



Inherent Risk, Residual Risk, and Risk Appetite: A Case Study of Kipang Kurnia Sari MSMEs in West Sumatra

Elfita Bunga Hati¹, Fathia Meiza Aulia², Fathur Rahman³

^{1,2,3}) Islamic Business Management, UIN Mahmud Yunus Batusangkar, Batusangkar, Indonesia

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Abstrak

Manajemen risiko pada Usaha Mikro, Kecil, dan Menengah (UMKM) sering kali bersifat reaktif dan tidak terstruktur, sehingga potensi kerugian yang dapat diprediksi menjadi ancaman nyata terhadap keberlangsungan usaha. Penelitian ini menganalisis penerapan konsep *inherent risk*, *residual risk*, dan *risk appetite* pada UMKM Kipang Kurnia Sari, sebuah usaha yang memproduksi *kipang*, makanan tradisional khas Sumatera Barat. Penelitian ini menggunakan pendekatan studi kasus deskriptif kualitatif yang didukung oleh penilaian risiko semi-kuantitatif berdasarkan skala *Likelihood* (L) dan *Impact* (I). Hasil penelitian mengidentifikasi enam risiko utama, dengan penurunan penjualan musiman sebagai risiko yang memiliki skor *inherent risk* tertinggi (9). Setelah penerapan pengendalian yang telah ada, lima dari enam risiko yang teridentifikasi berhasil diturunkan hingga berada dalam batas *Risk Tolerance Limit* (RTL) yang telah ditetapkan (*residual risk* ≤ 4). *Risk appetite* UMKM ini diklasifikasikan sebagai konservatif, yang mencerminkan keterbatasan sumber daya keuangan serta tingginya ketergantungan terhadap pemilik usaha. Temuan penelitian ini menegaskan perlunya formalisasi sistem manajemen risiko melalui penyusunan *Standard Operating Procedures* (SOP) secara tertulis serta penguatan lini pertahanan ketiga dalam kerangka *Three Lines of Defence*.

Kata kunci: *inherent risk*; *residual risk*; *risk appetite*; manajemen risiko; usaha mikro, kecil, dan menengah (UMKM).

Abstract

Risk management in Micro, Small, and Medium Enterprises (MSMEs) is often reactive and unstructured, making foreseeable losses a significant threat to business continuity. This study analyzes the application of the concepts of inherent risk, residual risk, and risk appetite in Kipang Kurnia Sari, an MSME producing kipang, a traditional snack from West Sumatra. A qualitative descriptive case study approach was employed, supported by a semi-quantitative risk assessment based on Likelihood (L) and Impact (I) scales. Six major risks were identified, with seasonal sales decline exhibiting the highest inherent risk score (9). Following the implementation of existing control measures, five of the six identified risks were successfully reduced to within the established Risk Tolerance Limit (RTL) (residual risk ≤ 4). The MSME's risk appetite was classified as conservative, reflecting its limited financial resources and strong dependence on the business owner. These findings highlight the need to formalize the risk management system through the development of written Standard Operating Procedures (SOPs) and the strengthening of the third line of defence within the Three Lines of Defence framework.

¹E-mail: bungahati5905@gmail.com

²E-mail: fathameizaaulia@gmail.com

³E-mail: fathur@gmail.com

Keywords: *Inherent risk; residual risk; risk appetite; risk management; micro, small, and medium enterprises (MSMEs).*

1. INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) play a strategic role in Indonesia's economic structure. According to the Ministry of Cooperatives and MSMEs (2022), MSMEs contribute more than 60% of the national Gross Domestic Product (GDP) and employ approximately 97% of the country's workforce. This substantial contribution positions MSMEs not only as a complementary component of the economy but also as a key pillar of national economic resilience, particularly in the face of global economic shocks (Tambunan, 2021; Halik et al., 2026). Despite their significant economic contribution, however, MSMEs remain highly vulnerable to various structural challenges, one of the most critical being inadequate risk management practices.

Risk management among Indonesian MSMEs is generally characterized by informal and reactive approaches. Business owners often respond to risks only after problems have occurred rather than anticipating potential threats in advance. This situation is further exacerbated by limited financial resources, inadequate human capital, and insufficient technical knowledge of standardized risk management frameworks (Yakob et al., 2019). Consequently, many MSMEs are unable to withstand operational disruptions that could otherwise be mitigated through proactive risk management (Kurniawan, 2020). Furthermore, a study by Fatimah and Sari (2022) revealed that only approximately 23% of MSMEs in Java and Sumatra maintain formal written risk identification documents, while the majority continue to rely primarily on the intuition and experience of business owners when making operational decisions.

