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The Correlation Between Risk Assessment and Project's Performance in Libyan Construction Industry

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Abstract— ***The construction projects represent the basic framework for the process of economic and social development in any country because it is linked to all economic sectors, where the success of development plans depends primarily on the success of these projects. However, it faces many challenges and financial and non-financial risks that impede its success, especially in developing countries that suffer from political and economic instability such as Libya. Therefore, the current research seeks to explore the effect of assessment of risks (RMP-RA) on the project performance of Libyan construction. A survey of construction companies' directors was undertaken in Libya and a total of 250 useable questionnaires were received for empirical research for the suggested model, utilizing a structural-equation model (Smart-PLS). The findings from this research revealed that RMP-RA has effects with positive and significant on the performance of Libyan construction projects. According to this study, RA has been identified as the most critical resource and capability that can assist construction firms in fostering its projects' performance in Libya. It has made a significant contribution by increasing awareness of the effect of RMP-RA on construction projects' performance.***

Index Terms— ***Assessment of Risk; Project Performance; Libyan construction Industry.***

I. INTRODUCTION

Highlight The construction industry is an enormous contributor to the economic growth and national development of nations given its propensity to account for some of the world's largest project undertakings and its involvement of multiple stakeholders and workers in implementing the project (Serpell et al., 2017 Urbański et al., 2019; Pirwani et al., 2020; Sabiel, 2020; Ekung et al., 2021). Nonetheless, the role and contribution of the construction industry vary from one country to another. However, in the context of developing economies, the construction industry makes a significant contribution to national economies through the development of new infrastructures such as airports, schools, railways, housing, roads, and so on (Dakhil, 2013; Urbański et al., 2019; Ganbat et al., 2019b; Pirwani et al., 2020; Sabiel, 2020; Ekung et al., 2021). The design and construction of these infrastructural projects make the construction industry one of the most complex and risky businesses in the world (Urbański et al., 2019; Pirwani et al., 2020; Chilumo et al., 2020; Sabiel, 2020; Ekung et al., 2021).

According to Tahir (2015), Pirwani et al. (2020), and Sabiel (2020) the construction industry has amassed a poor reputation for managing risks and this has resulted in many projects failing to meet deadlines, cost, and quality requirements. They further explain that in the construction industry, projects are extremely complex and fraught with uncertainty; with risks and uncertainty having potentially damaging consequences for construction projects. Hence, nowadays, identifying and analysing potential risks becomes a crucial and inevitable aspect of building construction projects if project success is to be achieved (Nguyen & Watanabe, 2017; Ali et al., 2018; Obondi, 2020a; Pirwani et al., 2020; Chilumo et al., 2020; Ekung et al., 2021).

At present, Libya is constrained by a serious housing deficit (El-Abidi et al., 2019). While it can be argued that many other developing countries face similar problems, the specific demographic trends of each country need to be clearly understood. Libya has a small population of 6,258,984 (as of 2014) although its surface area is 1,759,540 km 2. (World Bank, 2015). The demographic distribution of the population of Libya changed from 24.2% in 1954 to over 88% in 2006 in their cities and towns. Two main cities, Tripoli (capital) and Benghazi (second largest) in 2006 concentrated 25 per cent of the population (Higham & Troug, 2018; El-Abidi et al., 2019) .The settling pattern of Libya can therefore be described as high in some cities but with intense spatial inequalities across regions (Alfakhri et al., 2017; KUSAKCI et al., 2017; Ismail, et al., 2018; Alfakhri et al. 2018; Alzohbi et al., 2018; Marzouk & El-Hesnawi, 2018; Shibani & Gherbal, 2018; Higham & Troug, 2018).

Assessment of risk is a part of whole process called risk management. Risk management consists of identification of risk; assessment of risk; response and monitoring of risk. Risk management is a planned and structured process aimed at helping the project team make the right decision at the right time to identify, classify, quantify the risks and then to manage and control them (Project Management Institute, 2013; Urbański et al., 2019; According to Banaitiene & Banaitis (2012), "risk management encompasses identifying influencing factors that could potentially negatively impact a project's cost, schedule and quality baselines; quantifying the associated potential impact of the identified risk, and implementing measures to manage and mitigate the potential impact". Additionally, The goals of risk management are to increase the likelihood and impact of positive events and reduce the probability and impact of negative events (Chilumo et al., 2020. However, building projects were faced with the challenge of not practicing risk management that resulted in projects being delayed and longer than expected to increase the project's budget (Chilumo et al., 2020; AlPirwani et al., 2020; Masengesho et al., 2020). This challenge is more pronounced in Libya and in most devloping countries (Ali et al., 2018; & Troug, 2018; AlPirwani et al., 2020; Chilumo et al., 2020).

