Tec Empresarial
P-ISSN: 1659-2395; E-ISSN: 1659-3359

Frameworks, Approaches, and Tools for Risk Identification in Microfinance Institutions: A Systematic Literature Review

Ifelda Nengsih[A], Aisyah Abdul Rahman[B*], Zaleha Yazid[C]

Abstract

The increasing complexity of financial risks and the acceleration of digital transformation have changed risk identification practices in Microfinance Institutions. Although the literature on risk management in this sector continues to grow, the existing studies remain fragmented across governance, technology, and social value and sustainability, lacking a comprehensive framework. Therefore, this systematic literature review aims to synthesize and critically evaluate the development of risk identification frameworks, approaches, and tools in Microfinance Institutions. Using the PRISMA procedure, 29 articles from five internationally reputable scientific databases were analyzed using thematic synthesis, yielding six main themes and 16 subthemes. The results of the study show a shift from the traditional credit risk assessment model to a multidimensional framework that integrates multi-criteria methods, artificial intelligence, fintech, blockchain, governance mechanisms, risk culture, and sustainability principles such as ESG and Sharia values. However, there are still research gaps in the dimensions of non-credit risk, including reputational risk and technology risk, as well as in aspects of socio-institutional dynamics, particularly in the context of developing countries. This study emphasizes the need to develop a more adaptive, contextual, and integrated risk identification model to strengthen risk management practices in Microfinance Institutions.

Keywords: *Frameworks, Approaches, Tools for Risk Identification, Microfinance Institutions.*

INTRODUCTION

Microfinance Institutions (MFIs) play a key role in expanding financial inclusion and helping low-income groups by offering small, high-risk, trust-based loans (Demirgüç-Kunt, 2016; Ledgerwood et al., 2013; Bharti N, 2022). These features make MFIs prone to several risks, including financing, operational, institutional, and external risks arising from the economy and regulations. In this setting, risk management acts as both an internal control and a strategic tool for stability and sustainability (Hopkin 2018; Al Astal et al. 2024).

[A]*Institute of Islam Hadhari, Universiti Kebangsaan Malaysia, Selangor, Malaysia, Email: p132848@siswa.ukm.edu.my*
[B]*Institute of Islam Hadhari, Universiti Kebangsaan Malaysia, Selangor, Malaysia,* ***Corresponding Author's Email****: eychah@ukm.edu.my*
[C]*Institute of Islam Hadhari, Universiti Kebangsaan Malaysia, Selangor, Malaysia, Email: leyha@ukm.edu.my*

Among all stages of risk management, risk identification is fundamental because it serves as the basis for risk analysis, evaluation, and control (The International Organization for Standardization, 2018). If institutions fail to identify risks comprehensively, key risks may go undetected, weakening the risk management system's effectiveness (Hopkin, 2018). In MFIs, risk identification is complex. It involves limited formal data, changing customer characteristics, and interactions between technical and institutional factors (Ledgerwood, Joanna; Earne, Julie; Nelson, 2013; Power, 2007).

Along with the development of the academic literature, various studies have proposed frameworks, approaches, and tools to support risk identification in MFIs. The framework serves as a conceptual structure for classifying and understanding the sources of risk, the approach reflects the methodological perspective used in the identification process, while the tool acts as an operational instrument in the practical implementation of risk identification (Anderson & Narasimhan, 1979; Power, 2007; Ostrom & Wilhelmsen, 2019). However, these findings remain scattered across various studies with diverse focuses, contexts, and methodologies, so they do not provide a comprehensive picture of the development of risk identification in MFIs.

Studies on risk identification in MFIs show rapid development as attention to financial inclusion and institutional stability increases. Various studies have examined the identification of risk from various perspectives, ranging from technical to institutional approaches, using different frameworks, approaches, and tools (Ledgerwood, Joanna; Earne, Julie; Nelson, 2013; Cull, R., Demirgüç-Kunt, A., & Morduch, 2016). However, the existing literature still shows a high level of fragmentation, both in terms of study focus and research methodology, making it difficult to produce comprehensive, structured knowledge synthesis. This condition leads to a partial and dispersed understanding of the development and pattern of risk identification in MFIs.

In this context, a Systematic Literature Review (SLR) is a necessary approach because it provides a systematic, transparent, and replicable synthesis of knowledge. Through a structured literature search and selection procedure, SLR allows researchers to objectively identify, evaluate, and integrate previous research findings (Tranfield & Denyer, 2003; Kitchenham, 2004; Xiao & Watson, 2019). Thus, this SLR is directed to comprehensively map the frameworks, approaches, and tools used in risk identification processes in MFIs, as well as to reveal patterns, trends, and research gaps relevant to the development of future studies and practices.

Although the study of risk identification in microfinance institutions has advanced, the literature still presents major conceptual and empirical problems. Most researchers focus on specific risk types, such as financing or operational risk, and often ignore the interconnectedness among risks and the broader institutional context (Ledgerwood, Joanna; Earne, Julie; Nelson, 2013; Hopkin, 2018). Also, many studies treat risk identification as a secondary part of risk

management, so its processes, frameworks, and tools are not studied in depth (Ackermann et al., 2007; Massingham, 2010). This results in a fragmented understanding of risk identification practices in MFIs that have not been comprehensively developed.

Another problem that stands out is the lack of an integrated mapping that connects risk identification frameworks, approaches, and tools into a single, comprehensive synthesis. The existing literature generally addresses these three aspects separately with diverse methodological approaches and research contexts, making it difficult to draw generalizing or comparative conclusions (Power, 2007; Tranfield & Denyer, 2003). As a result, there are still gaps in studies on how risk identification frameworks, approaches, and tools complement and evolve in the context of MFIs. This gap underscores the need for studies that systematically synthesize the literature to provide a more structured and comprehensive picture.

Traditional literature reviews are generally narrative and descriptive, so they rely heavily on the researcher's subjectivity in selecting, interpreting, and synthesizing the literature. This approach is often not supported by transparent, well-documented literature search and selection procedures, making it difficult to replicate and potentially biasing the presentation of research findings (Tranfield, 2003; Kitchenham, 2004). In addition, traditional literature review tends to provide a partial overview of the development of a field of study because it is unable to systematically map the patterns, trends, and research gaps spread across various studies (Chaomei Chen, 2017; Azarian, M., Yu, H., Shiferaw, A. T., & Stevik, 2023). These limitations make traditional approaches inadequate for addressing the need for comprehensive, evidence-based knowledge synthesis, especially in the study of risk identification in ikro financial institutions, which have a diverse and fragmented literature.

Systematic Literature Review (SLR) excels because it has a systematic, transparent, and replicable procedure. The process is structured, starting with the formulation of study questions, literature review strategies, and inclusion and exclusion criteria, to the process of assessing the quality of articles, so as to allow the synthesis of research findings objectively and evidence-based (Tranfield, 2003; Kitchenham, 2004; Xiao & Watson, 2019). This system can comprehensively map research patterns and trends and also identify study gaps that have not been widely explored in the literature. In the context of risk identification in MFIs, SLR is highly relevant because it can integrate frameworks, approaches, and tools from diverse studies, yielding a more structured, in-depth understanding that serves as a basis for future research and practice.

Previously, SLRs generally focused on the performance, sustainability, or risk management practices of MFIs; this SLR specifically focused on the risk identification process as the initial foundation of risk management. This SLR not only reviews risks by type and impact, but also systematically maps and integrates the frameworks,

approaches, and tools used to identify risks in MFIs. By covering studies across methodologies and diverse research contexts, this SLR provides a more comprehensive synthesis than previous studies that tend to be partial or thematic. This approach allows this SLR not only to summarize the development of the literature but also to identify patterns, trends, and research gaps in a more structured manner, thereby providing a clear conceptual and methodological contribution to the development of risk identification studies in financial institutions.

Unlike previous studies that generally map MFI risk management in general or focus on one specific risk dimension (e.g., credit risk or operational risk), this SLR specifically focuses on risk identification as the foundational phase that determines the quality of the entire risk management cycle. The main novelty of this study lies in the effort to integrate three components that have often been discussed separately, namely; Frameworks, approaches, and analytical tools, into one integrated synthesis that explains how the three are interconnected, developed, and used to produce a more comprehensive risk identification process in MFIs.

In addition to mapping the development of the literature based on the main themes, this study offers a conceptual contribution in the form of an integrative map of risk identification that summarizes the mechanisms of linkages between (i) financing-based risk assessment models, (ii) strengthening risk governance and culture, (iii) data-based digital transformation and smart technology, (iv) integration of sharia, social and sustainability values, (v) resilience to crises and systemic risks, and (vi) the foundation of data quality, model validation, and regulatory compliance. This integrative map not only clarifies the basis for the evolution of risk identification in the microfinance space but also provides a more structured framework for developing adaptive, context-specific risk identification models, particularly in developing countries.

Based on the thematic synthesis of the 29 selected articles, this study further proposes an integrative framework for risk identification that places risk identification as a socio-technical process influenced by three main layers: (1) technical-analytical layers, such as credit scoring, multicriteria scoring, DSS, data mining, and AI/ML; (2) the layer of organizational governance, which includes the supervisory structure, internal audit, risk culture, and the efficiencies of technology and human resources; and (3) contextual value layers, which include sharia principles, social trust, ESG, as well as regulatory dynamics and crises. This framework emphasizes that the effectiveness of risk identification is not determined by a single instrument, but by the alignment among these layers to produce an accurate, accountable, and relevant risk identification process for the MFI's operational context.

The main questions of the research will be answered through this systematic literature review on how the risk identification process is studied and operationalized in the context of MFIs, drawing on diverse analytical frameworks, approaches, and tools. The research questions presented in this study are how frameworks, approaches, and analytical

tools are used in the literature to identify risks in MFIs, and to what extent the implementation of these three contributes to risk mitigation efforts. Through this research question, this article will systematically explore the various risk identification frameworks, approaches, and tools used in the academic literature, and examine how their application supports risk mitigation efforts in MFIs amid the complexity and dynamics of the risks they face.

This study aims to systematically review and synthesize previous research to obtain a more comprehensive understanding of risk identification practices in MFIs. In particular, this study aims to identify, analyze, and systematically synthesize the frameworks, approaches, and analytical tools used in the literature on risk identification practices in MFIs, with the aim of understanding their application, effectiveness, and contribution to risk mitigation. Through structured literature mapping, this research is expected to provide conceptual and practical contributions to the development of academic studies and to strengthen risk identification and mitigation practices in MFIs in the long term.

