Best Contractor practice innovations in managing risk during the Pandemic

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ABSTRACT

Due to the Pandemic, the contractor's ability to handle associated risk and uncertain conditions have become even more crucial to the successful completion of the project. In addition to strategic agility and inventive capabilities, entrepreneurial capabilities play a vital role in effective risk management. A quantitative research design employing the survey method to collect data from contractors in the Indonesian construction sectors was selected to conduct this study. 400 structured and self-administered questionnaires were disseminated, and after data cleaning and screening, 329 were finished. The collected questionnaires were further analyzed using SPSS and AMOS. The findings demonstrated a substantial relationship between inventive capabilities and risk management. A substantial correlation was also identified between strategic agility and risk management. The results of entrepreneurial leadership moderation have been large and favorable. The research has higher theoretical and practical value because the findings can be applied to the Indonesian building industry. In addition, the study contributes to the expanding body of knowledge on contractors' skills.

KEYWORDS: Entrepreneurial leadership, innovative capabilities, strategic agility, risk management, contractor's competencies, Pandemic

1. INTRODUCTION

Successful project completion and effective process accomplishments depend on the contractor's competencies. Risk management in Indonesian organizations is on the rise and gaining importance since it equips firms with the essential tools that boost their capacity to detect and address potential risks effectively. After Covid-19, the possibility of dangers in various projects steadily grows. For preventative measures, the Indonesian construction industry considers risk management a significant instrument and essential component, with monitoring risk aspects at each step of its processes. Once a risk is identified, risk reduction is straightforward (Jepson, Kirytopoulos, & Chileshe, 2022; Lisdiono et al., 2022). Ignorance of risk factors, especially in the construction business, results in rework, which affects worker morale and incurs additional expenses. Without risk management, construction industries in Indonesia cannot achieve their goals, as if objectives are created without considering risk factors, they are likely to lose focus and become ambiguous, especially if risk factors impact working procedures.

Entrepreneurial leaders in the business sectors with strategic agility can observe and rationally respond to any changes more quickly, as well as carefully project construction project risk elements. Hence, strategic agility contributes to firms' growth sustainability and profitability performance (Fernald Jr, Solomon, & Tarabishy, 2005; Harrison, Paul, & Burnard, 2016; Zulkifli, 2022). Agile leaders manage and anticipate uncertainty, volatility, ambiguity, and complexity levels. In addition to being advantageous for risk management, the innovative skills of contractors also support risk management. Since Covid-19, innovative risk management solutions have increased in Indonesian businesses (Prasetyo et al., 2022). Organizing and encouraging the workers involved in a construction project to achieve the project's objectives through many factors, such as risk optimization, innovation, and management of the business's dynamic environment, strengthens the project's risk management (Kassai, 2022; Rela et al., 2022; Shayan, Pyung Kim, & Tam, 2022). The present study aims to explore the most innovative contractor risk management practices during the Pandemic.

With the rapid growth of technology and the modernization of business processes, contractors' abilities in the Indonesian construction industry have become a risk management concern. There is a lack of research on the competencies of contractors in the Indonesian construction industry in terms of risk management. Specifically, the Indonesian building industry is fraught with unpredictability and risk. Literature from the past demonstrates that managing risks and uncertainties is the primary responsibility of the contract owner. New concepts and appropriate novelty qualities in businesses result in enhanced risk administration (Mahmoudi, Sadeghi, & Deng, 2022; Sadikoglu & Ozorhon, 2022). Previous studies have paid little or no attention to risk management factors in the Indonesian construction industry and the best contractor's capabilities to determine the reduction of risks in projects (Abuanzeh et al., 2022; Tsilionis & Wautelet, 2022; Zahoor et al., 2022). This study bridges the gap by combining the key elements into a single framework that examines the contractor's competencies and subsequently influences the effectiveness of risk management in Indonesia. The introduction is followed by a review of prior studies that served as the basis for the research framework and the formulation of hypotheses, which leads to the methodology section, which elaborates on the detailed mechanism used in this research, and the discussion section, which describes prior studies that correspond to the results. The conclusion wraps up the entire analysis and its implications or recommendations for future research.

