrated conceptual model related to these relationships ([31], [32], [33]).

AMOS is an acronym for (Analysis of Moments Structures). This is one of the newest software developed for (SEM). The researchers could employ AMOS Graphic to model and analyses the interrelationships among latent constructs effectively, accurately, and efficiently. More importantly, the multiple equations interrelationships in a model are computed simultaneously [37].

Therefore, the objectives of this study are to propose and develop a conceptual model for (RFs) in (TP) affecting the contract implementation stage in onshore oil and gas (PFPs) using (SEM) after identifying the variables of the proposed model (MRTPI).

Table 1. (RFs) affecting on the contract implementation stage.

Author name	Country	Project type	Risks / Causes		Effects
			Factor	Groups	
[38]	Indian	Construction	67	Project manager's competence, supportive owners, top management, monitoring, feedback, coordination, favourable working condition, commitment of all project participants, owner's competence, conflict among project participant, project manager's ignorance, hostile socioeconomic environment, owner's incompetence, indecisiveness of project participants, and harsh climatic condition at site.	Schedule, cost, quality, and no dispute.
[39]	Malaysia	Construction	28	Client, contractor, consultant, material, labour and equipment, contract, contract relationships, and external.	Time overrun, cost overrun, disputes, arbitration, litigation, and total abandonment.
[40]	Libya	Construction	43	Acts of God, design , construction, Financial /economic, management/ Administrative, and code.	Loss of interest by the stakeholder, blacklist by authorities, waste of money and time, and declination of reputation.
[41]	Ghana	Road construction	-	Delays in payments to contractors, variations, inflation, poor communication, technical complexity / size of projects, force majeure, and dispute.	Cost overrun
[15]	Pakistan	Construction	20	Owner, consultant, contractor, contact condition and external.	Dispute, negotiation, lawsuit, total desertion, litigation and abandonment.
[42]	Iran	Construction	28	-	Time overrun, cost overrun, dispute, arbitration, litigation, and total abandonment
[43]	USA	U.S. Army Corps	40	Safety issues, design errors, delay, and changes.	Conflicts, claims, and disputes
[44]	Palestine	Construction	26	Concurrent closure of borders due to the political situation, design error or omissions, suspension of work, shortage of material and high raising of its price, and contract ambiguities.	Cost overrun, loss of efforts, suspension of work, and contract termination.
[17]	Surabaya	Construction	26	Natural, design, resources, financial, legal and regulatory, and construction risks.	Cost, time, quality, satisfaction, and profit
[45]	Indian	Construction	27	Construction , Financial/Economical , Management , and Contract	Conflicts & disputes.
[46]	Iran	Water	84	Government, owner, consultant, material, design team, contractor, project, equipment, additional weather and land labor.	Cost overrun and time delay

[47]	KSA	Construction	-	Unclear, insufficient, lacking timely responses, experience level of participants, language challenges, poor documentation, conflicting interests, and the distance between communicating parties.	Dispute & failures
[48]	Libya	Road	39	Owner, contractor, consultant, utility services, government regulation, project, external, equipment and material.	Time overrun, cost overrun, poor quality, disruption, litigation, arbitration, breach of contract, obstruction of economical and development.
[49]	Pakistan	Construction	33	Incompetent contractor, delay in procurement of long lead items, delay in payments to contractors, inaccurate cost estimates, inaccurate project schedule & incompetent project team, lack of project planning, incompetent project manager, delay in providing site access to contractors, lack of cash flows, and delay in design phase.	Project Failures
[50]	Nepal	Road		Engineer doesn't work impartial and do not fulfil their responsibility promptly, contractors generally do not fulfil or are reluctant to perform contractual obligations, employers are not prompt in decision making for any problems, employers are not very serious toward fulfilment of their contractual obligation, incorrect and inconsistent drawing.	Claim and Disputes.

III. Conceptual model

To fill the gap in this study and to present a scientific contribution that helps the project parties in practice and helps researchers to further develop, the researchers propose (MRTPI) from a review of past research works ([51] , [48]). The (MRTPI) is the basis for testing, assessing and validating the relationships of independent, moderate and dependent variables ([52], [48]). Hence, in this study, the proposed of (MRTPI) as presented in Figure 1&2 each of the variables are : 9 (RFs), 4 (TPs), 10 defense's strategies (DSs), and 5 final objectives (FPOs), includes a number of separate indicators or sub-variables listed below:

3.1 Risk Factors (RFs) in (TP).

RFs are the variable for the group of Risk-related factors in (TP), which consist of the following sub-variables: MR for Management Risk, ER for Engineering Risk, FER for Financial and Economic Risk, GPR for Government policies Risk, OR for Organization Risk, PER for Risk of Planning and Estimates, HSEQR for Health, Safety, Environmental, and Quality risk, CULR for Contractual and Legal Risk and CLR for Cultural Risk.

3.2 Tender process (TP) stages.

TPs are the variable for the group of (TP) -related stages, which consist of the following sub-variables: TP1 for tender preparation, TP2 for tendering by Client, TP3 for Bidding / tendering by Contractor and TP4 for tender evaluation.

3.3 Defense Strategies (DS).

There are two (DS), the first one is in the planning stage, and the others is on the contract implementation stage.

DS1 is the variable for the group of defenses strategies-related to the planning stage, which consists of the following sub-variables: CS for contracting strategy, PDM for project delivery methods, CPA for contract price arrangement, and ICF for contract clauses / international contract form.

DS2 is the variable for the group of defenses strategies-related to the contract implementation stage, which consists of the following sub-variables: CC for contingency charges, CD for conservative design, LQ for lowering work quality, Claim, Dispute, and litigation.

