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Strengthening Local Industrial Ecosystems: Potentials and Challenges of IKM Development in North Sumatra

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Abstract

This study evaluates the readiness and competitiveness of Small and Medium Industry (IKM) clusters across districts and cities in North Sumatra using a structured scoring model that assesses six key dimensions: institutional and legal capacity, production and human resources, market access and competitiveness, sustainability and development, and linkages to Special Economic Zones (KEK) and Industrial Estates (KI). The analysis, based on quantitative scoring complemented by qualitative insights, reveals significant disparities in cluster performance. Leading clusters such as the Simalungun Coffee Cluster and the Serdang Bedagai Pandan Weaving Cluster demonstrate strong institutional frameworks, high production capacity, product innovation, and established market linkages. Meanwhile, developing and potential clusters exhibit moderate performance but require improvements in technology adoption, product diversification, and market expansion. Clusters in the guidance category face fundamental challenges, including weak institutional structures, limited production capabilities, and minimal access to broader markets. Overall, the findings highlight the critical role of institutional strengthening, technological upgrading, and market integration as core strategies for cluster development. The study recommends a phased and targeted development approach tailored to each cluster's readiness level to enhance regional competitiveness and support sustainable industrial growth in North Sumatra.

Keywords: *Small and Medium Industry (IKM), Cluster Development; Competitivenes Institutional Capacity Market Access; KEK–KI Linkages; North Sumatra*

I. INTRODUCTION

Small and Medium Industries (IKM) serve as a fundamental pillar of the national economic structure, including in North Sumatra Province. IKM not only absorbs a substantial share of the labor force but also drives value addition from local resources and strengthens the national industrial supply chain. According to the Central Bureau of Statistics (BPS, 2023), Indonesia has 4,181,128 micro enterprises and 319,456 small enterprises. The highest concentration of IKM remains in Java—particularly East Java, West Java, and Central Java—due to their more advanced industrial infrastructure and logistics networks. Nevertheless, provinces outside Java, such as North Sumatra and West Nusa Tenggara, show a notable upward trend in IKM growth, although they have not yet reached the industrial density and maturity found in western and central Indonesia. At the provincial level, North Sumatra hosts approximately 126,907 IKM units spread across districts and cities, contributing significantly to local economic activity and employment. Based on estimates from the Ministry of Industry (2024), the national IKM sector employs around 13.1 million workers. With North Sumatra contributing roughly 3.03% of this total, the sector is estimated to absorb about 397,000 workers in the province alone. (Porter, 1998) This highlights the strategic role of IKM in strengthening community-based economic structures and From a policy perspective, national industrial development follows the National Industrial Development Master Plan (RIPIN) 2015–2035, as mandated by Government Regulation No. 14 of 2015. RIPIN outlines a long-term vision to increase the contribution of the non-oil and gas industrial sector to the national GDP from 21.2% (2015) to 30% by 2035. One of its key priorities is the equitable distribution of industrial value-added outside Java—targeted to increase from 27.7% to 40%—through the strengthening of region-based IKM. This policy direction is reinforced by Government Regulation No. 7 of 2021 on the Facilitation, Protection, and Empowerment of Cooperatives and MSMEs, which provides a strong legal foundation for streamlining licensing procedures, expanding access to finance, strengthening institutions, and improving market access. (Schmitz, 1995)

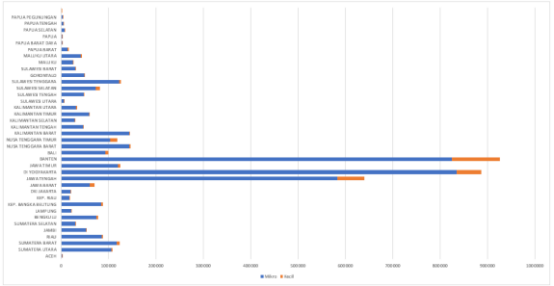

Figure 1. Distribution of Small and Medium Industries in Indonesia, BPS Statistics 2023

In North Sumatra, the IKM ecosystem is closely linked to the development of strategic industrial zones, including the Sei Mangkei Special Economic Zone (SEZ), the Medan Industrial Estate (KIM), and the Kuala Tanjung Industrial Estate. The Sei Mangkei SEZ focuses on the downstream processing of palm oil and rubber; KIM functions as a hub for manufacturing and logistics; while Kuala Tanjung is oriented toward port-based industries and export activities. The interconnection between community-level IKM centers and these strategic industrial zones forms a mutually reinforcing regional production system. (Humphrey, 2002) Local raw materials are processed by IKM at the village or sub-district level into intermediate or semi-finished products, which are subsequently absorbed by medium and large industries within these industrial estates (Tambunan, 2019). Conversely, SEZs and industrial estates serve as sources of technology transfer (spillover effects), industrial partnerships, and expanded markets for IKM products, thus forming an integrated industrial symbiosis. (Berry, A., Rodriguez, E., & Sandee, H., 2001)

