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FACTORS AFFECTING THE EFFECTIVENESS OF CONTRACTORS' ALL RISK INSURANCE CLAIMS: A STUDY OF STATE-OWNED CONTRACTORS IN INDONESIA

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ABSTRACT

Risk affects the productivity, performance, quality, and cost constraints of construction projects; such risk can be managed by transferring it to contractors' all risk (CAR) insurance claims. While several studies have attempted to determine the efficiency of CAR insurance in construction projects, the phenomenon model needs to be more comprehensively developed to provide contractors with strategic steps that can enhance the effectiveness of using CAR insurance to manage risk. The study aims to find out the factors that affecting the effectiveness of contractors' all risk insurance claims of state-owned contractors in Indonesia Accordingly, this study used partial least squares structural equation modelling to overcome the shortcomings of the previous approaches used. It analyzed 33 claims data from 25 construction projects and compiled five internal/external factors: knowledge and experience of claims and the supporting role of contractor organizations (internal), and insurers, brokers, and insurance products (external). The analysis results found that the knowledge and experience of claims and insurance product factors had the most influence on claim success (β = 0.419 and 0.371, respectively). Interestingly, these factors were significantly influenced by roles and supporting organizations (β = 0.478 and 0.791, respectively). Overall, synchronizing purchased insurance policies with risk registers can increase insurance effectiveness. The findings extend the efforts to optimize the use of CAR insurance in construction projects for contractors.

KEYWORDS *contractors' all risk; insurance; claim; effective; construction*

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INTRODUCTION

Construction projects are dynamic and have high risk potential. Risk can impact the productivity, performance, quality, and cost constraints of the projects (Labombang, 2011). Risk is uncertain, meaning it may or may not occur. So, in construction projects, risk cannot

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be eliminated but can be reduced or transferred from one party to another. Generally, risk can occur as a result of many factors, such as the project owner, the environment, nature, the production process, and so on. In the initial cost planning at the time of tender, costs are allocated to cover risks that may occur (Dikmen et al., 2007). However, not all costs can be accommodated in the initial bidding cost plan; doing so would make it difficult for a plan to compete in the bidding. Therefore, it is necessary to identify and mitigate risks that have not been covered in the project costs. One way of doing this is to transfer the risk to another party, such as a subcontractor or project owner, or to use construction insurance.

Insurance can be interpreted as an agreement in which an insurer binds themselves to the insured by accepting a premium to provide compensation to the insured due to loss, damage, or loss that may be suffered due to an unspecified event (Chapter 246 of the Indonesian Trade Code). Contractors' all risk (CAR) insurance is often used in construction. Apwiddhal (2012) states that the basic concept of CAR insurance is to provide comprehensive coverage against damage or failure that occurs during the implementation of a building project for both construction and infrastructure projects. It is provided by insurers in reference to world insurance standards, such as Munich-Re, Swiss-Re, and so on.

However, the use of CAR insurance in construction projects raises questions about the effectiveness and efficiency of transferring the risks that may occur. Several studies have been conducted to determine the efficiency of CAR insurance in construction projects (Halwatura, 2015; Musundire & Aigbavboa, 2015; Perera et al., 2008). While the notion of effectiveness means that the existence of CAR insurance can divert the risks that occur, the efficiency of CAR insurance relates to how much of the claim is obtained against both the costs for damage that has occurred and the costs that have been incurred to buy the insurance. Perera et al. (2008) find that Sri Lankan construction projects' claim success rate is only 47%, which is attributed to contractors' insufficient and incorrect knowledge and experience regarding risk management. Meanwhile, Putri and Yuwono (2017) reveal that CAR insurance has a 72.54% influence on the transfer of potential risks to construction projects. Overall, CAR insurance is influenced by many factors; particularly the main stakeholders involved, such as contractors, project owners, and insurers. Contractors play an important role in optimizing CAR insurance in their construction projects. However, there is a tendency for contractors to regard CAR insurance as merely a tool to fulfil contract administration that incurs additional costs. This is due to contractors' low risk management practices and lack of knowledge (Patrick et al. 2007; Perera et al. 2008). Meanwhile, insurers have policies for providing insurance products (Halwatura, 2015) and will offer standard products to contractors based on the characteristics of a given project when contractors want the lowest possible premium costs. Therefore, this study investigates the following questions:

(1) What are the identifiable factors that affect the effectiveness of the success rate of risk management, especially through CAR insurance?
(2) How can partial least squares structural equation modelling (PLS-SEM) be used to determine the effect and relationship of these factors on the expected risk treatment?
(3) What steps need to be considered by the contractor regarding the CAR insurance used so that it can be more optimal or efficient?

Halwatura (2015) and Perera et al. (2010) describe the efficiency of using CAR insurance and the factors that influence its use. While these two studies have identified the inefficiencies in the use of CAR insurance in the construction field, further research is required to reveal the factors that have the most influence on efforts to manage risk through CAR insurance. Therefore, this study proposes a phenomenon model that analyzes the strength of the influence and relationship between factors, so as to optimize the use of CAR

insurance in risk transfer through claims from the contractors' perspective. The phenomenon model needs to be more comprehensively developed to provide contractors with strategic steps that can enhance the effectiveness of CAR insurance, This study uses PLS-SEM modelling to overcome the shortcomings of the previous approaches used to manage risk through CAR insurance. This study then examines whether the purchase of CAR insurance is sufficient in the claims submitted to the insurer against the losses experienced. As such, this study does not only discuss limited claims for accidents that are accepted or rejected, but also examines whether the claims paid are optimal for transferring the losses suffered due to an accident. Is CAR insurance a new opportunity for managing the potential risks that may occur in construction projects? In the future, contractors are expected to develop better risk management strategies, such as through CAR insurance.