3.4 Final Project Objectives (FPOs).

FPO is the variable for the group of final project objectives, which consist of the following sub-variables: PQ for Poor quality, Pd for time overrun, CO for cost overrun, PF for Project failure / abandoned and CHE for company harm effect.

To prove this theoretical framework, the hypotheses can be applied as shown in figure 1 & 2 , to obtain the results.

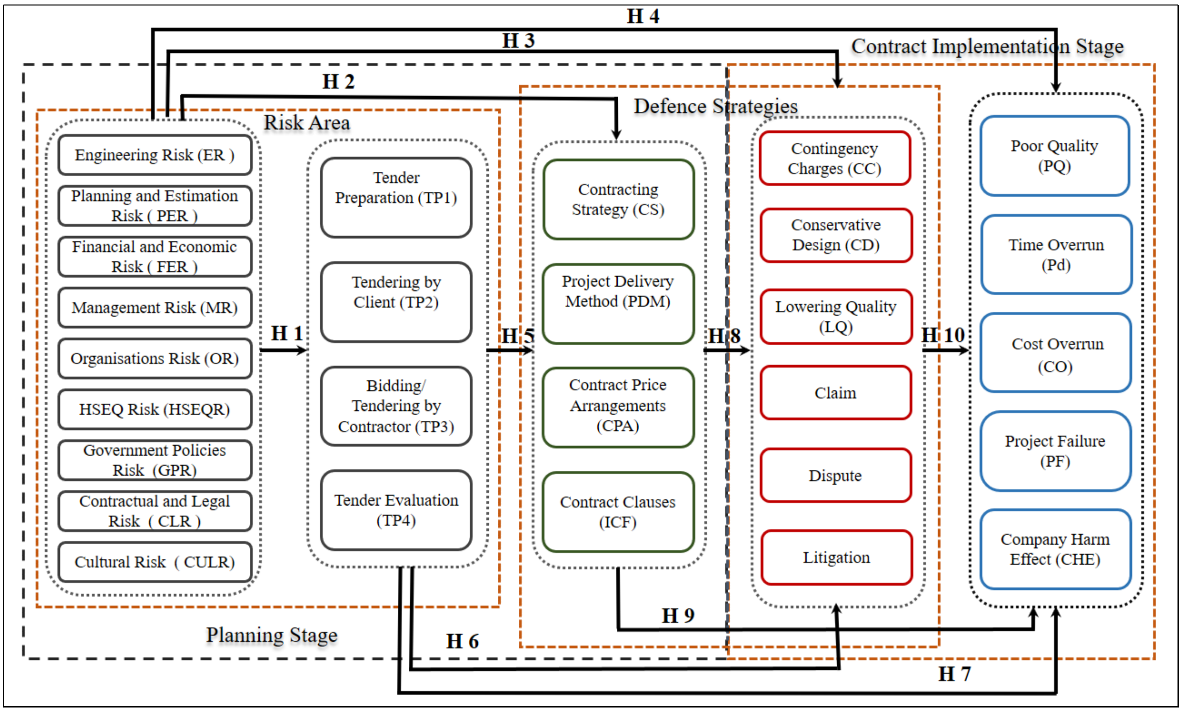

Figure1. The proposed of (MRTPI).

IV. Theoretical Framework

The theoretical framework hypotheses are used to prove the (MRTPI). It can be applied as shown in figure 3 as per built by AMOS- SEM program that tested in this paper, the details as follows:

H1: (RFs) in (TP) have a significant effect in (TP) procedure itself.
H2: (RFs) in (TP) have significant effects on (FPOs).
H3: (RFs) in (TP) have significant effects on selecting (DS1).
H4: (RFs) in (TP) have significant effects on selecting (DS2).
H5: (TP) procedures have significant effects on (FPOs).
H6: (TP) procedures have significant effects on selecting (DS1).
H7: (TP) procedures have significant effects on selecting (DS2).
H8: (DS1) has significant effects on (FPOs).
H9: (DS1) has significant effects on (DS2).
H10: (DS2) has significant effects on (FPOs).

