APTISI Transactions on Technopreneurship (ATT)
Vol. 8, No. 1, March 2026, pp. 310−324
E-ISSN: 2656-8888 | P-ISSN: 2655-8807, DOI:10.34306

Improving Risk Management Maturity in Ultra Micro SOE Holding Companies

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Article Info

Article history:

Submission March 27, 2025
Revised June 20, 2025
Accepted December 24, 2025
Published February 12, 2026

Keywords:

AHP
Marger
Maturity
Risk Management
Ultra-Micro

ABSTRACT

The dynamics of global business are highly developed along with technological advances. This also happens to state-owned enterprises which are then merged into Ultra Micro (UMi) holding consisting of PT Bank Rakyat Indonesia Tbk (BRI), PT Pegadaian, and PT Permodalan Nasional Madani (PNM). For this reason, it is necessary to have the right strategy to improve risk management maturity in this UMi holding. The research used the Analytic Hierarchy Process (AHP) approach. This **research methodology** is descriptive-analytical, with the aim of describing and analysing the factors that influence risk management in ultra-micro holding, as well as identifying the best alternative strategies based on the comparison of relevant criteria. The questionnaire was distributed to 16 respondents consisting of experts (lecturers, Financial Services Authority (OJK), Bank Indonesia (BI), BRI, PT Pegadaian, and PNM. These **findings indicate** that based on the priority of the most impactful factor is Leadership, the actor is Holding BOD, the goal is Improved leadership quality and holding risk culture, while the alternative strategy Evaluate and improve the holding's integration plan (HR, operational and business) including risk management aspects. This finding shows that leadership is very important in the process of margers and acquisitions in order to improve risk management maturity. This research contributes to achieving Sustainable Development Goals (SDGs), particularly SDG 1 (No Poverty), SDG 8 (Decent Work and Economic Growth), and SDG 16 (Strong Institutions) by developing AHP-based strategies for improving risk management maturity in ultra-micro SOE holding companies, thereby enhancing their capacity to support inclusive economic development.

DOI: https://doi.org/10.34306/att.v8i1.675

1. INTRODUCTION

The financial industry in Indonesia has undergone major transformation in recent years, particularly with the formation of the Ultra Micro (UMi) holding that unites BRI, Pegadaian, and PNM to strengthen financing for low-income and ultra-micro segments. This initiative reflects the government's effort to expand financial inclusion, while earlier studies such as [1] highlight the influence of SOEs in firms' strategic endeavours and leadership dynamics, and [2, 3] emphasise that well-managed mergers and acquisitions can enhance efficiency and competitiveness. As a new entity, UMi faces integration challenges, especially in harmonising varied risk management maturity levels, while sociocultural differences increase the importance of employee integration

as noted by [4, 5], in line with the sector's growing exposure to traditional and emerging risks including cyber, ESG, and digital disruptions.

The regulatory environment, reinforced by OJK's requirements for comprehensive, integrated risk management, urges UMi to accelerate its risk governance improvements. Prior research shows that holding structures often struggle to align risk policies across units [6], while [7] stresses that appropriate strategies support better risk identification and mitigation. Without structured strategies, the maturity gap can hinder UMi's long-term sustainability, consistent with [8] which highlights the need for an integrated approach aligning risk management with organizational goals, and [9, 10] which finds that both middle and top management involvement reduces resistance during integration.

Existing studies on risk management maturity largely focus on single institutions, leaving a gap in understanding how unique multi-entity holdings like UMi can harmonise their frameworks [11, 12]. This reinforces the need for targeted research, as [13] underscores the importance of clear targets and priorities in improving maturity levels. Therefore, this study aims to develop a comprehensive and implementable strategy to enhance UMi's risk management maturity, providing decision-makers with a strong basis for prioritization initiatives. The relevance to SDGs is evident, UMi contributes to SDG 1 through financial access for vulnerable populations [14], strengthens SDG 8 by supporting sustainable economic growth [15], and advances SDG 16 by promoting institutional governance and resilience [16].

2. LITERATURE REVIEW

At this level of focus, AHP is used to identify and establish key objectives for developing strategies that enhance the risk management maturity of the ultra-micro holding by breaking down broad issues into more specific sub-levels, as highlighted by [17]. Strong leadership is essential for building a robust risk culture, with [18] noting that effective leaders significantly influence risk-related decision-making. Change management enables organizations to adapt to internal and external shifts, which is crucial for successful transformation as emphasized by [19], while Organizational Restructuring strengthens risk management capabilities according to [20, 21]. Human resource policies also enhance employees' competencies in dealing with risks, as stated by [22], and good governance reinforces the structure and processes of risk management, as revealed by [23]. Recent literature further underscores the critical role of state-owned enterprises in supporting SDG implementation, where risk management maturity is identified as a key factor, particularly in developing countries, thereby demonstrating how the intersection of risk management and sustainable development can improve SDG performance [24].

