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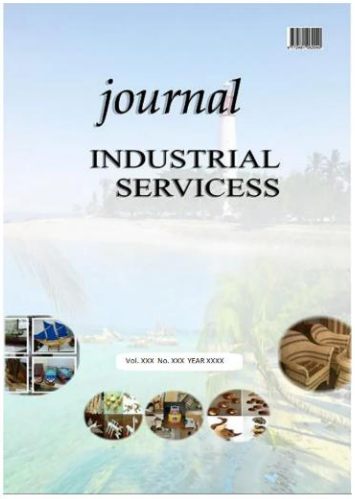

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Original research article

Business continuity maturity in the banking industry: A governance perspective

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ABSTRACT

The banking industry plays a crucial role in maintaining a region's financial system's stability. Therefore, the speed at which the banking industry can recover and restore its operational services to normal conditions after experiencing disruptions or disasters is vital for stakeholders. The existence of a comprehensive Business Continuity Maturity Model that integrates governance perspectives and risk-based approaches can enhance the resilience of banking organizations by providing a robust framework that aligns business continuity practices with strategic governance and effective risk management. This research aims to establish a framework for the business continuity maturity model from a governance perspective, utilizing a risk-based approach and performance indicators through the balanced scorecard method. The findings indicate that a comprehensive Business Continuity Maturity Model from a governance perspective must include parameters related to financial impact, organizational reputation, regulatory compliance, strategic alliances, awareness, the completeness of policies and procedures, and the continuous enhancement of capabilities and competencies through simulation and testing processes.

1. Introduction

Business Continuity Management is a management approach encompassing various perspectives to ensure that an organization's critical business and operational activities can operate at a minimum level during disruptions and are restored promptly after a disruption or disaster has ended [1]. Business continuity is carried out by identifying all potential threats and risks that may disrupt the smooth operational activities of the organization [2], [3]. However, business continuity is not only about managing risks; it also requires follow-up actions to ensure that the organization has strategies and plans in place to address and mitigate disruptions, as well as to restore business operations and enhance existing business continuity efforts [4].

The increasingly competitive and evolving market conditions present new challenges related to customer acquisition and retention processes, as well as the ability of organizations—particularly in the banking industry—to endure and continue essential activities during disruptions or crises [5]. The speed at which the banking industry can recover and restore its activities to normal conditions after a disruption is essential for stakeholders, especially given the banking industry's crucial role in maintaining a country's financial system's stability. This is exemplified by the case of Silicon Valley Bank in the United States, which faced liquidity risks that had a significant impact on the financial conditions in the country [6].

The banking industry is a trust-based business. A decline in stakeholders' confidence in the market and banks can lead to the potential collapse of the financial system, forcing the government to stabilize it and rebuild the lost trust [7]. Proper analysis and planning can achieve greater resilience in the banking industry. The banking industry can foster trust among stakeholders, such as shareholders, customers,

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employees, and the community, ensuring they can continue their business processes normally with minimal risk during potential disruptions [8].

Nowadays, a new phenomenon is emerging in the banking industry related to systemic risk, where disruptions in one environment can lead to disturbances or even failures in systems in other environments [9]. The diverse spectrum of risks faced by banks presents unique challenges, requiring control strategies that are both structured and integrated. Furthermore, disruptions stemming from natural disasters—such as megathrust earthquakes and floods—or human-induced crises, including wars, geopolitical instability, and cyberattacks, have the potential to inflict severe financial losses. In extreme cases, these events can undermine organizational resilience and drive banks toward insolvency or bankruptcy [5].

Disruption threats today are no longer confined to natural disasters that physically affect organizations. Emerging threats, particularly human-induced cyber threats, highlight the necessity of ensuring that all risks and organizational vulnerabilities are effectively managed and controlled [10]. According to [11], handling disruption consists of four main components: Objectives, Assurance, Tasks, and Resources. These components reflect the actions to be undertaken, the events to be addressed, and the messages to be communicated. Strengthening leadership [12], enhancing managerial competency [13], raising employee and stakeholders' awareness [14], and reinforcing business processes & organizational technology are all critical measures. Such preparedness should be cultivated through simulations, exercises, audits, and testing to effectively confront potential disruptions [15]. Therefore, to enhance the effectiveness of business continuity implementation in the banking industry, organizations must assess their level of preparedness using appropriate indicators and parameters to ensure organizational resilience [16]. Organizations can effectively manage business continuity by maintaining a balanced focus on internal conditions. Furthermore, the business continuity management approach needs to be holistic, from understanding events and potential hazards, their impact on organizational activities, and measured planning for continuing business processes during disruptions [17]. In addition, improvements in change management capabilities—particularly those related to strategic planning and organizational culture—have been shown to significantly enhance organizational performance and ensure sustained business continuity [18]. A comprehensive Business Continuity Maturity Model encompasses various perspectives, such as operational control, facilities, and information technology [19].