2. REVIEW OF LITERATURE

2.1. Theoretical background

Extreme value theory can improve the evaluation and management of severe economic hazards (EVT). According to studies, EVT often gives precise measures of capital asset return severe quantiles and tail likelihood (Diebold, Schuermann, & Stroughair, 2000). Modern Portfolio Theory introduced the principles of portfolio selection, capital efficiency, risk payback trade-off, and relationships between the yields of diverse assets (Hawley & Beyhaghi, 2013). MPT is a prescriptive rather than descriptive theory that offers shareholders a solution by demonstrating the optimal investment strategy within a portfolio to maximize the total expected return for a given level of risk or to minimize portfolio risk for the same expected return. The variance of an investment's yield, which gauges how returns can deviate from their expected returns, is used to determine the risk associated with that investment. According to the componential hypothesis, individuals are most likely to be inventive when their talents and deepest desires or core interests coincide (Amabile, 2018; Liu et al., 2016).

2.2. Strategic agility impact risk management

Developing and maintaining strategic agility has become a challenge for businesses and their executives. Strategic agility may assist firms in achieving ambitious objectives (Morton, Stacey, & Mohn, 2018). When conducting business, companies face numerous risks, including economic, strategic, and operating hazards (Wirahadi & Pasaribu, 2022). Strategic agility is an organization's capacity to anticipate, act proactively, and adapt to strategy-related difficulties in the face of inherent constraints or future strategies and risks (Nkuda, 2017). The perspective on ecological disturbance includes unpredictability and instability brought about by rapid technological advancements and market-leading changes (Arbussa, Bikfalvi, & Marquès, 2017) brought about by unanticipated market requirements, consumer preferences, competitiveness, technological advances, dispersion, and unanticipated occurrences. Because it is difficult to anticipate a dynamic climate, businesses must adapt swiftly to remain competitive (Haider & Kayani, 2020). Strategic creativity, or the capacity to easily and consistently identify future markets (Kale, Aknar, & Başar, 2019), is therefore acknowledged as a necessary condition for firm performance and has drawn a great deal of interest from the academic and healthcare communities (Ivory & Brooks, 2018). Many elements, including strategic agility, endurance, adaptability, and absorption capacity, have emphasized the need for businesses to adjust to rapid environmental change (Lungu, 2020). While organizations aspire to be nimble, establishing and maintaining strategic agility is challenging for CEOs and other top-level executives involved in strategy generation. Building strategic agility within an organization is a method for mitigating risks and unforeseen changes encountered by enterprises. The first hypothesis to be tested is as follows:

H1: *Strategic agility of contractors has a significant impact on Risk management*

2.3. Innovation capability impacts risk management

Creativity and risk are interdependent. In addition, the literature on innovation activities advises that innovation-focused businesses should proactively watch, assess, analyze, and manage impending scenarios to avoid risks whenever possible (da Silva Etges & Cortimiglia, 2017). Innovation is essential to strengthening a company's competitive edge in the market (Mendoza-Silva, 2020). Innovation influences and benefits customers, businesses, and the economy as a whole. It is a vital engine of economic growth and prosperity (Mendoza-Silva, 2020). Managing risk enables a company to become more capable of reaching its goals. Risk analysis and management fall under the scope of innovation management since ambiguity has existed since creative enterprises have existed (Etges, Souza, & Kliemann, 2017). The following hypothesis will be tested:

H2: *Innovation capability has a significant influence on Risk management*

2.4. Entrepreneurial Leadership impact risk management

Entrepreneurs can maintain their viability in dynamic and changing environments by assuming the duty of entrepreneurial leadership, which has been identified as a critical element. Research demonstrates that entrepreneurial leadership is positively related to company performance through prioritizing client innovation and growth and positioning strategy (Harrison et al., 2016). Entrepreneurial leadership is characterized by a desire for innovation, the ability to take measured risks, and proactiveness (Al Mamun et al., 2018). As a venture is in various stages of development, EL must be committed to finding solutions to difficulties and reducing risk (Hussain & Li, 2022). It has been suggested that strengthening one's leadership skills is essential for enhancing one's ability, self-confidence, and output. On the other hand, entrepreneurs take risks, develop, and compete in the same market (Ali, Kelley, & Levie, 2020; Donbesuur, Boso, & Hultman, 2020).

A company's adoption of risk management may be successful or unsuccessful based on the decision-making skills of its leaders. The success of every teammate and the leader's efficacy will depend on the leadership's ability to assess risk and make decisions to accept varying degrees of execution risk. Hazards affecting the firm's ability to accomplish its goals are present in every action it takes. Environmental variables compel the firm to apply preventative risk management measures, which have evolved into a crucial component of risk management framework creation. The effectiveness of central government risk assessment is greatly influenced by two latent variables: competent leadership and sound governance. A leader's personality may affect the responses after implementing a risk management system (Syahwani, 2019). Entrepreneurial leadership had a good effect on the capability-driven strategy, which assists companies in establishing their core innovation skills. Innovation-capable entrepreneurial leadership greatly impacts organizational effectiveness (Al-Sharif et al., 2023). The following hypothesis will be investigated in this study:

H3: *Entrepreneurial Leadership has a moderating effect on Strategic agility and Innovation Capability*

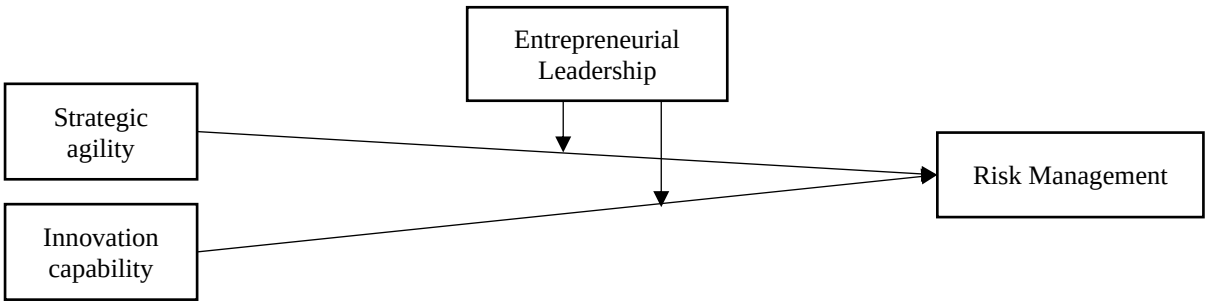

Figure 1. Research Model

3. METHODS

3.1. Method and data collection

This study utilized a quantitative deductive methodology. The method was selected because it objectively examines the influence of contractors' best practices in risk management during the Pandemic. The information was collected via standardized surveys and disseminated by personal administration. For the sake of research ethics, respondents were told that their data would be kept anonymous and that written agreement would be obtained from each respondent before the initiation of the study. The respondents were requested to provide information regarding their age, gender, and level of education. No such information was provided in the surveys to safeguard the respondent's anonymity, as it could have led to their identity.

3.2. Sample

Although a sample size of 200 or more is sufficient for structural equation modeling, several studies advocated for sample sizes between 250 and 350 for satisfactory results. According to this criterion, the present study's sample size is adequate. The present study employed a quantitative cross-sectional methodology and recruited 400 top-level management contractors from the Indonesian construction industry. After data cleaning and screening, 329 full questionnaires were included for data analysis, with a slightly higher proportion of male and a somewhat lower proportion of female employees. It implies that the construction business of

Indonesia hires more men than women as poll-focused contractors in upper-level management, the majority of whom are aged between 31 and 35. These older contractors also had more job experience than the rest. Most responders were knowledgeable in their respective fields, indicating a high likelihood of accurate outcomes by incorporating their reasoned opinions. Most respondents had 11 to 15 years of job experience. Figures 2, 3, and 4 indicate the demographic features of respondents.