In this context, a comprehensive understanding of three fundamental risk management concepts, namely inherent risk, residual risk, and risk appetite, becomes essential. Inherent risk refers to the level of risk that exists before any control measures are implemented (Cohen et al., 2026). Residual risk represents the level of risk that remains after the implementation of control measures, whereas risk appetite reflects the level of risk an organization is willing to accept in pursuit of its strategic objectives (Zwietering et al., 2021). These concepts are closely interconnected and collectively provide the analytical foundation for designing an effective and proportionate risk management system (COSO, 2017; Standardization, 2018).

This study examines the case of Kipang Kurnia Sari, a traditional food MSME in West Sumatra that produces kipang, a traditional snack made from rice and corn. As a small enterprise operating in the food processing industry, the business is exposed to a wide range of operational risks, including fluctuations in raw material prices, production safety issues, equipment failures, and changes in market demand. Although risk management practices are implemented informally, the enterprise has established several operational control mechanisms that provide an opportunity to examine the practical application of modern risk management concepts within a real business setting.

The objectives of this study are fourfold: (1) to identify and analyze the inherent risks faced by Kipang Kurnia Sari MSMEs; (2) to evaluate the effectiveness of existing control measures and determine the corresponding level of residual risk; (3) to formulate an appropriate level of risk appetite based on the enterprise's operational conditions and organizational capacity; and (4) to propose practical and realistic risk mitigation strategies. By focusing on the unique characteristics of a traditional food MSME, this

study is expected to contribute to the development of risk management practices in Indonesia while providing practical insights for MSME practitioners and academic researchers.

Previous studies on MSME risk management have primarily focused on identifying operational and financial risks, evaluating the implementation of general risk management practices, or examining the adoption of ISO 31000 principles in small business environments (Kurniawan, 2020; Fatimah & Sari, 2022). These studies have consistently demonstrated that most MSMEs employ informal and reactive approaches to managing risks. However, the existing literature has paid limited attention to how different categories of risk are systematically assessed throughout the entire risk management process, beginning with inherent risk, followed by residual risk after the implementation of control measures, and ultimately culminating in the determination of organizational risk appetite. Consequently, the dynamic relationship among these three core concepts remains insufficiently explored, particularly within traditional food-processing MSMEs.

To address this gap, the present study provides an integrated case-based analysis that simultaneously evaluates inherent risk, residual risk, and risk appetite using a semi-quantitative risk assessment framework adapted to the operational characteristics of a traditional food MSME. Unlike previous studies that primarily describe risk identification or the general implementation of ISO 31000, this study demonstrates how these three concepts can be operationalized to support managerial decision-making, prioritize mitigation strategies, establish Risk Tolerance Limits (RTL), and evaluate organizational governance through the Three Lines of Defence framework. Accordingly, this study contributes to the existing literature by proposing an applied analytical model that translates established risk management concepts into practical guidance for resource-constrained MSMEs.

2. Literature Review

2.1 Risk Management and ISO 31000:2018 Framework

Risk management is defined as a systematic process of identifying, analyzing, assessing, and responding to risks that may hinder an organization from achieving its objectives (K. Lambe et al., 2025; Yakob et al., 2019). The ISO 31000:2018 standard defines risk management as a coordinated set of activities to direct and control an organization's response to risk (ISO, 2018). This standard emphasizes that risk management is not merely a technical tool but an integral component of effective organizational governance. Within the ISO 31000:2018 framework, the risk management process comprises the stages of establishing the context, risk identification, risk analysis, risk evaluation, risk treatment, and monitoring and review, all of which are implemented as a continuous and iterative cycle.

The implementation of this framework in MSMEs requires appropriate adaptation due to their limited resources and relatively simple organizational structures. Salim and Wahyuni (2021) reported that MSMEs adopting simple yet consistent risk management practices demonstrate greater business resilience than those that do not implement such practices. This finding suggests that the fundamental principles of risk management can be effectively applied to businesses of all sizes, provided that their implementation is tailored to the organization's specific context and operational capacity.

Previous empirical studies have consistently shown that the adoption of ISO 31000

principles enhances organizational resilience and strengthens risk awareness across various business sectors (Alijoyo & Norimarna, 2021; Qureshi, 2023). Nevertheless, most studies involving MSMEs have focused primarily on describing the implementation of the framework rather than evaluating the effectiveness of its individual risk management components. Consequently, empirical evidence demonstrating how ISO 31000 can be translated into practical risk assessment and managerial decision-making within resource-constrained traditional food MSMEs remains limited. This study addresses this gap by operationalizing the ISO 31000 framework through an integrated assessment of inherent risk, residual risk, and organizational risk appetite.

2.2 The Concept of Inherent Risk

Inherent risk refers to the level of risk that exists within an activity, process, or business environment before any control measures are implemented. The Committee of Sponsoring Organizations of the Treadway Commission (COSO, 2017) defines inherent risk as the level of risk to which an organization is exposed in the absence of any mitigating controls or interventions. Originally developed within the context of internal auditing, the concept has since become a fundamental component of enterprise risk management and corporate governance.