This study is conducted to complement previous studies that have focused more on operational factors [19], [20], [21], [22]. The focus shifts to a more strategic, specifically related to governance perspective. This study aims to establish a framework for the Business Continuity Maturity Model in the Banking Industry with a governance perspective.

The study utilized a risk-based approach and performance indicators through the balanced scorecard method [23]. The Balanced Scorecard serves as an integrated measurement framework, structured across four perspectives—financial, customer, internal business processes, and learning and growth—to strengthen the governance perspective in assessing business continuity maturity.

State-of-the-art Business Continuity Maturity Models in the banking industry highlight the need for more comprehensive frameworks that integrate governance perspectives and risk-based approaches. This study seeks to address that gap by proposing an enhanced framework that builds upon existing models from prior research, including Rai and Mohan's Business Continuity Model Reality Check for Banks in India [24]; Randeree, Mahal, and Narwani's Business Continuity Maturity Model for banking sector in the UAE based on CMMI [25]; Pinto's general maturity model based on ISO 22301 process approach [21]; and Russo's model integrating ISO 22301, NFPA 1600, CMMI V2.0, COBIT 2019, ITIL V4 known as a framework for the multidisciplinary assessment of organizational maturity on business continuity management [4], [19], [20], [22].

By integrating a governance perspective with multidimensional performance indicators through the Balanced Scorecard approach, the proposed framework is designed to strengthen organizational capabilities, particularly in the banking sector, in sustaining business continuity. This advancement is expected to enhance the maturity level of business continuity practices, thereby reinforcing overall organizational resilience and strengthening stakeholder trust.

2. Material and method

This study has the goal of developing a Business Continuity Maturity Model for the banking industry in the future, as shown in Fig. 1. The development of the Business Continuity Maturity Model framework from various perspectives is critical, with governance being the primary focus of this study. The development of the Business Continuity Maturity Model from a governance perspective aims to identify factors that influence organizational governance, which subsequently impacts the overall Business Continuity Maturity Model for the banking industry.

This study employs qualitative surveys through focus group discussions (FGDs) with selected experts to explore the organizational context, particularly factors—both internal and external—that influence business continuity, as illustrated in Fig. 2. Participants in this study were recognized experts in Business Continuity Management (BCM) and risk management functions, representing three state-owned banks, one of the largest private banks, and two regional development banks in Indonesia.