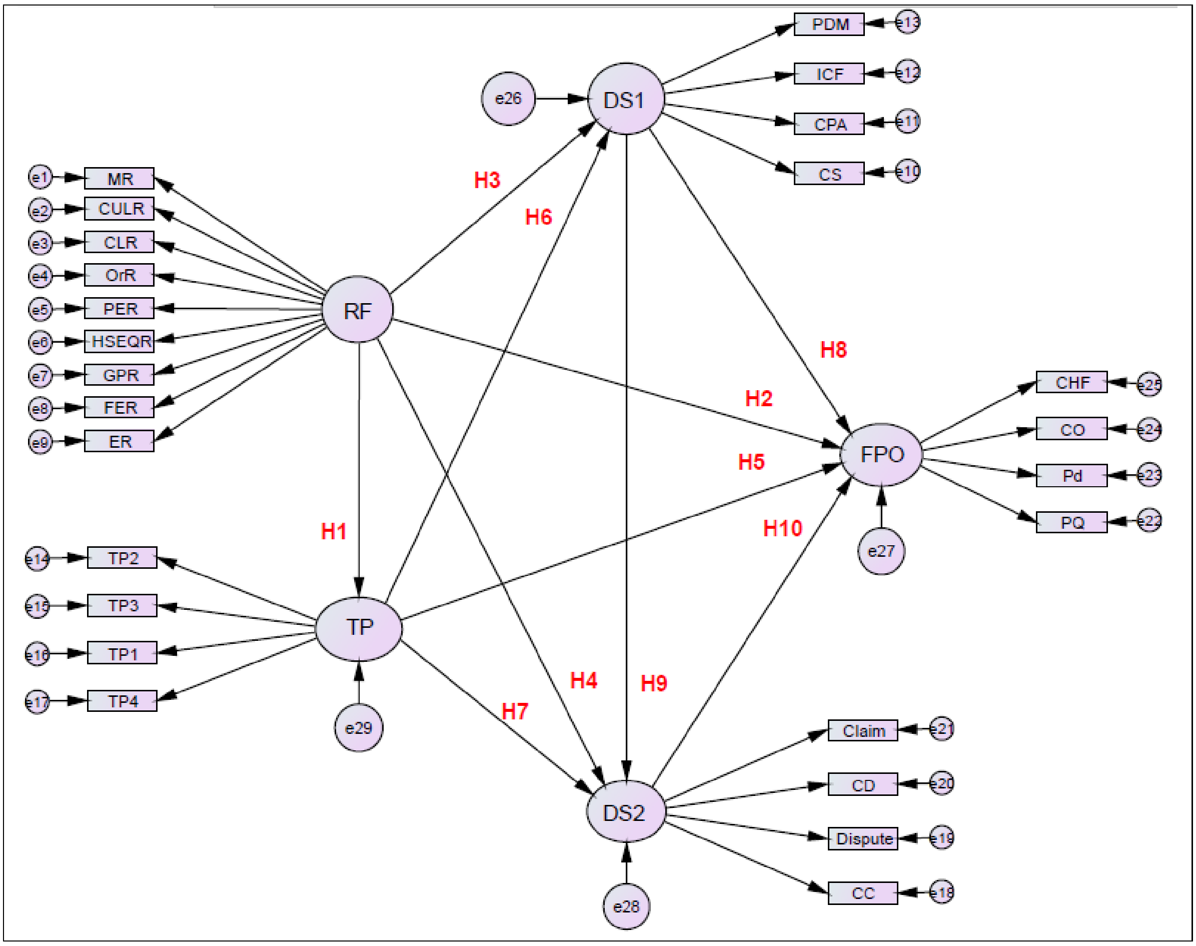

Figure2. The theoretical framework hypotheses of (MRTPI) as per built by AMOS-SEM Program (Source: Researcher)

V. Research Methodology

In this study, the methodology is divided into two stages, the first stage is data collection from a literature review and questionnaire design, the questionnaire pilot tested, and distributed to respondents in (tendering & contracts department, planning & control and estimation department, risks department, and top management) in oil and gas (PFPs) in Yemen, using a five-point Likert scale in the questionnaire. This study has been based on 200 valid responses. The second phase includes data analysis and discussion, using Amos 21.

VI. Data analysis and discussion

Data gathered via the literature review and questionnaire has been analyzed using (SEM). The [37] mentioned in dealing with SEM, there are two models involved in the analysis namely:

The Measurement Model (MM) – the model that demonstrates the relationship between response items and their underlying latent construct. The researcher needs to assess this model for Unidimensionality, validity, and reliability prior to modelling the structural model.

The structural model – the model that demonstrates the interrelationships among constructs in the study. The constructs are assembled into the structural model based on the hypothesis stated in the theoretical framework. [37].

6.1 Confirmatory Factor Analysis (CFA)

(CFA) sometimes called Measurement Model (MM), which is a statistical technique used to verify the factor structure of a set of observed variables, and study the relationship between these variables and whether their underlying latent constructs exist ([53], [54],[55]).

According to [56], the items of the constructs undergo the (CFA) procedure involving uni-dimensionality test, convergent validity, construct validity and discriminant validity, using Amos program, followed by the measurement of reliability on all items, using SPSS Program to ensure the consistency of the (MM), and to measure the constructs that could not be measured directly [57].

To evaluate the fitness of (MM) ([58], [59] ,[56]) have suggested using, at least, three fit indexes, the absolute fit, incremental fit and parsimonious fit of which are for construct validity. At least one index should hit the threshold of acceptance from each category of model fit as in table 2 & 3, below.

6.1.1 Unidimensionality Assessment

CFA examines the uni-dimensionality of a scale initially developed by (EFA) ([60] , [61]). In this study, and as per proposed in figure1&2. CFA checked the uni-dimensionality of all measuring items, which is initially developed by (EFA), as shown in figure 2. It is found that all measuring items have positive and acceptable factor loadings (greater than 0.5), except 3 items that are deleted because their loadings were below this threshold. The researchers deleted 3 of 24 items. Thus, for the whole model, only 21 items remained as they depict loadings between 0.565 and 0.890 (Table 4).

To check the adequacy and fitness of the measurement, the model in first running the goodness of fit indexes has been found not the goodness of fit. The (MM) was developed as shown in figure 3 , by Modification Indices (MI) for covariance, and in the second running the goodness of fit indexes have been obtained as shown in table 5.

According to [62] having an acceptable overall model fit, the next phase of CFA is to assess the psychometric properties of measures regarding construct validity, convergent validity, discriminant validity and reliability properties.

6.1.2 Validity

Validity is the ability of an instrument to measure what it supposed to be measured for a latent construct. The validity of (MM) is assessed based on the requirements. There are three types of validity required for each (MM) ([63],[62]).

A. **Convergent Validity:** Convergent validity is a set of items in one construct. The convergent validity could be verified by computing the Average Variance Extracted (AVE) for every construct by Equ. (1). the value of (AVE ≥ 0.5) for this validity to achieve, as shown in table 4. Table 4, shows all the (AVE) greater than 0.5, hence the convergent validity is valid for all constructs.

B. **Construct Validity** :The construct validity is achieved when the fitness indexes for a construct achieves the required level [37].The fitness indexes, their respective categories, and the level of acceptance are presented in table 2. All fitness indexes are at the required level as shown in table 5.