2.1. Theoritical Framework

Analytic Hierarchy Process (AHP) is a systematic decision-making method for solving complex problems by breaking them down into structural components [17, 25]. In this research, there is a hierarchy scheme in an effort to improve the risk management maturity strategy of the BUMN Ultra Mikro holding presented in Figure 1.

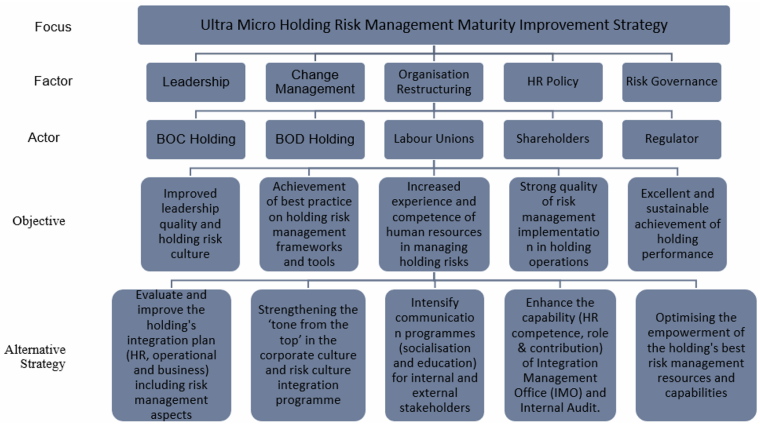

Figure 1. Strategy for Improving the Risk Management Maturity of Ultra Micro SOE Holding Companies

2.1.1. Focus Level

The focus of AHP is the main problem to be solved, which is the starting point for creating a decision hierarchy [26]. In this research, the focus level is the preparation of a strategy to improve the Risk Management Maturity of UMi holding, which aims to provide a basis for decision making in prioritization alternative strategies to achieve the established risk management maturity target [27, 28].

2.1.2. Factor Level

Factors in AHP are criteria that guide decision making and include both qualitative and quantitative aspects [29]. In this study, the factors consist of leadership that is distributed and participative in managing risk across Bank BRI, Pegadaian, and PNM, change management that drives transformation and organizational synergy, Organizational Restructuring that adjusts structures to strengthen risk handling, HR policies that build risk management competence through training, and risk governance that applies the three line model while promoting transparency, accountability, responsibility, independence, and fairness throughout organizational processes [30].

2.1.3. Actor Level

Actors in AHP are the decision makers who determine assessments and weights for each criterion [31]. In this study, the actors include the Boards of Commissioners and Directors of Bank BRI, Pegadaian, and PNM who oversee governance and execute strategic decisions, trade unions that represent employees facing uncertainty during the holding formation, shareholders represented by the Government of Indonesia through the Ministry of State Owned Enterprises, and regulators including the Financial Services Authority for microprudential supervision and Bank Indonesia for macroprudential oversight and payment system management.

2.1.4. Objective Level

The purpose of AHP is to generate priority rankings of strategy alternatives, and in this study the objective level focuses on improving leadership quality and risk culture through active involvement of commissioners supervisors and directors in strengthening governance. Another objective is achieving best practice in the risk management framework by enhancing structures processes modelling technology and data. The study also aims to increase human resource competence through systematic capability building, ensure consistent implementation of risk management in daily operations, and ultimately achieve strong and sustainable holding performance across financial and non financial aspects.

2.1.5. Level of Strategy Alternatives

Alternative strategies in AHP provide practical options for solving the problem and help decision makers choose the best approach through numerical evaluation [32, 33]. In this study, the strategy level includes continuous improvement of HR operations and process integration, reinforcing leadership commitment to strengthen corporate and risk culture, and enhancing communication so stakeholders clearly understand the holding formation. It also involves boosting the capability of the Integration Management Office and Internal Audit to manage integration risks and optimising the use of the holding strongest risk management resources through best practice and effective use of existing competencies data and systems [34, 35].

3. RESEARCH METHODOLOGY

This research aims to develop a strategy to improve risk management maturity in the ultra-micro holding using the AHP, chosen for its ability to handle complex decisions involving multiple criteria and alternatives. AHP enables the prioritisation of strategies by structuring the problem into a hierarchy and breaking it into smaller, more measurable components. The methodology is descriptive-analytical, focusing on analysing the factors that affect risk management maturity and identifying the most appropriate strategy alternatives [36–38].

