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Implementation of Risk Management in Marine Hull Facultative Underwriting: A Case Study of PT XYZ Reinsurance Company

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Abstract: The marine insurance and reinsurance industry is characterized by high levels of uncertainty due to technical, operational, and environmental risks. In Indonesia, Marine Hull insurance plays a strategic role in supporting maritime transportation, yet it is also exposed to significant underwriting risks. Effective risk management in underwriting is therefore essential to ensure portfolio sustainability and underwriting performance. This study aims to analyze the implementation of risk management in Marine Hull Facultative underwriting at PT XYZ, measure the maturity level of risk management based on ISO 31000, and formulate improvement recommendations.

This research employs a mixed method approach using questionnaires, Focus Group Discussions (FGD), interviews, and document analysis. The Risk Maturity Model (RMM) was applied to assess four attributes: risk management framework, risk culture, documentation, and underwriting systems. The findings indicate that the overall maturity level of underwriting risk management at PT XYZ is at the Preliminary Defined level. While risk awareness and underwriting documentation are relatively well established, weaknesses remain in system integration, audit follow up, and governance consistency. Strengthening system support, formalizing risk governance, and enhancing continuous improvement mechanisms are recommended to improve underwriting quality and reduce underwriting losses.

Keywords: *Risk Management, Maturity, Underwriting Risk, Marine Hull, Reinsurance, ISO 31000.*

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I. INTRODUCTION

The maritime sector plays a vital role in global and national economic activities, particularly for countries with extensive sea transportation networks such as Indonesia. Marine transportation activities inherently involve various risks, including technical failures, human error, environmental hazards, and regulatory uncertainties. These risks create significant exposure for Marine Hull insurance, which provides coverage for physical damage to vessels and their machinery. Consequently, Marine Hull underwriting requires rigorous risk assessment and effective risk management to ensure portfolio quality and financial sustainability.

In the reinsurance industry, underwriting Marine Hull Facultative business presents additional complexity due to the selective nature of risk acceptance and the high value of insured assets. Underwriting decisions in reinsurance directly affect loss ratios, underwriting results, and capital adequacy. Poor underwriting risk management may lead to adverse selection, excessive risk accumulation, and increased claim volatility. Therefore, integrating risk management into underwriting processes is essential to support prudent decision making and longterm performance.

PT XYZ, as one of the reinsurance companies operating in Indonesia, has experienced fluctuations in underwriting performance in its Marine Hull portfolio. Internal performance reports indicate underwriting losses in recent years, driven mainly by increased claim frequency and severity. These conditions suggest potential weaknesses in underwriting risk assessment, risk selection criteria, and supporting risk management systems. Such challenges highlight the importance of evaluating the maturity of risk management practices in underwriting activities.

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Risk management maturity reflects the extent to which risk management is systematically embedded in organizational processes and decision making. Organizations with low maturity levels tend to rely heavily on individual judgment, informal practices, and fragmented documentation. In contrast, higher maturity levels are characterized by standardized procedures, integrated systems, and continuous monitoring and improvement. In underwriting, maturity determines the consistency and reliability of risk acceptance decisions.

Although numerous studies have examined enterprise risk management maturity, empirical research focusing specifically on underwriting risk management maturity in Marine Hull reinsurance within the Indonesian context remains limited. Most existing studies address risk management in banking, public sector organizations, or general insurance without emphasizing the underwriting function as a critical risk gateway. This research seeks to fill this gap by analyzing the maturity of risk management implementation in Marine Hull Facultative underwriting at PT XYZ.

The objectives of this study are threefold: (1) to analyze the implementation of risk management in Marine Hull Facultative underwriting, (2) to measure the maturity level of underwriting risk management based on ISO 31000 principles, and (3) to formulate recommendations for improving underwriting risk management practices. The findings are expected to contribute both academically and practically by providing insights into underwriting risk management maturity in the reinsurance industry.