Bakhary et al. (2015) reveal that the dominant factor that influences claim success is managers who lack the awareness to actively detect claim requirements, such as supporting documents, at the outset. Therefore, knowledge of the importance of insurance must be understood by all project personnel so that the data for each project stage can be controlled according to the minimum requirements for submitted claims. Furthermore, the contractor must understand the stages of the claim process when submitting a CAR insurance claim. Insurance effectiveness concerns protecting contractors' interests after accidents or other unexpected events. Perera et al. (2008) reveal that the rejection rate for submitted claims exceeds 50%, of which 68% comprises of material damage claims and 43% comprises of third-party claims. Halwatura (2015) reveal that most claims are rejected due to both technical policy exceptions and contractors' poor knowledge of claims-filing procedures, including their inability to provide documented proof of an accident and taking a long time to prepare the data. Moreover, contractors often claim more than the value of the damage. Musundire and Aigbavboa (2015) highlight that contractors' lack of risk assessment at the outset of a project also impacts claim failure. So, Liu and Lin (2018) advise contractors to obtain help from insurance brokers and legal advisors to cover the contractors' limited knowledge and ensure that claim failure does not occur. However, contractors do not solely focus on whether a claim is accepted or rejected; even if their claims are accepted, other problems often arise. Moreover, contractors believe that the claim process is too long, and that the value paid is not as expected; the average ratio between the number of resolved claims and the value submitted is only 0.5 (Islam et al. 2009; Islam 2013). Therefore, the contractor must bear the loss.

Low claim settlement is influenced by many factors, such as high deductibles on purchased insurance policies and contractors' requests to get the lowest premium possible. Insurance premiums and deductibles are negatively correlated. That is, a higher deductible places greater responsibility on the insured to compensate for the losses suffered, while when premiums are low, insurers are responsible for paying less compensation (Cheng et al., 2011). Therefore, it is necessary to apply a concept to form an efficient deductible that can be applied to the indifference curve between insurance costs and risk attitudes. This will ensure satisfactory consistency between the optimal deductible and the construction project's insurance choice, despite the risk transfer cost being affected by the slight difference between the predicted and actual loss. Thus, the goal of the insured is to realize the lowest possible risk transfer costs (Cheng et al., 2011).

CAR insurance claim success framework

Cause-and-effect diagrams outline problems to help trace unwanted effects back to their root causes (Project Management Institute 2015). They break down problems into components to aid the understanding of the main causes of the problems for analysis. These diagrams take a systems view by treating the environment around the problem as a system

to avoid the problem analysis being affected by individual influences. An example diagram is the fishbone diagram, which is often called the Ishikawa diagram. This diagram provides a snapshot of the current situation and the high-level causes of why a problem has occurred. It is considered a good starting point for root cause analysis and provides a guide to the causes that will lead to the most successful follow-up. For example, it may reveal areas that lack data, which would be worthwhile to collect. However, this technique alone is not sufficient for understanding all the root causes of a problem. Therefore, it must be combined with other techniques, such as interrelationship diagrams.

This study reviewed the previous literature on the effectiveness of CAR insurance on claim success (Table 1) and analyzed the reasons for claim rejection. It then categorized five indicators of claim success in terms of internal/external factors. The internal factors include conditions on the contractors' side; the external factors include external stakeholders' influence on a claim, insurers, and insurance products. Insurers' main concerns are their internal company policies (Fauzi & Rashid, 2016; Owusu-Manu et al., 2020; Vasilyeva & Okrepilov, 2018), and insurance products are policies purchased by contractors at the beginning of a project. Regarding contractors' knowledge and experience of risk management, Perera et al. (2008) explain that foreign contractors have a significantly higher level of knowledge and experience than local contractors. So, lack of knowledge and experience is a serious problem when deciding on deductibles and endorsements, taking remedial action, keeping records as evidence, and claiming damages.

Contractors' organizational support is another important factor. Contractors tend to focus on risks that may not necessarily occur, which becomes a cost burden, and is the basis for insurance. Contractors think that there a small chance for risks to occur, which is attributed to their lack of understanding of the importance of project risk management, which, in turn, may be due to their lack of training. This includes buying insurance and submitting claims.

Table 1. Prior research on CAR insurance claim success factors

Claim success indicators	References
Insurance product	Perera et al. (2010), Halwatura (2015), Musundire and Aigbavboa (2015), Cheng et al. (2011), Ryu et al. (2016), Owusu-Manu et al. (2020), Islam et al. (2009), Islam (2013)
Insurer	Perera et al. (2010), Halwatura (2015), Fauzi and Rashid (2016), Hatmoko et al. (2021), Owusu-Manu et al. (2020), Vasilyeva and Okrepilov (2018), Akinradewo (2022), Islam et al. (2009), Islam (2013)
Broker	Perera et al. (2010), Liu et al. (2018)
Knowledge and experience of claims	Perera et al. (2010), Halwatura (2015), Musundire and Aigbavboa (2015), Liu et al. (2018), Patrick et al. (2007), Owusu-Manu et al. (2020)
Organizational roles and support	Halwatura (2015), Akinradewo (2022)

Overall, the factors that cause insurance products to accommodate risk can be summed as brokers who do not provide clear information regarding insurance products, insurers' lack of openness at the outset, contractors' limited knowledge and experience of insurance products, and the absence of support from contractors' organizations. These factors can lead to the greater possibility of a rejected claim. However, the relationship between the factors is unclear; for example, the relationship between the insurer and the insurance products being sold. Therefore, it is necessary to conduct additional analysis using interrelationship diagrams. Interrelationship diagrams can help stakeholders to

understand the relationship between cause and effect and identify the causes that produce problems. Figure 1 shows the causal relationship between these factors.