METHOD

Reference sources

This study uses the Systematic Literature Review (SLR) approach by adopting the PRISMA 2020 Protocol as developed by Page et al. (2021) as the primary guide in the process of identifying, filtering, and reporting the literature, which is an improvement of the previous PRISMA guidelines by Moher et al. (2010). PRISMA 2020 was chosen because it has been widely recognized as an international standard for the conduct of systematic literature reviews across disciplines, including finance and risk management, and emphasizes the principles of transparency, repeatability, and traceability of the research process. The use of PRISMA 2020 is also relevant considering that the literature on risk identification in MFIs is diverse and fragmented, so a systematic selection procedure is needed to ensure that the articles analyzed are not only the thematically relevant, but also have adequate methodological quality to be comprehensively synthesized related to risk identification frameworks, approaches, and tools as well as their contribution to risk mitigation efforts.

Formation of Study Questions

The formulation of research questions in this study was carried out using the Research Question Development Tool (RQDT) approach to ensure that the questions asked align with the limitations and gaps in the existing literature and support the systematic literature selection process. In the context of this SLR, the PICo (Population, Interest, Context) framework is used as the primary tool because it provides a clear, focused structure for formulating research questions relevant to the objectives of the systematic literature review (Haddaway et al., 2018). Through the PICo approach, Microfinance Institutions are designated as the population; risk identification practices, including frameworks,

approaches, and analysis tools, are described; and the contribution of these practices to risk mitigation efforts is provided as Context. The application of the PICo framework guides researchers in formulating key research questions that specifically examine how the academic literature discusses and implements risk identification in MFIs.

Systematic Search Strategy

To conduct a comprehensive search, 3 main steps are carried out: identification, screening, and eligibility. The steps can be explained as follows:

1. Identification

The identification stage in a systematic search strategy begins with the determination of the main keywords derived directly from the research question, namely those related to risk identification, microfinance institutions, frameworks, approaches, and analytical tools. To ensure comprehensive search coverage, key keywords are expanded by identifying synonyms, related terms, and word variations, using prior literature and relevant conceptual references, as recommended in a systematic literature review (Torraco, 2005). Article searches were conducted through five main databases, namely SCOPUS, Web of Science, SpringerLink, ScienceDirect, and ProQuest, which were selected for providing internationally reputable literature with wide coverage and high publication quality (Falagas et al., 2008; Mongeon, P., & Paul-Hus, 2016). The search process uses a search string tailored to each database's characteristics and combines Boolean operators, phrase searching, and truncation to improve the accuracy and relevance of the retrieved articles.

Tabel 1. Keyword Search List

Keywords	Synonym	Related Term	Variation
Risk Identification	Risk Detection, Risk Assessment	Risk Evaluation, Risk Recognition	Risk Mapping, Risk Register
Framework	Model, Structure, System	Risk Management Framework	Conceptual framework
Approach	Method, Strategy	Analytical Approach, Theoretical Approach	Strategic approaches
Tools	Instrument, Technique	Mechanism, Diagnostic Tool, Early Warning Tool	Early Warning Indicators, Risk Monitoring System
Risk Mitigation	Risk Reduction, Risk Control	Risk Response	Resilience Building, Risk Treatment Plan
Microfinance Institutions	MFIs, Islamic Microfinance	Microcredit Programs, BMT, Financial Inclusion	Cooperatives, Rural Banks
Implementation	Application, Utilization	Practice, Execution	Operationalization, Deployment
Contribution	Impact, Outcome	Effectiveness, Role	Influence, Added Value

Due to the use of various databases, the search strategy is also adjusted to the characteristics and technical limitations of each database, so that keyword combinations are not applied uniformly across them. Some databases, such as ScienceDirect, limit the number of keywords that can be used in a single search, so searches are performed by dividing keywords into search blocks. In this context, the search on ScienceDirect was conducted by forming several blocks that represent aspects of microfinance institutions, risk identification, and analytical frameworks and tools, to maintain optimal literature coverage. A similar approach is also applied to SpringerLink, by adapting the search structure to the database's internal mechanisms. This adjustment is made to ensure that the technical limitations of each database do not reduce the completeness and relevance of the literature identified in the early stages of SLR.

2. Screening

The screening stage is used to evaluate the articles obtained at the identification stage, ensuring that only relevant and high-quality literature is further analyzed in this study. The screening process is carried out in stages, considering the suitability of the topic, the study's focus, and the maturity of the research field, as suggested in the previous systematic literature review (Kraus et al., 2020). At this stage, article selection is carried out by applying contextually formulated inclusion and exclusion criteria to ensure alignment with the research question and SLR objectives (Kitchenham, 2004; Xiao & Watson, 2019). Given that there is no universal standard criterion for each SLR, the determination of inclusion and exclusion criteria is adjusted to the characteristics and focus of this study (Circum, 2015; Johnson & Hennessy, 2019).

Details of the inclusion and exclusion criteria used in the screening stage are presented in the following table to provide clarity and transparency in the literature selection process. This criterion is applied consistently across all databases, with technical adjustments to the search based on each database's characteristics.

Table 2: Inclusion and Exclusion Criteria

Criterion	Inclusion	Exclusion
Document Type	Journal Articles (Empirical/Conceptual/Mixed)	SLR/Bibliometrics/Meta analysis, Books/Book Chapters, Proceedings, editorial, Policy Brief, non-scientific reviews
Language	English	Other than English
Key Focus	Identify, assess, or mitigate risks in the context of microfinance	Studies that do not address risk identification/mitigation
Object/Context	Microfinance Institutions (MFI/micro-cooperatives/MFIs/MT/Microfinance programs)	Commercial banking, capital markets, or corporate investments with no relevance to MFIs

Methodological Contribution	Present frameworks, approaches, or analytical tools/risk indicators	It does not present an approach framework, or an analysis tool that can be extracted
Conceptual transferability	Non-MFI studies that present a framework, approach, or risk tool that can be adapted to the MFI context	Non-MFI studies without potential conceptual or methodological adaptation

In addition to articles that explicitly focus on microfinance institutions, this study also selectively includes articles with a non-microfinance institution context, provided they make relevant conceptual or methodological contributions. Non-MFI articles are considered when presenting an adaptable framework, a generic risk identification approach, or risk tools and indicators that can be applied in a micro financial context. The inclusion of such articles is based on the principles of conceptual and methodological transferability, not on the similarity of the research object alone, and will be explicitly explained at the synthesis and discussion stages to ensure clarity of context and relevance of findings to the focus of the study (Lockwood, C., Munn, Z., & Porritt, 2015; Munthe-kaas et al., 2020).

3. Eligibility

The eligibility stage is conducted to assess the final feasibility of articles that have passed the screening stage by examining the full-text in greater depth. At this stage, each article is evaluated to ensure its suitability against the inclusion and exclusion criteria set, as well as its relevance to the study's focus and SLR research questions (Kitchenham, 2004; Xiao & Watson, 2019). The feasibility assessment focuses on the clarity of the research context, the adequacy of methodological information, and the presence of conceptual or methodological contributions in the form of frameworks, approaches, or analytical tools that can be extracted and synthesized (Tranfield, 2003; Around, 2015).

In this SLR, the eligibility process identified 208 articles, manually reviewed based on titles, abstracts, results, and discussion sections to assess their substantive relevance to the study's focus. Of these, 179 articles were issued due to several main considerations, including not focusing on MFIs with the main operational characteristics of financing or savings and loans, not discussing the process of identifying or managing internal risks of financial institutions, and the existence of articles that, although alluding to small-scale financial institutions, are in the category of financial institutions that are not regulated by MFIs. After the feasibility evaluation, a total of 29 articles were deemed to meet the criteria and were subsequently included as the final articles used in the analysis and synthesis stage of this SLR.

A summary of the process of identification, screening, eligibility, and inclusion of the final article in this study is presented in the PRISMA diagram, as shown in the following Figure 1.