II. LITERATURE REVIEW

- *Risk in Insurance and Reinsurance*

Risk is defined as the effect of uncertainty on objectives (ISO 2009). In insurance and reinsurance, risk arises from uncertainty related to loss occurrence, claim severity, and timing. Underwriting risk refers to the possibility that premiums collected will be insufficient to cover claims and expenses. Marine Hull insurance is particularly exposed to underwriting risk due to vessel condition variability, operational practices, navigational routes, and environmental factors.

In reinsurance, underwriting risk is amplified by the aggregation of large and complex risks. Facultative reinsurance requires detailed risk assessment for each individual risk, making underwriting quality a critical success factor. Failure to properly assess risk characteristics may lead to excessive exposure and deteriorating underwriting performance.

- *Risk Management and ISO 31000*

Risk management is an integral part of governance and organizational management (ISO 2018). ISO 31000 defines risk management as coordinated activities to direct and control an organization with regard to risk. The framework emphasizes principles such as integration, structured approach, customization, and continual improvement. Effective risk management supports decision making, improves performance, and enhances organizational resilience.

In underwriting, risk management involves systematic identification, analysis, evaluation, and treatment of risks associated with insured objects. This process should be supported by clear policies, competent personnel, adequate documentation, and reliable systems. Integration of risk management into underwriting ensures consistency and transparency in risk acceptance decisions.

- *Risk Management Maturity*

Risk management maturity models describe stages of development in risk management implementation, ranging from ad hoc practices to optimized, fully integrated systems. Organizations at the preliminary level typically apply risk management inconsistently, relying on individual expertise rather than standardized processes. At higher maturity levels, risk management becomes embedded in organizational culture, supported by integrated systems and continuous monitoring.

Previous studies suggest a positive relationship between risk management maturity and organizational performance. Higher maturity levels enable organizations to anticipate risks more effectively, reduce losses, and improve decision quality. In underwriting, maturity is associated with improved risk selection, pricing accuracy, and portfolio stability.

- *Underwriting Risk Management in Marine Hull Insurance*

Underwriting Marine Hull insurance requires comprehensive assessment of physical hazards, moral hazards, and morale hazards. Physical hazards include vessel age, maintenance condition, and technical specifications. Moral hazards relate to the behavior and integrity of the insured, while morale hazards involve negligence or lack of care. Effective underwriting risk management integrates these aspects into a structured assessment process.

However, underwriting practices often face challenges such as limited system support, incomplete risk data, and insufficient integration with risk management functions. These challenges highlight the importance of assessing underwriting risk management maturity to identify gaps and improvement opportunities.

III. MATERIALS & METHODS

A. Research Object and Location

The object of this research is the implementation of risk management in Marine Hull Facultative underwriting at PT XYZ, a reinsurance company operating in Indonesia. The study focuses specifically on underwriting activities, as underwriting represents the primary risk gateway that determines portfolio quality and underwriting performance. The research was conducted between May and July 2025.

The selection of PT XYZ as the research object was carried out purposively based on several considerations: (1)

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the company actively underwrites Marine Hull Facultative risks, (2) underwriting performance fluctuations have been observed in recent years, and (3) the company has formally adopted risk management principles in accordance with ISO 31000.

➢ *Research Approach*

This study employs a mixed method approach combining qualitative and quantitative techniques. The mixed method design enables a comprehensive understanding of underwriting risk management practices by integrating measurable maturity scores with in depth qualitative insights from practitioners. This approach is suitable for maturity assessment studies, where both numerical evaluation and contextual interpretation are required.

➢ *Data Types and Sources*

The data used in this study consist of primary and secondary data. Primary data were obtained through structured questionnaires, Focus Group Discussions (FGD), and semistructured interviews with underwriting and risk management personnel. Secondary data were collected from internal underwriting guidelines, risk assessment documents, underwriting reports, and relevant company policies.

➢ *Respondents*

The study involved 5 respondents selected through purposive sampling, consisting of Manager Underwriter, Senior Underwriter, Underwriting Analyst, and risk management officers directly involved in Marine Hull Facultative underwriting. These respondents were selected due to their roles and experience in underwriting and risk management processes.