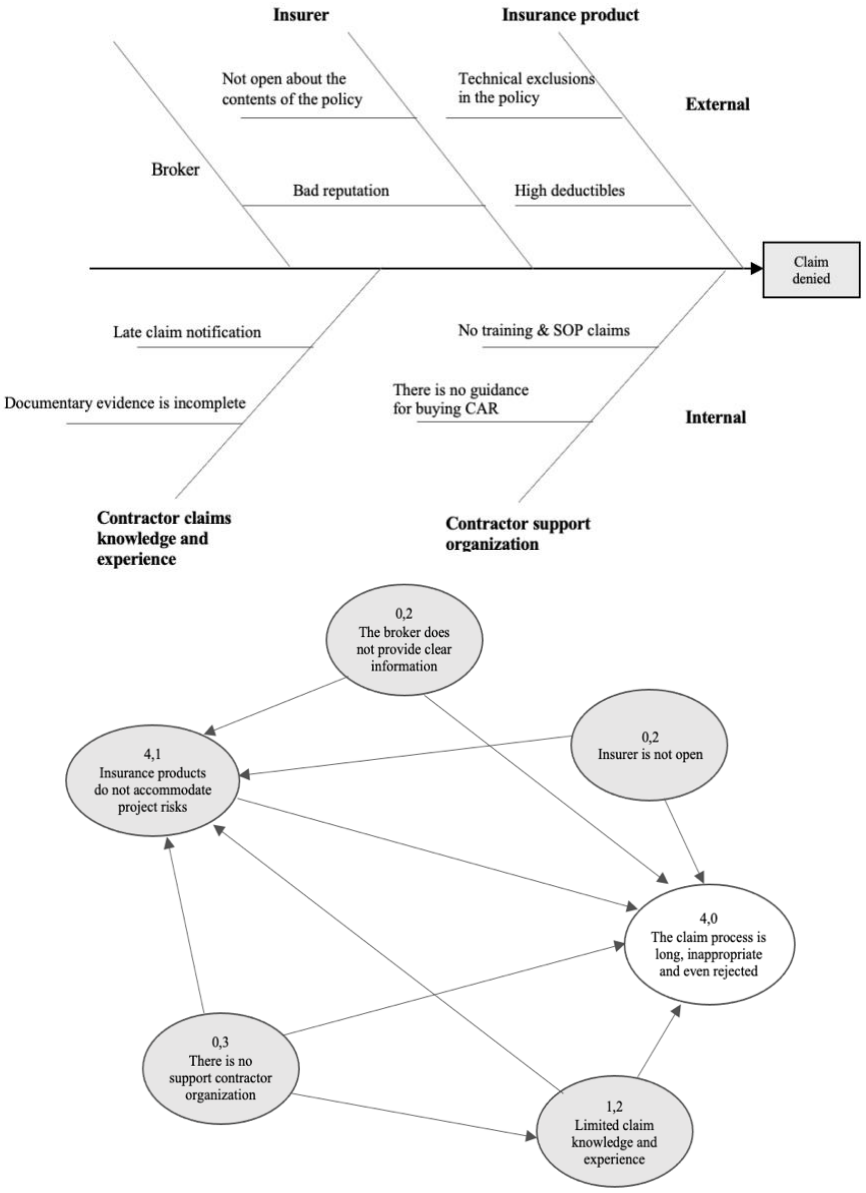

Figure 1. Fishbone and Interrelationship Diagram Showing Causes of Rejected Insurance Claims

Gap in the prior research

Many studies have explored the effectiveness of CAR insurance on claim success in construction projects using different approaches. For example, Perera et al. (2008) use data analysis to obtain several reasons for the rejection and settlement of claims by insurers; however, their study does not describe the factors that have the most influence on the contractors' success in obtaining claim approval. Can an insurance product impact the chances of success or failure for unanswered claims? Halwatura (2015) use probability sampling and questionnaire surveys to determine the effectiveness of using CAR insurance policies. They reveal that few contractors like to be directly involved in the insurance

process, and use expert services. Moreover, contractors prefer to have proper insurance coverage for their projects rather than rely on their knowledge of good risk management. Finally, contractors have difficulties in the claims-making process due to the long written formalities. Although Halwatura's (2015) findings describe the causes for contractors' claims to be approved or rejected by insurers, they do not reveal the factors that have the most influence on claim success, or the involvement of the stakeholders involved. Musundire and Aigbavboa (2015) use survey analysis and mean item scores to study the efficiency of CAR insurance in mitigating construction risk to determine the factors that influence the use of CAR insurance in South Africa. They find that the influencing factors are based on the perspectives of contractors and insurers. However, their survey participants did not state whether they had ever filed an insurance claim, which affects the perceived success of the intended claim. Contractors who are directly involved in the claim process will have a more detailed understanding of whether the processes or results are in line with the expectations at the outset. Fauzi and Rashid (2016) examine the transparency of CAR Takaful insurance claims by studying regulations and conducting interviews with several construction experts and actors. Their results reveal a lack of transparency and information disclosure not only in the assessment of claims for CAR Takaful but also in conventional insurance. Furthermore, they reveal that the current practice of assessing claims is based only on internal habits or ad hoc reports by loss appraisers. Thus, Takaful operators cannot provide clarity or further explanations regarding the processes and procedures for assessing CAR Takaful claims, which greatly influences the results of the claims submitted by contractors. Vasilyeva and Okrepilov (2018) assert that contractors should first identify risks before buying insurance to ensure that the insurance purchased is suitable if an accident occurs.

Meanwhile, several studies have used PLS-SEM to study insurance. For example, Ibrahim et al. (2021) analyze questionnaire data using PLS-SEM to discover the factors that affect Bumiputera contractors' acceptance of CAR Takaful products. Their results show that attitudes, subjective norms, religiosity, and awareness have a positive relationship with acceptance, while religiosity is the most significant factor that affects acceptance. Putri and Yuwono (2017) determine the effect of using CAR insurance on transferring potential risks in construction projects; their results show that 72.54% of CAR insurance use can transfer potential risks. Finally, Liu et al. (2018) use PLS-SEM analysis to develop an expanded theory of planned behaviour model to understand and predict contractors' purchase intention of construction insurance. They find that insurance purchase intention is primarily influenced by attitudes and subjective norms rather than perceived behavioural control. Moreover, perceived risk and experience have a significant impact on attitudes and perceived behavioural control.

Overall, this study concludes that using PLS-SEM can enable the root cause of the problem to be understood and can overcome the shortcomings of the previous studies' approaches. Therefore, this study chose PLS-SEM for the following reasons: (1) the purpose of this study was to test theoretical assumptions; (2) the developed hypothetical model is complex, involving many metrics and constructs; (3) PLS-SEM is a nonparametric method that does not have distribution assumptions; (4) PLS does not require a large sample size; and (5) PLS is suitable for exploratory studies that focus on a model's predictive ability.

PLS-SEM modelling

PLS-SEM uses an iterative algorithm consisting of several analyses under the ordinary least squares method. Therefore, in PLS-SEM, the problem of identification is not important. PLS-SEM can deal with problems that usually arise in covariance-based SEM

analysis. In addition to PLS-SEM as an alternative for data analysis, when the sample size is small, its application has little available theory, predictive accuracy is paramount, and the correct model specifications cannot be ensured. Yamin and Kurniawan (2011) denote the following steps of PLS-SEM analysis: model estimation, model evaluation, and assessment criteria.

RESEARCH METHOD

This study used primary data from a questionnaire survey; interviews; and the research objects' project data, such as their projects' risk register data, purchased insurance policies, and the data on the contractors' received and rejected claims. The secondary data were obtained from the prior literature.

This study distributed a structured questionnaire to 33 construction projects with a minimum work progress of 50% within several BUMN Karya in Indonesia between 2015–2022. The target projects had different characteristics. Most of the respondents were project managers (PM) with a work history of more than 5 years. The PMs were responsible for coordinating all project activities, including risk management.