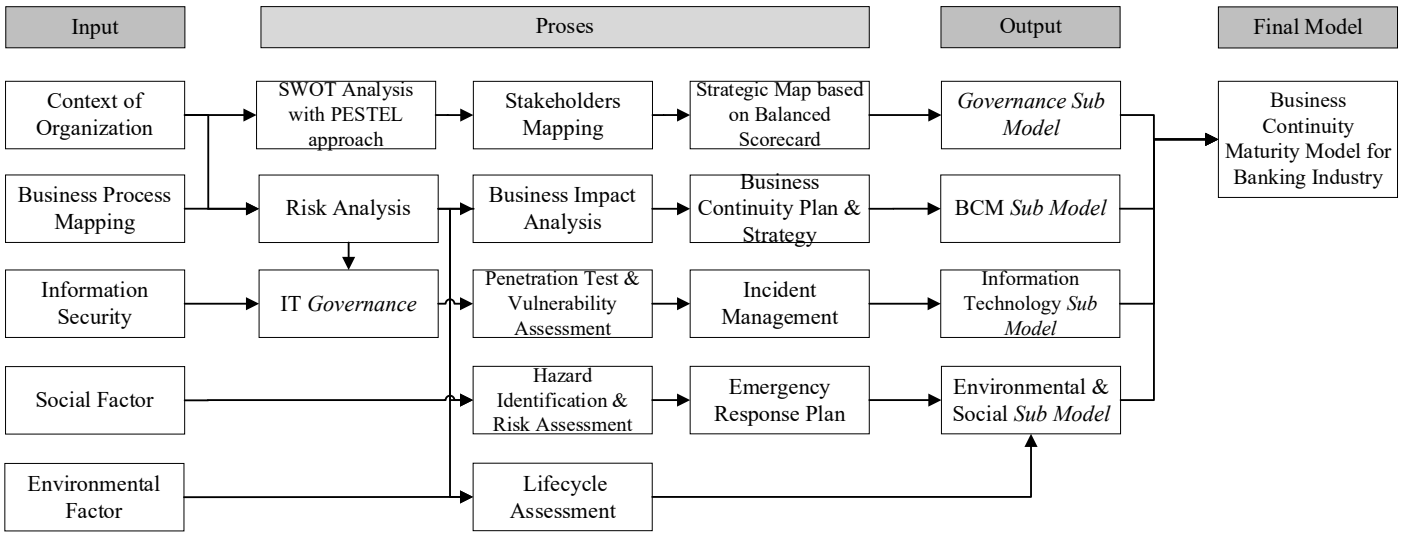

Fig. 1. Conceptual business continuity maturity model.

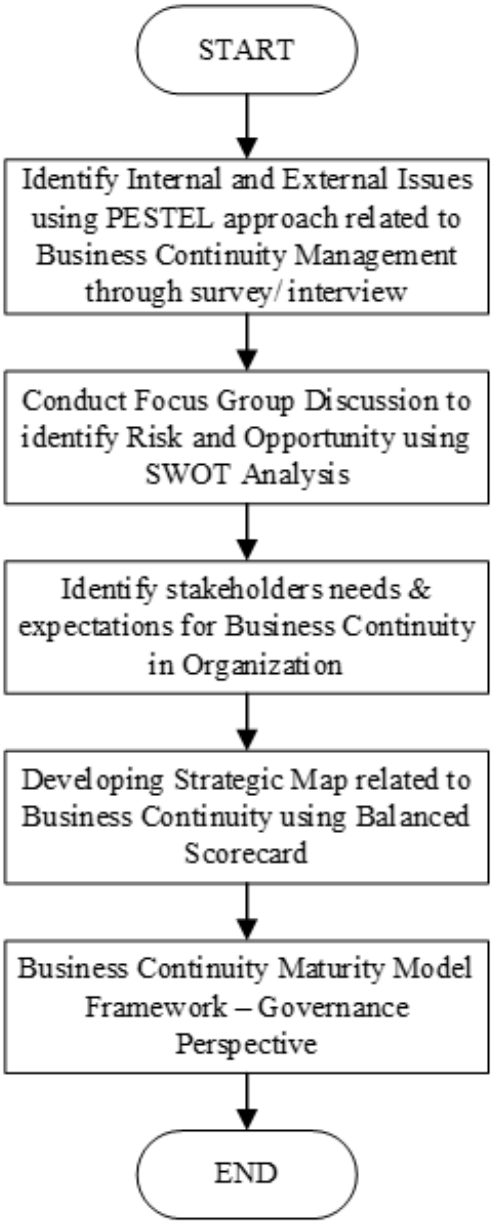

Fig. 2. Research methodology.

The selection process emphasized multidisciplinary expertise, with participants actively engaged in professional roles related to BCM, Information Technology, Risk Management, and Strategic Planning. To ensure methodological rigor and minimize potential bias, the inclusion criterion required participants to hold at least a senior managerial position, thereby guaranteeing both the relevance of expertise and the strategic perspective necessary for the research objectives.

Based on the survey results, the first iteration of the research involved an initial analysis using the Political, Economic, Social, Technological, Environmental, and Legal (PESTEL) approach, followed by focus group discussions to identify risks and opportunities. These risks and opportunities were further examined through Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis [26], [27], which served to identify governance factors influencing business continuity and organizational resilience.

The second iteration focused on stakeholder analysis to determine the needs, expectations, and requirements of relevant stakeholders. This stage ensured that governance parameters were aligned with stakeholder interests and regulatory obligations, thereby reinforcing accountability and transparency in business continuity practices.