Table 1 Respondent Data

No	Position	Total of Respondent
1	Manager Underwriter	1
2	Senior Underwriter	1
3	Underwriting Analyst	2
4	Risk Management staff	1

B. Risk Management Maturity Measurement

➢ *Maturity Measurement Framework*

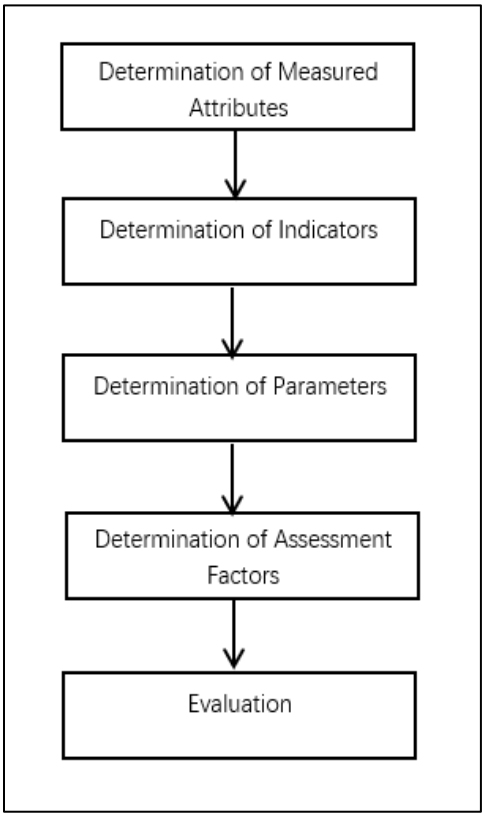

Fig 1 Measurement Framework

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Risk management maturity was measured using a Risk Maturity Model (RMM) adapted from ISO 31000 principles. The model evaluates four key attributes relevant to underwriting activities:

- Risk Management Framework
- Risk Culture
- Documentation
- Underwriting System

Each attribute was assessed using indicators rated on a five level maturity scale: Initial, Preliminary, Defined, Managed, and Optimized. Scores from questionnaires were aggregated to determine the maturity level of each attribute and the overall underwriting risk management maturity.

The questionnaire was developed based on ISO 31000 principles and the Risk Maturity Model (RMM) and consisted of 53 items, distributed across four key attributes as follows:

- *Risk Management Framework - 12 items*

These items assess the existence, structure, integration, governance, risk appetite alignment, and continuous improvement of the risk management framework in Marine Hull underwriting.

- *Risk Culture - 14 items*

These items evaluate risk awareness, risk-based decision making, accountability, communication, training, and behavioral aspects of underwriters in managing Marine Hull risks.

- *Documentation - 12 items*

These items measure the completeness, consistency, standardization, accessibility, and utilization of underwriting and risk-related documentation, including historical loss and claims data.

- *Underwriting System - 15 items*

These items assess the effectiveness of underwriting systems, data integration, analytical tools, system support for risk assessment, monitoring, and decision making processes.

➢ *Maturity Measurement Scale*

- Level 1 (Initial): The assessed factor has not been implemented in Marine Hull underwriting at PT XYZ (score 1.00 - 1.99).
- Level 2 (Preliminary): The assessed factor has been implemented but not yet integrated into Marine Hull underwriting processes at PT XYZ (score 2.00 -2.99).
- Level 3 (Defined): The assessed factor has been implemented but is not yet applied consistently in Marine Hull underwriting at PT XYZ (score 3.00 - 3.99).
- Level 4 (Managed): The assessed factor has been implemented and applied consistently in Marine Hull underwriting at PT XYZ (score 4.00 - 4.50).
- Level 5 (Optimized): The assessed factor has been fully implemented and embedded as part of the organizational culture in Marine Hull underwriting at PT XYZ (score 4.50 - 5.00).

C. Data Analysis

Quantitative data from questionnaires were analyzed using descriptive statistics to determine average maturity scores. Qualitative data from interviews and FGDs were analyzed using thematic analysis to support and explain quantitative findings. Triangulation between data sources was applied to enhance the validity and reliability of the results.