C. **Discriminant Validity (DV)** : (DV) compares correlations of constructs and the square roots of the average variance extracted ($\sqrt{(AVE)}$) for a construct [64]. (DV) assesses the level to which a construct is dissimilar, and unrelated, to other constructs. The value recommended by [65] correlations between factors must be less than 0.85.

In this study, (DV) is tested by comparing the correlations of constructs and ($\sqrt{(AVE)}$) for a construct. (DV) values for the developed (MM) are set out in table 6, the inter-correlations between deconstructs range from (0.312 to 0.541). Such also depict that the ($\sqrt{(AVE)}$) are all-greater than correlations between the latent constructs. Hence, it is below the threshold 0.85; hence, this study has proposed an adequate (DV).

Table 2. Fitness of (MM).

Name of category	Full Name	Name of index	Level of acceptance
1. Absolute fit	Chi Square is significant at ($P < 0.05$).	$\chi 2$ at ($P < 0.05$)	$P < 0.05$
	Root Mean Square of Error Approximation.	RMSEA	RMSEA < 0.08
	Goodness of Fit Index.	GFI	GFI > 0.85
2. Incremental fit	Adjusted Goodness of Fit.	AGFI	AGFI > 0.85
	Comparative Fit Index.	CFI	CFI > 0.90
	Tucker-Lewis Index.	TLI	TLI > 0.90
	Normed Fit Index.	NFI	NFI > 0.90
3. Parsimonious fit	Chi Square/Degrees of Freedom.	Chisq /df	Chi-Suare / df < 3.0

Source of this table adapted from: [66], [67], [68] , [69] , [59] , [65] , [37] , [70], [56] ,[71], [62], [4] .

Table 3. Assessment the (MM).

Assessment	Criterion	Name of Index	Level of Acceptance
Uni-dimensionality	Factor loading	Standardized Regression Weight	Weight ≥ 0.5
	Path Coefficients	β-value	β-value ≥ 0.1
Reliability	Internal Reliability	Cronbach Alpha (α)	α ≥ 0.7
	Construct Reliability	CR	CR ≥ 0.6
Validity	Convergent validity	Average Variance Extracted (AVE)	AVE ≥ 0.5
	Construct validity	See Table 1.	
	Discriminant validity		≤ 0.85

Source of this table adapted from: [59], [65], [37], [70], [61], [56], [62], [48], [4].

According to [37] the equations of (AVE) and (CR) as following:

$$\mathrm{AVE} = \frac{\sum \mathrm{K}^2}{\mathrm{n}} \qquad \mathrm{Equ.}(1)$$

$$\mathrm{CR} = \frac{\sum \mathrm{K}^2}{[(\sum \mathrm{K})^2 \ + \ (\sum 1 - \ \mathrm{K}^2 \ )]} \qquad \mathrm{Equ.}(2)$$

Where: Ϗ = factor loading of every item, n = number of items in a model.

Table 4. Summary of all Construct, factors loading, α, CR, and AVE.

Categories	Item	Identifier	Loading Factors	Cronbach's Alpha (α)	AVE	CR
Risk Factors (RFs)	Management Risk	MR	0.890	0.910	0.503	0.899
	Culture Risk	CULR	0.781			
	Contractual & Legal Risk	CLR	0.763			
	Organizational Risk	OrR	0.751			
	Risk of Planning & Estimate	PER	0.739			
	Health , Safety, Environmental , and Quality Risk	HSEQR	0.631			
	Governmental Policy Risk	GPR	0.601			
	Financial & Economic Risk	FER	0.594			
	Engineering Risk	ER	0.565			
Defense Strategies in Planning Phases (DS1)	Contracting strategy	CS	0.830	0.907	0.621	0.867
	Contract price arrangement	CPA	0.794			
	Contract clauses / international contract form	ICF	0.779			
	Project delivery methods	PDM	0.747			
Tender Process (TP)	Tender preparation	TP2	0.872	0.911	0.617	0.865
	Tendering by (Client)	TP3	0.843			
	Bidding / tendering by (Contractor)	TP1	0.722			
	Tender evaluation	TP4	0.691			
Defense Strategies in Implementation Phases (DS2)	Contingency Charges	CC	0.873	0.896	0.605	0.858
	Dispute	Dispute	0.856			
	Conservative Design	CD	0.688			
	Claim	Claim	0.672			
	Litigation	Litigation	Deleted			
	Lowering Quality	LQ	Deleted			
Final Projects Objectives (FPOs)	Poor quality	PQ	0.876	0.879	0.595	0.853
	Time overrun	Pd	0.804			
	Cost overrun	CO	0.717			
	Company harm effect	CHF	0.671			
	Project failure / abandoned	PF	Deleted			

(Source: Data analysis, Researcher)

Table 5. The three categories of model fit, level of acceptance and cut-off values.

Name of category	Name of index	Level of acceptance	Model values	Status
1. Absolute fit	Chi-Square	P < 0.05	0.000	Acceptable
	RMSEA	RMSEA < 0.08	0.064	Acceptable
	GFI	GFI > 0.85	0.877	Acceptable
2. Incremental fit	AGFI	AGFI > 0.85	0.854	Acceptable
	CFI	CFI > 0.90	0.940	Acceptable
	TLI	TLI > 0.90	0.932	Acceptable
	NFI	NFI > 0.90	0.916	Acceptable
3. Parsimonious fit	Chisq/df	Chi-Square / df < 3.0	1.811	Acceptable

(Source: Data analysis, Researcher)

Table 6. Discriminant validity index summary for the construct.