In the third iteration, the Balanced Scorecard (BSC) approach was applied [23] through the development of a strategy map, integrating the findings from the previous stages. The BSC framework facilitated the formulation of performance indicators across four perspectives: financial performance, customer and stakeholder perspective, internal business processes, and employee awareness and competency related to business continuity and organizational resilience [28]. The performance index derived from this approach reflects the organization's maturity level in sustaining business continuity and resilience, ultimately supporting growth and long-term development.

3. Results and discussions

3.1. PESTEL & SWOT analysis

In the initial stage of the research, respondents representing state-owned banks, national private banks, regional development banks, and people's credit banks were involved in identifying issues that could potentially affect the implementation of Business Continuity. This identification process employed the PESTEL approach (Political, Economic, Social, Technological, Environmental, Legal) to ensure systematic and comprehensive exploration of relevant issues, as summarized in Table 1. The political dimension reflects geopolitical conditions, which are closely linked to legal aspects, particularly regulations that safeguard business continuity. Economic factors are associated with broader economic developments and are often interrelated with social conditions. Technological advancements and digitalization play a critical role in business continuity, especially in the banking industry, where nearly all core processes depend on information technology. Finally, environmental considerations are essential to ensure that organizational activities generate sustainable impacts over the long term. Internal issues are identified by considering the organization's values, culture, knowledge, organizational performance, strategies to achieve policies/goals, resources and expertise, standards, guidelines, models adopted, and information systems & technology. External issues are identified by considering changes or the emergence of regulation, technological advancements, market competition, global economic situation changes, cultural factors, and social environments at the international, national, regional, and local levels, competition, events that may affect the organization's reputation, and technological changes.

This study was subsequently extended with a SWOT analysis, which identified positive and negative issues based on the outcomes of the PESTEL assessment. Positive issues are interpreted as opportunities, represented through the Strengths and Opportunities dimensions, while negative issues or risks are reflected in Weaknesses and Threats. As shown in Table 2, the SWOT analysis was conducted by considering multiple factors, including the organization's vision, mission, objectives, and core business operations, particularly within the banking industry context. By systematically identifying both external and internal issues through a SWOT approach tailored to the organizational context [29], [30], the organization's capacity to achieve the intended objectives of business continuity management implementation can be significantly strengthened.

Table 1
Internal and external issues in the banking industry.

No	Issues
1	Internal: Awareness of business actors regarding BCM (I.1)
2	Internal: BCM procedures/business processes (I.2)
3	Internal: Provision and Management of Facilities Related to BCM (I.3)
4	Internal: Conducting disruption simulations (I.4)
5	External: Disruptions (E.1)
6	External: Surrounding environmental conditions influenced by social, geopolitics, and economic issues (E.2)
7	External: Dominance of digitalization and information technology (E.3)
8	External: Competitive business environments and strategic alliances (E.4)

Table 2
SWOT analysis based on issues in banking industry.

Issue	Risks (R) [Weakness /Threat]	Opportunities (OP) [Strength/ Opportunity]
1	Organizations are unaware of potential disruptions, leading to unpreparedness for crises (R.1)	Increase awareness of BCM implementation by involving internal and external stakeholders as needed (OP.1)
2	Organizations are unprepared with alternative business processes in the face of disruptions (R.2)	Enhance business processes during disruptions (OP.2)
3	Poor facility conditions can hinder the response to disruptions (R.3)	Develop facility maintenance programs according to the BC Plan, DR Plan, and Risk Threat Assessment follow-ups (OP.3)
4	Personnel do not understand what to do during disruptions (R.4)	Develop disruption simulation plans according to organizational scenarios and needs (OP.4)
5	Disruptions to organizational operations can lead to losses and customer attrition (R.5)	Optimize disruption handling by involving relevant internal and external stakeholders as needed (OP.5)
6	Disruptions to organizational operations lead to losses due to surrounding conditions (R.6)	Optimize handling of potential disruptions by involving relevant stakeholders who can monitor social, political, and economic conditions (OP.6)
7	Operational activities may be disrupted or halted due to technological disruptions, resulting in service failures, acquisition failures, and customer loss (R.7)	Optimize handling of potential disruptions by establishing a Disaster Recovery Center and Business Resumption Site (OP.7)
8	NA	Collaborate with other banks to mutually utilize facilities as Business Resumption Sites (OP.8)

Table 3
Stakeholder analysis in banking industry.