This study then conducted interviews with project respondents that had both succeeded and failed to submit claims, and who had or were currently filing claims for accidents that had occurred. Information obtained from the interviews about projects that had failed to make claims could provide insights into the causes for claim failure; information obtained about the projects that had successfully submitted claims could reveal the constraints experienced, the claim success rate, and whether they expected risk transfer at the outset of the project. Finally, this study conducted interviews with brokers and insurers to enrich the results.

Figure 2 presents an overview of the research process. This study started by conducting a review of similar studies to identify the gap in the research. Next, this study identified the factors that influenced the success of CAR insurance claims based on the literature. These factors were then analyzed using a cause-and-effect diagram to examine the root of the problem and the relationship between factors; this relationship became the research framework. The primary data collection was conducted using CAR insurance claim submission data, including the date of loss notifications, submitted backup data and adjustment claims, premiums, policy clauses on potential risks that could occur in a project, and the insurer. The data obtained from the claim data and questionnaire analysis were then reprocessed using PLS-SEM analysis with the appropriate variables. Table 2 shows the identified variables based on the literature on claim success.

Table 2. Research variables

Variable			Indicator
Dependent	Y	Claim success	Claim decision Percentage of approved claim amount Claim disbursement time Claim process
Independent (internal)	X1	Organizational roles and support	Risk training related to insurance standard operational procedures in insurance-related organizations Management assistance in the claim process Risk training related to insurance standard operational procedures in insurance-related organizations

			Management assistance in the claim process
	X2	Knowledge and experience of claims	Competence of personnel's policy understanding Understanding of risk management Knowledge of claim submission procedures Claim notification to the insurer Preparation of claim backup data Prior claim experience
Independent (external)	X3	Insurance product	Insurance premium price Deductible percentage Percentage of sum of insurance third party liability to insurance amount Exception clause Period of insurance Securities
	X4	Insurer	Insurer's qualification The loss adjuster is cooperative Insurer's disclosure of claims
	X5	Broker	Use a broker or not Broker's reputation The role of the broker against the claims submitted

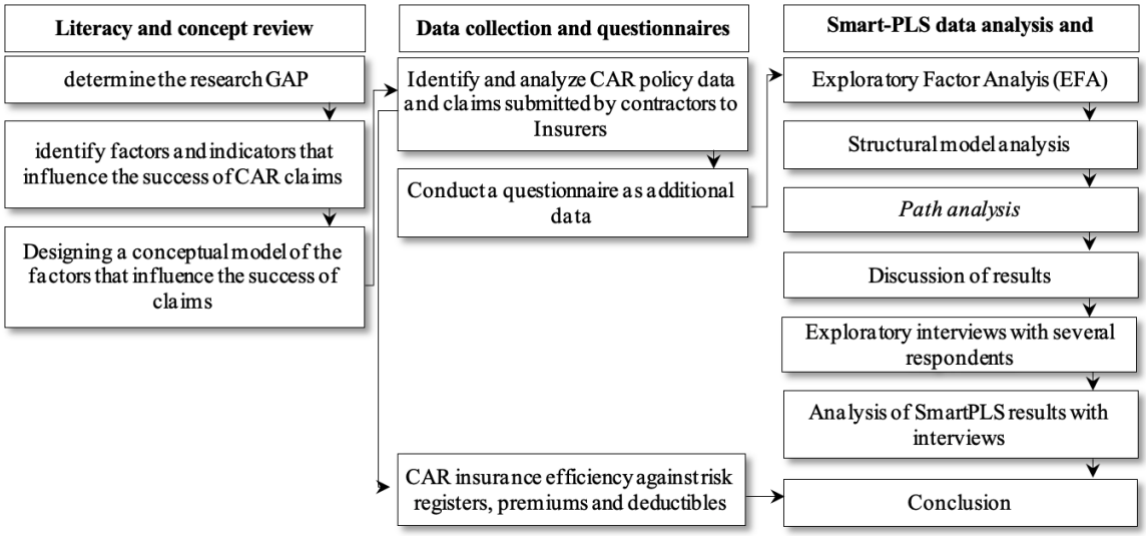

Figure 2. Study Process

RESULT AND DISCUSSION

The structural model of claim success (measurement of first-order factors)

This study assessed the model following the guidelines set by Hair et al. (2019), which include assessing reflective measurements (e.g. load indicators), evaluating the reliability of internal consistency, and assessing formative measurements (e.g. convergent and discriminant validity). Hair et al. (2019) recommend the indicator weight measurement

for each variable value to exceed 0.708; indicators with lower values must be removed. Furthermore, other criteria should be considered, such as composite reliability and convergent validity. Hair et al. (2019) provide the limit of 0.70 for the composite reliability value and 0.5 for each construct of the convergent validity value, or average variance extracted. However, Vinzi et al. (2010) provide a lower limit of 0.6 for the composite reliability value, which can still be considered.

The structural model of claim success (measurement of second-order factors)

This study tested the structural model or inner model to determine the relationship between constructs, significance value, R-square (R2), f-square effect size (f2), goodness of fit, Q-square predictive relevance (Q2), and q-square effect size (q2) in the research model. This study's structural model analysis used bootstrapping and blindfolding techniques, with a significance of 0.1 (Figure 3). Table 3 shows the path coefficient results.

Table 3. Composite reliability and average variance extracted measurement model

Variable	Composite reliability	Average variance extracted
Supporting roles and organizations	0.891	0.731
Knowledge and experience of claims	0.852	0.659
Insurance product	0.693	0.653
Insurer	0.762	0.618
Broker	0.922	0.855
Claim success	0.902	0.755