Inherent risk is commonly assessed by evaluating two primary dimensions: the likelihood of a risk occurring and its potential impact. These dimensions are typically measured using a five-point rating scale and presented in the form of a risk matrix or heat map (Sutherland et al., 2022). The inherent risk score is calculated by multiplying the Likelihood (L) score by the Impact (I) score, thereby generating an overall risk exposure score that facilitates risk comparison and prioritization (Darmawi, 2016). Although a high inherent risk score does not necessarily indicate unacceptable risk, it provides an important basis for determining where control measures and organizational resources should be prioritized.

Previous studies have generally employed inherent risk assessment to prioritize operational risks before implementing control measures. However, many of these studies conclude at the risk identification stage without examining whether the identified risks remain significant after mitigation measures have been implemented (Brustbauer, 2014; Crovini et al., 2021). Consequently, the practical value of inherent risk assessment in evaluating the effectiveness of risk controls remains insufficiently explored. This study addresses this limitation by integrating inherent risk assessment with residual risk evaluation to examine the actual effectiveness of existing control measures.

2.3 Concept of Residual Risk

Residual risk refers to the level of risk that remains after control measures or mitigation strategies have been implemented. This concept represents the actual level of risk exposure faced by an organization under normal operating conditions. According to Hanafi (2016), the difference between inherent risk and residual risk reflects the effectiveness of the internal control system. A smaller reduction from inherent risk to residual risk indicates less effective control measures, whereas a greater reduction suggests that the implemented mitigation strategies have been more effective.

Residual risk assessment involves re-evaluating the likelihood and impact of identified risks after existing control measures have been considered. Residual risks that exceed the organization's acceptable tolerance threshold require additional control

measures, whereas those that fall within the acceptable threshold require continuous monitoring (Hartmann et al., 2021). In practice, risks cannot be completely eliminated; therefore, effective risk governance aims to ensure that residual risks remain within the organization's acceptable level of risk tolerance (Susilo & Kaho, 2018).

Previous studies have acknowledged that residual risk reflects the effectiveness of internal controls; however, empirical applications of this concept in MSMEs remain relatively limited. Most existing studies discuss residual risk from a conceptual perspective without demonstrating how it can support managerial decision-making or the prioritization of mitigation strategies (Hartmann et al., 2021; Mouchantaf et al., 2021). In this study, residual risk is not only calculated but also evaluated against predetermined Risk Tolerance Limits (RTL), thereby providing a more practical assessment of organizational risk acceptability.

2.4 Risk Appetite and Risk Tolerance Limits

The Institute of Risk Management (IRM, 2011) defines risk appetite as the overall level of risk that an organization is willing to accept in pursuit of its strategic objectives. It reflects the organization's philosophy toward risk-taking and directly influences its organizational culture, strategic direction, and business practices. Establishing an appropriate level of risk appetite helps align business strategy with day-to-day risk management activities.

Risk appetite should be clearly distinguished from two closely related concepts: risk tolerance and risk capacity. Risk tolerance refers to the acceptable variation around a predetermined level of risk, whereas risk capacity represents the maximum level of risk that an organization can absorb without jeopardizing its operational sustainability or business continuity (Hartmann et al., 2021). Together, these three concepts form a complementary hierarchy that guides organizational risk management and decision-making. In the context of MSMEs, however, the explicit definition of risk appetite is often overlooked, despite its critical role in supporting strategic decisions, such as whether to pursue high-risk business opportunities or adopt a more conservative business strategy (Fahmi, 2020).

Although risk appetite has become a fundamental element of enterprise risk management, its application within MSMEs has received relatively limited scholarly attention. Existing studies frequently examine risk appetite from the perspective of corporate governance but rarely provide practical approaches for determining acceptable risk thresholds in small businesses operating with limited resources. This study addresses this limitation by operationalizing the concept through the establishment of a practical Risk Tolerance Limit (RTL) that reflects the operational capacity and financial constraints of a traditional food MSME.

2.5 Three Lines of Defence (3LoD)

The Three Lines of Defence (3LoD) is a governance framework that allocates risk management responsibilities across three complementary lines of defence. The first line consists of operational management, which is directly responsible for executing business processes and managing day-to-day operational risks. The second line comprises the risk management and compliance functions, which provide oversight, guidance, and support to the first line. The third line consists of the internal audit function or another independent assurance body that objectively evaluates the overall effectiveness of the organization's governance, risk management, and internal control systems (IIA, 2020).

Although the Three Lines of Defence framework was originally developed for large organizations, its underlying principles can be adapted to MSMEs according to their organizational characteristics and resource capacity. In MSMEs, the first line of defence is typically performed by operational employees, the second line by business owners or managers, and the third line through periodic, although often informal, review and evaluation mechanisms. Weaknesses in any of these lines of defence may create gaps in the overall risk governance system (Widjaja, 2019).