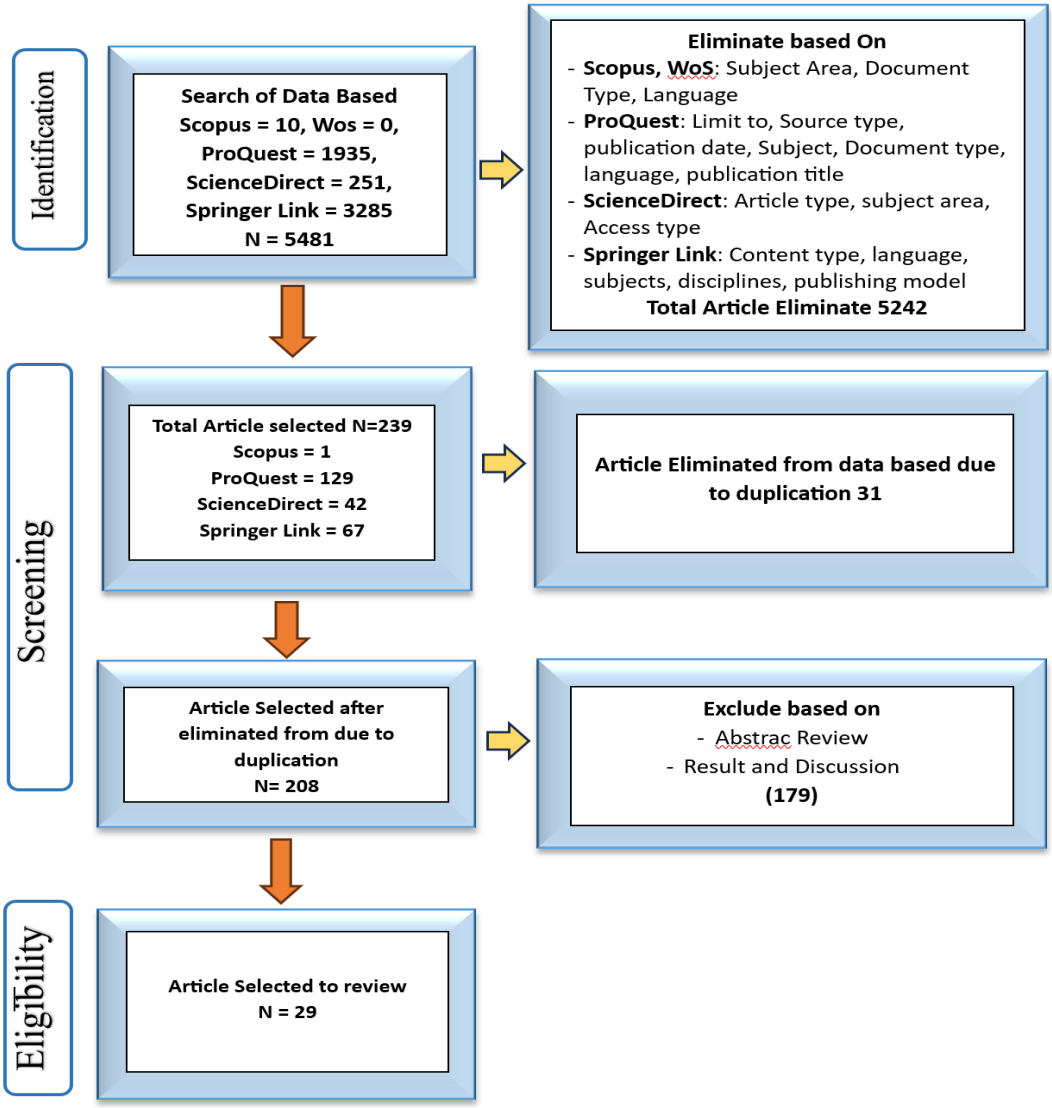

Figure 1. Flowchart of article, Identification, Screening, Eligibility

4. Article quality rating

Article quality assessment is an important step in SLR to ensure that the included studies are of adequate methodological quality and minimize potential bias that could affect the synthesis results. Cumpston et al. (2019) argue that quality evaluation is necessary to ensure that the findings are derived from trustworthy and valid literature. In a systematic literature review, quality assessment can be carried out using various approaches, such as assessment tools, quantitative scales, checklists, and standard formulas, depending on the objectives and characteristics of the research (Kitchenham, 2007). In addition, Seehra et al. (2024) state that there is no universal approach to quality assessment, so the researcher has the flexibility to choose the instrument that best aligns with the study's perspective and the needs of the literature review.

In this SLR, the article's quality is assessed using an instrument developed by Abouzahra et al. (2020), comprising six evaluative questions that assess the study's quality and relevance. Each question is assessed

using three answer categories, namely Yes with a score of 1, Partial with a score of 1.5, and No with a score of 0, thus allowing the assessment process to be carried out quantitatively and in a structured manner. Articles are declared to meet the quality threshold if they obtain a total score of more than 50 percent of the maximum score. To reduce subjectivity in the assessment process, the article's quality was evaluated by two additional assessors, each with expertise in risk management and qualitative research. The results of the article quality assessment are summarized and presented in a table to enhance transparency in the study selection process.

Tabel 3. Quality Assessment (QA) of Primary Studies (PSs)

ID	QA1	QA2	QA3	QA4	QA5	QA6	Total Score	% by Max PS
PS1	Y	Y	Y	Y	Y	P	5,5	91.67%
PS2	Y	Y	Y	Y	P	P	5	83.33%
PS3	Y	Y	Y	Y	Y	Y	6	100.00%
PS4	Y	Y	Y	Y	P	Y	5,5	91.67%
PS5	Y	Y	Y	Y	Y	P	5,5	91.67%
PS6	Y	Y	Y	Y	P	P	5	83.33%
PS7	Y	Y	Y	Y	Y	P	5,5	91.67%
PS8	Y	Y	Y	Y	Y	Y	6	100.00%
PS9	Y	Y	Y	Y	Y	Y	6	100.00%
PS10	Y	Y	Y	Y	Y	Y	6	100.00%
PS11	Y	Y	Y	Y	P	P	5	83.33%
PS12	Y	Y	Y	Y	P	P	5	83.33%
PS13	Y	Y	Y	Y	P	P	5	83.33%
PS14	Y	Y	Y	Y	P	Y	4,5	75.00%
PS15	Y	Y	Y	Y	Y	P	5,5	91.67%
PS16	Y	Y	Y	Y	Y	P	5,5	91.67%
PS17	Y	Y	Y	Y	Y	P	5,5	91.67%
PS18	Y	Y	Y	Y	P	P	5	83.33%
PS19	Y	Y	Y	Y	Y	Y	6	100.00%
PS20	Y	Y	Y	Y	Y	Y	6	100.00%
PS21	Y	Y	Y	Y	Y	P	5,5	91.67%
PS22	Y	Y	Y	Y	Y	Y	6	100.00%
PS23	Y	Y	Y	Y	Y	Y	6	100.00%
PS24	Y	Y	Y	Y	Y	P	5,5	91.67%
PS25	Y	Y	Y	Y	Y	Y	6	100.00%
PS26	Y	Y	Y	Y	Y	Y	6	100.00%
PS27	Y	Y	Y	Y	P	P	5	83.33%
PS28	Y	Y	Y	Y	Y	Y	6	100.00%
PS29	Y	Y	Y	Y	Y	Y	6	100.00%

QA1: Is the purpose of the study clearly stated?
QA2: Is the interest and the usefulness of the work clearly presented?
QA3: Is the study methodology clearly established?
QA4: Are the concepts of the approach clearly defined?
QA5: Is the work compared and measured with other similar work?
QA6: Are the limitations of the work clearly mentioned?

After assessing all articles, it was found that the average value of the articles was more than 3.0 (50%), indicating that the entire article is worthy of review.

6. Data Extraction and Analysis

After ensuring that the selected articles meet the quality criteria through a quality assessment, the next stage of this SLR is data extraction and thematic analysis. Given that the studies analyzed in this SLR employ diverse research designs, a qualitative synthesis is needed to integrate the findings comprehensively (Whittemore et al., 2005). Therefore, this study adopts a thematic synthesis approach, as recommended by Flemming et al. (2019), which is considered highly flexible for synthesizing data from diverse research designs. Thematic synthesis allows researchers to identify patterns and trends in the literature, then group findings based on similarities in meaning or conceptual relationships relevant to the research question (Braun & Clarke, 2019).

The thematic analysis process in this study follows the stages described by Kiger dan Varpio (2020), beginning with active, repeated reading of all selected articles to gain a thorough understanding of the main data. The next stage is the data coding process, which begins with open coding, identifying the parts of the article relevant to the study's focus. Furthermore, the results of open coding are grouped by relevance and meaning similarity to form axial coding, which is then further synthesized into a theme through the selective coding process (Braun & Clarke, 2019). Through a series of coding processes and validation by two experts in qualitative research and risk management, a number of themes and subthemes were identified that represent the study's focus. The data validation and re-reading process also resulted in improvements to the theme structure, including the incorporation of themes that have conceptual proximity and the removal of subthemes that are not relevant to the research question, before the final results are systematically presented in the SLR findings section.

RESULT

Background of the Selected Study

A total of 29 selected articles show a significant increase in publications in the 2023-2025 period, reflecting increasing academic attention to risk identification in MFIs. Geographically, research was conducted across various regulatory and socio-economic contexts, both in developing and developed countries, demonstrating that risk identification is cross-contextual and globally relevant.

The distribution of the year of publication of the selected article is presented in Figure 2 below:

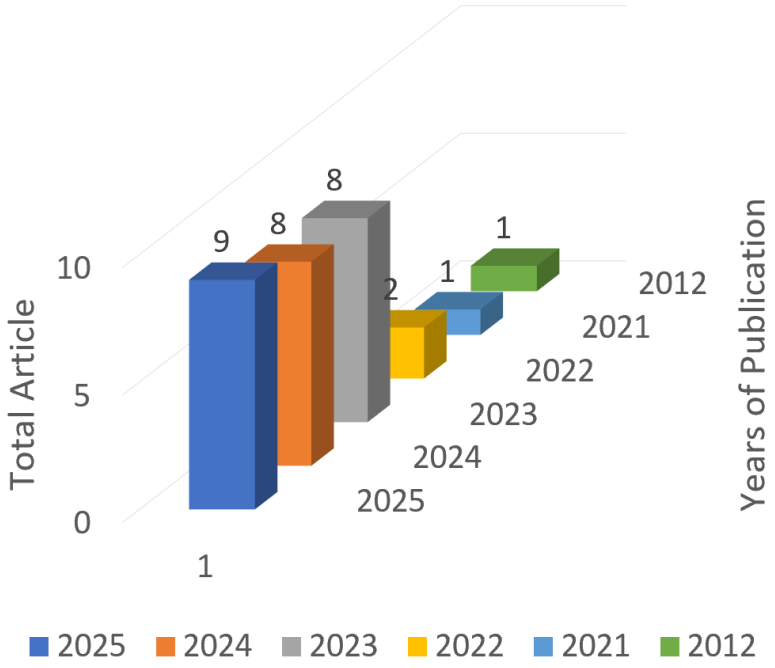

Figure 2. Publication Years of selected Study

The image shows an increase in publications in the most recent period. The geographical distribution of the research is presented in Figure 3. Which shows the variation in the context of cross-regional studies.