IV. RESULT

➢ *Risk Assessment Process*

- *Data Collection*

The risk assessment process begins with the collection of supporting data from the ceding company upon receipt of a facultative offer. Underwriters review the completeness and accuracy of submitted documents, which serve as the primary basis for risk analysis and underwriting decision making.

- *Risk Identification*

Once the documentation is complete, underwriters identify potential risks by reviewing policy terms and conditions, exclusions, and other relevant risk factors. The validated data are then input into the underwriting system to support structured risk analysis.

- *Approval Process*

Following risk identification, underwriters assess available underwriting capacity and ensure compliance with the company's acceptance policy, which defines authority limits and underwriting restrictions. The approval process is conducted through the system in accordance with delegated authority levels, ranging from the Head of Facultative Underwriting to senior management. Approved risks are bound and communicated to the ceding company, while rejected submissions are formally notified.

- *Evaluation*

Post binding evaluation is conducted on a regular basis to assess underwriting outcomes and identify areas for improvement. Monthly underwriting reviews are held to discuss portfolio performance, including accepted accounts, loss ratios, premium statistics, and underwriting decisions.

- *Overall Risk Management Maturity Level*

The assessment results indicate that the overall maturity level of risk management in Marine Hull Facultative underwriting at PT XYZ is positioned between the Preliminary and Defined levels. This indicates that risk management practices have been formally introduced and partially standardized, but full integration and continuous improvement have not yet been achieved.

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Table 2 Risk Management Framework

No	Assessment Factor	Score
1	The company has a formal policy for the implementation of risk management in the Marine Hull underwriting process	3.2
2	Top management is actively involved in risk monitoring or the underwriting committee	2.6
3	The organizational structure demonstrates a clear relationship between the underwriting function and risk management	2.6
4	Underwriting procedures include stages of risk identification and risk analysis	4.4
5	Risk assessment results serve as the basis for risk acceptance or rejection decisions	3.6
6	Standard operating procedures (SOPs) or a risk management manual are available as references for the Marine Hull underwriting process	3.4
7	Risk reports are regularly submitted to the risk committee or management	3.2
8	Risk communication between units (Underwriting, Claims, Risk Management) is conducted through formal meetings or forums	2.4
9	A risk recording system (Risk Register System) is used in the underwriting process	2.8
10	The company has a risk appetite statement defining the level and types of risk that guide risk acceptance decisions	3.6
11	Internal and/or external audits are conducted regularly to assess the effectiveness of risk management implementation	2.2
12	Followup actions from audit results and risk evaluations are documented and used to improve underwriting procedures	1.8
	Total / Average Score	**2.98**

The risk management framework attribute achieved a Preliminary level. PT XYZ has established underwriting guidelines and risk assessment procedures however, the implementation remains inconsistent across underwriting cases. Risk identification and evaluation are conducted, but audit followup and management review are not yet systematic.

Table 3 Risk Culture

No	Assessment Factor	Score
1	Management actively provides direction and support for the implementation of risk culture within the underwriting unit	2.8
2	Management regularly communicates the importance of risk culture implementation to all underwriters	4.2
3	Underwriters understand the types of risks involved in Marine Hull insurance	4.8
4	Risk training programs (seminars/workshops) are conducted	2.8
5	The prudential principle is applied in every underwriting decision	3.6
6	Formal risk reporting procedures or standard operating procedures (SOPs) are in place	3.6
7	Risk evaluation forums are conducted on a regular basis	3.4
8	Each underwriter is accountable for the risks they underwrite	4.8
9	Underwriting decisions are based on risk analysis results rather than solely on business targets	3.2
10	Risk data are verified prior to risk acceptance	4.4
11	Underwriters routinely report the results of risk assessments to management or the risk management unit	3.8
12	Underwriter performance is evaluated based on loss ratio and compliance with risk policies	3.6
13	Underwriters consistently ensure the authenticity of risk data and vessel documentation prior to accepting risks	4.6
14	Risks with incomplete information are rejected or revised before approval	4.2
	Total / Average Score	**3.84**

Risk culture achieved a Defined level. Underwriters demonstrate adequate awareness of underwriting risks, particularly physical and moral hazards. Risk considerations are routinely discussed during underwriting meetings. However, risk management training is not conducted regularly, and risk awareness initiatives remain limited in scope.