	RF	DS1	TP	DS2	FPO
RF	**0.709**				
DS1	0.315	**0.788**			
TP	0.445	0.450	**0.786**		
DS2	0.312	0.541	0.364	**0.778**	
FPO	0.396	0.317	0.420	0.333	**0.771**

(Source: Data analysis, Researcher)

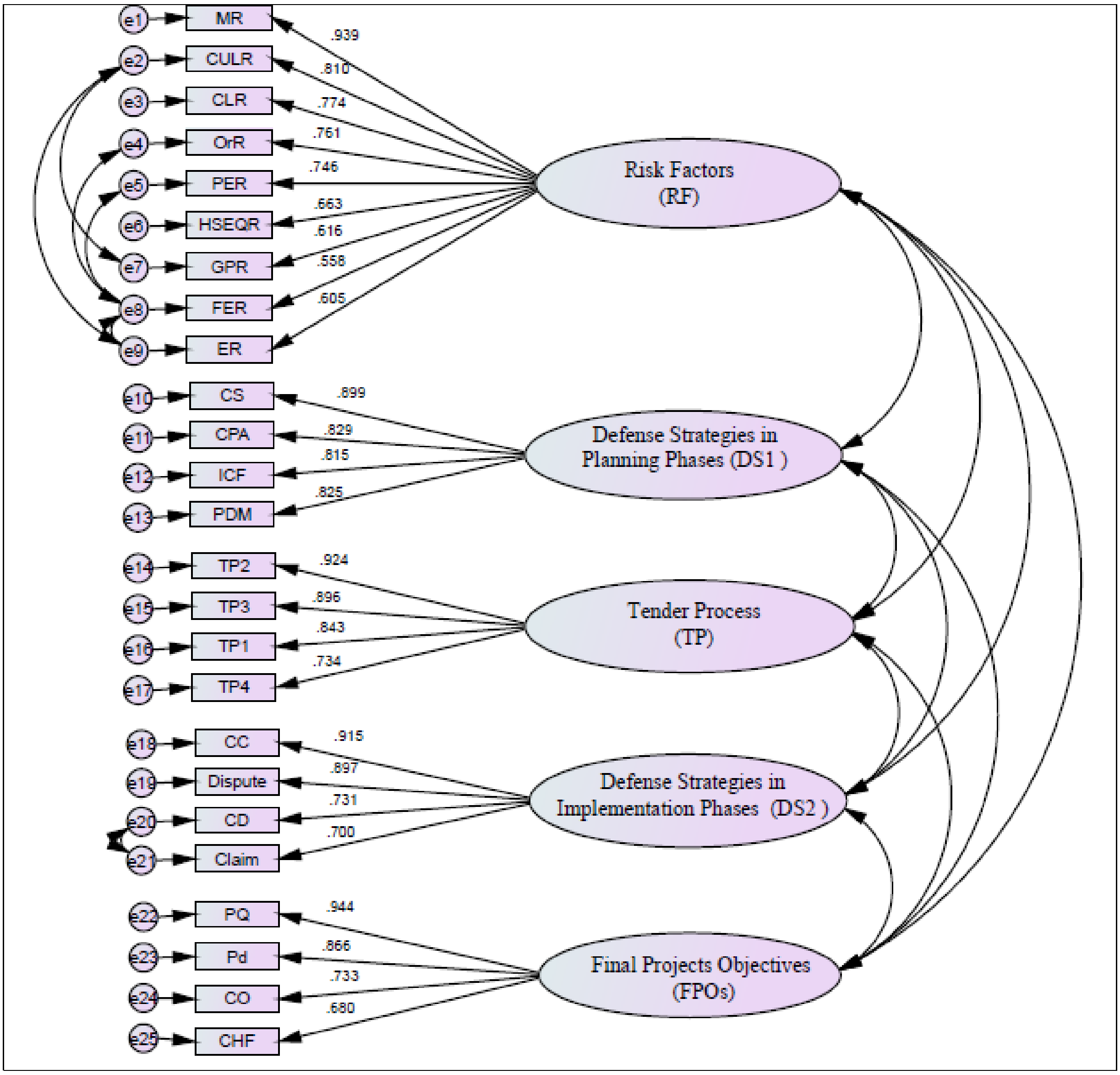

Figure 3. Simulation process results for (MRTPI). (Source: Data analysis, Researcher)

6.1.3 Reliability

Reliability is the extent of how reliable is the (MM) in measuring the intended latent construct. The assessment for the reliability of a (MM) could be made using the following criteria [37], as shown in table 3.

a. **Internal Reliability (IR):** The (IR) indicates how strong the measuring items are holding together in measuring the respective construct. This (IR) is achieved when the value of Cronbach's Alpha (α) exceeds 0.7, as shown in table 3, (calculated in SPSS). In this study, the (IR), ranging from (0.879 - 0.911), is greater than 0.7, as shown in table 4. It indicates that the (IR) is strong for the measuring items and holding together in measuring the developed model.

b. **Composite Reliability (CR):** The (CR) indicates the reliability and internal consistency of a latent construct. (CR > 0.6) is required in order to achieve CR for a construct, as shown in table 3 , CR is calculated by Equ. (2). In this study, the (CR) ranging from (0.853 to 0.899), as shown in table 4. It is greater than 0.6 that indicates the reliability and internal consistency of a latent construct within range.

c. **Average Variance Extracted (AVE)**: The (AVE) indicates the average percentage of variation explained by the measuring items for a latent construct: (AVE > 0.5) is required for every construct as in table 3; (AVE) is calculated by Equ. (1). The (AVE) ranges from (0.853 to 0.899), as shown in table 4. It is greater than 0.5.

Based on table 4, all reliabilities of the constructs are correspondingly in the comfortable range.