Primary data were collected through questionnaires designed to assess key factors influencing risk management maturity and to compare strategy alternatives through pairwise assessments, which are central to AHP [39, 40]. The questionnaire was distributed to 16 expert respondents from academia, the Financial Services Authority, Bank Indonesia, BRI, Pegadaian, and PNM, ensuring that the analysis reflects perspectives from both regulatory and operational environments [41].

4. RESULT AND DISCUSSION

4.1. Factor Level

The AHP results show Leadership as the top driver of risk management maturity with a weight of 0.383, followed by Change Management at 0.249, while Risk Governance at 0.153 and Organizational Restructuring at 0.148 act as structural supports. HR Policies has the lowest weight of 0.066, indicating that efforts should prioritize strong leadership, accelerated change management, and improved governance frameworks [42].

Table 1. Matrix of Factor Criteria Values

Factor	Leadership	Change Management	Organizational Restructuring	HR Policy	Risk Governance	Total	Priority	Eigen Value
Leadership	0.411	0.594	0.331	0.222	0.359	1.916	0.383	0.896
Change Management	0.133	0.193	0.361	0.243	0.314	1.245	0.249	1.884
Organizational Restructuring	0.162	0.070	0.130	0.243	0.136	0.741	0.148	1.506
HR Policy	0.127	0.054	0.037	0.069	0.045	0.332	0.066	1.158
Risk Governance	0.167	0.090	0.140	0.223	0.146	0.766	0.153	0.955
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**6.399**

The Table 1 shows Change Management as the strongest factor at 1.884, followed by Organizational Restructuring at 1.506, with HR Policies at 1.158, Risk Governance at 0.955, and Leadership at 0.896 supporting, indicating priority should focus on change management and restructuring. The consistency ratio of 0.084 confirms the results are consistent and valid.

4.2. Actor Level

4.2.1. Leadership

The Table 2 shows a centralised structure led by the Holding BOD with a weight of 0.366, followed by the Holding BOC at 0.248, while Shareholders at 0.151, Regulators at 0.128, and Trade Unions at 0.107 play smaller supporting roles, indicating decision making is concentrated at the board level [43].

Table 2. Matrix of Actor Criteria Values (Leadership)

Actor	Holding BOC	Holding BOD	Labour Union	Shareholders	Regulator	Total	Priority	Eigen Value
Holding BOC	0.264	0.331	0.270	0.236	0.138	1.240	0.248	0.940
Holding BOD	0.286	0.359	0.385	0.455	0.345	1.830	0.366	1.019
Labour union	0.104	0.099	0.107	0.150	0.078	0.537	0.107	1.009
Shareholders	0.132	0.093	0.084	0.118	0.328	0.755	0.151	1.277
Regulator	0.214	0.117	0.154	0.040	0.112	0.638	0.128	1.138
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.383**

The AHP Eigen Value analysis for Leadership shows that Shareholders hold the strongest influence with a value of 1.277, followed by Regulators with 1.138 and Trade Unions with 1.009, while the Holding BOD with 1.019 remains a key decision maker and the Holding BOC with 0.940 provides governance support, reflecting a multifaceted leadership structure. The consistency ratio of 0.085 is below 10 per cent, indicating that the results are consistent and valid for strategic decision making to improve risk management maturity.

4.2.2. Change Management

In the AHP analysis of the Change Management actor criteria value matrix, Holding BOD emerges as the dominant entity with a priority of 0.395, confirming its key role in driving organizational transformation. Holding BOC with a contribution of 0.251 supports the change process, reflecting the active involvement of the top management level. Shareholders (0.144) and Trade Unions (0.127) contribute moderately in driving the change dynamics, while Regulators with the lowest weight of 0.083 play a limited oversight role. This hierarchy

reveals that the initiation and implementation of change management relies heavily on strategic leadership, particularly the Board of Directors, with structural support from the Board of Commissioners (Shows on Table 3.

Table 3. Value Matrix of Actor Criteria (Change Management)

Actor	Holding BOC	Holding BOD	Labour Union	Share-holders	Regu-lator	Total	Priority	Eigen Value
Holding BOC	0.269	0.301	0.280	0.207	0.200	1.256	0.251	0.936
Holding BOD	0.349	0.392	0.488	0.413	0.333	1.975	0.395	1.008
Labour union	0.100	0.084	0.104	0.207	0.140	0.634	0.127	1.220
Shareholders	0.166	0.121	0.064	0.128	0.240	0.720	0.144	1.126
Regulator	0.116	0.102	0.064	0.046	0.087	0.415	0.083	0.959
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.248**

Trade Unions lead change management with an Eigen Value of 1.220, followed by Shareholders at 1.126, while the Holding BOD at 1.008 and the Regulator at 0.959 and Holding BOC at 0.936 have smaller roles. The consistency ratio of 0.055 confirms the results are consistent and valid.