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Table 4 Documentation

No	Assessment Factor	Score
1	The company has written policies regarding the implementation of risk management in Marine Hull underwriting	3.4
2	Marine Hull underwriting SOPs are available and consistently applied	3.4
3	existing SOPs are able to mitigate risks, particularly highrisk exposures	2.8
4	Reinsurance slips, cover notes, and risk notes are complete and properly documented	3.8
5	Risk evaluation reports and vessel survey results are systematically documented	3.8
6	Ceding companies provide complete documentation when deficiencies are identified	4.2
7	Every risk acceptance or rejection decision is supported by formal records and official approval	4.6
8	Loss ratio reports and risk evaluation results are documented on a regular basis	4.0
9	The format and terminology of underwriting documents have been standardized across all units	3.6
10	Changes or revisions to underwriting documents are recorded in the system	3.8
11	Underwriting documentation complies with POJK regulations, PSAK 62, and international standards	4.6
12	Claims outcomes and premium data are documented and utilized for analytical purposes	3.8
	Average Score	**3.82**

The documentation attribute was assessed at the Defined level. Underwriting files, risk assessments, and approval records are documented in a structured manner. Nevertheless, documentation quality varies between underwriters, and historical risk data are not fully utilized for analytical purposes.

Table 5 System

No	Assessment Factor	Score
1	The company has a digital underwriting system that is used consistently	3.0
2	Premium, claims, and vessel data are stored in a centralized database	3.2
3	The underwriting system includes risk assessment features for vessel and policy risk analysis	2.6
4	Risk analysis results are used in determining reinsurance acceptance terms and conditions	3.8
5	Risk accumulation can be identified and monitored through the system	3.4
6	Underwriter risk calculations (e.g., coverage exposure) can be generated by the system	2.6
7	Underwriting data input is validated and approved through formal authorization	3.0
8	The system has security controls (user ID, password, audit trail) and complies with information security policies	3.2
9	The underwriting system is integrated with claims and finance systems for risk data exchange	3.2
10	Consolidated underwriting, claims, and risk reports are automatically generated by the system	3.6
11	Policy documents, slips, and survey reports are stored in a coded digital archive	2.8
12	The system is regularly maintained and supported by data backup procedures	2.2
13	The system is capable of generating reports in accordance with OJK/POJK regulatory formats and requirements	3.0
14	Underwriters have received training on the use of the underwriting system	3.2
15	The IT unit regularly performs system updates and system development	1.8
	Average Score	**2.97**

The underwriting system attribute remains at the Preliminary level. the low scores obtained in these assessment factors indicate the organization's primary areas of weakness. The system has not yet provided strong risk assessment functionality, and system maintenance remains inadequate and weak. This condition is further reflected in the low score for IT risk testing related to routine system updates and system development, which recorded a value of 1.8. Without significant improvement and development in this attribute, it

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will be difficult to support risk management in a comprehensive and effective manner.

V. DISCUSSION

- *Risk Management Framework*

The preliminary maturity level of the risk management framework indicates that PT XYZ has taken initial steps toward structured underwriting risk management. The presence of guidelines and procedures reflects management recognition of underwriting risk. However, inconsistent application and limited audit follow up reduce the effectiveness of the framework. This finding aligns with previous studies suggesting that formal frameworks without strong governance mechanisms tend to remain procedural rather than strategic.

- *Risk Culture*

The defined level of risk culture demonstrates that underwriters possess basic risk awareness and understand the importance of risk assessment in underwriting decisions. Nevertheless, the absence of continuous training and formal risk communication limits cultural reinforcement. Risk culture should evolve beyond individual awareness to become an organizational norm supported by leadership and incentive systems.