6.2 Test of Hypotheses

The purpose of path analysis in (SEM) for (MRTPI) is to test the statistical significance of the effect of explanatory variables [72].

The path coefficients (β-value) indicate the impact of a path on the dependent variable ([73], [74], [48]). According to table 6, a model can be considered acceptable if (β-value is above 0.1). In addition, the significance of the direct relationship between two latent variables is determined by the critical ratio test (CR ≥1.96 representing the significance at the $p < 0.05$). ([75], [76], [77], [78], [79]).

In this study, the values of hypotheses (H1, H2, H5, H6, H9, H10) (β-value > 0.1; CR ≥1.96; and $p < 0.05$) as shown in figure 4 and table 7, indicate the impact of a path on the dependent variable, and the direct relationships are significant. Thus, the hypotheses are accepted and supported.

The other values of hypotheses (H3, H4, H7, H8) (β-value < 0.1; CR <1.96; and $p > 0.05$) as shown in figure 4 and table 7, indicate no impact of a path on the dependent variable and the direct relationships are not significant. Thus, the hypotheses are not acceptable and should be deleted.

In figure 5 and table 7, the hypotheses of (H2 =0.334, H5=0.331) show the effects of (RFs) with /without (TP) in (FPOs) as twice the effects of (RFs) with (DS) (H10 = 0.183). This means the proposed (DS) reduces the effects of (RFs) approximately to half. Thus, the hypotheses (H2 and H5) should be deleted.

The hypotheses values of (H1=0.450, H6 = 0.457, H10= 0.203) in table 8, indicate the strong impact of a path on the dependent variable, and the direct relationships are of strong significance. Thus, the hypotheses are acceptable as shown in figure 6, and considered as a developed (MRTPI) for oil and gas (PFPs) in Yemen.

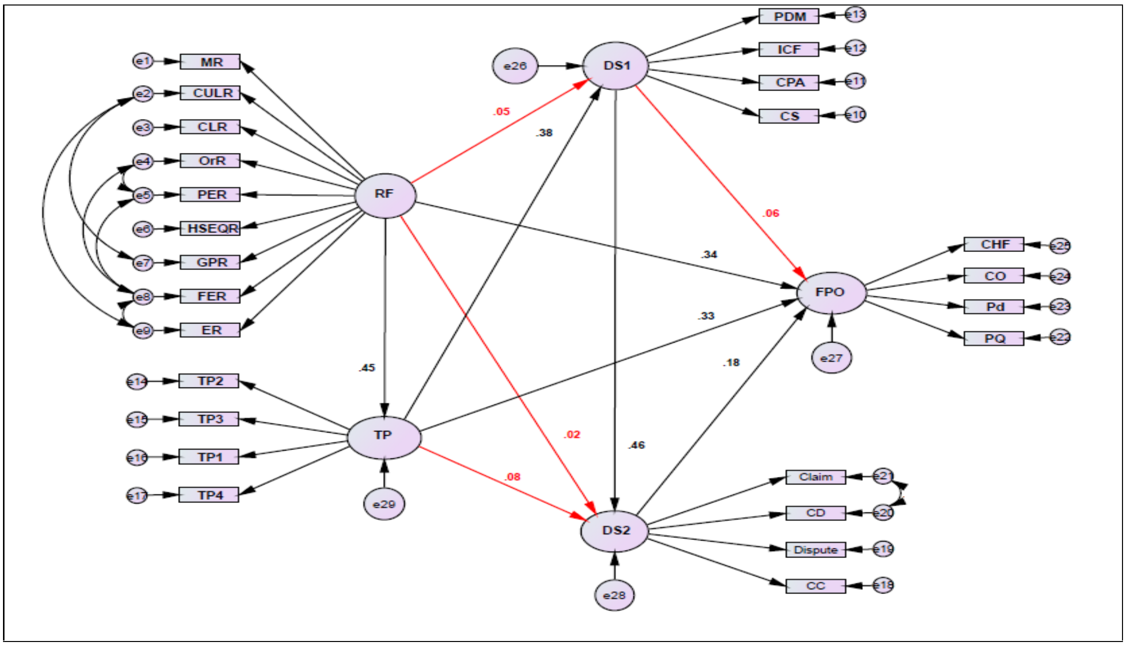

Figure 4. Integrated Conceptual Model (ICM)– First running - (Source: Data analysis, Researcher)