No	Interested Parties (IP)	Needs	Expectations
1	Shareholders (IP.1)	BCM's strategy to maintain organizational profitability	Regular monitoring of target achievements
2	Government (IP.2)	Compliance with laws and regulations	Active involvement in regulatory compliance, especially concerning business continuity
3	Customer (IP.3)	Consistent and reliable banking operations	Clear communication and coordination during disruption/disaster
4	Communities (IP.4)	Impact positively on the surrounding community	Clear communication and coordination during disruption/disaster
5	Management (IP.5)	Good performance, Achieve organizational objectives, secure and conducive operations, and good reputation	Clear communication and coordination during disruption/disaster
6	Employees (IP.6)	Good performance, Achieve organizational objectives, health & safety assurance	Clear communication and coordination during disruption/disaster
7	Business Partners (IP.7)	Continuity of business operations	Support during disruption/disaster situations

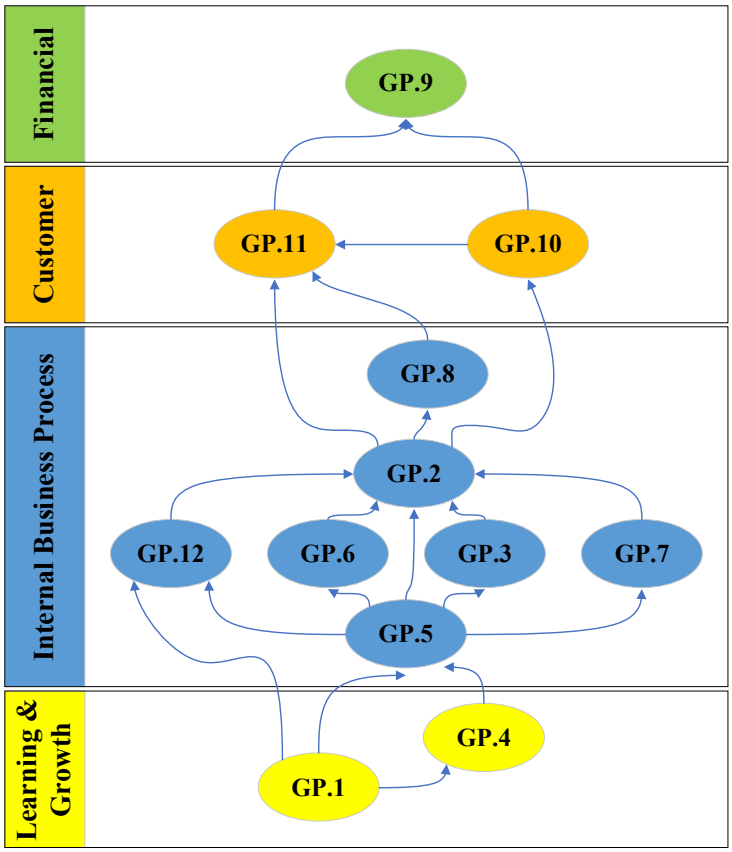

Fig. 3. Strategy map for governance parameters.

3.2. *Stakeholder analysis*

Besides PESTEL and SWOT analysis, the organization must identify stakeholders' needs, expectations, and requirements relevant to implementing business continuity [19], [29]. The identification of stakeholders' needs and expectations was based on interviews with practitioners in the banking industry, focusing on determining who the relevant stakeholders are, as well as what needs must be fulfilled and what expectations should be met to further enhance stakeholder satisfaction, as presented in Table 3. This identification process is essential to illustrate a good governance perspective in ensuring the continuity of the banking industry while considering the interests of various relevant stakeholders.

3.3. *Governance indicators based on Balanced Scorecard*

Following the SWOT analysis and the identification of stakeholder needs and expectations, parameters influencing business continuity in banking were developed using the Balanced Scorecard (BSC) approach.

Table 4
Governance parameters for business continuity maturity in the banking industry.