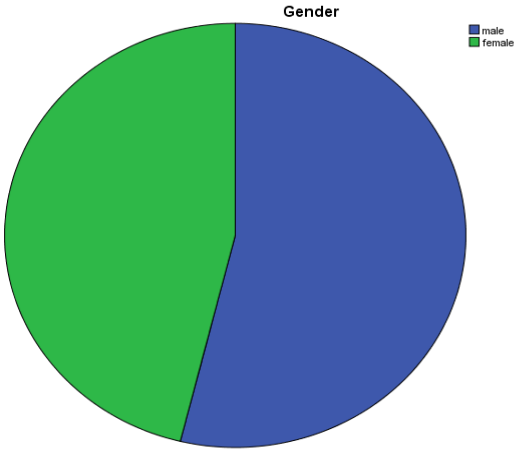

Figure 2: Gender Distribution of respondents

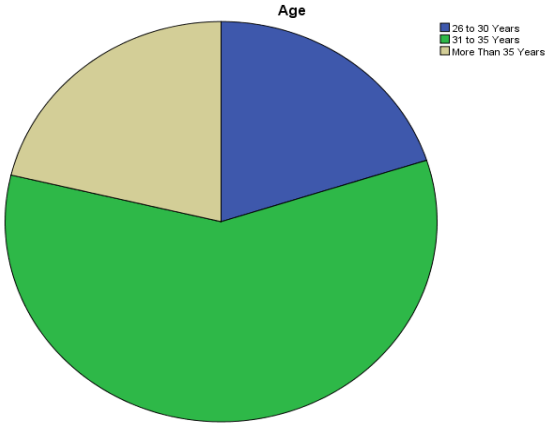

Figure 3: Age distribution of respondents

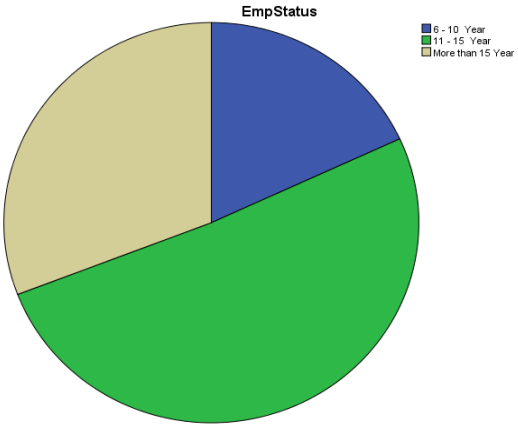

Figure 4: Work experience of the respondents

3.4. Measurements and analytical procedures

The researcher has operationalized the researched variables using previously tested and created scales. Five items have been adapted from the scale developed to measure inventive capacities (Iddris, 2016). Moreover, entrepreneurial leadership has been calculated using five items from the scale developed by Tong (2020). Strategic agility has been tested using six scale items (Idris & Al-Rubaie, 2013). To measure risk management, a six-item scale has been adopted and applied (Hassan & Yazid, 2019). AMOS was used to evaluate the indirect and direct impacts between variables, as shown in figure 1. The researcher utilized SPSS to examine the respondents' demographic characteristics. The second part of the investigation involved evaluating the normalcy of the data using descriptive analysis. The third analysis phase relates to the EFA for variance investigation and sample suitability. The fourth step involved the CFA, which was used to test the validity and dependability of the study model. The next phase involved the application of structural equation modeling to evaluate the moderating effect of entrepreneurial leadership and the direct relationships between variables.