4.2.3. Organizational Restructuring

The Table 4 show Organizational Restructuring is driven mainly by the Holding BOC at 0.348 and Holding BOD at 0.347, with Trade Unions at 0.134 providing support and Shareholders at 0.105 and Regulators at 0.065 playing minor roles, highlighting strong board synergy in guiding structural change.

Table 4. Value Matrix of Actor Criteria (Organizational Restructuring)

Actor	Holding BOC	Holding BOD	Labour Union	Share-holders	Regu-lator	Total	Priority	Eigen Value
Holding BOC	0.386	0.457	0.402	0.280	0.217	1.742	0.348	0.903
Holding BOD	0.271	0.321	0.387	0.387	0.371	1.737	0.347	1.081
Labour union	0.107	0.093	0.112	0.222	0.134	0.668	0.134	1.193
Shareholders	0.117	0.070	0.043	0.085	0.211	0.526	0.105	1.241
Regulator	0.119	0.058	0.056	0.027	0.067	0.327	0.065	0.977
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.396**

Shareholders as the most influential in restructuring at 1.241, followed by Trade Unions at 1.193, with the Holding BOD at 1.081 and the Regulator at 0.977 and Holding BOC at 0.903 having smaller roles, indicating the need for broad stakeholder involvement. The consistency ratio of 0.088 confirms the results are consistent and valid.

4.2.4. HR Policy

The Table 5 show HR policies are mainly driven by the Holding BOD with a weight of 0.427, followed by the Holding BOC at 0.267, while Trade Unions at 0.142 and Shareholders at 0.100 and Regulators at 0.064 play smaller supporting roles, indicating HR policy is largely shaped by internal management.

Table 5. Value Matrix of Actor Criteria (HR Policy)

Actor	Holding BOC	Holding BOD	Labour Union	Share-holders	Regu-lator	Total	Priority	Eigen Value
Holding BOC	0.270	0.270	0.230	0.273	0.293	1.336	0.267	0.990
Holding BOD	0.438	0.438	0.543	0.424	0.293	2.136	0.427	0.975
Labour union	0.140	0.097	0.120	0.178	0.176	0.710	0.142	1.186
Shareholders	0.088	0.092	0.060	0.089	0.170	0.499	0.100	1.122
Regulator	0.064	0.104	0.047	0.036	0.069	0.320	0.064	0.925
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.198**

Trade Unions are the most influential in HR policy with an Eigen Value of 1.186, followed by Shareholders at 1.122, while the Holding BOC at 0.990 and Holding BOD at 0.975 share a balanced role and Regulators at 0.925 have the least impact. The consistency ratio of 0.043 confirms the results are consistent and valid.

4.2.5. Risk Governance

The Table 6 shows risk governance is primarily driven by the Holding BOC at 0.360 and the Holding BOD at 0.347, while Shareholders at 0.103, Trade Unions at 0.097, and Regulators at 0.092 provide supporting roles, indicating governance effectiveness depends mainly on the two boards.

Table 6. Value Matrix of Actor Criteria (Risk Governance)

Actor	Holding BOC	Holding BOD	Labour Union	Shareholders	Regulator	Total	Priority	Eigen Value
Holding BOC	0.382	0.412	0.377	0.366	0.267	1.802	0.360	0.945
Holding BOD	0.310	0.334	0.432	0.385	0.275	1.736	0.347	1.038
Labour union	0.081	0.062	0.080	0.132	0.130	0.486	0.097	1.211
Shareholders	0.086	0.071	0.050	0.082	0.229	0.517	0.103	1.263
Regulator	0.142	0.121	0.061	0.036	0.099	0.459	0.092	0.924
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.381**

Shareholders lead risk governance with an Eigen Value of 1.263, followed by Trade Unions at 1.211, while the Holding BOD at 1.038 leads execution and the Holding BOC at 0.945 and Regulator at 0.924 play smaller roles. The consistency ratio of 0.085 confirms the results are consistent and valid.

4.3. Objective Level

4.3.1. Holding BOC

The Table 7 show the BOC prioritises Leadership and Risk Culture at 0.517, followed by the Risk Management Framework and Tools at 0.231, while Implementation Quality at 0.101, HR Competence at 0.082, and Holding Performance at 0.069 play smaller roles, indicating focus on a strong risk foundation.