After identifying a specific risk, the next step is to determine its severity and priority by analysing the available qualitative and quantitative information, including probabilities and impacts, related to the risk description (Nguyen & Watanabe, 2017; Ali et al., 2018; Pirwani et al., 2020; Chilumo et al., 2020). The goal of risk analysis is to identify and estimate the possibility of a specific risk occurring, as well as to determine the impact of that risk on project outcomes if it does (AL-Hasani, 2018). The method starts with a quantitative and qualitative expert assessment of the risk's probability and impact, which is based on the experts' previous experieAL-Hasani, 2018).

Risk has been split into qualitative and quantitative instruments, as previously said. Direct judgment, ranking possibilities, comparing options, and descriptive analysis are examples of qualitative tools and procedures (AL-Hasani, 2018). Quantitative methods and approaches can help you improve the accuracy of your risk analysis. Probability analysis, sensitivity analysis, scenario analysis, simulation analysis, and correlation analysis are just a few examples Ali et al., 2018; AL-Hasani, 2018; Pirwani et al., 2020; Chilumo et al., 2020). Risk analysis, both qualitative and quantitative, entails: (a) Determining the importance of a risk-based on its likelihood and probable influence (consequences) on the project's goals, schedule, cost, scope, and quality. This is done using matrices that specify combinations of likelihood and impact while taking organizational thresholds into account, resulting in risk ratings of low, moderate, and high priority. (a) assessing both opportunities and threats; (c) based evaluations on factual information and data where possible and appropriate; (d) stating the assumptions underlying the analysis; and (e) reassessing the qualitative risk scores during the PLC.

The hazards identified as high-priority by qualitative risk analysis are subsequently addressed to quantitative risk analysis, albeit this is not always necessary for effective response (AL-Hasani, 2018). The methods used for a given project will be determined by the project's timeline and budget, as well as the necessity for qualitative and quantitative risk assessments AL-Hasani, (2018).

Scenario analysis is most commonly utilised in uncertain scenarios. Techniques like expected value, decision tree analysis, sensitivity analysis, and Monte Carlo simulation are commonly used, according to AL-Hasani (2018), and can be used to (a) quantify the possible outcomes for the project, as well as their probabilities; (b) determine the probability of achieving the project's objectives; and (c) identify project cost, schedule, and risk.

Based on prior studies and literature review the researcher posed the next hypothesis:

H1: Practicing the assessment of risk has a positive impact on Libyan construct's project performance.

Following the hypothesis figure 1 presents the conceptual framework of the current study.

relevant to the corresponding risks related to project management.

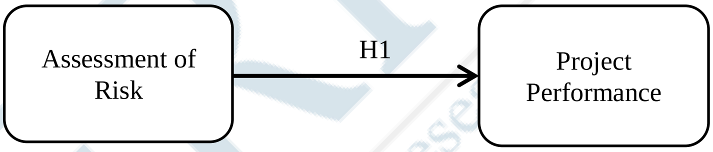

Figure 1: The research framework

II. Research Methodology

To achieve these goals, a quantitative approach to collect data from executive directors of Libyan construction firms was employed. Questionnaires were distributed to 312 Libyan construction companies in Tripoli and Benghazi. A total of 250 questionnaires valid questionnaires for analysis were received with a response rate of 80 percent. Furthermore, the study used SEM-PLS to test the hypothesis of study. In addition, in this study, the operationalization of the RA practices measurement was based on five items from and later which were refined by Liu et al. (2016) and Boateng et al. (2020). Additionally, the operationalization of the projects' performance measurement was based on four items drawn from Nassar and Abou Rizk (2014) which were refined by Ali et al. (2018) and (Unterhitzenberger & Bryde, 2019). All items were designed to be answered based on a five-point Likert scale (1= Strongly Disagree, 2= Disagree, 3= Neutral, 4=Agree, 5= Strongly Agree).