4. RESULTS

4.1. Descriptive Summary

The descriptive analysis of the relevant research model is displayed in Table 4.1. The descriptive test describes the variables' summary statistics, which allowed for an accurate evaluation of response orientation, normalcy, outlier analysis, and missing values. Following the demographics test, the descriptive test was administered to screen the data for outliers and missing values (Colorafi & Evans, 2016). The value range mirrored the endpoints of the scale used to measure responses, such as the 5-point Likert scale. The minimum response for each variable item was one, and the maximum was five. The results suggested that there were no outliers in the data and confirmed that there were no missing values. The number of instances included against these variables was 329, indicating that the analysis contained no missing values.

Table 4.1. Descriptive of the studied variables

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
SA	329	1.00	5.00	3.1986	1.06492	-.308	.134
IC	329	1.00	5.00	3.2578	1.14186	-.265	.134
EL	329	1.00	5.00	3.2736	1.18849	-.234	.134
RM	329	1.00	5.00	3.2715	1.03146	-.168	.134
Valid N (listwise)	329						

SA= Strategic Agility, IC= Innovation capabilities, EL= Entrepreneurial leadership, RM= Risk management

The mean values for the variables were between 3.1-3.2, exhibiting a sequence of agreement among the respondents.

4.2. Rotated component matrix

In addition to testing the KMO & Bartlett values for the study model, sample suitability was confirmed. The test determined whether the sample data matched the variance contribution and were appropriate. The KMO value for the research sample was .962, which is acceptable and indicates that the sample size for factor analysis estimate and "variance analysis" was

sufficiently large (Kline, 2014). As shown in table 4.2, the Bartlett test was likewise significant (p=.000), indicating that the itemized correlation between the components does not lead to cross-loading or duplicating items.

Table 4.2. KMO & Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.962**
Bartlett's Test of Sphericity	Approx. Chi-Square	14029.433
	df	231
	Sig.	.000

Table 4.3 displays the rotated matrix resulting from factor analysis. The results demonstrated that the itemized variance is statistically significant and that all factors contribute significantly to the model variance. No cross-loading was noticed, as each variable included a different amount of items, and no value had a loading of less than 0.4. Exploratory factor analysis found substantial results justifying the absence of CMB in the study's sample data. In addition, it was revealed that the research factors effectively contribute to the total variance.

Table 4.3. Factor Loadings

	Component			
	1	**2**	**3**	**4**
SA1		.827		
SA2		.794		
SA3		.775		
SA4		.757		
SA5		.749		
SA6		.789		
IC1	.775			
IC2	.861			
IC3	.524			
IC4	.867			
IC5	.864			
EL1			.870	
EL2			.864	
EL3			.863	
EL4			.868	
EL5			.595	
RM1				.868
RM2				.560
RM3				.568
RM4				.883
RM5				.859
RM6				.887

SA= Strategic Agility, IC= Innovation capabilities, EL= Entrepreneurial leadership, RM= Risk management

4.3. Validity of studied constructs

Construct validity is demonstrated through discriminant, and convergent validity underpins the constructs' validity. The scale's internal consistency is verified by convergent validity and reported by AVE and CR (Kopcha et al., 2014; Rojas & Widiger, 2014; Zelkowitz & Cole, 2016). Table 4.4 indicates that the values of AVE and CR satisfy the 0.5 and 0.7 threshold criterion, respectively. Hence, convergence validity is demonstrated.

Table 4.4. Discriminant and convergent validity

	CR	AVE	MSV	SA	IC	EL	RM
SA	0.923	0.892	0.345	**0.867**			
IC	0.914	0.792	0.323	0.856	**0.823**		
EL	0.901	0.820	0.319	0.621	0.718	**0.855**	
RM	0.822	0.676	0.302	0.530	0.671	0.711	**0.708**

SA= Strategic Agility, IC= Innovation capabilities, EL= Entrepreneurial leadership, RM= Risk management

It has been noted that the MSV is less than the AVE. Comparatively, the inter-construct correlation was lower than the intra-construct correlation. This describes a significant relationship between related constructs, yet no construct adequately illustrates the variable's phenomenon. More intra-construct correlation is indicative of the model's discriminant validity. Due to the presence of both discriminant and convergent validities, construct validity is demonstrated.