Table 7. Objective Criteria Value Matrix (Holding BOC)

Objective	Leadership and risk culture	MR Framework and Tools	HR Experience and Competence	Quality of Risk Management Implementation	Achievement of Holding Performance	Total	Priority	Eigen Value
Leadership and risk culture	0.561	0.659	0.450	0.471	0.447	2.587	0.517	0.922
MR framework and tools	0.155	0.182	0.333	0.249	0.234	1.154	0.231	1.266
HR experience and competence	0.090	0.039	0.072	0.159	0.048	0.409	0.082	1.133
Quality of risk management implementation	0.107	0.066	0.041	0.090	0.202	0.506	0.101	1.124
Achievement of holding performance	0.087	0.054	0.104	0.031	0.069	0.345	0.069	0.997
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.443**

The AHP Eigen Value analysis shows the Risk Management Framework and Tools as the top BOC priority at 1.266, followed by HR Experience and Competence at 1.133 and Implementation Quality at 1.124, while Holding Performance at 0.997 and Leadership and Risk Culture at 0.922 have smaller roles. The consistency ratio of 0.099 confirms the results are consistent and valid.

4.3.2. Holding BOD

The Table 8 show the BOD prioritises Leadership and Risk Culture at 0.428, followed by HR Experience at 0.207, with the Framework and Tools at 0.145 and Implementation Quality at 0.137 supporting, while Holding Performance at 0.083 has minimal influence, focusing on a strong risk foundation.

Table 8. Matrix of Goal Criteria Values (Holding BOD)

Objective	**Leadership and risk culture**	**MR Framework and Tools**	**HR Experience and Competence**	**Quality of Risk Management Implementation**	**Achievement of Holding Performance**	**Total**	**Priority**	**Eigen Value**
Leadership and risk culture	0.430	0.582	0.576	0.251	0.299	2.138	0.428	0.994
MR framework and tools	0.095	0.128	0.173	0.157	0.174	0.726	0.145	1.132
HR experience and competence	0.112	0.111	0.150	0.376	0.285	1.034	0.207	1.381
Quality of risk management implementation	0.233	0.111	0.054	0.136	0.153	0.687	0.137	1.011
Achievement of holding performance	0.130	0.067	0.047	0.080	0.090	0.415	0.083	0.919
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.437**

HR Experience and Competence is the top factor for Holding BOD at 1.381, followed by the Risk Management Framework at 1.132 and Quality of Implementation at 1.011, with smaller influence from Leadership and Risk Culture and Holding Performance. The consistency ratio of 0.098 confirms consistency.

4.3.3. Labour Union

The Table 9 show Leadership and Risk Culture as the Union's top priority at 0.392, followed by HR Experience at 0.193, with the Framework and Tools at 0.178 and Implementation Quality at 0.162, while Holding Performance at 0.075 has minimal influence, focusing on core risk management foundations.

Table 9. Objective Criteria Value Matrix (Labour Union)

Objective	**Leadership and risk culture**	**MR Framework and Tools**	**HR Experience and Competence**	**Quality of Risk Management Implementation**	**Achievement of Holding Performance**	**Total**	**Priority**	**Eigen Value**
Leadership and risk culture	0.409	0.422	0.477	0.398	0.253	1.959	0.392	0.958

MR framework and tools	0.177	0.183	0.185	0.210	0.135	0.891	0.178	0.973
HR experience and competence	0.148	0.170	0.172	0.210	0.264	0.964	0.193	1.120
Quality of risk management implementation	0.148	0.125	0.118	0.144	0.275	0.810	0.162	1.127
Achievement of holding performance	0.118	0.099	0.048	0.038	0.073	0.376	0.075	1.030
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.207**

The AHP analysis shows Trade Unions prioritise Quality of Risk Management Implementation at 1.127, followed by HR Experience at 1.120, with support from Holding Performance at 1.030, the Risk Management Framework at 0.973, and Leadership at 0.958. The consistency ratio of 0.046 confirms consistency.

4.3.4. Shareholders

The Table 10 shows shareholders prioritise Leadership and Risk Culture at 0.408, followed by the Risk Management Framework at 0.232, with moderate focus on Holding Performance and balanced support from Implementation Quality and HR Experience, emphasizing strategic foundations.