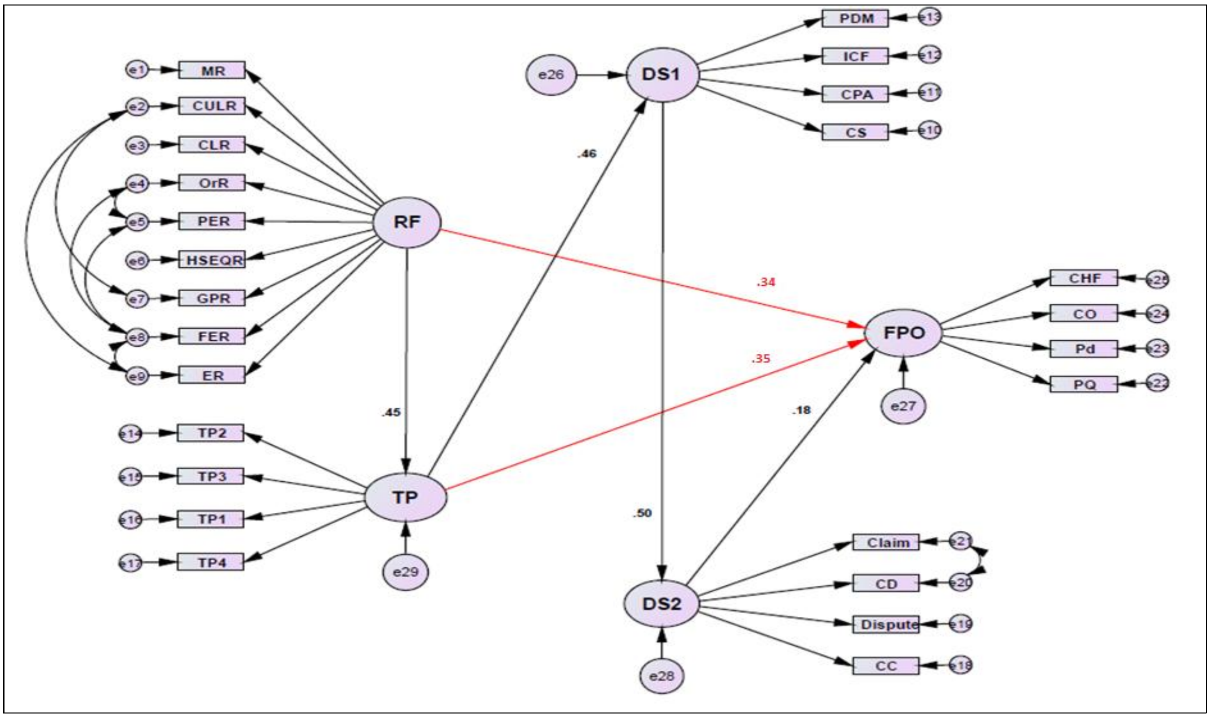

Figure 5. Integrated Conceptual Model (ICM)– Second running - (Source: Data analysis, Researcher)

Table 7. Results of examining hypotheses in the initial structural model.

Hypotheses (H)	Relationships			β (β > .1)	C.R. (C.R.> 1.96)	P (P < .05)	Significant Yes / No	Comments Support / Delete
H1	TP	<---	RF	.446	6.312	***	Yes	Support
H6	DS1	<---	TP	.378	4.712	***	Yes	Support
H3	DS1	<---	RF	.053	1.849	.064	No	Delete
H9	DS2	<---	DS1	.455	5.408	***	Yes	Support
H4	DS2	<---	RF	.021	1.576	.115	No	Delete
H7	DS2	<---	TP	.082	1.290	.197	No	Delete
H10	FPO	<---	DS2	.183	2.608	.016	Yes	Support
H2	FPO	<---	RF	.344	3.939	.001	Yes	Support
H5	FPO	<---	TP	.331	3.902	.002	Yes	Support
H8	FPO	<---	DS1	.059	.663	.507	No	Delete

(Source: Data analysis, Researcher)

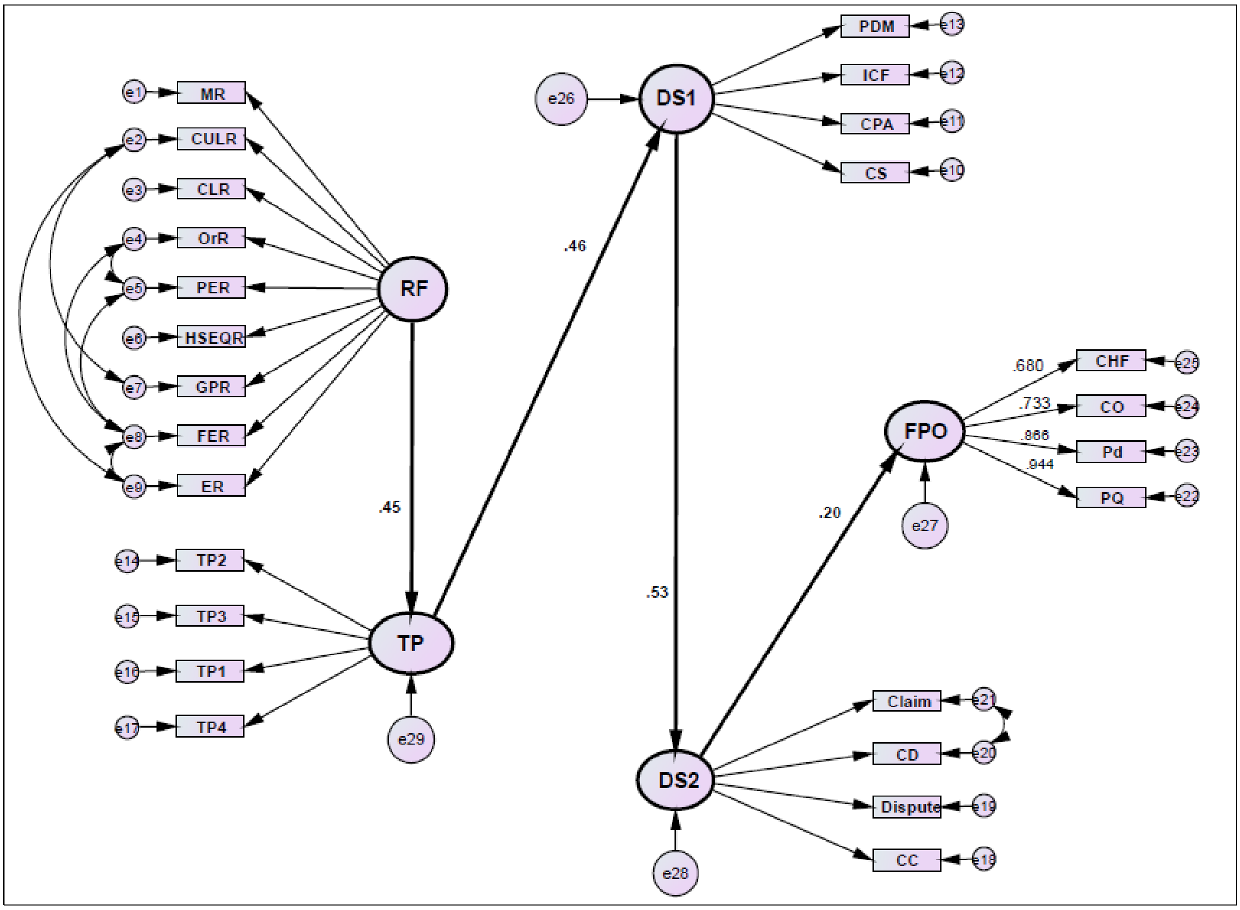

Figure 6. The developed Integrated Theoretical Framework of (MRTPI). (Source: Data analysis, Researcher)

Table 8. Results of examining hypotheses in the developed structural model.