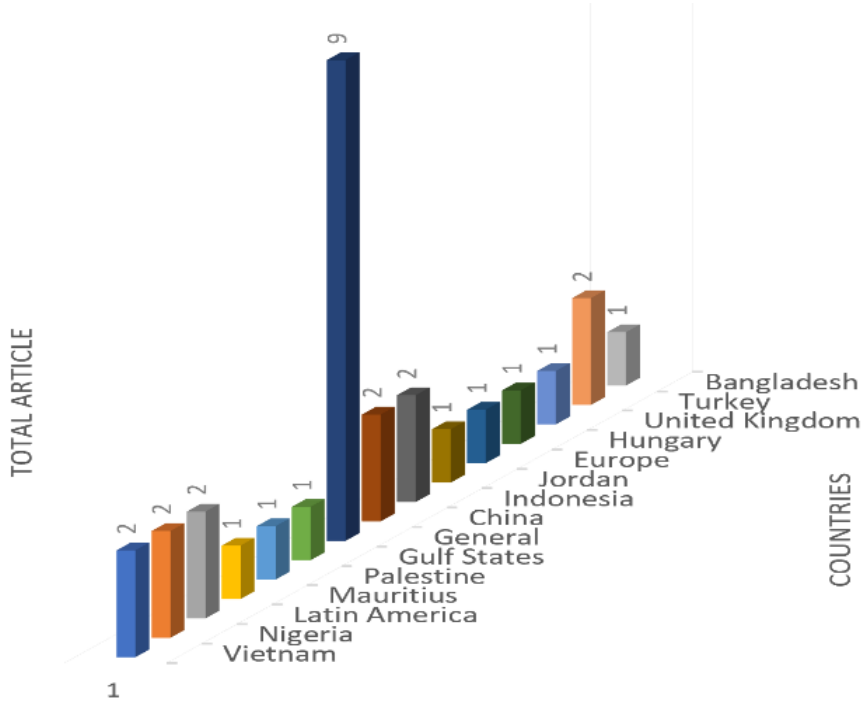

Figure 3. Countries where the selected studies were conducted

Furthermore, the composition of the selected article research design is shown in Figure 4:

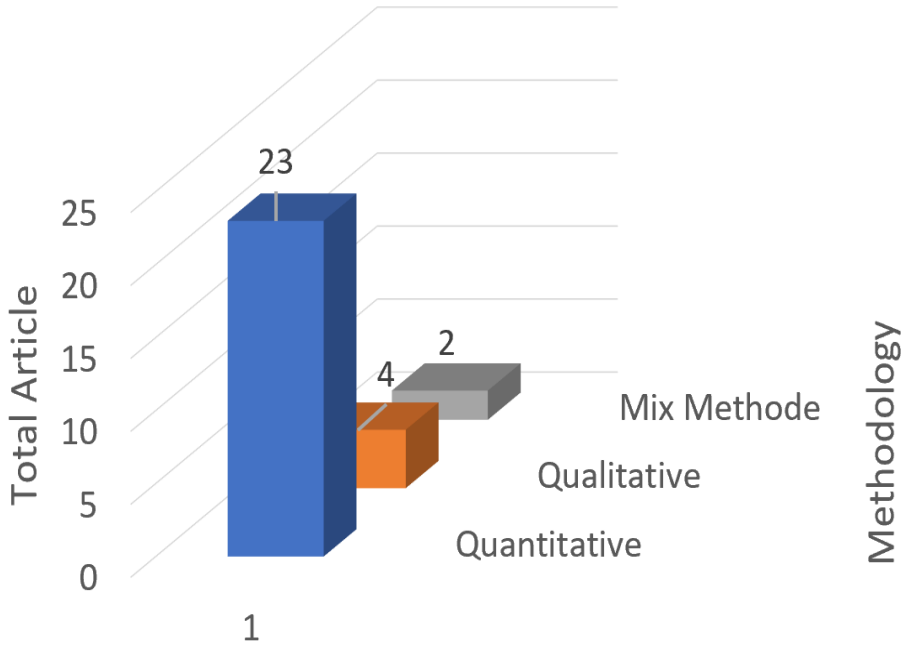

Figure 4. Research design of Selected Studies

The Developed Themes

Thematic analysis was conducted on 29 selected articles, yielding six themes that addressed this research question. Of the six themes, 15 subthemes were also produced. Details on themes, subthemes, and articles that support them are in the following table.

Table 4. Themes and Sub-Themes

Author	Method	County	Risk Identification Frameworks		Governance & Risk Culture		Digital & AI-Based Risk Tools				Syariah, Social, & Sustainabiliy			Crisis Resilience		Data Quality & Regulatory Compliance	
			CS & FCs	MM	GS	RC	IT	AI	DSS	TR	SP	STT	ESG	CR	RA	DQ	RCp
Ayayi (2012)	QN	Vietnam	√													√	
Omidiji et al. (2025)	QN	Nigeria			√												
Almaqtari et al., (2025)	QN	Several countries					√									√	√
Moreno-Menéndez et al. (2025)	MX	America Latin				√											
Ramdani et al. (2024)	MX	Mauritius				√											
Abusharbeh (2023)	QN	Palestine	√														
Hakimi et al. (2025)	QN	GCC			√												
Mehdi et al. (2025)	QN	Global						√									
Wu & Qi (2025)	QN	China					√										
Bermudez Vera et al. (2025)	QN	Amerika Latin							√							√	
Harahap et al. (2023)	QN	Indonesia									√						
Al-Nimer (2024)	QN	Jordania											√				
Nkambule et al. (2024)	QN	Global						√									
Mpofu (2024)	QL	Developing Country								√							
Aysan et al. (2024)	QN	Cross Country						√			√						
Wan et al. (2023)	QN	Global		√					√								
Baldissarro et al. (2024)	QN	Europe											√				
Anh et al. (2024)	QN	Vietnam								√							√
Chang & Liang (2023)	QN	China		√					√								
Toth & Kasa (2022)	QN	Hungaria				√									√		
Roy & Shaw (2021)	QN	South Asia		√													
Oseni (2023)	QN	Nigeria	√														
Pantos (2023)	QL	England												√			
Bayram et al. (2022)	QL	Türkiye											√				
Ozdemir et al. (2023)	QL	Türkiye									√						
Gama et al. (2023)	QN	Global										√					
Gunawan & Nurchasanah (2024)	QN	Indonesia				√						√		√	√		
Lee et al. (2025)	QN	Global												√			
Hossain & Majumder (2025)	QN	Bangladesh												√			

Abbreviations: CS & FCs = Credit Scoring and Five Cs; MM = Multicriteria Models; GS = Governance Structure; RC = Risk Culture; IT = IT Governance and Fintech; AI = Artificial Intelligence and Machine Learning; DM = Decision Support & Data Mining; TR = Technological Readiness; SP = Shariah Principles; ST = Social Trust; ESG = Environmental, Social, and Governance; CR = Crisis & Stress Testing; RA = Risk Awareness; DQ = Data Quality; RCp = Regulatory Compliance.

The themes and subthemes in the table above will be explained as follows:

1. Risk Identification Framework and Model in Microfinance Institutions

The credit risk assessment model remains the primary foundation for risk identification in microfinance institutions because it systematically determines financing feasibility and potential defaults. The literature shows that instruments such as credit scoring, portfolio at risk (PAR), dan Principle Five Cs of Credit (Character, Capacity, Capital, Collateral, and Condition of Economy) are the dominant approaches in assessing microfinance risks (Ayayi, 2012; Abusharbeh, 2023; Ocean, 2023). The application of historical data-driven models and financing behaviors has been shown to improve decision-making reliability, but recent developments underscore the need to expand the evaluation dimension. In the context of Islamic microfinance institutions, the integration of moral values and social responsibility is an important part of risk assessment, so that the identification model is not solely quantitatively oriented, but also considers the character, managerial capacity, and principles of maqasid al-shariah as the ethical foundation for financing evaluation (Ayayi, 2012); Abusharbeh, 2023; Ocean, 2023). These findings suggest that credit risk assessment models are evolving from a technical approach to a more contextual and multidimensional framework.

In line with these developments, a multi-criteria approach is increasingly being used to increase objectivity and consistency in the risk evaluation process. Various methods, such as Best-Worst Method (BWM), analytic Hierarchy Process (AHP), Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), and Multi-Criteria Decision-Making (MCDM), are integrated in microfinance risk assessments to reduce subjective bias and strengthen decision-making transparency (Roy & Shaw, 2021; Chang & Liang, 2023; Wan et al., 2023). The integration of these methods allows the prioritization of risk factors in a more structured manner, is adaptive to uncertainty, and can combine the weights of criteria in a measurable manner. Thus, applying a multicriteria model not only improves the accuracy of risk identification but also enhances the rationality and accountability of the evaluation process in microfinance institutions (Roy & Shaw, 2021; Chang & Liang, 2023; Wan et al., 2023).

2. Risk Governance, Audit, and Culture as a Risk Control Mechanism

A strong governance structure is a key foundation for effective risk control in microfinance institutions. The literature shows that the presence of supervisory boards, risk committees, and internal audits plays a strategic role in strengthening transparency, accountability, and

the separation of responsibilities between management and supervisors (Omidiji et al., 2025; Hakimi et al., 2025). Clearly distributed governance has been shown to correlate with reduced credit and operational risk, while allowing institutions to balance financing innovation with prudential principles. Internal audits in this context serve not only as an error-detection mechanism but also as a means of organizational learning that encourages continuous improvement of the internal control system (Omidiji et al., 2025; Hakimi et al., 2025). Thus, governance and auditing can be understood as the first line of defense in microfinance institutions' risk mitigation frameworks.

On the other hand, risk culture is an organizational dimension that strengthens the effectiveness of formal governance structures. Studies have shown that internalizing the values of integrity, openness, and continuous learning fosters proactive risk awareness across all levels of the organization (Ramdani et al., 2024; Moreno-Menéndez et al., 2025; Gunawan & Nurchasanah, 2024; Toth & Kasa, 2022). Continuous training and capacity building of human resources foster risk awareness aligned with the institution's social goals, while community involvement in decision-making strengthens risk ownership and social legitimacy. In addition, national cultural factors and organizational character shape individual perceptions of risk and collectively influence risk management behavior (Ramdani et al., 2024; Moreno-Menéndez et al., 2025; Gunawan & Nurchasanah, 2024; Toth & Kasa, 2022). Overall, these findings confirm that the effectiveness of risk control mechanisms is not only determined by formal structures, but also by the quality of the risk culture that develops within the organization.

3. Digital Transformation and Smart Technology in Risk Identification

Integration of IT Governance, fintech, and Blockchain technology, is the foundation of digital transformation in risk identification in microfinance institutions. Good information technology governance enables real-time risk monitoring, enhances transaction transparency, and improves data security, thereby reducing moral hazard and increasing customer trust (Almaqtari et al., 2025; Wu & Qi, 2025). Collaboration with fintechs also improves the efficiency of the financing process by automating risk verification and increasing the accuracy of financing evaluations.

The Utilization of artificial intelligence (AI) and machine Learning (ML) expands predictive capabilities in identifying credit and operational risks. Algorithms such as the adaptive Neuro-Fuzzy inference System (ANFIS), Random Forest, and ensemble models further improve analytical accuracy of analysis by exploring more complex historical data patterns (Aysan et al., 2024; Nkambule et al., 2024; Mehdi et al., 2025). This approach is driving a shift towards a risk identification model based on predictive analytics and evidence-based decision making.

The Development of Decision Support System (DSS) and data mining further strengthen data-driven approaches in risk decision-making. The integration of DSS with multicriteria methods enables a more structured, objective analysis of scenarios, while data mining helps

detect anomalies and potential defaults in the financing portfolio (Bermudez Vera et al., 2025; Chang & Liang, 2023; Wan et al., 2023). This approach improves the efficiency, consistency, and accountability of the risk evaluation process.