Table 10. Objective Criteria Value Matrix (Shareholders)

Objective	**Leadership and risk culture**	**MR Framework and Tools**	**HR Experience and Competence**	**Quality of Risk Management Implementation**	**Achievement of Holding Performance**	**Total**	**Priority**	**Eigen Value**
Leadership and risk culture	0.400	0.623	0.456	0.332	0.232	2.042	0.408	1.021
MR framework and tools	0.108	0.169	0.292	0.299	0.293	1.161	0.232	1.376
HR experience and competence	0.078	0.051	0.088	0.126	0.171	0.514	0.103	1.163
Quality of risk management implementation	0.141	0.066	0.082	0.117	0.146	0.551	0.110	0.945
Achievement of holding performance	0.274	0.091	0.082	0.126	0.159	0.732	0.146	0.923
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.429**

The AHP Eigen Value analysis shows shareholders prioritise the Risk Management Framework at 1.376, followed by HR Experience at 1.163 and Leadership at 1.021, with smaller roles for Implementation Quality at 0.945 and Holding Performance at 0.923. The consistency ratio of 0.096 confirms consistency.

4.3.5. Regulator

The Table 11 shows that Leadership and Risk Culture is the top priority for regulators at 0.316, followed by the Risk Management Framework at 0.276 and Quality of Implementation at 0.202, highlighting a focus on governance and compliance. HR Experience and Competence at 0.138 shows moderate contribution, while Holding Performance at 0.068 emphasizes prioritizing governance over financial performance, aligning with regulators' role in ensuring sustainable risk management.

Table 11. Objective Criteria Value Matrix (Regulator)

Objective	Leadership and risk culture	MR Framework and Tools	HR Experience and Competence	Quality of Risk Management Implementation	Achievement of Holding Performance	Total	Priority	Eigen Value
Leadership and risk culture	0.327	0.373	0.374	0.261	0.245	1.581	0.316	0.967
MR framework and tools	0.236	0.270	0.315	0.276	0.286	1.382	0.276	1.025
HR experience and competence	0.112	0.110	0.128	0.232	0.107	0.689	0.138	1.077
Quality of risk management implementation	0.236	0.185	0.104	0.189	0.296	1.009	0.202	1.070
Achievement of holding performance	0.089	0.063	0.079	0.042	0.066	0.339	0.068	1.022
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.160**

The AHP Eigen Value analysis shows that regulators prioritise HR Experience and Competence at 1.077 and Quality of Implementation at 1.070, with the Risk Management Framework and Tools at 1.025 and Holding Performance at 1.022 receiving balanced focus, while Leadership and Risk Culture at 0.967 has a moderate role, indicating emphasis on HR strength and implementation quality. The consistency ratio of 0.036 confirms the results are consistent and valid.

4.4. Level of Strategy Alternatives

4.4.1. Leadership and Risk Culture

The Table 12 show the Integration Plan as the top priority at 0.410, followed by Tone from the Top at 0.206, with the Communication Programme at 0.165 and IMO and Internal Audit at 0.124 providing support, while Resources and Capabilities at 0.095 has the least influence, indicating that structural and behavioural alignment is the main focus in shaping an effective risk culture.

Table 12. Strategic Alternative Criteria Value Matrix (Leadership and Risk Culture)

Alternatives	Integration Plan	Tone from the Top	(Imo) and Internal Audit	Communication Programme	Resources and Capabilities	Total	Priority	Eigen Value
Integration plan	0.409	0.518	0.527	0.425	0.170	2.049	0.410	1.003
Tone from the top	0.140	0.177	0.190	0.182	0.340	1.030	0.206	1.161

(Imo) and internal audit	0.087	0.105	0.112	0.182	0.136	0.622	0.124	1.108
Communication programme	0.152	0.154	0.097	0.158	0.265	0.826	0.165	1.046
Resources and capabilities	0.213	0.046	0.073	0.053	0.088	0.473	0.095	1.069
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.388**

The AHP analysis shows Tone from the Top as the most influential at 1.161, followed by IMO and Internal Audit at 1.108, with Resources, Communication, and Integration Plan supporting. The consistency ratio of 0.087 confirms consistency.

4.5. MR Framework and Tools

The Table 13 show the integration plan as the top priority at 0.398, followed by Tone from the Top at 0.245 and IMO and internal audit at 0.169, while resources and capabilities at 0.103 and the communication programme at 0.085 play smaller but still meaningful roles in strengthening the risk management framework.

