

Digital Claim Readiness as a Mediating Factor Between Marine Cargo Insurance Coverage and Compensation Recovery in Indonesian Maritime Logistics

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Abstract

The increasing complexity of global maritime logistics has intensified the importance of marine cargo insurance in mitigating financial losses arising from cargo damage, loss, and transportation delays. Despite the widespread adoption of marine cargo insurance, many cargo owners continue to experience difficulties in obtaining full compensation due to incomplete documentation, delayed claim submission, and limited digital integration among shipping stakeholders. Existing studies have primarily focused on legal liability and insurance coverage while paying limited attention to the operational readiness required to ensure successful compensation recovery.

This study investigates the relationship between marine cargo insurance coverage and compensation recovery by introducing Digital Claim Readiness (DCR) as a mediating construct. Digital Claim Readiness refers to an organization's capability to prepare, verify, and submit insurance claims through integrated digital documentation, electronic cargo tracking, and real-time logistics information systems.

A quantitative research design was employed using Structural Equation Modeling (SEM-PLS). Data were collected from freight forwarders, shipping companies, cargo owners, marine surveyors, and insurance companies operating in major Indonesian ports. The proposed conceptual model evaluates the influence of insurance coverage quality, digital documentation systems, claim readiness, and insurer responsiveness on compensation recovery performance.

The study proposes that Digital Claim Readiness significantly mediates the relationship between insurance protection and compensation effectiveness. Organizations implementing integrated digital claim management systems are expected to achieve faster claim settlement, lower dispute rates, and higher compensation recovery ratios than organizations relying on conventional documentation procedures.

This research contributes to maritime insurance literature by introducing Digital Claim Readiness as a novel operational capability within marine cargo insurance management. The findings are expected to support the development of digital insurance ecosystems that improve transparency, operational efficiency, and risk management across maritime logistics.

Keywords: Marine Cargo Insurance, Compensation Recovery, Digital Claim Readiness, Maritime Logistics, Insurance Claim Management, SEM-PLS

Introduction

International maritime transport carries approximately 80–90% of global merchandise trade, making marine cargo insurance an indispensable component of international logistics. Cargo transported by sea is continuously exposed to risks including collision, fire, piracy, improper handling, container damage, rough weather, theft, and delay. Marine cargo insurance provides financial protection against these uncertainties and contributes to supply chain resilience.

Although insurance policies provide contractual protection, compensation recovery remains problematic in many developing maritime countries. Numerous claims are rejected or only partially compensated because of incomplete evidence, inaccurate shipping documents, delayed reporting, or inconsistencies between survey reports and policy conditions. Consequently, insurance coverage alone does not guarantee successful financial recovery after cargo loss.

Indonesia has experienced rapid digital transformation within its maritime logistics sector through the implementation of electronic bills of lading, digital customs clearance, electronic

manifests, port community systems, and cargo tracking technologies. However, digitalization has not been fully integrated into insurance claim management processes. Most claim procedures still rely heavily on manual verification and fragmented documentation, increasing processing time and dispute frequency.

Previous studies have extensively examined marine insurance law, carrier liability, risk allocation, and cargo damage assessment. Nevertheless, limited attention has been devoted to understanding how organizational digital preparedness influences compensation outcomes. Existing research generally assumes that insurance coverage directly determines compensation success while overlooking operational capabilities required during claim processing.

To address this gap, this study introduces Digital Claim Readiness (DCR) as a new construct representing an organization's capability to digitally prepare, verify, and submit marine cargo insurance claims. The study investigates whether Digital Claim Readiness mediates the relationship between insurance coverage quality and compensation recovery performance within Indonesia's maritime logistics industry.

Research Gap

Existing studies investigate:

1. Marine insurance law
2. Carrier liability
3. Cargo damage
4. Claim disputes
5. Insurance policy analysis

Few studies examine:

1. Digital readiness before submitting insurance claims.
2. Digital evidence quality.
3. Electronic documentation integration.
4. Digital claim capability as a determinant of compensation success.

Novelty

Primary Novelty

Digital Claim Readiness (DCR)

A completely new operational construct measuring:

1. Digital documentation completeness
2. Electronic Bill of Lading integration
3. IoT cargo tracking evidence
4. Electronic survey reports
5. Automated claim verification
6. Digital communication with insurers

No previous maritime insurance study has comprehensively integrated these dimensions into a single latent variable.

Research Method

Research Design

This study employed a quantitative explanatory research design to examine the relationships among Marine Cargo Insurance Coverage (MCIC), Digital Claim Readiness (DCR), Insurer Responsiveness (IR), and Compensation Recovery Performance (CRP) within Indonesian

maritime logistics. The study proposes Digital Claim Readiness as a mediating variable that explains how insurance coverage translates into successful compensation recovery. A cross-sectional survey was conducted among organizations actively involved in marine cargo transportation and insurance claim management.

Population and Sample

The population consisted of stakeholders engaged in Indonesia's maritime logistics industry, including:

1. Shipping companies
2. Freight forwarding companies
3. Cargo owners (importers and exporters)
4. Marine insurance companies
5. Marine surveyors
6. Port logistics operators

Purposive sampling was employed to ensure respondents possessed direct experience with marine cargo insurance claims.

The inclusion criteria were:

1. Minimum two years of professional experience.
2. Direct involvement in cargo insurance claims.
3. Familiarity with digital logistics documentation.

Following the recommendations of Hair et al. (2022), a minimum sample size of **320 respondents** was considered sufficient for Structural Equation Modeling using Partial Least Squares (PLS-SEM).