- *Documentation*

Documentation maturity at the defined level indicates that PT XYZ has achieved standardization in underwriting records. However, documentation is primarily compliance oriented and not yet leveraged for risk analytics or portfolio evaluation. This limits the organization's ability to learn from historical underwriting outcomes and improve future decision making.

- *Underwriting System*

System limitations represent one of the most significant barriers to higher maturity. The reliance on manual tools restricts analytical depth and consistency. Previous research emphasizes that system integration is a critical enabler of advanced underwriting risk management, particularly for complex risks such as Marine Hull. Without system enhancement, improvements in other attributes may not translate into better underwriting performance.

The results indicate a clear gap between the relatively strong risk culture and the weaker underwriting system. While individual risk awareness among underwriters has been well established, it is not yet adequately supported by integrated systems, control mechanisms, and effective audit follow up. Consequently, lessons learned from major claims are not fully institutionalized, increasing the likelihood of recurring risks despite the existence of formal underwriting procedures. This finding suggests that a strong risk culture alone is insufficient to ensure effective risk management without corresponding system support.

Moreover, the measured level of risk management maturity reflects the organization's process and governance readiness rather than its underwriting performance outcomes. The application of ISO 31000 in Marine Hull underwriting also faces limitations due to the unique characteristics of the risk, which involve low frequency but high severity losses and heavy reliance on underwriter judgment. Therefore, adaptive approaches and strengthened internal policies are required to complement the existing framework and enhance overall risk management effectiveness.

VI. CONCLUSION

This study concludes that the maturity level of risk management in Marine Hull Facultative underwriting at PT XYZ is positioned at the Preliminary Defined level. While risk management practices have been formally introduced and partially standardized, full integration into underwriting decision making has not yet been achieved. Strengths are observed in risk awareness and documentation, while weaknesses remain in governance consistency, system support, and continuous improvement mechanisms.

Improving underwriting risk management maturity requires strengthening the risk management framework through consistent audit follow up, enhancing risk culture via structured training programs, improving documentation utilization for analytical purposes, and upgrading underwriting systems to support integrated risk assessment. These improvements are expected to enhance underwriting quality, reduce loss volatility, and improve portfolio performance.

REFERENCES

[1]. Adam FF. Marine hull product risk assessment at a reinsurance company. In: *Proceedings of the 6th International Conference on Vocational Education Applied Science and Technology (ICVEAST 2023).* Adv Soc Sci Educ Humanit Res. 2023; Vol. 783: 296–306. doi:10.2991/978-2-38476-132-6_28.

[2]. Afiyanti Y. Focus Group Discussion (Diskusi Kelompok Terfokus) sebagai Metode Pengumpulan Data Penelitian Kualitatif. *Jurnal Keperawatan Indonesia.* 2008; 12(1): 58–62. https://doi.org/10.7454/jki.v12i1.201

[3]. Arjang A, Ausat AMA, Prasetya YB. Optimalisasi sistem informasi dalam meningkatkan daya saing UMKM: Analisis sinergi inovasi digital dan fenomena FOMO dalam dinamika pasar. *Jurnal Minfo Polgan.* 2025; 14(1): 68–76. doi:10.33395/jmp.v14i1.14629

[4]. Berry-Stölzle TR, Fritzsch S, Scharner P, Weiß G. Insurers' climate change risk management quality and natural disasters. *Journal of Risk & Insurance*. 2024; 91(2): 263–298. doi:10.1111/jori.12472

[5]. Fu'adi A, Andrian P, Sutopo YA. Asesmen tingkat maturitas sistem kerja hybrid di PT Elang Mahkota Teknologi, Tbk. *Journal of Electrical, Electronic, Mechanical, Informatic and Social Applied Science (EEMISAS).* 2024; 3(1): 22–28. doi:10.58991/eemisas.v3i1.52

[6]. Heckman L. *The ALA Guide to Information Sources in Insurance, Risk Management, and Actuarial Science.*