The Three Lines of Defence model has been widely discussed in the context of large organizations and financial institutions, where governance structures are generally well established. However, empirical studies examining its adaptation within MSMEs remain limited because these enterprises typically operate with simple organizational structures and overlapping managerial responsibilities. By applying the Three Lines of Defence framework to a traditional food MSME, this study demonstrates how its governance principles can be adapted to small business settings while still providing a practical framework for evaluating the effectiveness of organizational controls.

3. RESEARCH METHOD

3.1 Research Design

This study employed a qualitative single-case study design supported by a semi-quantitative risk assessment (Yin, 2018). The qualitative approach was selected because it enabled an in-depth exploration of risk management practices, organizational control mechanisms, and decision-making processes within a real-world business context. The semi-quantitative risk assessment was incorporated to systematically evaluate inherent and residual risks using Likelihood (L) and Impact (I) scales ranging from 1 to 5, thereby generating a measurable Risk Level score ($L \times I$).

3.2 Justification for the Single-Case Study

A single-case study was deliberately selected because Kipang Kurnia Sari represents a typical traditional food MSME operating with limited resources, informal management practices, and a high degree of dependence on the business owner. These characteristics make it an appropriate case for examining the implementation of risk management concepts under real operational constraints. The purpose of employing a single-case study was not to achieve statistical generalization but to obtain an in-depth understanding of organizational risk management practices within their natural setting. Accordingly, the findings are intended to support analytical generalization by providing theoretical and practical insights that may be transferable to traditional food MSMEs with similar organizational characteristics, operational processes, and resource constraints.

3.3 Sampling Strategy

Purposive sampling was employed to select participants with direct knowledge of operational activities and business decision-making (Memon et al., 2025). The participants consisted of the business owner and six operational employees who were actively involved in production and daily business operations. They were considered capable of providing comprehensive information regarding risk identification, existing control measures, and operational challenges.

3.4 Interview Protocol

Semi-structured interviews were conducted using an interview guide developed based on the ISO 31000:2018 risk management framework. The interview protocol covered four thematic areas: (1) identification of operational risks, (2) existing control measures, (3) decision-making related to acceptable risk levels, and (4) organizational governance and monitoring mechanisms. Open-ended questions enabled participants to elaborate on their experiences while ensuring consistency across interviews.

3.5 Interview Procedure

Each interview lasted approximately 45–60 minutes and was conducted face-to-face at the business premises. With the participants' consent, interviews were documented through field notes and audio recordings to facilitate accurate transcription and subsequent analysis.

3.6 Observation Procedure

Non-participant observation was conducted throughout the production process, including raw material storage, palm sugar processing, machine operation, packaging activities, and product distribution. The observations focused on identifying operational risks, evaluating existing control measures, documenting employee practices, and assessing workplace conditions. Observation findings were systematically recorded in structured field notes immediately after each observation session (Miles et al., 2021).

3.7 Data Analysis

Data were analyzed using a thematic analysis approach (Miles et al., 2021). Interview recordings were transcribed verbatim, while observation notes were compiled and reviewed repeatedly to facilitate data familiarization. Open coding was subsequently performed to identify meaningful statements related to operational risks, control mechanisms, governance practices, and organizational decision-making. Similar codes were then grouped into broader themes corresponding to the concepts of inherent risk, residual risk, risk appetite, and the Three Lines of Defence. Finally, the qualitative findings were integrated with the semi-quantitative risk assessment results to develop a comprehensive interpretation of the organization's risk profile.

3.8 Data Triangulation

Methodological triangulation was employed by combining semi-structured interviews and direct field observations. Source triangulation was also applied by comparing information obtained from the business owner with that provided by operational employees. Interview findings were subsequently verified through direct observation of production activities, workplace conditions, machine operations, raw material handling, and product distribution to ensure consistency across data sources (Miles et al., 2021; Sugiyono, 2020).

Whenever discrepancies emerged between interview responses and observational findings, follow-up questions were addressed to the participants to clarify the inconsistencies until a consistent interpretation was achieved. The final risk assessment was established only after sufficient convergence had been obtained between interview data and field observations.

No formal organizational documents were available because the enterprise operated informally as a traditional MSME. Consequently, data triangulation relied

primarily on the convergence of evidence obtained from interviews and direct observations.

3.9 Data Validation and Trustworthiness

The trustworthiness of the findings was established according to the criteria proposed by Fiantika et al. (2022), namely credibility, transferability, dependability, and confirmability. Credibility was enhanced through methodological and source triangulation, as well as member checking with the business owner. Transferability was strengthened by providing a rich description of the organizational context to enable readers to assess the applicability of the findings to similar settings. Dependability was ensured by maintaining comprehensive documentation of the research procedures and analytical decisions throughout the study. Confirmability was supported by preserving interview transcripts, field notes, coding records, and the audit trail to ensure that the findings were grounded in the collected data rather than researcher bias.