The impact of IKM development on employment is also substantial. Every 1,000 IKM units in North Sumatra are estimated to generate 8,000–10,000 direct jobs, in addition to indirect employment opportunities in logistics, transportation, and supporting services. Therefore, strengthening the IKM sector is not only an economic development strategy but also a mechanism for poverty reduction, territorial equity, and industrial resilience at the regional level. (Hill, 2021)

Given this strong potential, comprehensive policy support, and strategic integration with industrial zones, North Sumatra has significant opportunities to reinforce its local-resource-based industrial ecosystem. (Narjoko, 2007) However, optimizing these opportunities requires strengthened institutions, product standardization, market integration, and a clear roadmap for IKM center development—particularly in the context of forming and advancing designated IKM clusters. (Alna, 2022)

II. RESEARCH METHODOLOGY

Research Approach

This study applied a **mixed-method (qualitative–quantitative)** approach to obtain a comprehensive understanding of the potential of IKM centers. Quantitative methods were used to analyze statistical data, commodity potential, and productivity, while qualitative methods explored deeper insights from IKM actors, stakeholders, and relevant institutions. The research design was **descriptive–exploratory**, aimed at identifying and analyzing the potentials, challenges, and opportunities for IKM center development.

Research Location and Period

The research was conducted in major IKM-active regions—Medan, Binjai, Deli Serdang, Serdang Bedagai, Batubara, Asahan, Karo, and Simalungun.

Data Sources

The study used primary and secondary data. Primary data were obtained through in-depth interviews, field observations, and questionnaire surveys targeting IKM actors and related stakeholders. Secondary data were sourced from BPS, the Department of Industry and Trade, and other official publications containing statistics on business units, workforce, production, and regional distribution.

Data Analysis Techniques

Data were analyzed using: [1] Descriptive analysis to summarize IKM characteristics, [2] SWOT analysis to identify internal and external factors, and, [3] Scoring analysis to determine priority levels and development strategies.

III. RESULTS AND DISCUSSION

Scoring Analysis of IKM Center Readiness and Potential

The evaluation of Small and Medium Industry (IKM) centers in North Sumatra was carried out using a scoring system that assesses several key aspects influencing their readiness and competitiveness. These aspects include:

1. institutional capacity and legal status,
2. production and human resources,
3. market access and competitiveness,
4. sustainability and development prospects,
5. linkages with Special Economic Zones (SEZ), and
6. linkages with Industrial Estates (IE).

Each aspect was assigned a weighted score, producing a total maximum score of 100. Based on the final score, IKM centers were classified into four categories:

- **Excellent (56.61–70.06)**
- **Developing (38.01–56.60)**
- **Potential (40.02–47.53)**
- **Under Development (16.27–27.54)**

Overall, the scoring analysis shows that while North Sumatra has several high-performing IKM centers, most centers remain in the *Potential* or *Under Development* category. This indicates the need for targeted strategies to:

1. strengthen institutions and production capacity,
2. expand market access through local, national, and international partnerships,
3. encourage product innovation and diversification, and
4. enhance sustainability through government support and stakeholder collaboration.

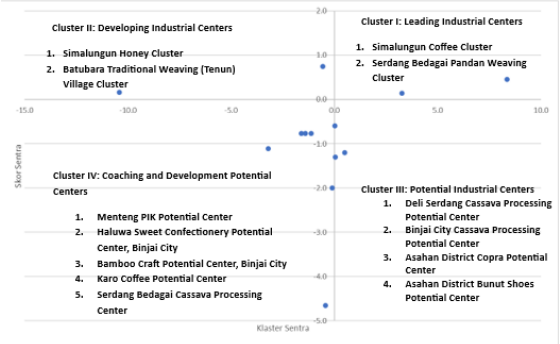

Figure 2. Overview of the Classification of Industrial Centers Based on Scoring Analysis

Excellent Category (56.61–70.06)
IKM centers in this category demonstrate strong institutional structures, high production capacity, skilled human resources, wide market access, and continuous innovation. Examples include:

- **Simalungun Coffee Center (Score 70.06)** – High institutional maturity, strong production performance, and sustained innovation supported by the local government.
- **Pandan Weaving Center, Serdang Bedagai (Score 58.55)** – Strong organization, reliable production, broad marketing networks, and access to SEZ and IE markets.

These centers act as role models for other regions due to their competitive advantages and consistent development.

Developing Category (38.01–56.60)
Centers in this category show considerable potential but still require improvements in technology, market access, and product diversification.

- **Simalungun Honey Center (Score 38.80)** – Adequate institutional and production capacity but limited innovation and market reach.
- **Batubara Tenun Center (Score 37.76)** – Potential in human resources and production, but requires stronger institutions and broader marketing networks.

Strategic interventions needed include institutional strengthening, technology upgrading, product innovation, and expanded partnerships.

Potential Category (40.02–47.53)
These centers have adequate production capacity and available human resources, but market access remains limited and innovation is still low.
Examples include:

- Deli Serdang Cassava Potential (47.53)
- Binjai Cassava Potential (40.02)
- Asahan Copra (41.90)
- Bunut Asahan Footwear (41.27)

These centers require support in improving product quality, technology adoption, diversification, and marketing strategies to progress to the Developing category.