4.4. Confirmatory factor analysis

The confirmatory factor analysis has been suggested to evaluate the measurement model's fit. There are five fundamental factors for assessing model fitness. As indicated by Kenny, Table 4.5 displays the threshold value for each indicator and the observed value against each indicator of CMIN/df, GFI, IFI, CFI, and RMSEA (2015). As depicted in figure 5, the resultant value confirms that the model is accurate.

Table 4.5. Model fitness

CFA Indicators	CMIN/DF	GFI	IFI	CFI	RMSEA
Threshold Value	≤ 3	≥ 0.80	≥ 0.90	≥ 0.90	≤ 0.08
Observed Value	1.492	0.881	0.944	0.902	0.035

The analysis results in the preceding tables demonstrate the measurement model's acceptability by explicating its sufficiency, validity, and goodness of fit. None of these indications demonstrated a lack of fitness; hence, the measurement model depicted in Figure 5 is fit, indicating that SEM can be conducted.

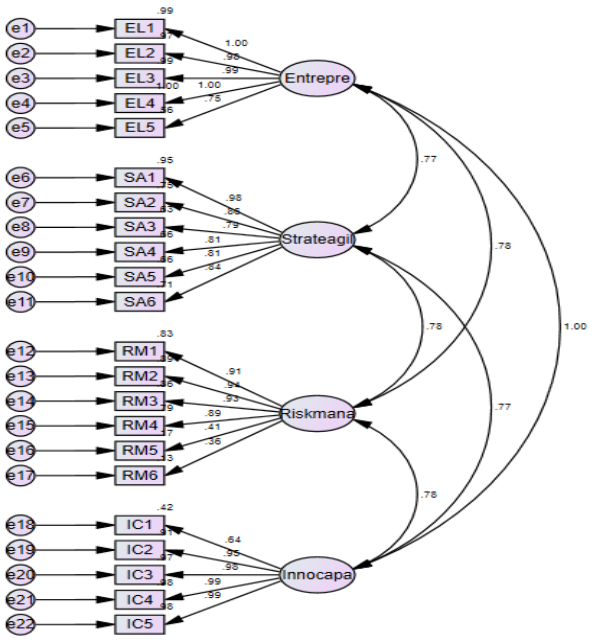

Figure 5: CFA

4.5. Structural equation modeling

Structural equation modeling accurately evaluates direct and indirect relationships between variables (Kline, 2015; Little, 2013). This paper provides a paradigm wherein entrepreneurial leadership moderates inventive skills and strategic agility. The results for both direct and indirect consequences are shown in Table 4.6. The first two hypotheses investigate the direct/linear relationship between strategic agility, inventive skills, and risk management. The links have been accepted as both p-values for the first two linear associations are less than 0.05.

Table 4.6. Structural Equation Modelling

Hypothesized Path	B	SE	P value
SA→ RM	.243	.052	0.00
IC→ RM	.603	.052	0.01
SA*EL→ RM	.163	.041	***
IC*EL→RM	.174	.055	***

SA= Strategic Agility, IC= Innovation capabilities, EL= Entrepreneurial leadership, RM= Risk management

It has been indicated in table 4.6 that a one-unit increase in the strategic agility of contractors leads to .243 units increase in risk management with a p-value of 0.00. The one-unit increase in innovation capabilities causes an impact of .60 units in risk management with a p-value of 0.01. Figure 7 and 8 illustrates the positive and significant moderation of entrepreneurial leadership. Therefore, entrepreneurial leadership also significantly and positively moderates the impact between SA and RM with a p-value shown in steric ***, indicating significant associations and fulfilling the threshold range, i.e., the p-value must be smaller than 0.05. The last moderation of EL between IC and RM also results in a significant and positive moderation with a p-value shown in ***. Therefore all four hypotheses have been accepted.