Table 13. Value Matrix of Alternative Strategy Criteria (MR Framework and Tools)

Alternatives	**Integration Plan**	**Tone from the Top**	**(Imo) and Internal Audit**	**Communication Programme**	**Resources and Capabilities**	**Total**	**Priority**	**Eigen Value**
Integration plan	0.429	0.548	0.403	0.297	0.314	1.991	0.398	0.927
'Tone from the top'	0.164	0.209	0.384	0.228	0.240	1.225	0.245	1.170
(Imo) and internal audit	0.130	0.066	0.122	0.269	0.256	0.843	0.169	1.385
Communication programme	0.130	0.083	0.041	0.090	0.083	0.425	0.085	0.948
Resources and capabilities	0.147	0.094	0.051	0.117	0.107	0.516	0.103	0.960
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.391**

The AHP analysis shows Internal Management Oversight and internal audit as the top influence at 1.385, followed by Tone from the Top at 1.170, with resources, communication, and integration supporting at 0.960, 0.948, and 0.927, highlighting the importance of oversight, leadership, and capacity. The consistency ratio of 0.087 confirms consistency.

4.5.1. HR Experience and Competence

The Table 14 shows the integration plan as the top HR strategy priority at 0.429, followed by Tone from the Top at 0.246, with Internal Management Oversight at 0.120, resources at 0.117, and communication at 0.088 supporting HR development.

Table 14. Alternative Strategy Criteria Value Matrix (HR Experience and Competence)

Alternatives	**Integration Plan**	**Tone from the Top**	**(Imo) and Internal Audit**	**Communication Programme**	**Resources and Capabilities**	**Total**	**Priority**	**Eigen Value**
Integration plan	0.451	0.627	0.419	0.347	0.300	2.144	0.429	0.951
'Tone from the top'	0.130	0.181	0.350	0.278	0.290	1.230	0.246	1.357
(Imo) and internal audit	0.107	0.051	0.099	0.194	0.150	0.601	0.120	1.214

Communication programme	0.117	0.059	0.046	0.090	0.130	0.442	0.088	0.980
Resources and capabilities	0.195	0.081	0.086	0.090	0.130	0.583	0.117	0.896
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.399**

Tone from the Top is the top driver of HR development at 1.357, followed by Internal Management Oversight at 1.214, with supporting roles from the communication programme, integration plan, and resources. The consistency ratio of 0.089 confirms the results are consistent.

4.5.2. Quality of Risk Management Implementation

The Table 15 shows the integration plan as the top priority at 0.311, followed by Tone from the Top at 0.296, emphasizing leadership's role in risk management. IMO and internal audit at 0.158 ensure implementation quality, while Resources and Capabilities at 0.120 and communication programmes at 0.116 support the process.

Table 15. Value Matrix of Alternative Strategy Criteria (Quality of Risk Management Implementation)

Alternatives	**Integration Plan**	**Tone from the Top**	**(Imo) and Internal Audit**	**Communication Programme**	**Resources and Capabilities**	**Total**	**Priority**	**Eigen Value**
Integration plan	0.324	0.395	0.387	0.248	0.202	1.556	0.311	0.960
'Tone from the top'	0.234	0.285	0.387	0.274	0.298	1.478	0.296	1.036
(Imo) and internal audit	0.096	0.084	0.114	0.282	0.212	0.788	0.158	1.380
Communication programme	0.145	0.116	0.045	0.111	0.163	0.581	0.116	1.045
Resources and capabilities	0.201	0.120	0.068	0.085	0.125	0.598	0.120	0.956
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.377**

The AHP Eigen Value analysis shows IMO and internal audit as the top factors in risk management implementation at 1.380, followed by Tone from the Top at 1.036, with the communication programme at 1.045, integration plan at 0.960, and resources at 0.956 supporting the process. The consistency ratio of 0.084 confirms the results are consistent and valid.

4.5.3. Achievement of Holding Performance

The Table 16 shows the integration plan as the top priority for holding performance at 0.404, followed by Tone from the Top at 0.282, highlighting leadership's role. Resources at 0.123, Internal Management Oversight at 0.114, and communication at 0.077 support performance, emphasizing internal capacity, oversight, and coordination.

Table 16. Matrix of Alternative Strategy Criteria Values (Achievement of Holding Performance)

Alternatives	**Integration Plan**	**Tone from the Top**	**(Imo) and Internal Audit**	**Communication Programme**	**Resources and Capabilities**	**Total**	**Priority**	**Eigen Value**
Integration plan	0.427	0.628	0.402	0.336	0.227	2.020	0.404	0.947
'Tone from the top'	0.135	0.199	0.349	0.270	0.455	1.409	0.282	1.414
(Imo) and internal audit	0.107	0.058	0.101	0.184	0.118	0.568	0.114	1.126

Communication programme	0.109	0.063	0.047	0.086	0.082	0.386	0.077	0.902
Resources and capabilities	0.222	0.052	0.101	0.124	0.118	0.617	0.123	1.043
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**5.000**	**1.000**	**5.432**

The AHP Eigen Value analysis shows 'Tone from the Top' as the most influential factor at 1.414, followed by the integration plan at 0.947. Internal Management Oversight and internal audit at 1.126 highlight the importance of oversight, while Resources and Capabilities at 1.043 emphasize internal capacity building. Communication programmes at 0.902 remain relevant, despite their lower weight. The consistency ratio of 0.097 confirms the results are consistent.