However, the success of digital transformation is not only determined by technological sophistication, but also by organizational readiness and human resource competence. Digital infrastructure, internal regulations, and employee adaptability are key factors in integrating technology systems into risk management (Anh et al., 2024; Mpofu, 2024). Without adequate institutional readiness, the benefits of technology can be reduced, especially in developing countries.

4. Sharia Integration, Social Value, and Sustainability in Risk Mitigation

The integration of sharia principles and instruments in risk management is the main foundation for Islamic microfinance institutions to maintain operational sustainability while ensuring compliance with maqasid al-shariah. The literature shows that the application of instruments such as takaful, rahn, and partnership-based contracts (Musharakah and Mudharabah) strengthens risk mitigation mechanisms through the principles of risk sharing and Social Solidarity (Aysan et al., 2024; Harahap et al., 2023; Ozdemir et al., 2023). This approach not only lowers the individual's financial risk exposure but also improves social protection for low-income members and strengthens public trust in Islamic microfinance institutions. Thus, sharia principles function as both a risk-mitigation instrument and an ethical foundation in microfinance management.

In addition to the normative dimension of sharia, social trust and institutional reputation are non-financial assets that play a significant role in organizational stability and resilience. The level of public trust in microfinance institutions correlates with the transparency, integrity, and consistency of institutional accountability (Gama et al., 2023; Gunawan & Nurchasanah, 2024). A strong reputation can reduce the risk of sudden withdrawals (withdrawal risk) and strengthen member loyalty, while community closeness serves as an informal risk buffer in a crisis. Therefore, strengthening social trust not only affects institutional legitimacy but also serves as a non-financial risk-mitigation mechanism that determines long-term sustainability.

Furthermore, the integration of environmental, social, and governance (ESG) principles and the concept of green fintech marks the expansion of the risk-mitigation paradigm towards a more comprehensive sustainability framework. ESG implementation is associated with reduced long-term risk exposure through socially and environmentally responsible business practices (Al-Nimer, 2024; Baldissarro et al., 2024; Bayram et al., 2022). The adoption of green investments and real-time environmental impact monitoring strengthens competitiveness while reducing reputational and environmental risks. In the context of Islamic Microfinance institutions, the ESG approach strengthens the synergy between financial, social, and spiritual goals, so that risk mitigation is

not only technical but also reflects a moral commitment to sustainable development.

5. Resilience to Crisis and Systemic Risk

Global crises such as the COVID-19 pandemic, natural disasters, and other external pressures have tested the resilience of microfinance institutions in managing systemic risks and the sustainability of their operations. The literature shows that the level of resilience of institutions is strongly influenced by portfolio diversification, risk management capacity, readiness for stress testing, and thening from the Government (Gunawan & Nurchasanah, 2024; Hossain & Majumder, 2025; S. Lee et al., 2025; Pantos, 2023). The application of scenario analysis and stress testing before the crisis improves adaptability to market shocks, while the digitalization of services and social stimulus programs contributes to liquidity stability. In addition to business diversification and funding strategies, as well as coordination with local communities, this approach has been proven to strengthen institutions' resilience in the face of systemic pressures. These findings confirm that the resilience of microfinance institutions depends not only on financial strength, but also on managerial flexibility and social support within their ecosystem within their institutional ecosystem.

On the other hand, risk culture and financial literacy are the foundation of organizational behavior that determines the speed of response to crises. Institutions with a mature risk culture tend to have more prudent, data-driven early-detection and decision-making mechanisms (Gunawan & Nurchasanah, 2024; Toth & Kasa, 2022). Collective awareness of potential threats encourages open communication and more effective internal coordination, while member and management financial literacy strengthens adaptive capacity amid uncertainty. Thus, strengthening risk culture and financial literacy can be understood as long-term investments that form institutional resilience to systemic risks.

6. Data Quality, Model Validation, and Regulatory Compliance as the Foundation for Risk Identification

Data quality and model validation are fundamental prerequisites for the reliability of risk identification systems in microfinance institutions. The literature shows that data accuracy, completeness, and verification are directly correlated with the effectiveness of risk prediction models and the quality of financing decision-making (Almaqtari et al., 2025; Ayayi, 2012; Bermudez Vera et al., 2025). Inaccuracies in customer data can undermine credit risk assessments, while data governance and a robust information security system play a role in preventing data manipulation and leakage that has the potential to pose operational and reputational risks. In addition, a regular model validation process is required to ensure that algorithms and risk parameters remain relevant to changing market conditions and customer behavior. Thus, data quality and model validation are not only technical, but also a governance mechanism that ensures the integrity of the overall risk management system.

On the other hand, compliance with national regulations and policies is the foundation of legitimacy in the implementation of a digital-based risk management system. The success of digital risk transformation is strongly influenced by the alignment of institutional practices with the standards and guidelines set by financial authorities (Almaqtari et al., 2025; Anh et al., 2024). Regulations that are adaptive to technological innovation, including regulatory sandboxes and personal data protection frameworks, encourage the implementation of a more secure and transparent risk identification system. Policy harmonization between regulators and microfinance institutions also strengthens digital integrity and accountability for risk reporting, while maintaining alignment with sharia principles and national governance. Therefore, regulatory compliance not only ensures operational legitimacy but also establishes a sustainable, standardized risk management system.

DISCUSSION

This study aims to systematically outline how various risk identification frameworks, approaches, and tools have been applied in the context of microfinance institutions, and how these practices are evolving towards a more adaptive, sustainable, and governance-oriented risk management system. The thematic synthesis suggests that risk identification is no longer understood as a stand-alone technical procedure, but rather as a multidimensional process that integrates quantitative approaches, institutional governance, digital technology, social values, and sharia principles. By blending cross-border findings with supporting literature beyond the SLR article, this discussion identified points of convergence and conceptual tension in the evolution of risk identification practices in microfinance institutions.

First, the dominance of credit scoring, portfolio at risk (PAR), and the Five Cs of Credit (5C) principle indicate that a balance between data-driven approaches and contextual considerations remains at the core of financing risk evaluation (Abusharbeh, 2023; Ayayi, 2012; Oseni, 2023). Empirical evidence suggests that using historical data can reduce the risk of default and build a culture of sustainable risk measurement (Joris Van Gool et al., 2011; Ibtissem, 2013; Omowole et al., 2024). Nevertheless, subjective bias in the application of the 5Cs remains a concern (Hassan, 2015; Ondolos et al., 2021), so the effectiveness of risk assessment frameworks depends on integrating analytical accuracy with contextual socio-ethical sensitivity.

Second, multi-criteria approaches such as AHP, TOPSIS, and BWM aim to improve the objectivity and consistency of risk evaluation (Chang & Liang, 2023; Roy & Shaw, 2021; Wan et al., 2023). Combined methods such as Fuzzy AHP-TOPSIS improve the accuracy of microcredit risk rating (Innov et al., 2021; Roy & Shaw, 2022), although variations in method combinations and criterion weights may yield different outputs (Ishak, A., 2020; Hanin et al., 2023). This underscores the importance of continuous model validation so that technical efficiency does not come at the expense of substantive accuracy in decision-making.

Third, internal governance and audit function as structural control mechanisms that strengthen the integrity of the risk identification system (Hakimi et al., 2025; Omidiji et al., 2025). The relationship between audit functions, downgrades, Loan Losses, and increased accountability has been documented in various contexts (Spira LF, 2003; Bananuka J, Nkundabanyanga SK, Nalukenge I, 2018). At the same time, risk culture and financial literacy form behavioral dimensions that determine the effectiveness of implementation (Gunawan & Nurchasanah, 2024; Moreno-Menéndez et al., 2025; Ramdani et al., 2024; Toth & Kasa, 2022). Collective awareness of risk and community participation strengthen risk ownership at the grassroots level (Idris, 2023; Musah & Emilson, 2025; Meara et al., 2017; Hwang, H., Vedlitz, A., & Bixler, 2023), showing that risk identification is a socio-organizational process that cannot be separated from the institutional context.

Fourth, digital transformation expands the dimension of analytics through fintech, Blockchain, and Artificial Intelligence (AI) and Machine Learning (ML) (Almaqtari et al., 2025; Mehdi et al., 2025; Nkambule et al., 2024; Wu & Qi, 2025). This technology enables real-time, predictive risk detection and increases financing transparency (Shawon, 2025; Rizky & Dirgahayu, 2025). Model-based random forests, ensemble learning, and adaptive neural systems improve the accuracy of credit risk prediction (Zhu et al., 2019; Tu, 2025; Dražen et al., 2025), despite the concern that trustworthiness and algorithm transparency remain a concern (Faheem, 2021; Oko-odion, 2025). Therefore, digitalization must be accompanied by strict data governance and model validation to prevent the emergence of new risks.

Fifth, the sharia dimension, social value, and sustainability broaden the definition of risk from mere financial exposure to social, moral, and environmental risks. Instruments such as takaful, rahn, and partnership contracts based on maqasid al-sharia strengthening solidarity and Social Justice (Aysan et al., 2024; Gama et al., 2023; Gunawan & Nurchasanah, 2024; Harahap et al., 2023; Ozdemir et al., 2023), while micro-takaful strengthens the financial resilience of vulnerable groups (Akram et al., 2025; Beshir et al., 2023). Integrations of environmental, social, and governance (ESG) and green fintech are broadening the sustainability perspective (Macchiavello & Siri, 2020; Upadhya et al., 2024). However, the risks of greenwashing necessitates the establishment of clear independent metrics and robust auditing mechanisms (De Silva Lokuwaduge, C. S., & De Silva, 2022; Alaudhli, 2024).

Sixth, the experience of the Covid-19 pandemic and various economic disasters that have caused global crises shows that the resilience of micro-institutions is influenced by stress testing, portfolio diversification, and community coordination (Gunawan & Nurchasanah, 2024; Hossain & Majumder, 2025; S. Lee et al., 2025; Pantos, 2023; Toth & Kasa, 2022). The Bank for International Settlements (BIS) guidelines and empirical literature emphasize the importance of scenario planning and preparedness before a crisis (Anand Kumar T, 2007; Pasara &

Mhlanga, 2026). Digital capabilities and IT infrastructure are helping to accelerate post-disruption recovery.