Hypotheses (H)	Relationships			β	C.R.	P	Significant	Comments
				(β > .1)	(C.R.> 1.96)	(P < .05)	Yes / No	Support / Delete
H1	TP	<---	RF	.450	6.403	***	Yes	Support
H6	DS1	<---	TP	.457	6.344	***	Yes	Support
H9	DS2	<---	DS1	.526	6.902	***	Yes	Support
H10	FPO	<---	DS2	.203	2.975	.002	Yes	Support

(Source: Data analysis, Researcher)

The developed model (MRTPI) as shown in Figure 6, reduced the effecting of risk factors in tender process by the half using defense strategies and enhancing the final projects objectives as shown in figure 7 with (0.944 for (PQ), 0.866 for (Pd), 0.733 for (CO), and 0.680 for (CHE). Thus, the findings of this study help practitioners gain an in-depth understanding of (RFs) in the (TP) affecting the implementation stage and how to select suitable defense strategies to reduce risk causes and effects. Moreover, to enable project teams to manage risks and make the decision to support the contracting authority in the (TP) and implementation stage.

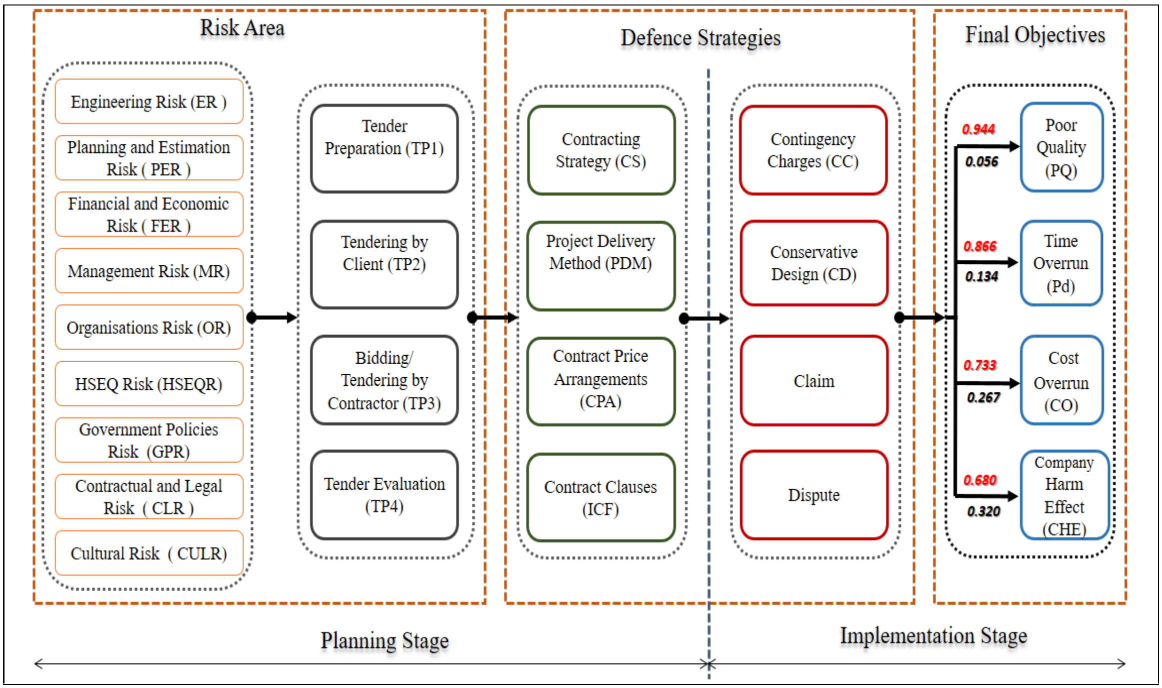

Figure 7. The developed of (MRTPI). (Source: Data analysis, Researcher)

VII. Conclusion

This study has attempted to identify the (RFs) in (TPs) affecting the contract implementation stage and (DS) to reduce these effects in oil and gas (PFPs) in Yemen. There are 24 items as identified from the literature review and questionnaires with key expert persons in the oil and gas industry. Consequently, these items are grouped into five categories following the classification from a previous study. Only 21 out of 24 are considered by the respondents as factors of five categories that significantly affect oil and gas (PFPs) in Yemen.

This study has provided new goodness fit developed model called (MRTPI) based on 21 items into five categories. It is suggested that (DS) can reduce the effects of (RFs) in (TPs), both in the planning stage and implementation stage by half and in enhancing the final projects objectives with (0.944 for (PQ), 0.866 for (Pd), 0.733 for (CO), and 0.680 for (CHE)

The (MRTPI) can be used to provide a better understanding of the link between (RFs) in (TPs) and (FPOs). In addition, make stronger recommendations for effective intervention in using suitable defense strategies in projects. As well as, the (MRTPI) is useful to participants in the oil and gas sector, the construction sector, as well as for researchers in this field.

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