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jan924

Chicago: ALA Editions, an imprint of the American Library Association; 2016.
[7]. Hopkin P. *Fundamentals of Risk Management: Understanding, Evaluating and Implementing Effective Risk Management.* 4th ed. London: Kogan Page Ltd; 2010.
[8]. Jiang M, Liu Y, Lu J, Qu Z, Yang ZL. Risk assessment of maritime supply chains within the context of the Maritime Silk Road. *Ocean and Coastal Management.* 2023; 231: 106380. doi:10.1016/j.ocecoaman.2022.106380
[9]. Junedah L. Pengaruh maturitas SPIP, kapabilitas APIP, serta implementasi e-planning dan e-budgeting terhadap kualitas sistem akuntabilitas kinerja instansi pemerintah (SAKIP) [Master's thesis]. Universitas Lampung; 2019.
[10]. Kurniawan A, Wibowo A. Maturitas enterprise risk management kontraktor besar di Indonesia dan faktor-faktor yang memengaruhinya. *Jurnal Teknik Sipil.* 2017; 24(3): 257–268. doi:10.5614/jts.2017.24.3.9
[11]. LogicManager, Inc. RIMS Risk Maturity Model for Enterprise Risk Management (RMM) [Internet]. Boston, MA: LogicManager; 2006 Nov 28 [cited 2026 Jan 13]. Available from: https://www.logicmanager.com/resources/news/rims-launches-risk-maturity-model-for-enterprise-risk-management/
[12]. London School of Insurance. Marine Hull Insurance and Reinsurance [Internet]. London: London School of Insurance; 2019 [cited 2026 Jan 13]. Available from: https://elearning.londonschoolofinsurance.com/pdf/en/Marine-Hull_Ins_Reins.pdf
[13]. Marsauli V, Raharja S. Penerapan maturitas manajemen risiko, memahami level maturitas yang relatif rendah: studi kasus di PT XYZ. *Diponegoro Journal of Accounting.* 2023; 12(2): 1–10.
[14]. Molak V. *Fundamentals of Risk Analysis and Risk Management.* Boca Raton, FL: CRC Press; 1997.
[15]. Ningrat MA, Suwanda D, Huseno T. Analisis maturitas dan kerangka governance, risk, and compliance (GRC) upaya peningkatan pendapatan asli daerah atas pengelolaan kekayaan yang dipisahkan di Provinsi DKI Jakarta: Studi kasus PT Bank DKI tahun 2018–2022. *Jurnal Mahasiswa Ekonomi dan Bisnis.* 2024; 4(2): 514–524.
[16]. Njatrijani R. Klaim marine hull and machinery dalam praktek pertanggungan. *Diponegoro Private Law Review.* 2018; 3(1): 326–344.
[17]. Nuryawati L, Ritonga IT. Analisis hubungan maturitas sistem pengendalian intern pemerintah (SPIP) dan kualitas pengelolaan keuangan (studi pada pemerintah daerah di Indonesia) [Master's thesis]. Universitas Gadjah Mada; 2022.
[18]. Oko-Osi AH, Aroyehun DD. Underwriting practices and financial performance of insurance companies in Nigeria. *Lagos Journal of Banking, Finance & Economic Issues.* 2024; 5(1): 93–105.
[19]. Peraturan Otoritas Jasa Keuangan Republik Indonesia Nomor 1/POJK.05/2015 tentang Penerapan Manajemen Risiko bagi Lembaga Jasa Keuangan Non-Bank [Internet]. Jakarta: Otoritas Jasa Keuangan; 2015 [cited 2026 Jan 13].
[20]. Pratama RS, Rahmi M. Analisis manajemen risiko proses underwriting pada asuransi syariah: studi kasus PT Asuransi Jiwa Reliance Syariah. *Islamic Economics and Business Review.* 2023; 1(2): 155–168.
[21]. PT Maskapai Reasuransi Indonesia Tbk. Laporan keuangan [Internet]. 2026 [cited 2026 Jan 13]. Available from: https://marein-re.com/laporan-keuangan