Finally, data quality, model validation, and regulatory compliance are the foundations of the integrity of the risk identification system (Almaqtari et al., 2025; Anh et al., 2024; Ayayi, 2012; Bermúdez Vera et al., 2025). Independent audits and periodic reviews prevent overreliance on algorithms (Nwachukwu, 2024), while regulatory sandbox balances innovation and consumer protection (Sariguna & Kennedy, 2020).

Theoretically, these findings expand the framework of Enterprise Risk Management (ERM) by placing risk identification not only as an initial stage in the risk management cycle, but also as a socio-technical process influenced by the interaction among analytical systems, governance structures, and contextual values. In the context of Islamic microfinance institutions, integrating maqasid al-shariah and ESG principles suggests that risk identification is not only aimed at minimizing financial exposure but also at maintaining social legitimacy and institutional sustainability. Thus, this study contributes to the financial risk management literature by offering an integrative perspective that connects analytical models, governance mechanisms, technological infrastructures, and socio-institutional values shaping risk identification practices in microfinance institution.

Beyond its empirical synthesis, this study advances the theoretical understanding of risk identification by conceptualizing it as a layered socio-technical governance mechanism. Rather than functioning merely as an initial procedural stage within Enterprise Risk Management (ERM), risk identification in MFIs operates at the intersection of analytical infrastructures, institutional governance, and normative value system. This reconceptualization positions risk identification as an embedded institutional process shaped by organizational logics, regulatory environments, and socio-cultural expectations.

Overall, this discussion suggests that risk identification in microfinance institutions is evolving towards an integrative paradigm that integrates technical-analytical, organizational governance, and contextual values. This synthesis provides a conceptual basis for developing adaptive, context-specific risk identification models, particularly in the environment of Islamic micro-institutions in developing countries.

The findings of this study provide significant theoretical and practical implications for the development of risk management in microfinance institutions. Theoretically, the synthesis results reinforce the view that risk identification should be understood as an integrated institutional process rather than merely a technical stage in the risk management cycle. The integration of data-driven approaches with governance, social values, and maqasid al-shariah principles suggests that the Enterprise Risk Management (ERM) framework should be expanded to encompass both normative and contextual dimensions within the micro-environment of Islamic finance. Thus, this study contributes to the risk management and microfinance governance

literature by offering an integrative perspective that simultaneously connects the technical, organizational, and ethical dimensions.

From a practical perspective, these results confirm the importance of strengthening governance, model validation, and digital readiness as a prerequisite for the effectiveness of risk identification systems. Regulators and associations of micro-institutions, including the OJK, relevant ministries, and associations of microfinance institutions, need to develop more specific guidelines on data-based risk identification, internal audits, and digital governance that are adaptive to the character of micro-institutions. In addition, investment in digital literacy, risk culture, and strengthening human resource capacity are key factors in ensuring the sustainability of the risk management system. The integration of ESG practices in microfinance can also improve institutions, in line with findings on the importance of social and environmental values in risk mitigation (Ahamad et al., 2025).

Nonetheless, the study identified several research gaps. First, the literature remains dominated by a focus on credit and operational risk, while sharia, reputation, and technology risk are relatively underexplored empirically, particularly in the context of ESG and Islamic finance (Judijanto et al., 2025). Second, methodological approaches are still dominated by quantitative design, with limitations in explaining institutional dynamics and organizational culture at the micro level (Sieraa et al., 2024). Third, there is a contextual gap between technology-based models developed in countries with mature digital infrastructure and the conditions of micro-institutions in developing countries, which face limited resources and regulations (Khanchel et al., 2025).

In line with these gaps, future research needs to develop a risk identification framework that integrates AI, data quality, and model validation with Sharia compliance in the real context of institutions (J. Lee et al., 2015). Field-based and longitudinal studies are also needed to examine how risk culture, community values, and institutional capacity moderate risk management effectiveness. In addition, mixed-method, design-based research, and institutional analysis approaches can be used to bridge the gap between conceptual models and practical implementation. The integration of the international standard ISO 31000:2018 with the principles of ERM and Islamic finance is also an important agenda to produce more comprehensive and contextual risk management standards.

CONCLUSION

This systematic literature review confirms that risk identification in microfinance institutions, especially Islamic microfinance institutions, has evolved from a partial risk assessment approach to a more integrative and multidimensional framework. These developments reflect a shift from a conventional model based on financial indicators to a system that combines quantitative analytics, digital technology, institutional governance, and social values and maqasid al-shariah principles. The thematic synthesis shows that the effectiveness of risk identification is

not determined solely by the sophistication of technological methods or devices, but by institutions' ability to manage the interactions among analytical systems, governance structures, human resource capacity, regulations, and contextual values. Thus, risk identification needs to be understood as a strategic and institutional socio-technical process, rather than just an administrative procedure within the risk management cycle.

In the midst of the dynamics of digitalization, the demands of sustainability, and the increasing complexity of global risks, the conceptual and empirical strengthening of risk identification frameworks is becoming increasingly important. Variations in regulatory contexts, institutional capacity, and socio-economic characteristics across developing countries suggest that a universal approach must be adapted to remain relevant and applicable. Therefore, the development of a future risk identification model needs to integrate sensitivity to local context, substantive sharia values, technological readiness, and strengthened governance and data quality. Overall, this study extends the financial risk analysis literature by formulating an integrative perspective on risk identification that connects analytical techniques, governance structures, technological capabilities, and institutional value systems within microfinance institutions.

Author Contributions: Conceptualization the idea for the article (Ifelda Nengsih, Aisyah Abdul-Rahman, Zaleha Binti Yazid), who performed the literature search and data analysis (Ifelda Nengsih), and who drafted and/or critically revised the work (Ifelda Nengsih), writing - reviewing and editing (Ifelda Nengsih, Aisyah Abdul-Rahman, Zaleha Binti Yazid) - read and approved the final manuscript (Ifelda Nengsih, Aisyah Abdul-Rahman, Zaleha Binti Yazid).

Funding: -

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Conflicts of Interest: The authors have no conflicts of Interest to declare relevant to this article's content.

REFERENCES

Abouzahra, A., Sabraoui, A., & Afdel, K. (2020). Model composition in Model Driven Engineering: A systematic literature review. *Information and Software Technology*, *125*(May), 106316. https://doi.org/10.1016/j.infsof.2020.106316

Abusharbeh, M. T. (2023). Modeling the factors of portfolio at risk for microfinance institutions in Palestine. *Cogent Economics and Finance*, *11*(1), 1–15. https://doi.org/10.1080/23322039.2023.2186042

Ackermann, F., Eden, C., Williams, T., & Howick, S. (2007). Systemic risk assessment: a case study. *Journal of the Operational Research Society*, *58*, 39–51. https://doi.org/https://doi.org/10.1057/palgrave.jors.2602105

Ahamad, S., Uddin, S., Aminul, A., Mohd, I., & Hakim, Y. (2025). *Environmental , Social , and Governance Practices and Microfinance Institutions Sustainability : A Global Study*. 80–94. https://doi.org/10.1002/sd.70252

Akram, A., Robbi, M., Abdul, M., Faizuddin, M., Zuki, M., & Hassan, R. (2025). *Micro-Takaful Coverage Among Low-Income Communities in Malaysia : Exploring the Challenges and Proposed Solutions*. *14*(2), 70–80.

Al-Nimer, M. (2024). Innovation Capacity as a Mediating Mechanism Between Strategic Risk Integration and ESG Performance: Evidence from Jordanian Banks. *International Journal of Financial Studies*, *12*(4). https://doi.org/10.3390/ijfs12040126

Al Astal, A. Y. M., Ateeq, A., Milhem, M., & Shafie, D. I. (2024). Corporate Governance and Internal Control Mechanisms : Developing a Strategic Framework. *Business Sustainability with Artificial Intelligence (AI): Challenges and Opportunities*, *2*, 551–564.

Alaudhli, R. J. (2024). *Greenwashing Risk and Its Mitigation for Sustainable Finance*. *6*(61), 5–33. https://doi.org/doi.org/10.52132/Ajrsp.e.2024.61.1

Almaqtari, F. A., Yahya, A. T., Al-Maskari, N., Farhan, N. H. S., & Al-Aamri, A. M. Y. Y. (2025). Assessing the Integrated Role of IT Governance, Fintech, and Blockchain in Enhancing Sustainability Performance and Mitigating Organizational Risk. *Risks*, *13*(6), 1–27. https://doi.org/10.3390/risks13060105

Anand Kumar T, N. J. (2007). Disaster Prevention and Management : An International Journal Article information : *Disaster Prevention and Management: An International Journal*, *16*(1), 21–32. https://doi.org/https://doi.org/10.1108/09653560710729785

Anderson, J., & Narasimhan, R. (1979). *Assessing Project Implementation Risk : A Methodological Approach. September 2016*.

Anh, N. T. M., Hoa, L. T. K., Thao, L. P., Nhi, D. A., Long, N. T., Truc, N. T., & Ngoc Xuan, V. (2024). The Effect of Technology Readiness on Adopting Artificial Intelligence in Accounting and Auditing in Vietnam. *Journal of Risk and Financial Management*, *17*(1). https://doi.org/10.3390/jrfm17010027

Ayayi, A. G. (2012). Credit risk assessment in the microfinance industry: An application to a selected group of Vietnamese microfinance institutions and an extension to East Asian and Pacific microfinance institutions Ayayi Credit Risk Assessment. *Economics of Transition*, *20*(1), 37–72. https://doi.org/10.1111/j.1468-0351.2011.00429.x

Aysan, A. F., Ciftler, B. S., & Unal, I. M. (2024). Predictive Power of Random Forests in Analyzing Risk Management in Islamic Banking. *Journal of Risk and Financial Management*, *17*(3).