4. RESULTS AND DISCUSSION

4.1 Inherent Risk Profile of Kipang Kurnia Sari MSMEs

Based on semi-structured interviews and direct field observations, six major risks were identified across the production and marketing activities of Kipang Kurnia Sari. The inherent risk assessment was conducted using the predetermined Likelihood (L) and Impact (I) scales presented in **Table 1**.

Table 1. Risk Assessment Scale

Likelihood (L)	Impact (I)
1 = Very rare (almost never occurs)	1 = Very low (no significant impact)
2 = Rare (occurs once every few years)	2 = Low (minor losses that are easily recoverable)
3 = Occasional (occurs several times per year)	3 = Moderate (significant losses requiring management attention)
4 = Frequent (occurs almost every month)	4 = High (substantial losses disrupting business operations)
5 = Very frequent (occurs almost every week)	5 = Critical (threatening business continuity)

Using the above assessment criteria, the inherent risk profile of Kipang Kurnia Sari was established before considering the effectiveness of any existing control measures.

The likelihood and impact scores were not assigned arbitrarily but were determined through the triangulation of evidence obtained from semi-structured interviews with the business owner and operational employees, direct field observations, and a review of available operational records. The likelihood score reflected the estimated frequency of each risk event based on participants' experiences during recent business operations, whereas the impact score represented the perceived operational and financial consequences of each event for production continuity, product quality, and overall business performance. Final scores were determined through a consensus-based evaluation of all available evidence to minimize subjective judgment.

Each identified risk was included in the final risk register only after similar information had been consistently reported by multiple participants and subsequently verified through direct observation of operational activities. This triangulation process reduced the likelihood that individual perceptions would disproportionately influence the final risk assessment, thereby enhancing the credibility and reliability of the assessment results.

Table 2. Risk Register and Inherent Risk Assessment

Risks	Causes	L I	Inherent Risk (L × I)	Level
Blowing machine explosion	Failure to monitor the ampere indicator	2 4	8	Medium
LPG gas explosion	Gas hose leakage	1 4	4	Low
Increase in raw material prices	Shortage of raw materials	1 2	2	Low
Burnt palm sugar	Negligence during the cooking process	3 2	6	Medium
Buyer fraud	Goods shipped before payment is received	2 3	6	Medium
Seasonal decline in sales	Reduced consumer demand during certain seasons	3 3	9	High

Table 2 presents the inherent risk profile of Kipang Kurnia Sari prior to the implementation of any additional control measures. Among the six identified risks, seasonal decline in sales recorded the highest inherent risk score (9), indicating the enterprise's substantial dependence on seasonal market demand. This was followed by the risk of a blowing machine explosion (score = 8), which, although relatively infrequent (L = 2), could result in severe operational consequences (I = 4). Two other risks, namely burnt palm sugar and buyer fraud, each obtained an inherent risk score of 6 and were therefore classified as medium-level risks. However, these risks exhibited different characteristics. Burnt palm sugar was primarily associated with a higher likelihood of occurrence (L = 3) because it could recur during routine production activities, whereas buyer fraud reflected a lower frequency but greater financial consequences.

The assigned likelihood and impact scores were derived from empirical evidence collected during fieldwork rather than from researcher judgment alone. For example, seasonal decline in sales received a likelihood score of 3 because participants consistently reported that demand decreased during several recurring periods each year, particularly after major festive seasons, but did not occur on a monthly basis. Accordingly, the event was classified as occasional rather than frequent. Its impact was assigned a score of 3 because reduced sales decreased revenue and production volume without posing an immediate threat to business continuity.

Similarly, buyer fraud received an impact score of 3 because the resulting financial losses generally involved individual transactions that could be absorbed without causing substantial operational disruption. In contrast, increases in raw material prices were assigned an impact score of 2 because the business owner typically responded by adjusting product prices or modifying purchasing schedules, thereby limiting their financial consequences. These assessments demonstrate that both the likelihood and

impact scores were determined on the basis of observed operational conditions and participants' experiences rather than arbitrary estimation.

These findings support the results reported by Kurniawan (2020), who found that traditional food MSMEs are particularly vulnerable to operational risks arising from manual production processes and fluctuations in seasonal market demand. The production activities of Kipang Kurnia Sari rely heavily on manual labor with minimal automation, thereby increasing exposure to human error and operational disruptions, a characteristic commonly observed among traditional food MSMEs in Indonesia.

The findings are also consistent with previous studies indicating that operational and market-related risks constitute the primary sources of vulnerability among traditional food MSMEs (Kurniawan, 2020; Salim & Wahyuni, 2021). Similar to these studies, the present research demonstrates that dependence on manual production processes increases the likelihood of operational errors, while fluctuating consumer demand generates considerable business uncertainty (Chakabva et al., 2021; Feng et al., 2023).