Under Development Category (16.27–27.54)
These centers are in an early phase of development, characterized by weak institutional structures, low production capacity, limited skills, and minimal market access. Examples include:

- Menteng Medan PIK (21.28)
- Binjai Bamboo (18.78)
- Binjai Haluwa Sweets (16.27)
- Karo Coffee Center (22.23)
- Serdang Bedagai Cassava Center (27.54)

These centers require comprehensive interventions such as training, institutional strengthening, production upgrading, product innovation, and improved market linkage. With proper support, they can progress to the Potential category and eventually reach Developing or Excellent status (Faried, 2019)

The scoring analysis reveals substantial variations in the level of readiness and competitiveness among Small and Medium Industry (IKM) clusters across districts and cities in North Sumatra. (Fadlan, 2022) Clusters that achieve higher scores generally demonstrate strong institutional capacity, wider market access, better production technology, and clear linkages to industrial value chains within Special Economic Zones (KEK) and Industrial Estates (KI). In contrast, low-performing clusters struggle with weak institutional structures, limited production capacity, low adoption of technology, and restricted access to broader markets. (Marini, 2023)

The leading clusters, such as Simalungun Coffee Cluster (70.062) and Serdang Bedagai Pandan Weaving Cluster (50.466), exhibit strong performance across key indicators including institutional readiness, production capacity, product diversification, and market competitiveness. (Pratama, 2025) Their success is supported by consistent government facilitation, innovation-driven development, and strong connections to local tourism, industrial, and export markets—making them viable models for cluster development elsewhere in the province. (Rifai, 2021). Clusters categorized as “Developing,” such as Karo Coffee (30.658), Simalungun Honey (38.802), and Batubara Tenun (37.758), show promising potential but still lack technological advancement, market expansion, and innovation capabilities. While they possess moderate institutional capacity, their market diversification and competitiveness remain limited, restricting their ability to scale. (Sembiring, 2023)

The “Potential” category includes clusters such as Cassava Deli Serdang (47.534), Cassava Binjai

(40.022), Kopra Asahan (41.898), and Bunut Shoes Asahan (41.274). These clusters possess adequate production capabilities and economic value but lack innovation, product upgrading, and technological support. Strengthening these areas is essential to elevate them into higher categories.

Clusters in the "Guidance" category—PIK Menteng Medan (21.278), Bamboo Binjai (18.778), Haluwa Manisan Binjai (16.274), Karo Coffee (22.23), and Cassava Serdang Bedagai (27.538)—represent the early-stage clusters with low institutional readiness, weak production systems, and limited market access. These clusters require comprehensive assistance, including institutional strengthening, technology adoption, and intensive mentoring to improve their competitiveness. (Tambunan T. , 2008)

Overall, the evaluation indicates that cluster competitiveness in North Sumatra is strongly influenced by institutional strength, production capacity, product innovation, and market linkages—particularly to KEK and KI. This underscores the need for a structured cluster upgrading strategy that integrates institutional reinforcement, technological development, and market expansion simultaneously. (Tambunan T. , The development of small and medium enterprises in Indonesia:, (2011).)

IV. CONCLUSION

The scoring assessment highlights significant differences in the readiness and competitiveness of IKM clusters in North Sumatra. While some clusters demonstrate strong performance and are ready to compete at national and international levels, many remain in the potential and guidance categories. Key conclusions include: Institutional strength is the most critical factor influencing cluster competitiveness. High-scoring clusters consistently show well-established and formal institutional structures. (Hasanah, 2022). Market access and linkages to KEK/KI clearly differentiate leading clusters from low-performing ones. Strong value-chain connections significantly enhance economic potential. Technology adoption and product innovation are essential for clusters in the "Developing" and "Potential" categories to move upward. (Sari, 2023). Clusters in the "Guidance" category require intensive interventions, particularly in human resource development, technological support, and institutional formation. (Wakhyuni, 2021). Cluster development must therefore be implemented through a phased and structured approach tailored to the specific conditions of each cluster category.

V. RECOMMENDATIONS

Based on the evaluation results, the following strategic recommendations are proposed:

1. Strengthening Institutional Capacity

- Establish formal institutions such as cooperatives or cluster management units.
- Develop organizational structures and standard operating procedures (SOPs).
- Increase local government involvement in legal facilitation and policy support.

2. Enhancing Production Capacity and Human Resources

- Conduct training on processing technology, quality control, and production management.
- Provide appropriate technological equipment to increase production efficiency.
- Implement intensive mentoring programs for clusters in the "Guidance" category.

3. Expanding Market Access and Business Partnerships

- Connect clusters to KEK Sei Mangkei, KIM, and Kuala Tanjung industrial networks.
- Promote partnerships with retailers, e-commerce platforms, and larger industries.
- Develop joint branding and marketing strategies for high-potential products.

4. Promoting Product Innovation and Diversification

- Encourage the development of derivative products for coffee, pandan weaving, cassava, and coconut-based industries.
- Strengthen research and development (R&D) support for packaging, quality improvement, and product upgrading.

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