https://doi.org/10.3390/jrfm17030104
Azarian, M., Yu, H., Shiferaw, A. T., & Stevik, T. K. (2023). Do We Perform Systematic Literature Review Right ? A Scientific Mapping and Methodological Assessment. *Logistics*, *7*(4), 89. https://doi.org/https://doi.org/10.3390/logistics7040089
Baldissarro, G., Bruni, M. E., Iazzolino, G., Morea, D., & Veltri, S. (2024). Does It Pay Off to Integrate ESG Performance into Bank Investment Portfolio Selection? Empirical Evidence in the European Energy Sector. *Sustainability (Switzerland)*, *16*(23). https://doi.org/10.3390/su162310766
Bananuka J, Nkundabanyanga SK, Nalukenge I, K. T. (2018). Internal audit function, audit committees' effectiveness and accountability in the Ugandan statutory corporations. *Journal of Financial Reporting and Accounting*, *16*(1), 138–157. https://doi.org/https://doi.org/10.1108/JFRA-07-2016-0062
Barbara Kitchenham, S. M. C. (2007). Guidelines for performing systematic literature reviews in software engineering. *Technical Report, Ver. 2.3 EBSE Technical Report. EBSE*, *January 2007*, 1–57.
Bayram, O., Talay, I., & Feridun, M. (2022). Can Fintech Promote Sustainable Finance? Policy Lessons from the Case of Turkey. *Sustainability (Switzerland)*, *14*(19). https://doi.org/10.3390/su141912414
Bermudez Vera, I. M., Mosquera Restrepo, J., & Manotas-Duque, D. F. (2025). Data Mining for the Adjustment of Credit Scoring Models in Solidarity Economy Entities: A Methodology for Addressing Class Imbalances. *Risks*, *13*(2), 1–17. https://doi.org/10.3390/risks13020020
Beshir, H. A., Alhabshi, S. M., & Zakariyah, H. (2023). *The Potential of Micro-Takaful in Improving Financial Inclusion among Low-income Households in Ethiopia*. *12*(2), 30–47. https://doi.org/https://doi.org/10.31436/jif.v12i2.823
Bharti N, M. S. (2022). Financial inclusion and the performance of microfinance institutions: does social performance affect the efficiency of microfinance institutions? *Social Responsibility Journal*, *18*(4), 858–874. https://doi.org/https://doi.org/10.1108/SRJ-03-2020-0100
Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, *11*(4), 589–597. https://doi.org/10.1080/2159676X.2019.1628806
Chang, Y., & Liang, Y. (2023). Intelligent Risk Assessment of Ecological Agriculture Projects from a Vision of Low Carbon. *Sustainability (Switzerland)*, *15*(7), 1–22. https://doi.org/10.3390/su15075765
Chaomei Chen. (2017). Science Mapping: A Systematic Review of the Literature. *Journal of Data and Information Science*, *2*(2), 1–40. https://doi.org/10.1515/jdis-2017-0006
Cull, R., Demirgüç-Kunt, A., & Morduch, J. (2016). *The Microfinance Business Model Enduring Subsidy and Modest Profit*. *August*.
Cumpston, M., Li, T., Page, M. J., Chandler, J., Welch, V. A., Higgins, J.

P. T., & Thomas, J. (2019). Updated guidance for trusted systematic reviews : a new edition of the Cochrane Handbook for Systematic Reviews of Interventions. *Cochrane Library*, 1–2. https://doi.org/https://doi.org/10.1002/14651858.ED000142

David Tranfield, David Denyer, P. S. (2003). Toward a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review. *British Journal of Managemen*, *14*, 207–222.

De Silva Lokuwaduge, C. S., & De Silva, K. M. (2022). ESG Risk Disclosure and the Risk of Green Washing. *Australasian Accounting, Business and Finance Journal*, *16*(1), 146–159. https://doi.org/https://doi.org/10.14453/aabfj.v16i1.10

Dražen, B., Perović Nataša, Aleksić Marinko, Rašović Ivana, & Oto, I. (2025). Machine Learning Analysis of Financial Risk Dynamics in Micro-, Small, and Medium Enterprises. *Dražen, B., Perović Nataša, Aleksić Marinko, Rašović Ivana, & Oto, I.*, *13*(12), 1–35. https://doi.org/https://doi.org/10.3390/risks13120240

Faheem, M. A. (2021). *AI-Driven Risk Assessment Models : Revolutionizing Credit Scoring and Default Prediction*. *5*(3), 177–186.

Falagas, M. E., Pitsouni, E. I., Malietzis, G. A., & Pappas, G. (2008). Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and weaknesses. *The FASEB Journal*, *22*(2), 338–342. https://doi.org/10.1096/fj.07-9492lsf

Flemming, K., Booth, A., Garside, R., Tunçalp, Ö., & Noyes, J. (2019). *Qualitative evidence synthesis for complex interventions and guideline development : clarification of the purpose , designs and relevant methods*. 1–9. https://doi.org/10.1136/bmjgh-2018-000882

Gama, A. P. M., Correia, R. E., Augusto, M., & Duarte, F. (2023). Third-party signals in crowdfunded microfinance: which microfinance institutions boost crowdfunding among refugee entrepreneurs? *Small Business Economics*, *61*(2), 559–586. https://doi.org/10.1007/s11187-022-00708-4

Gunawan, I., & Nurchasanah. (2024). Exploring factors influencing the microfinance program sustainability. *SN Business and Economics*, *4*(9). https://doi.org/10.1007/s43546-024-00701-x

Haddaway, N. R., Macura, B., Whaley, P., & Pullin, A. S. (2018). ROSES RepOrting standards for Systematic Evidence Syntheses : pro forma , flow - diagram and descriptive summary of the plan and conduct of environmental systematic reviews and systematic maps. *Environmental Evidence*, 4–11. https://doi.org/10.1186/s13750-018-0121-7

Hakimi, A., Saidi, H., & Saidi, S. (2025). Do Board Characteristics Affect Non-Performing Loans? GCC vs. Non-GCC Insights. *International Journal of Financial Studies*, *13*(2), 1–22. https://doi.org/10.3390/ijfs13020101

Hanin, N., Zaria, D., Dhandio, D. J., & Kusnandar, D. (2023). *IMPLEMENTATION OF AHP-TOPSIS AS A SUPPORT FOR MAKING DECISIONS ON MICRO BUSINESS FUNDING IN SAMBAS REGENCY*.

2023(1), 394–410.

Harahap, R. D., Arifin, Z., & Soemitra, A. (2023). Qard Al-Hasan Revitalization as a Financing Alternative for Micro, Small, and Medium Enterprises: An Analytic Network Process Approach. *International Journal of Professional Business Review*, *8*(8), e02819. https://doi.org/10.26668/businessreview/2023.v8i8.2819

Hassan, A. (2015). Financial inclusion of the poor: from microcredit to Islamic microfinancial services. *Humanomics*, *31*(3), 354–371. https://doi.org/http://dx.doi.org/10.1108/H-07-2014-0051

Hopkin, P. (2018). Fundamentals of Risk Management. In *Police Liability and Risk Management*. Kogan Page Publishers. https://doi.org/10.1201/b15522-5

Hossain, M. Z., & Majumder, R. R. (2025). Graduation from poverty condition of HAOR (seasonal wetland) people of Bangladesh: simultaneous effects of microcredits, SSNPs, flood and COVID-19. *Discover Social Science and Health*, *5*(1). https://doi.org/10.1007/s44155-025-00188-3

Hwang, H., Vedlitz, A., & Bixler, R. P. (2023). Growing community resilience from the grassroots: Risk awareness, confidence in institutions, and civic participation in a natural hazards context. *Natural Hazards Review*, *24*(3), 04023020. https://doi.org/https://doi.org/10.1061/NHREFO.NHENG-1658

Ibtissem, B. (2013). *CREDIT RISK MANAGEMENT IN MICROFINANCE : THE*. *2*(1), 9–24.

Idris, O. (2023). Discussion on the Role of Emotional Intelligence in Financial Decision-Making. *Open MenuJournal of Policy Options*, *6*(4), 20–29. https://resdojournals.com/index.php/jpo/article/view/338

Innov, S. F., Roy, P. K., & Shaw, K. (2021). *A multicriteria credit scoring model for SMEs using hybrid BWM and TOPSIS*. https://doi.org/https://doi.org/10.1186/s40854-021-00295-5

Ishak, A., & W. (2020). Analysis of Fuzzy AHP-TOPSIS Methods in Multi Criteria Decision Making : Literature Review Analysis of Fuzzy AHP-TOPSIS Methods in Multi Criteria Decision Making : Literature Review. *In IOP Conference Series: Materials Science and Engineering*, *1003*(1), 012147. https://doi.org/10.1088/1757-899X/1003/1/012147

Javier Sieraa, Muriel-patino, V., & Rodríguez-lópez, F. (2024). A comprehensive framework for understanding microfinance performance evaluation methods. *Humanities and Social Sciences Communications*, *11*(2024), 1–11. https://doi.org/10.1057/s41599-024-03213-z

Johnson, B. T., & Hennessy, E. A. (2019). Systematic reviews and meta-analyses in the health sciences: Best practice methods for research syntheses. *Social Science and Medicine*, *233*(November 2018), 237–251. https://doi.org/10.1016/j.socscimed.2019.05.035

Joris Van Gool, Wouter Verbeke, Piet Sercu, B. B. (2011). *CREDIT SCORING FOR MICROFINANCE : IS IT WORTH IT ?*

https://doi.org/https://doi.org/10.1002/ijfe.444
Khanchel, I., Lassoued, N., & Khiari, C. (2025). *Regional Science Policy & Practice Untangling the skein : The impact of FinTech on social and financial performance in microfinance institutions*. *17*(May).
Kiger, M. E., & Varpio, L. (2020). Thematic analysis of qualitative data: AMEE Guide No. 131. *Medical Teacher*, *42*(8), 846–854. https://doi.org/10.1080/0142159X.2020.1755030
Kitchenham, B. (2004). *Procedures for Performing Systematic Reviews [Procedimientos para realizar revisiones sistemáticas]*. https://www.researchgate.net/publication/228756057
Kraus, S., Breier, M., & Dasí-Rodríguez, S. (2020). The art of crafting a systematic literature review in entrepreneurship research. *International Entrepreneurship and Management Journal*, *16*(3), 1023–1042. https://doi.org/10.1007/s11365-020-00635-4
Ledgerwood, Joanna; Earne, Julie; Nelson, C. (2013). *The New Microfinance Handbook: A Financial Market System Perspective*. World Bank Publications.
Lee, J., Jusup, M., Podobnik, B., & Iwasa, Y. (2015). *Agent-Based Mapping of Credit Risk for Sustainable Microfinance*. 8–11. https://doi.org/10.1371/journal.pone.0126447
Lee, S., Han, K. C., Suk, D. Y., & Sung, H. M. (2025). COVID-19 pandemic impact on microfinance industry. *Future Business Journal*, *11*(1). https://doi.org/10.1186/s43093-025-00479-w
Lockwood, C., Munn, Z., & Porritt, K. (2015). *Qualitative research synthesis : methodological*. *13*(3), 179–187. https://doi.org/10.1097/XEB.0000000000000062
Loso Judijanto, Ahmad Iqbal Fathoni, Diah Fauziah, KMT Lasmiatun, M. I. A. (2025). ESG (Environmental, Social, Governance) Integration in Global Islamic Finance.pdf. *West Science Islamic Studies*, 19–25. https://wsj.westsciences.com/index.php/wsiss/article/view/1612/1704
Ma, T. (2025). *Decision Making : Applications in Management and Engineering Research on the Application of Artificial Intelligence Technology in Enterprise Financial Risk Warning - Based on Machine Learning Method*. *8*(1), 758–772.
Macchiavello, E., & Siri, M. (2020). *Sustainable Finance and Fintech: Can Technology Contribute to Achieving Environmental Goals? A Preliminary Assessment of 'Green FinTech".'* *71*. https://doi.org/https://dx.doi.org/10.2139/ssrn.3672989
Massingham, P. (2010). *Knowledge risk management : a framework*. *14*(3), 464–485. https://doi.org/10.1108/13673271011050166
Meara, P. O., Pendergast, C., Robinson, A., Meara, P. O., Pendergast, C., & Grassroots, A. R. (2017). *Grassroots Community Engagement: The Key to Success in a Community Building Program*. *1656*(August). https://doi.org/10.5172/rsj.351.17.2.155
Mehdi, R., Ahmed, I. E., & Mohamed, E. A. (2025). Rating the Impact of Risks in Banking on Performance: Utilizing the Adaptive Neural Network-Based Fuzzy Inference System (ANFIS). *Risks*, *13*(5).