However, unlike previous studies that primarily identified these risks descriptively, the present study systematically quantifies their relative severity through inherent risk assessment and prioritizes them according to their operational significance. This approach provides a more objective basis for determining mitigation priorities within resource-constrained MSMEs.

Overall, the resulting risk matrix reflects the actual operational conditions of Kipang Kurnia Sari rather than hypothetical assumptions, thereby enhancing the credibility and practical applicability of the semi-quantitative risk assessment.

4.2 Control Effectiveness Analysis and Residual Risk

Following the identification of existing control measures, a reassessment was conducted to determine the level of residual risk. A comparison between inherent risk and residual risk is presented in **Table 3**.

Table 3. Comparison of Inherent Risk and Residual Risk

Risk	Existing Controls	L I	Inherent Risk	L I	Residual Risk
Blowing machine explosion	Employees closely monitor the ampere indicator	2 4	8	1 4	4
LPG gas explosion	Periodic inspection of gas hoses	1 4	4	1 3	3
Increase in raw material prices	Adjustment of product selling prices	1 2	2	1 1	1
Burnt palm sugar	Employees exercise greater care during the cooking process	3 2	6	2 2	4
Buyer fraud	Full payment is required before shipment	2 3	6	1 2	2
Seasonal decline in sales	Production is reduced to approximately 50% of normal capacity	3 3	9	2 3	6

Table 3 demonstrates that all six identified risks were reduced through the implementation of existing control measures. The greatest reduction occurred in buyer

fraud, where the risk score decreased from 6 to 2 following the consistent implementation of a prepayment policy. This finding illustrates how relatively simple but consistently applied control measures can substantially improve an organization's risk profile.

In contrast, the risk associated with seasonal decline in sales decreased only from 9 to 6 and therefore remained within the moderate-risk category. Although reducing production capacity was operationally appropriate, this control measure addressed only the consequences of declining demand rather than its underlying cause, namely the enterprise's dependence on a single local market characterized by seasonal purchasing patterns. This finding indicates that the effectiveness of a control measure depends not only on its ability to reduce the overall risk score but also on its capacity to address the underlying source of the risk.

Similarly, the risk of burnt palm sugar retained a relatively high residual likelihood ($L = 2$) compared with most other operational risks after the implementation of existing controls. This suggests that verbal instructions encouraging employees to be more careful are insufficient as a sustainable control measure. These findings support the argument of Susilo and Kaho (2018), who emphasized that behavior-based controls without formal written procedures tend to become inconsistent over time.

The substantial reduction in most residual risk scores is consistent with previous studies demonstrating that relatively simple internal control mechanisms can significantly improve operational resilience when implemented consistently (Susilo & Kaho, 2018). Nevertheless, the persistence of a moderate residual risk for seasonal sales decline indicates that operational controls alone are insufficient to address strategic market risks.

This finding extends previous research by demonstrating that different categories of risk require different mitigation strategies (Chakabva et al., 2021). Operational risks can often be mitigated through procedural improvements and strengthened internal controls, whereas market-related risks require broader strategic initiatives, including market diversification, product innovation, and digital marketing (K. H. P. Lambe & Halik, 2024; Yakob et al., 2019). Accordingly, residual risk assessment provides valuable information not only for evaluating the effectiveness of existing controls but also for identifying areas where more strategic interventions are required.

4.3 Determination of Risk Appetite and Risk Tolerance Limit

Based on its resource capacity, capital structure, and overall risk profile, Kipang Kurnia Sari was classified as having a **conservative risk appetite**. This assessment was based on three principal considerations: limited working capital with no substantial financial reserves, a high level of operational dependence on the business owner as the sole decision-maker, and the absence of formal risk transfer mechanisms, such as business insurance. Accordingly, the Risk Tolerance Limits (RTL) were established as presented in **Table 4**.

Table 4. Risk Tolerance Limits (RTL) and Risk Appetite of Kipang Kurnia Sari MSMEs

Risk Level	Category	Risk Attitude (RTL)	Required Actions
1–4	Low	Accept	Regular monitoring; no immediate mitigation required

5–8	Moderate	Reduce	Implement mitigation measures within 1–3 months
9–14	High	Reduce / Avoid	Immediate mitigation within one month
15–25	Extreme	Avoid / Transfer	Immediate response and escalation to the business owner

Source: Adapted from IRM (2011) and COSO (2017) according to the operational characteristics of the business.

Based on the established RTL, the evaluation indicated that five of the six identified risks (83%) fell within the organization's acceptable risk tolerance (residual risk ≤ 4). The only risk exceeding the established tolerance limit was the seasonal decline in sales, which retained a residual risk score of 6 and therefore requires additional mitigation within the next one to three months.