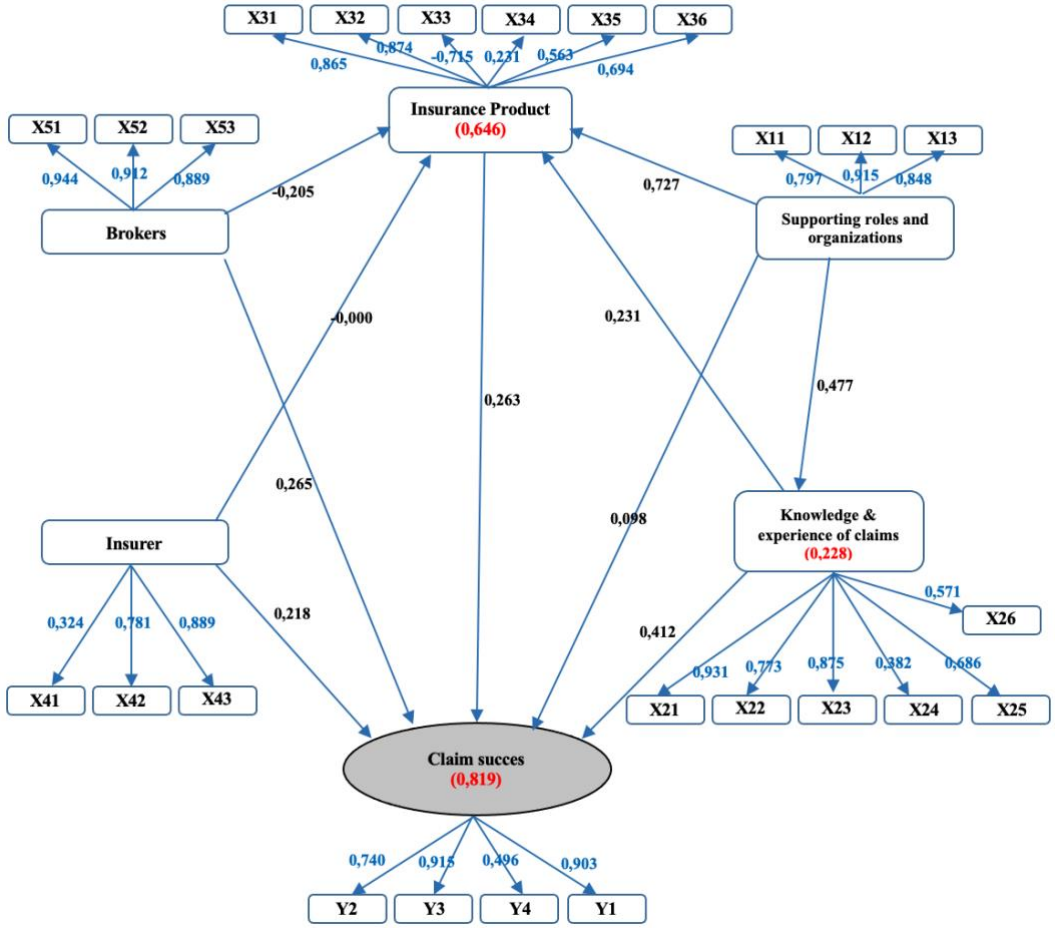

Figure 3. The PLS-SEM model of success claims with path coefficients and R2 (first-order factors)

Path analysis of the structural model

Path analysis is the most common method for simultaneously investigating the complex relationships between model constructs (Hair et al., 2019). The results for the path coefficient and t-statistic values were obtained from the bootstrapping analysis, with a sample size of 33 claims, 5000 repetitions, and a significance level of 10%. Table 4 shows that brokers and insurers have a negative influence on insurance products, with path coefficients of -0.013 and -0.103, respectively. This is because the indicator used to measure the insurance variable in question concerns the quality of the contractors' version of the insurance product. Generally, contractors want broad insurance coverage with the lowest possible premium and deductible values. Meanwhile, brokers and insurers want the highest premiums and deductibles to minimize the risk of claims in the future. However, the P-value reveals that the effect is not significant. Organizational roles and support for the knowledge and experience of claims and insurance products has a strong, positive influence (β = 0.478 and 0.791, respectively), at $p < 0.001$. Likewise, knowledge and experience of claims and insurance products have a strong, positive influence on claim success (β = 0.419 and 0.371, respectively), at $p < 0.001$.

As there was no collinearity, this study examined the R2 values. R2 values are only found in latent variables that are influenced by other latent variables. Hair et al. (2019) state that the R2 value can determine a structural model's prediction level; a value of 0.25 means the prediction level is weak, 0.5 is moderate, and 0.75 is substantial or strong. Table 4

shows that the R2 value of the knowledge and experience of claims variable is 0.228, so the trust variable is influenced by 22.8% of the other variables in the model, meaning that organizational roles and support affect knowledge and experience of claims. The remaining 77.2% is influenced by other factors outside the model. The insurance product variable has an R2 value of 0.679 or 67.9% and is influenced by organizational roles and support, knowledge and experience, brokers, and insurers. The remaining 32.1% is influenced by other variables outside the model. The risk handling success rate variable has an R2 value of 0.789 or 78.9% and is influenced by all variables in the model. The remaining 21.1% is influenced by other variables outside the model.

Furthermore, the f-square value determines the effect of the predictor variable on the dependent variable. Hair et al. (2019) explain that the value of $0.02 < f2 < 0.15$ shows a small effect, $0.15 < f2 < 0.35$ shows a medium effect, and $f2 > 0.35$ shows a large effect. The knowledge and experience of claims and brokers variables have large effects on the exogenous constructs ($f2 = 0.495$ and 0.632, respectively), while insurance products has a small effect on the exogenous construct. The Q2 value can further evaluate the prediction accuracy of PLS route models (Hair et al., 2019; Sarstedt et al., 2017). Q2 can be seen in the blindfolding calculation results in the construct cross-validated redundancy section. The Q2 value for endogenous constructs must exceed 0, and values of 0, 0.25, and 0.5 have a minimal, moderate, and large predictive effect, respectively. The Q2 value for the variable of risk handling success is $0.533 > 0$, so the model meets predictive relevance and has been constructed properly. This also means that the exogenous latent variables are good and can explain the endogenous variables in the model.