III. Results & Discussion

A. Formulation of model

The model formulated in this this study looked at the measurement-model with an emphasis on "a concept, convergent, and discriminant validity" following suggestion of Hair et al (2019) criteria. Construct-validity refers to the use of the results obtained to develop a test using measure and relevance. This concept could be explained more clearly by looking at the item's factor loadings in the measurement model's content validity (Chin (2010). Factor loading is the main factor used in this paper, with a cutoff value of 0.50 based on Hair et al (2010). The loadings of all items

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surpassed 0.50, as shown in Table 3. This outcome therefore validates "the measurement model's" content. Factor loadings, composite reliability (CR), and extracted average variance (AVE) may be used to analyze the construct under concern ((Hair et al., (2014), (2019)). According to Hair et al. (2019), CR should be greater than 0.70 and AVE should be greater than 0.50 which were the limits often used. The results shown in Table 1 show that CR findings were above 0.70 while AVE findings exceeded 0.50. Hence the measurement model's convergent validity was achieved.

After validating the convergent validity, the Heterotrait-Monotrait (HTMT) ratio of correlations technique was used to investigate discriminant validity. HTMT was provided in cases when the multitrait-multimethod matrix was utilized to examine the strength of correlations between and within components or variables Henseler et al., 2015 Hair et al., 2019). The discriminant validity would be at risk if the value of HTMT was above 0.9. Henseler et al. (2015) and Garson (2016)). Table 2 shows the values of Discriminant Validity and they are all below 0.90 and hence discriminant validity was established.

Table 1: Loading-factor and convergent-validity results

Model Construct	Measurement Item	Loading	Composite Reliability (CR)	Average Variance Extracted (AVE)
Risk Assessment (RMP_RA)	RMP_RA1	0.56	0.83	0.51
	RMP_RA2	0.61		
	RMP_RA3	0.59		
	RMP_RA4	0.83		
	RMP_RA5	0.86		
Project Performance (PP)	PP1	0.90	0.94	0.79
	PP2	0.92		
	PP3	0.92		
	PP4	0.81		

Table 2. Results of discriminant validity analysis by HTMT

Construct	Project Performance	Risk Assessment
Project Performance		
Risk Assessment	0.82	

B. Evaluation of the structural model

After the measurement model has been validated, the structural model was examined by using the Smart-PLS 3.3.3 program to look at the link between Risk Assessment (RMP_RA) and projects' performance. The path coefficients—which demonstrate the strength of the relationship between the independent and dependent variables—were examined. A bootstrap resampling method was used to calculate T-statistics and the standard errors. The bootstrap approach analysis is different from conventional computations. The path coefficients, standard error and t values as given in Table 3 and Figure 2 provide the findings. The result revealed that PMP-AR has a positive and significant impact on projects' performance in the Lipian construction industry "($\beta = 0.871$, $t = 58.744$, $p < 0.001$)", due to that, it supported the study's hypothesis. This means the PMP-AR implementation affected positively the projects' performance in the Lipian construction industry by 87 percent. This result was in agreement with earlier studies such as Renault et al (2018), Tahir et al. (2015), and Obondi (2020).

Table 3: Hypothesis test result

Hypothesis	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Risk Assessment -> Project Performance	0.871	0.015	58.744	0.000

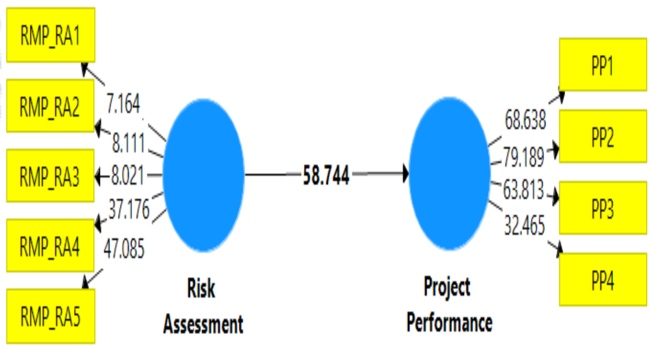

Figure 3: Hypothesis test result

IV. DISCUSSION OF RESULTS AND CONCLUSIONS

Use either The goal of this research was concerned with the impact of RM practice risk assessment (RMP-RA), on the performance of construction projects in Libya. one hypothesis was formulated to address the issue. Where the hypothesis deal with the influence of risk assessment (RMP-RA) on Libyan construction projects' performance. It was found that RMP-RA has a positive impact and significant on construction projects' performance. The effect was the RMP-RA practice by construction firms in Libya has improved the projects' performance by almost 87%. In conclusion, the above finding revealed to risk assessment (RMP-RA) practice had positive effects on enhancing project performance. By adopting this practice, the performance of the studied Libyan construction companies has increased to almost 87% overall. This clearly indicated that all parties involved in construction should apply risk assessment in their activities. The present study only examines one element of risk management which is the assessment of risks. This was limited due to the time frame available and the accessibility of data available for reliable analysis. Future studies should include other elements of RM practice.

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