4.6. Discussion

The AHP analysis highlights key factors for improving risk management maturity in ultra-micro holding. Change Management is the most dominant factor with an eigenvalue of 1.884, followed by Trade Unions at 1.220, playing a key role in developing risk culture. The quality of risk management implementation at 1.127 is a crucial goal, and extending communication programmes at 1.380 is prioritized for stakeholder education. The hierarchical priorities for improving risk management maturity are shown in Figure 2.

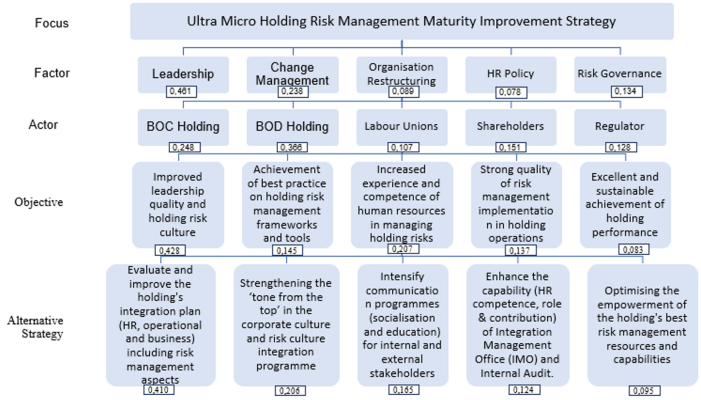

Figure 2. Results of the Strategy to Improve the Risk Management Maturity of UMi SOE Holding

This research uses AHP to prioritize factors, actors, objectives, and strategies for improving risk management maturity in UMi holding. Key factors include leadership, with Tone from the Top as critical, followed by the integration plan, Internal Management Oversight, and HR Experience. The BOD plays a significant role in driving risk management strategies, supported by empirical evidence that leadership and risk culture affect performance. Strategies like improving the integration plan, covering HR, operations, and risk management, align with best practices and have strong support from previous studies.

5. MANAGERIAL IMPLICATIONS

The findings of this study suggest that effective leadership is the key to improving risk management maturity within UMi holding companies. The results emphasize the critical role of leadership in fostering a strong risk culture and driving organizational change, which are essential for adapting to emerging risks and improving overall performance. The study highlights that change management and Organizational Restructuring should be prioritized as integral components of the strategy to enhance risk management maturity. Additionally, the involvement of all stakeholders, including top management, HR policies, and risk governance practices, plays a vital role in achieving sustainable risk management improvements. By focusing on these factors, UMi holding companies can build a robust and adaptable risk management system that aligns with both business objectives and regulatory demands, ensuring long-term operational resilience and contributing to the achievement of Sustainable Development Goals (SDGs), particularly SDG 16 and SDG 8.

6. CONCLUSION

Based on a synthesis of previous studies, the strategy to improve the risk management maturity of UMi holding with a focus on BOD leadership has a solid theoretical and empirical foundation. The application of the AHP methodology in this context has proven to be effective and relevant, while the focus on leadership factors and the role of the BOD as key actors is supported by various studies that show a strong correlation with organizational performance.

The proposed alternative strategy, namely the evaluation and improvement of a comprehensive holding integration plan, is in line with best practices identified in academic literature and industry practice. The implementation of this strategy is expected not only to improve risk management maturity but also to contribute to the improvement of overall organizational performance.

The strategic prioritization through AHP demonstrates clear SDG alignment. The highest-ranked strategy (Change Management Factor) directly addresses SDG 16 (effective, accountable institutions) while simultaneously improving risk management capabilities. This dual benefit exemplifies how institutional improvements can simultaneously serve business objectives and global development goals. The financial inclusion strategy's high ranking reflects its direct contribution to SDG 1 (equal access to financial services) and SDG 8 (domestic financial institution capacity). The AHP weighting confirms that stakeholders prioritize strategies with clear poverty reduction potential.

7. DECLARATIONS

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Conceptualization: PN; Methodology: DS; Software: ES; Validation: AS and DS; Formal Analysis: ES and PN; Investigation: DS; Resources: ES; Data Curation: PN; Writing Original Draft Preparation: ES and DS; Writing Review and Editing: PN and AS; Visualization: DS; All authors, ES, DS, AS, and PN, have read and agreed to the published version of the manuscript.

7.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

7.4. Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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