Table 4. Structural model path coefficients

Path relationship	β	Standard error	t-statistic	p-value	Result
Broker →Insurance product	-0.013	0.173	0.074	0.941	Not supported
Broker → Claim success	0.435	0.435	1.588	0.125	Not supported
Insurer → Insurance product	-0.103	0.179	0.557	0.565	Not supported
Insurer → Claim success	0.079	0.146	0.540	0.589	Not supported
Knowledge and experience of claims → Insurance product	0.038	0.218	0.173	0.862	Not supported
Knowledge and experience of claims → Claim success	0.419	0.227	1.845	0.066	Supported
Supporting roles and organizations → Knowledge and experience of claims	0.478	0.122	3.927	0.000	Supported
Supporting roles and organizations → Insurance product	0.791	0.131	6.017	0.000	Supported
Supporting roles and organizations →Claim success	0.087	0.175	0.498	0.619	Not supported
Insurance product → Claim success	0.371	0.176	2.111	0.035	Supported

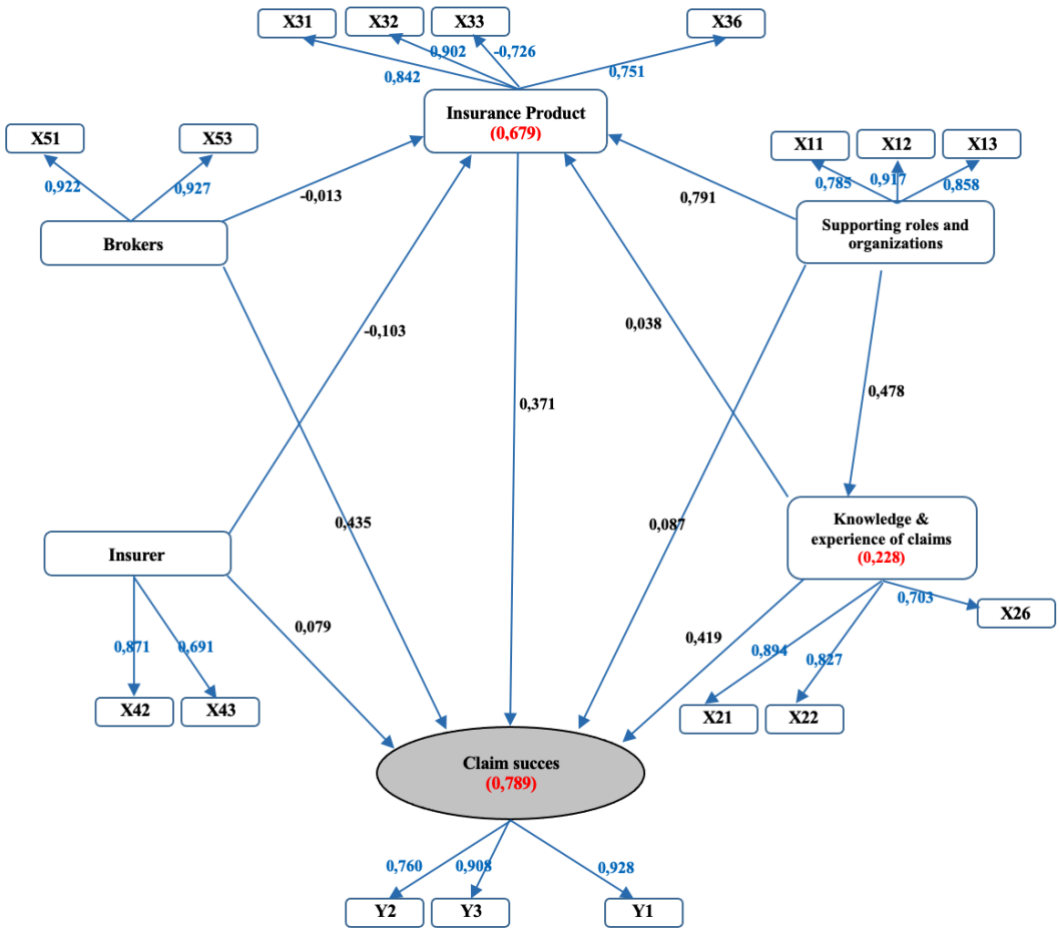

Figure 4. PLS-SEM bootstrapping measurement and analysis (second-order factors)

Discussion

The previous research has mostly evaluated insurance efficiency to minimize risk in construction projects using such phenomena as claim success and rejection factors and insurance challenges. However, these phenomena have not been separately considered. As a result, their contributions are limited to certain contexts. Moreover, they do not reveal the factors that have the most influence on contractors' claim success, or the strategies for contractors in the future. Furthermore, the policies between contractors and insurers differ. Claim success can be increased by evaluating the phenomena that occur in the field in relation to the claims process, and then identifying the important factors that influence and explain various levels of effectiveness in terms of CAR insurance when dealing with risks that may arise. Accordingly, this study used PLS-SEM modelling to develop a CAR insurance claim success model. First, this study conducted a comprehensive literature review to identify the claim success factors, which were then further analyzed through the questionnaire results to assess whether other factors were present. Second, this study categorized 5 main factors and 21 indicators to assess the constructed phenomena.

The results revealed that the knowledge and experience of claims and insurance product variables were the most important factors for the success rate of risk management through CAR insurance ($\beta = 0.419$ and 0.371, respectively) among all other factors, while knowledge and experience of claims was the most important factor for claim success. These results reinforce the previous findings (Fauzi and Rashid 2016; Halwatura 2015; Musundire and Aigbavboa 2015; Perera et al. 2008) that assert that knowledge is an important factor

in claim approval or rejection. In their study, claims were rejected due to project personnel not knowing how to submit claims, which ultimately resulted in the required supporting documents not being fulfilled. The same condition occurred in one of the current study's objects: the PLN Pasaman project, West Sumatra. The project's respondent submitted a claim for the collapse of the Sutet tower during the cable installation. The submitted claim was rejected because the data were incomplete and the claim exceeded the specified time limit. Another example is the IPAL B1 Palembang Network Development project. The project's respondent said that they had experienced unfavourable conditions related to claims in their previous project (the Palembang Musi IV Bridge project). The claim submitted at that time was rejected due to a clause in the policy that eliminated loss events. The respondent evaluated the failure that occurred, starting from the purchase of CAR insurance products that were adjusted to the risk registers made. Then, the policy contents were discussed with the broker regarding the intent of the articles. The respondent even asked the broker to translate the policy clauses into simpler language that was easier to understand. Finally, in the new project, the insurer paid for the claim that was filed and even obtained additional profits from the events that had occurred. These two project examples emphasize that the role of knowledge and experience is vital for claim success.