The conservative risk appetite identified in this study is also consistent with the principles of Islamic risk management, which emphasize prudence (*ihtiyāt*) in business decision-making. From the perspective of Islamic economics, risk acceptance should remain proportional to an organization's capacity to bear potential losses while avoiding *gharar* (excessive uncertainty) that may create injustice or harm to stakeholders (Fahmi, 2020).

The findings are consistent with previous studies indicating that family-owned MSMEs generally adopt conservative risk attitudes because of limited financial resources and strong dependence on owner-manager judgment (Raharja et al., 2022). Such conditions encourage business owners to prioritize business continuity and financial stability over aggressive expansion or high-risk investment decisions (Jansen et al., 2021).

However, this study extends the existing literature by translating the abstract concept of risk appetite into a practical Risk Tolerance Limit (RTL) that can be readily applied in MSME operations. Rather than serving merely as a theoretical concept, the RTL provides a practical decision-making tool that enables business owners to evaluate whether residual risks remain within acceptable operational boundaries and to prioritize mitigation efforts according to their available resources. This operationalization contributes to the practical implementation of Enterprise Risk Management in resource-constrained MSMEs.

4.4 Analysis of the Three Lines of Defence in Kipang Kurnia Sari MSMEs

The structural analysis of organizational controls using the Three Lines of Defence (3LoD) framework reveals an uneven distribution of governance responsibilities across the three lines of defence. The first line, consisting of six operational employees, performs day-to-day control activities reasonably well by monitoring machine operations, overseeing production processes, and implementing the prepayment policy for customers. However, these control activities remain largely informal and are not supported by written Standard Operating Procedures (SOPs). Consequently, their effectiveness depends heavily on the individual awareness, experience, and discipline of employees, creating the potential for inconsistent implementation over time.

The second line of defence is performed by the business owner, who simultaneously serves as manager, supervisor, and primary decision-maker. This role includes monitoring equipment conditions, evaluating operational performance, and making strategic production decisions. Although these oversight activities contribute to

effective operational control, they also create a significant concentration risk because the effectiveness of the entire governance system depends largely on a single individual. Consequently, the temporary absence or reduced involvement of the owner could substantially weaken the organization's overall control environment.

In contrast, the third line of defence, which ideally consists of an independent assurance or internal audit function, is virtually absent. The enterprise does not maintain formal risk registers, incident reports, or scheduled evaluations of risk management practices. As a result, organizational learning from previous risk events occurs in an informal and unsystematic manner. Without an effective third line of defence, the organization lacks an independent mechanism for evaluating whether existing control measures remain effective or require improvement.

These findings partially support previous studies reporting that governance structures in MSMEs are considerably less formal than those of larger organizations. Similar to previous research, the first and second lines of defence functioned reasonably well through direct operational supervision and active owner involvement. However, the absence of an independent third line of defence highlights a persistent governance limitation commonly observed in small businesses (Chakabva et al., 2021).

This condition can largely be explained by the organizational characteristics of traditional MSMEs, including limited financial resources, simple organizational structures, and overlapping managerial responsibilities, all of which make the establishment of formal internal audit functions impractical. Rather than replicating governance structures designed for large organizations, MSMEs require governance models that are proportionate to their organizational scale and operational capacity.

The present study extends the existing literature by demonstrating that the Three Lines of Defence framework can be effectively adapted, rather than directly replicated, within traditional food MSMEs. Although the third line of defence may not take the form of a formal internal audit function, periodic independent reviews, documented operational evaluations, and systematic risk monitoring can provide practical assurance mechanisms that strengthen organizational governance without imposing excessive administrative burdens. These findings contribute to the growing body of literature on governance adaptation for resource-constrained MSMEs.

4.5 Priority Mitigation Recommendations

Based on the overall findings, three priority mitigation recommendations are proposed. These recommendations are sequential, mutually reinforcing, and designed to improve the effectiveness of risk management within Kipang Kurnia Sari MSMEs.

First, the risk associated with seasonal sales decline should be reduced through market diversification strategies. This may be achieved by developing online sales channels through e-commerce platforms such as Tokopedia and Shopee, introducing smaller and more affordable product packaging, and implementing social media-based pre-order programs. These initiatives are expected to expand market reach beyond local seasonal demand patterns and reduce dependence on traditional sales channels. The residual risk score for seasonal sales decline, currently assessed at 6, is expected to decrease to below the Risk Tolerance Limit ($RTL \leq 4$) within two to three months, provided that these strategies are implemented consistently.

Second, existing control measures should be formalized through the development of written Standard Operating Procedures (SOPs) for critical operational activities, particularly machine and gas safety inspections and the palm sugar cooking process.

These SOPs do not need to be complex; a concise one-page document containing step-by-step procedures and daily checklists would be sufficient. Formalizing operational controls would strengthen the first line of defence, improve process consistency, reduce human error, and enhance alignment with Good Manufacturing Practice (GMP) principles.