https://doi.org/10.3390/risks13050085

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2010). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *International Journal of Surgery*, *8*(5), 336–341. https://doi.org/10.1016/j.ijsu.2010.02.007

Mongeon, P., & Paul-Hus, A. (2016). The journal coverage of Web of Science, Scopus and Dimensions: A comparative analysis. *Scientometrics*, *106*, 213–228. https://doi.org/10.1007/s11192-021-03948-5

Moreno-Menéndez, F. M., González-Prida, V., Pariona-Amaya, D., Zacarías-Rodríguez, V. E., Zacarías-Vallejos, V., Zacarías-Vallejos, S. R., Aguilar-Cuevas, L. A., & Campos-Carpena, L. P. (2025). Improving Financial Sustainability Through Effective Credit Risk Management and Human Talent Development in Microfinance Institutions. *International Journal of Financial Studies*, *13*(2), 1–31. https://doi.org/10.3390/ijfs13020060

Mpofu, F. Y. (2024). Industry 4.0 in Finance, Digital Financial Services and Digital Financial Inclusion in Developing Countries: Opportunities, Challenges, and Possible Policy Responses. *International Journal of Economics and Financial Issues*, *14*(2), 120–135. https://doi.org/10.32479/ijefi.15081

Munthe-kaas, H., Nøkleby, H., Lewin, S., & Glenton, C. (2020). *The TRANSFER Approach for assessing the transferability of systematic review findings*. *5*, 1–22. https://doi.org/https://doi.org/10.1186/s12874-019-0834-5

Musah, A., & Emilson, D. (2025). *Financial risk tolerance and financial behaviour of microentrepreneurs in Ghana*. 1–27. https://doi.org/https://doi.org/10.1007/s43546-025-00962-0

Nkambule, D. S., Twala, B., & Pretorius, J. H. C. (2024). Effective Machine Learning Techniques for Dealing with Poor Credit Data. *Risks*, *12*(11). https://doi.org/10.3390/risks12110172

Nwachukwu, G. (2024). Enhancing Credit Risk Management Through Revalidation and Accuracy in Financial Data : The Impact of Credit History Assessment on Procedural Financing. *International Journal of Research Publication and Reviews*, *5*(11), 631–644.

Oko-odion, C. (2025). *AI-Driven Risk Assessment Models for Financial Markets : Enhancing Predictive Accuracy and Fraud Detection*. *14*(04), 80–96. https://doi.org/10.7753/IJCATR1404.1007

Okoli, C. (2015). A guide to conducting a standalone systematic literature review. *Communications of the Association for Information Systems*, *37*(1), 879–910. https://doi.org/10.17705/1cais.03743

Omidiji, A., Ehalaiye, D., Gyapong, E., & Botica Redmayne, N. (2025). Internal audit, loan losses, and financial performance in microfinance institutions- a global evidence. *China Accounting and Finance Review*, *27*(3), 364–396. https://doi.org/10.1108/cafr-05-2024-0063

Omowole, B. M., Urefe, O., Mokogwu, C., & Ewim, S. E. (2024). Strategic approaches to enhancing credit risk management in microfinance

institutions. *International Journal of Frontline Research in Multidisciplinary Studies*. https://doi.org/https://doi.org/10.56355/ijfrms.2024.4.1.0033

Ondolos, N. K., Tuyon, J., & Mohammed, R. U. (2021). A Conceptual Framework for Bounded Rationality in Bank Officers ' Credit Decision for SME Lending in Malaysia. *Asia-Pacific Management Accounting Journal (APMAJ)*, *16*(3), 159–189. https://ir.uitm.edu.my/id/eprint/56528/

Oseni, E. (2023). Assessment of the Five Cs of Credit in the Lending Requirements of the Nigerian Commercial Banks. *International Journal of Economics and Financial Issues*, *13*(4), 58–65. https://doi.org/10.32479/ijefi.14482

Ostrom, L. T., & Wilhelmsen, C. A. (2019). *Risk Assessment*. John Wiley & Sons, Inc.

Ozdemir, M., Savasan, F., & Ulev, S. (2023). Leveraging financial inclusion through Islamic microfinance: A new model proposal for participation banks in Turkiye. *Borsa Istanbul Review*, *23*(3), 709–722. https://doi.org/10.1016/j.bir.2023.01.011

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *The BMJ*, *372*. https://doi.org/10.1136/bmj.n71

Pantos, S. (2023). Designing Stress Tests for UK Fast-Growing Firms and Fintech. *Risks*, *11*(2). https://doi.org/10.3390/risks11020031

Pasara, M. T., & Mhlanga, D. (2026). Accelerating sustainable development goals in the wake of COVID-19 : The role of higher education institutions in South Africa [version 1 ; peer review : 1 approved , 1 approved with reservations]. *Emerald Open Research*, *February*, 1–16. https://doi.org/10.1108/EOR-03-2023-0017/1610424/eor-03-2023-0017.pdf

Power, D. J. (2007). *A Brief History of Decision Support Systems*. 1–14. https://dssresources.com/history/dsshistoryv28.html

Ramdani, L., Abbana, S., & Marimuthu, F. (2024). Enhancing Operational Risk Management in the Mauritian Banking Sector: A Structured Approach. *International Journal of Economics and Financial Issues*, *14*(4), 1–8. https://doi.org/10.32479/ijefi.16153

Rizky, M., & Dirgahayu, T. (2025). *Blockchain for Philanthropic Crowdfunding in Indonesia : Enhancing Transparency , Accountability , and Public Trust*. *13*(3), 329–337. https://doi.org/https://doi.org/10.30595/juita.v13i3.27342

Roy, P. K., & Shaw, K. (2021). A multicriteria credit scoring model for SMEs using hybrid BWM and TOPSIS. *Financial Innovation*, *7*(1). https://doi.org/10.1186/s40854-021-00295-5

Roy, P. K., & Shaw, K. (2022). *An integrated fuzzy credit rating model using fuzzy-BWM and new fuzzy-TOPSIS-Sort-C*. *9*(4), 3581–3600.

https://doi.org/https://doi.org/10.1007/s40747-022-00823-5

Sariguna, P., & Kennedy, J. (2020). *The Impact of Financial Technology Development and the Indonesian Government Regulation*.

Seehra, J., Pandis, N., Koletsi, D., & Fleming, P. S. (2024). Use of quality assessment tools in systematic reviews was varied and inconsistent. *Journal of Clinical Epidemiology*, *69*(March 2005), 179-184.e5. https://doi.org/10.1016/j.jclinepi.2015.06.023

Shawon, A. H. (2025). Blockchain Resolutions for Credit Risk Management in Social Enterprise : Towards Sustainable Poverty Eradication in SAARC. *Journal of Economics, Management & Business Administration*, *4*(1), 1–21. https://doi.org/10.59075/jemba

Spira LF, P. M. (2003). Risk management: The reinvention of internal control and the changing role of internal audit. *Accounting, Auditing & Accountability Journal*, *16*(4), 640–661. https://doi.org/10.1108/09513570310492335

The International Organization for Standardization. (2018). ISO 31000: 2018 Risk Management Guidelines. In *ISO*. https://doi.org/10.1007/978-3-031-25984-5_314

Torraco, R. J. (2005). Writing Integrative Literature Reviews: Guidelines and Examples. *Human Resource Development Review*, *4*(3), 356–367. https://doi.org/10.1177/1534484305278283

Toth, R., & Kasa, R. (2022). SMEs before and during COVID-19. *Risks*.

Upadhya, Vaishnavi; Bendigeri, Deeksha; Nadiger, S. (2024). Exploring the Impact of Fintech on ESG (Environmental, Social, and Governance) Investments: an Empirical Analysis of Technological Innovations Shapping Sustainable Financial Practices. *International Journal of Business Ethics in Developing Economies*, *13*(1), 14.

Wan, Q., Miao, X., Wang, C., Dinçer, H., & Yüksel, S. (2023). A hybrid decision support system with golden cut and bipolar q-ROFSs for evaluating the risk-based strategic priorities of fintech lending for clean energy projects. *Financial Innovation*, *9*(1). https://doi.org/10.1186/s40854-022-00406-w

Whittemore, R., Knafl, K., & Knafl, K. (2005). *The integrative review : updated methodology*. *Broome 1993*, 546–553.

Wu, B., & Qi, Y. (2025). Does Fintech Improve the Risk-Taking Capacity of Commercial Banks? Empirical Evidence from China. *Economics*, *19*(1). https://doi.org/10.1515/econ-2025-0143

Xiao, Y., & Watson, M. (2019). Guidance on Conducting a Systematic Literature Review. *Journal of Planning Education and Research*, *39*(1), 93–112. https://doi.org/10.1177/0739456X17723971

Zhu, Y., Zhou, L., Xie, C., Wang, G., Nguyen, T. V, Zhou, L., Xie, C., Wang, G., & Nguyen, T. V. (2019). *Accepted Manuscript*. https://doi.org/10.1016/j.ijpe.2019.01.032