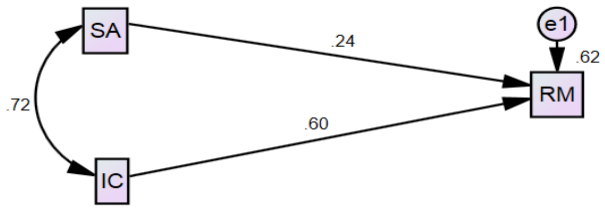

Figure 6: SEM

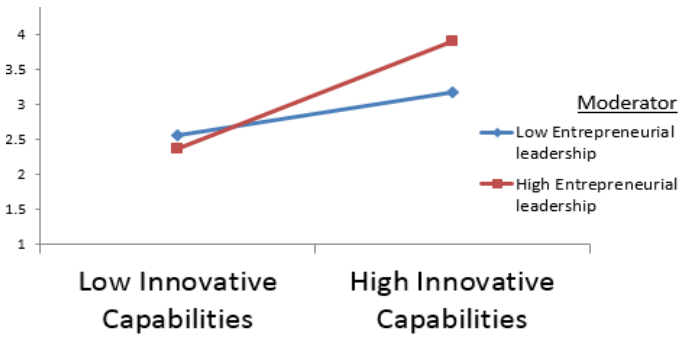

Figure 7: Moderation graph (IC*EL->RM)

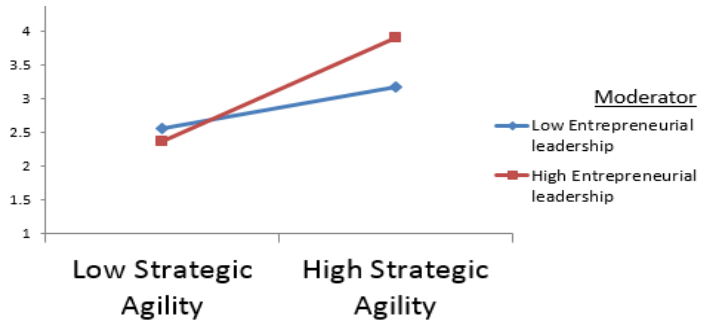

Figure 8: Moderation graph (SA*EL->RM)

5. DISCUSSION

This research was done to assess the capabilities of the contractor to handle risks during the Pandemic. The literature review resulted in the formation of four hypotheses. The initial interaction occurred between strategic agility and risk management. By examining the results of this correlation, it has been determined that strategic agility has a favorable and substantial effect on risk management. A study (Wong et al., 2022) revealed that risk assessment must be prevalent inside the organization if a company wants to increase its strategic agility. An adequate set of activities must be planned in the event of risk emergence to estimate risk control. Construction management risks must be monitored for beneficial outcomes (Mandal & Dubey, 2020). The construction industry strives to preserve its focus and adaptability to drive change swiftly and precisely. Hazards are inherent and unavoidable in all industrial sectors; the difficulty lies in their appropriate management. Strategic agility helps company executives manage the risks that arise when the future is unpredictable. Strategic agility in enterprises ensures a reasonable foundation for decision-making and novelty, especially when there is a greater probability of risk (Wirahadi & Pasaribu, 2022; Zieba, Durst, & Hinteregger, 2022).