Third, the third line of defence should be strengthened through the implementation of a simple periodic risk monitoring system. Business owners may utilize the existing risk register as an evaluation tool, document risk events as they occur, and regularly update residual risk assessments. A quarterly review process requiring approximately one hour every three months would provide a practical mechanism for organizational learning and continuous improvement without imposing additional financial burdens.

Collectively, these recommendations demonstrate that effective risk management in MSMEs does not necessarily require complex systems or substantial financial investment. Instead, relatively simple, low-cost, and context-appropriate measures can significantly improve organizational resilience, strengthen governance practices, and support business sustainability.

4.6 Theoretical and Practical Implications

The findings of this study demonstrate that effective risk management in MSMEs should be understood as a continuous and integrated process encompassing risk identification, risk assessment, control effectiveness evaluation, organizational risk appetite, and governance mechanisms. Unlike many previous studies that examine these components separately, this research integrates the concepts of inherent risk, residual risk, risk appetite, and the Three Lines of Defence within a single analytical framework adapted to the operational context of a traditional food MSME. Consequently, the study extends the Enterprise Risk Management (ERM) literature by illustrating how the principles of ISO 31000 can be operationalized through a practical and context-specific risk management model for resource-constrained MSMEs.

From the perspective of ISO 31000 implementation, the findings demonstrate that internationally recognized risk management principles can be effectively adapted to small enterprises without requiring complex organizational structures or sophisticated management systems. The study further contributes to the literature on MSME governance by showing that the Three Lines of Defence framework should be adapted rather than directly replicated in small businesses. In this context, governance effectiveness depends on proportional organizational arrangements that reflect the operational capacity and resource limitations of MSMEs.

From a practical perspective, this study provides a structured approach that MSME owners can readily implement to strengthen organizational risk management. The proposed use of simple risk registers, Risk Tolerance Limits (RTL), written Standard Operating Procedures (SOPs), and periodic risk monitoring offers practical governance mechanisms that improve risk awareness, support managerial decision-making, and enhance organizational resilience without imposing substantial financial or administrative burdens. These findings provide practical guidance for traditional food MSMEs seeking to strengthen governance while maintaining operational flexibility under resource constraints.

5. CONCLUSION

This study demonstrates that the concepts of inherent risk, residual risk, and risk appetite are not only applicable to large organizations but can also be effectively implemented in traditional food MSMEs, as evidenced by the case of Kipang Kurnia Sari. Four principal findings emerged from the study.

First, the inherent risk profile of Kipang Kurnia Sari is dominated by operational and market-related risks, with seasonal sales decline representing the highest inherent risk (score = 9). This finding indicates that dependence on manual production processes and seasonal local demand constitutes the primary source of business vulnerability.

Second, the existing control measures substantially reduced overall risk exposure, with five of the six identified risks (83%) falling within the established Risk Tolerance Limit (RTL). Nevertheless, the effectiveness of these controls remains constrained by their informal nature, as most operational practices rely on individual experience rather than documented Standard Operating Procedures (SOPs).

Third, the MSME demonstrates a conservative risk appetite, reflected in the adoption of a residual risk threshold of $RTL \leq 4$. This risk tolerance is consistent with the enterprise's limited financial resources, high dependence on owner-centered decision-making, and prudent risk management principles.

Fourth, the analysis of the Three Lines of Defence (3LoD) revealed that the first and second lines of defence function reasonably well, whereas the third line of defence remains largely absent. Consequently, the organization's governance system lacks an independent mechanism for evaluating the effectiveness of existing controls and promoting continuous organizational learning.

This study offers several theoretical contributions to the risk management literature. First, it extends the Enterprise Risk Management (ERM) perspective by demonstrating that inherent risk, residual risk, risk appetite, and governance mechanisms should be understood as interconnected components of an integrated risk management process. Second, it contributes to the practical implementation of ISO 31000 by illustrating how its principles can be operationalized through a simplified semi-quantitative assessment framework tailored to resource-constrained MSMEs. Third, the study contributes to MSME governance by showing that effective governance depends on the systematic integration of risk assessment into managerial decision-making rather than on complex organizational structures alone. Finally, the findings extend the application of the Three Lines of Defence framework by demonstrating that its governance principles can be proportionately adapted to traditional MSMEs through simplified managerial roles, periodic risk monitoring, and structured operational controls.

This study has several limitations. First, the analysis was based on a single traditional food MSME; therefore, the findings are intended to support analytical rather than statistical generalization. The proposed framework is most applicable to small family-owned enterprises operating under similar organizational characteristics and resource constraints. Second, the study focused primarily on operational and market risks within a single business context. Future research should examine multiple MSMEs from different industrial sectors and geographical regions to evaluate the broader applicability of the proposed risk management framework and to further refine governance models for resource-constrained enterprises.

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