[22]. Putratama MF, Basuki M. Manajemen risiko terhadap nilai klaim asuransi rangka kapal berdasarkan ITC Hull 1.10.83 Clause 280 (All Risks Comprehensive) pada kapal BG. TRG 06. *Jupiter: Publikasi Ilmu Keteknikan Industri, Teknik Elektro dan Informatika.* 2024; 2(5): 139–152. doi:10.61132/jupiter.v2i5.543
[23]. Ramadhani S, Ramadyanto W, Jahroh S. Risk assessment of the causes of cost overrun of project XYZ. *Indonesian Journal of Multidisciplinary Science*. 2024; 3(11)
[24]. Ramidi SE, M.Si. Manajemen Risiko – Sesi 4: Metode Perhitungan Risiko [Internet]. 2024 [cited 2026 Jan 13]. Available from: https://belajaronline.cmed-indonesia.com/wp-content/uploads/2024/05/Manajemen-Risiko-Sesi-4-Metode-Perhitungan-RIsiko-Ok.pdf
[25]. Renn O. Risk perception and risk management: A review. *Risk Analysis.* 2010; 30(4): 589–605.
[26]. Rofikah W, Septiarini DF. Implementation of underwriting risk management in PT Asuransi Jasindo Syariah. *Jurnal Ekonomi Syariah Teori dan Terapan.* 2020; 7(5): 901–910.
[27]. Safitri Z, Wendi E, Sitorus VP, Noviyanti I. Analisis SWOT terhadap pengembangan strategi bisnis pada Warung Makan Asyik Desa Balunijuk. *Jurnal Manuhara: Pusat Penelitian Ilmu Manajemen dan Bisnis.* 2024; 2(3): 140–153. doi:10.61132/manuhara.v2i3.967
[28]. Salim A. Dampak perubahan iklim terhadap transportasi laut. *Riset Sains dan Teknologi Kelautan.* 2023; 6(2): 170–173. doi:10.62012/sensistek.v6i2.31711
[29]. Sarjana S, Nardo R, Hartono R, Siregar ZH, Irmal, Sohilauw MI, Wahyuni S, Rasyid A, Djaha ZA, Badrianto Y. *Manajemen Risiko.* Bandung: CV. Media Sains Indonesia; 2022. p. 1–189.
[30]. Simanjuntak R, Priyarsono DS, Sumarti T. Analisis tingkat maturitas implementasi manajemen risiko di IPB University. *Jurnal Manajemen dan Organisasi.* 2021; 12(3): 177–188. doi:10.29244/jmo.v12i3.32779
[31]. Silmi. Analisis maturitas sistem pengendalian intern pemerintah terintegrasi peraturan BPKP nomor 5 tahun 2021. *Journal of Applied Managerial Accounting.* 2024; 8(1): 47–58.
[32]. Soekarto. *Pengantar risiko dan tipe-tipe risiko.* Indonesia; 2019.
[33]. Sudrajat RT. Analisis maturitas implementasi governance, risk, and compliance (GRC) di PT Kimia Farma Trading & Distribution [tesis]. Jakarta: Universitas Bakrie; 2025.
[34]. Suhartono R. Pengaruh maturitas Sistem Pengendalian Intern Pemerintah (SPIP) dan kapabilitas Aparat Pengawasan Intern Pemerintah (APIP) terhadap Indeks

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jan924

Persepsi Korupsi Indonesia. *Jurnal Manajemen dan Organisasi*. 2021; 12(3): 177–188.
[35]. Suparto ERA, Lukmandono L. Penilaian maturity level ERM (Enterprise Risk Management) berbasis ISO 31000:2018. *Prosiding SENIATI*. 2022; 6(3): 478–482. doi:10.36040/seniati.v6i3.5079
[36]. Taleb NN. *The Black Swan: The Impact of the Highly Improbable*. New York: Random House; 2007.
[37]. Vionna VV. Pengaruh penerapan manajemen risiko terhadap kinerja underwriting pada perusahaan asuransi umum. *Jurnal Manajemen dan Organisasi*. 2023; 14(2): 1–15.
[38]. Vorst CR, Priyarsono DS, Budiman A. *Manajemen Risiko Berbasis SNI ISO 31000*. Jakarta: Badan Standardisasi Nasional; 2024.