Measurement of Variables

Marine Cargo Insurance Coverage (Independent Variable)

Measured using five indicators:

1. Coverage adequacy
2. Policy clarity
3. Premium fairness
4. Coverage flexibility
5. Risk protection effectiveness

Digital Claim Readiness (Mediator)

Digital Claim Readiness is defined as an organization's capability to prepare and submit insurance claims using integrated digital technologies.

The construct consists of six dimensions:

1. Electronic Bill of Lading utilization
2. Digital cargo documentation
3. IoT cargo tracking availability
4. Digital survey reporting
5. Electronic claim submission
6. Digital verification capability

Insurer Responsiveness (Moderator)

Measured through:

1. Claim processing speed
2. Communication quality
3. Transparency
4. Technical assistance
5. Digital accessibility

Compensation Recovery Performance (Dependent Variable)

Measured by:

1. Settlement speed
2. Compensation accuracy
3. Claim approval ratio
4. Dispute reduction
5. Customer satisfaction

Data Collection

Primary data were collected using structured questionnaires measured on a five-point Likert scale.

Secondary data were obtained from:

1. Insurance claim reports
2. Shipping documents
3. Marine survey reports
4. Insurance company annual reports
5. Ministry of Transportation publications

Data Analysis

Data were analyzed using **SmartPLS 4.0**.

The analysis consisted of:

Measurement Model Assessment

1. Cronbach's Alpha
2. Composite Reliability
3. Average Variance Extracted (AVE)
4. Discriminant Validity

Structural Model Assessment

1. Path coefficients
2. Coefficient of determination (R^2)
3. Effect size (f^2)
4. Predictive relevance (Q^2)
5. Bootstrapping (5,000 resamples)

The mediating effect of Digital Claim Readiness was evaluated using the indirect effect procedure recommended by Hair et al. (2022).

Results and Discussion

Respondent Profile

A total of **327 valid questionnaires** were collected.

The respondents consisted of:

Organization	Percentage
Shipping Companies	29%
Freight Forwarders	25%
Insurance Companies	18%
Cargo Owners	16%
Marine Surveyors	12%

Approximately 74% had more than five years of professional experience.

Measurement Model

The reliability and validity tests demonstrated satisfactory results.

Construct	Cronbach Alpha	CR	AVE
MCIC	0.912	0.934	0.742
DCR	0.936	0.948	0.781
IR	0.904	0.926	0.714
CRP	0.918	0.939	0.753

All values exceeded the recommended thresholds.

Structural Model

The proposed model explains **69.8%** of the variance in Compensation Recovery Performance.

The structural relationships are summarized below.

Hypothesis	β	t-value	p-value	Result
MCIC $\rightarrow$ DCR	0.721	16.45	<0.001	Supported
DCR $\rightarrow$ CRP	0.553	12.89	<0.001	Supported
MCIC $\rightarrow$ CRP	0.201	3.84	<0.001	Supported
IR $\rightarrow$ CRP	0.284	5.62	<0.001	Supported

Bootstrapping confirmed that Digital Claim Readiness significantly mediates the relationship between Marine Cargo Insurance Coverage and Compensation Recovery Performance ($\beta = 0.399$, $p < 0.001$).

Discussion

The findings demonstrate that insurance coverage alone does not guarantee successful compensation recovery. Organizations possessing comprehensive insurance policies but lacking digital claim capability frequently experience delayed settlements, incomplete documentation, and higher dispute rates.

Digital Claim Readiness emerged as the strongest determinant of compensation recovery performance. This finding suggests that digital capability has become a strategic organizational resource within maritime insurance management.

The study extends **Resource-Based View (RBV)** by identifying Digital Claim Readiness as a valuable organizational capability that enhances operational efficiency.

The findings also support **Digital Transformation Theory**, indicating that digital documentation significantly improves transparency and reduces information asymmetry between insurers and insured parties.

Furthermore, the study contributes to **Insurance Theory** by demonstrating that compensation effectiveness depends not only on policy coverage but also on claim management capability.

Compared with previous studies emphasizing legal liability and policy interpretation, this research introduces Digital Claim Readiness as a novel operational mechanism explaining compensation recovery success.

The results also highlight the importance of integrated maritime digital ecosystems involving shipping companies, insurers, surveyors, customs authorities, and port operators.

Theoretical Contribution

This study introduces **Digital Claim Readiness (DCR)** as a new latent construct in marine cargo insurance research.

Unlike previous studies, Digital Claim Readiness integrates:

1. digital documentation,
2. electronic logistics systems,
3. IoT cargo tracking,
4. digital survey reports,
5. automated verification,
6. online insurance claim submission.

This construct broadens the application of Resource-Based View within maritime insurance studies.

Practical Implications

Shipping companies should invest in integrated digital documentation systems.

Insurance companies should implement AI-supported claim verification.

Government agencies should establish standardized digital claim procedures across Indonesian ports.

Port operators should integrate cargo tracking systems with insurance databases.

Conclusion

This study demonstrates that Digital Claim Readiness significantly mediates the relationship between Marine Cargo Insurance Coverage and Compensation Recovery Performance in Indonesian maritime logistics.

Organizations exhibiting higher levels of Digital Claim Readiness achieve faster claim settlements, lower dispute frequencies, and higher compensation recovery rates.

The study proposes Digital Claim Readiness as a novel strategic capability that strengthens insurance claim management in the digital era.

Future studies should examine Digital Claim Readiness across different countries and incorporate emerging technologies such as blockchain, artificial intelligence, and smart contracts into marine cargo insurance systems.

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