This study found that insurance products (in the form of policies) was the second most important factor. This factor was also influenced by knowledge and experience of claims. An insurance policy is considered the final reference when assessing whether an event is eligible for compensation. This factor has been discussed in previous studies (Cheng et al. 2011; Halwatura 2015; Owusu and Ghansah 2020; Perera et al. 2008; Ryu et al., 2016). Most claims are rejected because they conflict with CAR insurance policy clauses. For example, the current study conducted interviews with the respondent involved in the Palembang Musi IV Bridge project, who submitted a claim for an accident that was rejected by the insurer. The claim related to the collision of the steel piles of the bridge with a 300-foot pontoon carrying coal that was passing through the project site. The project is located on the Palembang Musi River and is close to the Boom Baru Port. So, the ship and coal pontoon traffic is quite dense. Of course, these risks were already identified at the outset of the project. After the incident, the project personnel immediately created a chronological report of events and informed the insurer, who requested the required documents, including an estimate of the cost of the loss incurred, within a certain time frame. This was not a serious problem for the project personnel, considering that all data were well documented. Then, the insurer received a claim from the project personnel, and assigned a loss adjuster team to check the condition in the field and justify and assess the cost of the damage that occurred. Loss adjusters are companies that assess damage and compile a final report to the insurer to suggest whether an incident claim should be approved. In this example, the insurer rejected the claim because there was an exception clause for 'wet risk' events, eliminating events that occur on water. The insurer assumed this should have been known by the project personnel, and the claim was rejected. However, the project personnel believed that this matter had not been previously discussed, and that this clause was not conveyed in the policy, resulting in misinterpretation by the project personnel.

This study next considered the role of organizational support on claim success. Although this factor did not have a direct significant effect on claim success, it affected other factors, such as knowledge and experience of claims ($\beta = 0.478$). Halwatura (2015) found that contractors' poor knowledge of claims-filing procedures caused claim rejection. This procedure relates to the conditions of the support of contractors' internal organization. Companies that already have standard operational procedures (SOP) in place regarding claims have less chance of having their claims rejected than companies that do not have

SOP. However, the SOP must be well distributed within a project, considering that the project is the main actor when a claim occurs. Usually, this is done via project personnel training so that rather than only knowing about project risk management, the personnel understand the use of CAR insurance and know how to submit claims. Moreover, project personnel create risk registers to assess risks. However, risk registers often do not properly include all project characteristics, so many risks are not identified. This supports the previous findings that assert that contractors do not have a background understanding of construction projects (Musundire & Aigbavboa 2015). Furthermore, expertise in managing risk through CAR insurance remains low (Musundire & Aigbavboa 2015; Patrick et al. 2007). For example, in the current study, an interview with a PM for the Tumbang Talaken-Fall project revealed that the project had suffered losses due to road improvement work being carried out, including damage by heavy vehicles from another project (the PLTU project) running concurrently. The only access road was the road being worked on. The transported materials had a payload that exceeded that permitted for class III asphalt roads (8 tons), while the constructed road had a receiving load of less than 8 tons. Initially, the project submitted a claim to the PLTU project owner. However, after receiving direction from their central management, particularly the legal department, the project submitted a damage claim to the insurer. Overall, the submitted claim was paid at more than the value of the loss experienced. This example highlights that the contractors' internal organization is important. In sum, projects that receive organizational support when submitting claims have a greater chance of having their claims recognized than projects that do not receive such assistance. This is an important finding because organizations are important actors who can become providers as well as liaisons between personnel who have more competence related to claims to be transferred to other personnel. This can improve the knowledge of the personnel in each project regarding claims.

This study found that the role of the broker was an important factor, with a value of $\beta = 0.435$, which was quite high compared to other the factors. The previous studies have rarely discussed the role of brokers in risk management. Perera et al. (2010) state that only 30% of contractors use broker services due to lack of knowledge and workload; however, their study does not specifically discuss the role of brokers. Many contractors think that if they go through a broker, their insurance premiums will be more expensive. This is because most contractors still perceive insurance as a 'burden' of overhead costs that must be reduced. For example, Liu et al. (2018) reveal that contractors in China are reluctant to buy insurance because they do not see the benefits of these products. In the current study, many contractors stated that they did not know the procedures for submitting claims but received direction from the broker. When an incident occurs, the contractor communicates with the broker, and the broker asks the contractor to immediately send notifications regarding loss of data, objects, and the chronology of the event. These notifications may not exceed the policy provisions, such as the loss notification clause being calculated from the time of occurrence or loss of date. During the loss adjuster's survey of the incident's location, the broker assists the contractor to provide more detailed information, especially regarding any policy clauses that can be used as the basis. For example, in this study, a project respondent for the Palembang IPAL Network project said that they had submitted a claim about a jacked reinforced concrete pipe (RCP) that had deviated due to hard ground conditions. As a result, the contractor had to re-jack the pipe onto another line. They also had to make a rescue pit to remove the jacking machine cutter head. Initially, they filed a claim for the activities carried out; that is, the cost of procuring the RCP pipe, installation work, rescue pit, and restoration work. However, the loss adjuster and broker stated that the rescue pit was not covered. According to them, the purpose of a rescue pit is to save the cutter head, while the tool should be insured under Heavy Equipment Insurance or Contractors' Plant

and Equipment. In contrast to the RCP pipe and jacking work, because these two items constituted paid items in the bill of quantity contract, they were included as objects protected by insurance. The broker advised the contractor to consider the overtime costs for catching up on the work that was directly impacted by the accident. This condition was included in clause MR006 regarding the 'cover of extra overtime charges'. Initially, the contractor did not realize this. So, according to them, the broker helped them to identify the object of the claim at the outset in the hope of reducing the losses incurred. Furthermore, they explained that the good relationship between the broker and insurer helped speed up the claim process. This is consistent with Halwatura's (2015) findings, who reveals that the contractor must maintain a good relationship with the insurer to expedite the claim process. The broker will assist in communicating with the insurer and appointed loss adjuster during the claim process.

CAR insurance claim success criteria

This study considered four criteria for the contractors' success in handling risk through CAR insurance: the decision on the claim outcome, the percentage of the value approved, the process, and the length of time until a claim is disbursed. Contractors do not only focus on whether the claims submitted are approved or rejected; they also expect the value of the claims to at least cover the losses experienced. This condition is in line with this study's finding that the percentage value of approved claims is the most important indicator, with a loading factor of 0.915. Figure 5 shows the percentage of the value of the claim paid compared to the value of the claim. This condition is influenced by the loss adjuster's deductible and correction values. Correction can be caused if the claim backup data are incomplete, and if the claim item does not include the insured object. Meanwhile, deductibles are always negatively correlated with insurance premiums, as lower deductibles place less responsibility on the insurer to compensate for the losses suffered. When insurance premiums are relatively low, insurers are responsible for paying less compensation for accidents by increasing their deductible values (Cheng et al. 2011). The contractor must be good at calculating the deviation of the increase in the premium value compared to the potential deductible that they will receive. The current study's data distribution is between 50%–60%, meaning that the average claim paid is only 50%–60% of the claim value. The claim value is calculated from the contractual unit price for material damage claims, which contain elements of profit and overheads (usually 15%). Therefore, the contractor must bear a loss of 35%–45%.