The second hypothesis hypothesized a linear relationship between inventive talents and their influence on risk assessment. According to Khraim (2022) research, innovative capabilities drive huge differences in how firms handle risks: the greater an organization's inventive capabilities, the greater its risk management prowess. The research by Sultana, Akter, and Kyriazis (2022) corroborates this viewpoint of innovative capabilities and risk management (AlTaweel & Al-Hawary, 2021). The management of risk innovation accelerates a radical transformation of a company's risk functions. Ilmudeen (2022b) and Kohtamäki et al. (2020) note that the inventive capabilities of the twenty-first century have spawned unique threats. While uncertain situations necessitate heightened scrutiny and concentration, innovation capabilities at the organizational level offer several benefits. Mata, Martins, and Inácio (2023) found that businesses with an innovative orientation may respond to managing risks more effectively than conventional businesses. Innovative capabilities are directly related to risk management, as introducing novelty into a firm increases the likelihood of hazards and unpleasant situations (Ilmudeen, 2022a; Yildiz & Aykanat, 2021).

According to the third hypothesis, entrepreneurial leadership greatly moderates the relationship between strategic agility and risk management. The final moderator is entrepreneurial leadership, which significantly mediates the relationship between creative capabilities and risk management. These two modifications were also deemed noteworthy. Entrepreneurial leadership, according to the study by Sari and Ahmad (2022), is a mindset that has the potential

to focus the firm on transforming issues into opportunities that provide social and economic value. Kassai (2022) indicates that entrepreneurial leadership can achieve a balance between the strategic management of dynamic and risk-changing systems. Entrepreneurial leadership focuses on growing other individuals surrounding them or other employees at work to improve risk management (Iqbal, Latif, & Ahmad, 2020; Islam et al., 2022). Thus, a sense of urgency is produced within the organization. Navarro et al. (2022) explained that organizations with employees or managers committed to strategic agility could effectively manage risks, but entrepreneurial leadership amplifies this risk management. Innovative qualities favor managers' ability to manage risks effectively, and entrepreneurial leaders improve the management of uncertain conditions and company hazards.

5.1. Conclusion

This research was designed to examine the effect of innovative capabilities and strategic agility on risk management among Indonesian contractors. Furthermore studied is the moderating role of entrepreneurial leadership between IC and SA. A survey was used to collect data, and a quantitative study methodology was utilized. Four hundred self-administered structured questionnaires were distributed to Indonesian construction sector contractors. After data cleansing and screening, 329 surveys were further evaluated using SPSS and AMOS statistical methods. The findings revealed a linear relationship between IC, RM, SA, and RM. The modulation of EL between SA and RM and IC and RM has also produced significant and favorable outcomes.

5.2. Theoretical and practical implications

The study has increased theoretical and practical significance. Theoretically, the construction industry's innovation and risk management literature has expanded. This study focuses on the contractor's risk management competencies; hence, the literature gap addressing the contractor's risk management competencies in the construction sector has been filled. The significance of entrepreneurial leadership in company has also been explained regarding risk management. Strategic agility has also been studied as an autonomous construct with an effect on risk management, which is a fresh addition to the expanding body of literature on strategic agility's capacity to manage uncertainties. The research is also of paramount practical value. Risk management can benefit from the incorporation of strategic agility into business, which can be pursued by upper management. Authorities in the Indonesian construction industry or other regulatory agencies may also aim to introduce and encourage new risk management capabilities. In addition, our research assists Indonesian contractors in enhancing their strategic agility and innovation capabilities for improved uncertainty management and risk assessments.

5.3. Limitations and future research indications

This research contains several flaws. Initially, the present investigation was conducted using quantitative research methods. Changing the methodological approach can add innovation and variety to the study. For this reason, qualitative or mixed-method research might be undertaken to assess a contractor's perspective competencies. The sample size was 400 because the study was cross-sectional. Future scholars can do longitudinal research to examine the seasonal variations in risk management due to the shift in strategic agility or innovation capabilities. In the future, researchers will also conduct interviews with contractors to get their opinions on risk management. The other characteristics of strategic agility, such as resource fluidity,

leadership unity, and strategic sensitivity, can also be assessed for their impact on risk management to introduce variety or originality into the research. This study's context is Indonesia. However, future researchers can alter the context to add innovation to their work. In addition to the "construction industry," another industrial sector may be targeted to examine risk management and managerial competencies for risk reduction.

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