Issues No.	Interest Parties (IP) No.	Governance Parameters (GP)
I.1	IP.1-IP.7	Socialization of the Business Continuity Management System (GP.1)
I.2	IP,2, IP.3, IP.5, IP.6	Strategy and business process improvement related to Business Continuity (GP.2)
I.3	IP.5, IP.6	Facility availability according to Business Continuity Strategy (GP.3)
I.4	IP.2, IP.5, IP.6	Disruption simulations periodically (GP.4)
I.5	IP.2, IP.5, IP.6	Manage and evaluate disruptions periodically (GP.5)
I.6	IP.2, IP.5, IP.6, IP.7	Identify potential disruptions through relevant stakeholders and manage disruptions according to responsibilities & authorities (GP.6)
I.7	IP.2, IP.5, IP.6	Periodic IT Disaster Recovery tests, technology emergency response drills, including manual process implementation trials (GP.7)
I.8	IP.1, IP.5, IP6, IP.7	Explore partnerships with other banks for collaboration or strategic alliance (GP.8)
-	IP.1	BCM strategy to maintain organization profitability (GP.9)
-	IP.2	Compliance with laws and regulations (GP.10)
-	IP.2, IP.3, IP.4	Good reputation (GP.11)
-	IP.6	Health and safety assurance during disruption (GP.12)

As part of the third iteration of the Focus Group Discussion (FGD), industry experts validated indicators across four perspectives—financial, customer, internal business processes, and learning & growth. This approach enabled the systematic mapping of interrelationships among parameters, consistent with the maturity model methodology applied in COBIT 2019 [31], [32]. The outcomes of this iteration are presented in a strategy map as seen in Fig. 3.

The Balanced Scorecard was employed as a structured framework to operationalize governance perspectives (GP.1–GP.12) in assessing business continuity maturity. From the financial perspective, organizational sustainability is evaluated through shareholder value and disruption-related losses (GP.9), with financial indicators linked to recovery time and reputational effects on customer trust. The customer perspective emphasizes reputation as a critical lagging indicator (GP.11), where compliance with laws and regulations (GP.10) directly influences customer confidence and regulatory trust. The internal business process perspective incorporates leading indicators, including periodic disruption management and evaluation (GP.5), business process improvements aligned with continuity strategies (GP.2), facility availability (GP.3), stakeholder and third-party engagement (GP.6), occupational health and safety during disruptions (GP.12), IT disaster recovery testing, emergency response drills, and manual process trials (GP.7), as well as collaboration with partner institutions to ensure continuity (GP.8). Finally, the learning and growth perspective focuses on awareness-building through the socialization of the Business Continuity Management System (GP.1) and regular disruption simulations (GP.4), which reinforce organizational preparedness and adaptive capacity. Collectively, this BSC-based framework integrates governance principles into measurable indicators, strengthening methodological rigor in evaluating business continuity maturity in the banking sector. Table 4 shows the critical key parameters.

3.4. Managerial implications

The research findings indicate that the Balanced Scorecard method can support effective organizational governance by ensuring that Business Continuity Management is implemented within a systematic framework. Therefore, it is crucial to confirm that all existing business continuity performance indicators serve as governance parameters for the organization when conducting its business operations.

4. Conclusions

This study demonstrates that the Balanced Scorecard, when combined with SWOT analysis using the PESTEL and Stakeholder Analysis approaches, provides an effective framework for identifying governance parameters essential to the systematic implementation of Business Continuity Management (BCM). Twelve key parameters were identified as critical to the Business Continuity Maturity Model, including financial impact, organizational reputation, regulatory compliance, responsibilities and authorities, awareness, policy and procedure completeness, and continuous capability enhancement through simulations and testing.

The integration of these parameters within a strategy map highlights their interconnections and reinforces the importance of cohesive governance mechanisms in advancing BCM maturity. The strategy map further serves as a practical tool to guide organizations in strengthening resilience and ensuring continuity of operations in the banking sector.

Future research may expand this framework by exploring additional perspectives, such as information technology, social, and environmental dimensions, in line with emerging challenges in digitalization and sustainability. Further work could also define maturity levels, develop assessment criteria, and design tools to support organizational self-assessment of business continuity maturity.

CRediT author statement

Indryadi Hardi: Conceptualization, Methodology, Collecting data, Writing-Original Draft. **Rina Fitriana**: Writing-Review & Editing. **Dadan Umar Daihani, Juniati Gunawan**: Resources, Validation, Formal Analysis.

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Data availability statement

The authors confirm that the data supporting the findings of this study are available within the article or its supplementary materials.

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