Figure 5 shows that the trend of the loss adjuster's correction value is still quite high. Half of the projects studied herein experience a correction value of 22% and above. This figure is almost the same as the percentage of loss borne by the contractor, meaning that the contractor must try to minimize the percentage of correction from the loss adjuster. The contractors' ability to provide backup data must be improved so that the submitted claims are more robust. Moreover, the contractors' understanding of the risks that may occur in their projects, which are usually listed in the risk registers, must form the basis for purchasing CAR insurance to ensure that the risk registers and CAR policy clauses correspond with each other. In this case, the contractors' ability and experience is the determining factor.

The contractors are also concerned about the disbursement process and time. The project respondent for the Palembang IPAL Network B1 and B2A said that even though their claims were approved, they felt that the process took too long, and there was no certainty regarding the processing time limit. The claim decision in the form of a letter of discharge was issued when the project was completed. Furthermore, the disbursement of the claim exceeded the time frame stipulated in the clause (i.e. settlement claim), which

was 30 days. This was because the claim value was too large, requiring discussion at the board of director level. However, each insurer has different policies. For projects with large contract values, the policy securities are usually held by more than one company, and some insurers are leaders while others are members. This depends on the condition of the insurer's financial ability to guarantee the certainty of claim payments. However, claim payments are often from insured members' retreats from the provisions stated in the insurance policies. This study found that this happened in the Batang Bayang Dam project, where the payments from the insurer took up to 2 years because 8 of the insurance companies became members. This condition is of particular concern to contractors who feel that the disbursement and claim process takes too long and disrupts their projects' cash flow. This often forces them to make corrections to project profit reporting if the project conditions have been completed but the claim process is ongoing. As such, the project is forced to 'accept' a 100% risk of the cost of losses incurred.

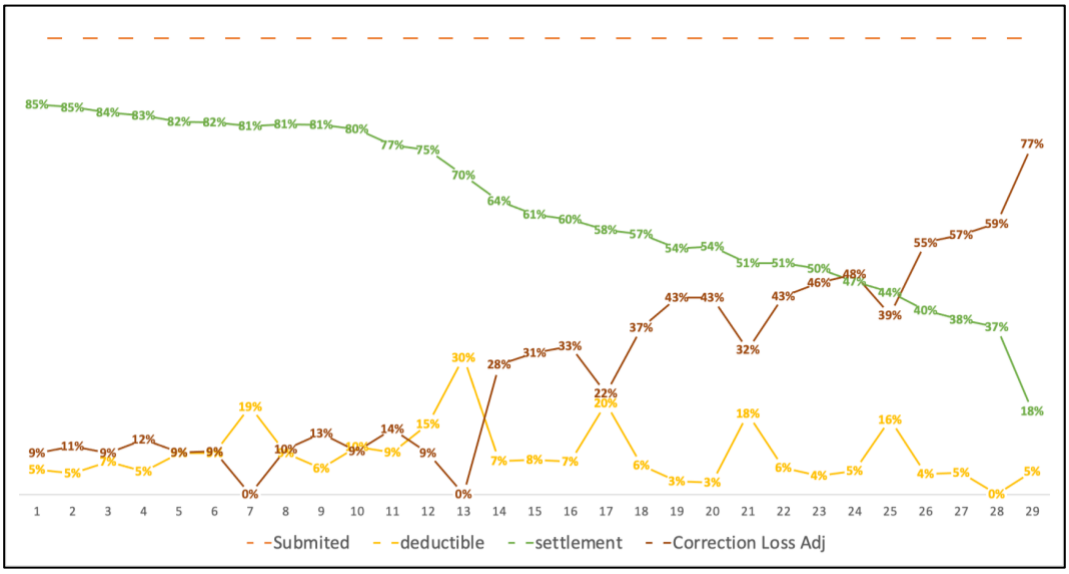

Figure 5. Comparison of the percentage of claims paid to projects

CONCLUSION

This study identified the factors that influenced the success of insurance claims, and used PLS-SEM modelling to construct a phenomenon model to develop strategic steps for contractors to enhance the effectiveness and efficiency of their use of CAR insurance. In this study, effectiveness concerned the reliability of the purchased insurance transferring risk, while efficiency was measured using the cost of the premium issued to purchase insurance compared to the value of the risk that can be paid by the insurer; it also depended on a project's risk assessment regarding its opportunities and impacts. This study compiled five internal/external factors from the literature. The internal factors were knowledge and experience of claims and the supporting role of the contractors' organization; the external factors were the insurers, brokers, and insurance products. The success of insurance claims was not only limited to the submitted claims being recognized or rejected; the percentage of the value of claims paid until the claim were processed was used as a benchmark. This study collected 33 claims from 25 projects in the form of claim documents and backup data, and conducted an online questionnaire using the project personnel involved. The data were analyzed using SmartPLS and PLS-SEM to test the the developed framework phenomena.

This study then conducted further interviews with several project personnel and related stakeholders using certain criteria, so as to test and strengthen the PLS-SEM analysis results.

The PLS-SEM analysis results revealed that the model was strong, and that the factors had a significant impact on claim success. The knowledge and experience of claims and insurance product factors had the most influence on claim success ($\beta = 0.419$ and 0.371, respectively). Interestingly, these two factors were significantly influenced by the role and support of the organization ($\beta = 0.478$ and 0.791, respectively). Optimizing contractor strategies to prioritize these factors can increase the effectiveness of using insurance to transfer risk. For example, by synchronizing the purchased insurance policies with the risk registers, especially for risks with a risk response plan transferred in CAR insurance, so that the purchased insurance product will be expected to effectively accommodate any risks that may occur. The results further revealed that the distribution of premium values ranged from 0.05%–0.15% with an average deductible of 10%. Out of 21 claims filed with losses in the form of material damage, only 1 project was likely to be capable (% settlement > 85%) of utilizing insurance to transfer risk. This condition was taken with the assumption of a project overhead and profit of 15%, as this percentage could be used by loss adjusters as a limit for the percentage of deductibles and corrections for filing claims. Overall, this study's findings complement the literature regarding the efforts to optimize the use of CAR insurance in construction, especially for contractors.

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