



Development of Village Industry Through an Integrated Information System in Nagari Simarasok, Baso Agam District

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ABSTRACT

The problems of Simarasok UMKM were identified: (1). The products have not been maximized due to marketing weaknesses, capital, and the purchasing power of woven/songket products tends to decrease, (2). Embroidery UMKM are part-time livelihoods for unmarried women and housewives, (3). There is no group of innovative skilled workers, (4). Marketing strategies are more on personal relationships, close proximity and less online sales, (5). Product quality/quantity can be improved, but constrained by external internal factors. The research used qualitative techniques and descriptive analysis; informants were collected by purposive sampling. Data findings, there are specialties of UMKM: 1). The embroidery industry has developed and is carried out by almost half of the female population, 2). Sugarcane and tobacco processing industry, conducted by men. There is a difference between the type of industry and the gender of the actors, which is not interchangeable. 3). Based on scale, the industries are small. Interestingly, UMKM development is carried out through an integrated information system. Although located in rural areas, Nagari Simarasok has utilized spatial technology as an integrated information system in mapping the condition of its UMKM. In this Nagari, a complete map with specifications such as maps of industrial asset ownership, maps of agricultural land potential, maps of economic potential and maps of natural resource potential can be accessed. With the completeness of the map, access to buyers, consumers and or other parties can more easily access it. This Nagari breakthrough has not even existed in urban villages in the city center.

Keyword:

UMKM, industry, maps, integrated information

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INTRODUCTION

Integrating information systems can significantly improve village industrial development by enabling more efficient coordination, planning, and decision-making. The implementation of information systems, such as the Village Financial System (SISKEUDES) in Bali, Indonesia, has demonstrated that the accuracy of system information and confidence in technology have a favorable influence on user utilization and contentment, resulting in overall advantages and the establishment of a lasting information society (Ariyanto et al., 2022). ICT systems like Akashganga and Gyandoot have showcased the promise of enhancing rural livelihoods in India despite facing infrastructure hurdles (Rao, 2003). The expansion of rural businesses, such as the textile cluster in northern Vietnam, is propelled by human and social capital accumulation. This growth can be further amplified by implementing integrated information systems facilitating vertical integration and entry into export markets (Nam et al., 2010). In China, establishing digital villages has been associated with advancing high-quality economic development, wherein the digital industry plays a pivotal role in this process (Mei et al., 2022).

The utilization of Geographic Information Systems (GIS) and Village Level Information Systems (VLIS) in India has demonstrated its efficacy in decentralized planning and rural watershed management, underscoring the significance of integrating spatial data [5]. The approaches used for diagnosing village systems in the Huanghuaihai Plain focus on the importance of socio-economic development and institutional innovation in addressing stagnation in the village industries (Li et al., 2014). ICT projects can potentially enhance the strength and sustainability of information systems in rural communities by fostering social

capital, as demonstrated by social processes and communicative action theory (Kanungo, 2004). The theoretical framework for establishing digital villages, which has been confirmed through a case study in China, emphasizes the significance of data, digital technology, and the involvement of multiple stakeholders to achieve sustainable rural development [8]. Furthermore, implementing integrated information management systems in rural sectors might be challenging, but it can potentially optimize production management and enhance accountability (Chiplunkar et al., 2001; Parikh, 2009). Integrated information systems play a crucial role in promoting the growth and longevity of the village industry by improving efficiency, fostering innovation, and enhancing socio-economic results.

The presence of industry in rural areas has both benefits and drawbacks. The shortcomings of are frequently overlooked due to their perceived limited contribution to economic advancement (Ashley & Maxwell, 2001). The lack of sufficient finance, infrastructure, and human resources hinders the initiation and growth of the project. The village industry is heavily impacted if there are price fluctuations or crop failure issues in the sectors on which it depends. Alternatively, it may also arise from industrial sociology issues, such as societal conservatism, which manifests as a resistance to embracing change or new technology. This resistance impedes the successful implementation of innovation and hence hampers productivity growth (Pramono & Mulia, 2023). Nevertheless, the village industry can enhance the local economy, generate employment opportunities, and enhance communal welfare. In addition, it may be stated that nearly all facets of the village industry can exert both internal and external influences on society.

Nagari Simarasok, located in Baso District, Agam Regency, West Sumatra, encounters many obstacles in advancing its local manufacturing sector. The local MSME industry is now facing many challenges that must be identified and addressed to enhance the region's economic potential sustainably. The marketing of MSME products has been primarily suboptimal owing to difficulties in marketing techniques, restricted financial accessibility, and a decrease in consumer purchasing power for woven and songket fabric items. Furthermore, many micros, small, and medium enterprises (MSMEs) are managed by unmarried women and housewives as supplementary sources of income. This highlights the necessity for additional assistance to enhance the standing and expansion of their businesses.

Furthermore, Nagari Simarasok is facing a deficiency of proficient teams and professionals capable of fostering innovation and promoting industrial growth. MSMEs continue to depend on individual initiatives, and they mainly lack substantial group support. Furthermore, while there has been some advancement in promoting things through interpersonal connections, there has yet to be an ideal utilization of online commerce that can effectively expand the market reach. Furthermore, the ability to enhance both the caliber and volume of output is limited by a range of internal factors, including managerial and technical expertise, as well as external factors, such as regulations promoting local industries' sustainable growth.

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Although facing hurdles, Nagari Simarasok achieved first place in the national village and sub-district competition in 2011, a remarkable accomplishment. The achievement is a result of the dedication and diligence of individuals in the sector and the implementation of sound policies that have successfully guided favorable industrial growth. To ensure the sustainable and inclusive development of the local economy, Nagari Simarasok aims to persistently identify and overcome any existing hurdles.

LITERATURE REVIEW

Extensive research has been carried out on the growth of industries in rural regions and their connection to Micro, Small, and Medium Enterprises (MSMEs). These studies have been undertaken at regional and national levels and approached from several scientific angles. The economic method centers around analyzing market structure, consumer and firm behavior, industrial regulations and policies, industrial sector marketplaces, and the impact of globalization and international commerce. Industrial economic studies offer valuable insights for policymakers, corporate leaders, and scholars in comprehending market dynamics and devising efficient methods to promote regional economic growth and the well-being of its artisans. One of the literature sources that explores the economy and industry in the context of West Sumatra regional studies is Fitriana

(2019) research. The study focuses on enhancing financial inclusion in the micro and small-scale creative industries in West Sumatra. Mulyani et al. (2022) discuss the significance of the processing industry in the economy of West Sumatra. Sahluddin (2019) analyzes the involvement of human resources in non-agricultural economic activities in rural West Sumatra. In addition to industrial economic studies, other studies are conducted in different domains, such as socio-cultural studies focusing on rural industries in West Sumatra. Hendrawati's (2016) research focused on the female artisans involved in the traditional weaving craft in Nagari Halaban, Lareh Sago Halaban District, Limapuluh Kota Regency, West Sumatra.

Nevertheless, there is a lack of research connecting rural industries with integrated information systems that use spatial data for enhanced accessibility. In 2011, Nagari Simarasok was recognized as the top Nagari/Village I at the national level. This accomplishment resulted from the advancements made by the Nagari administration in collaboration with its citizens, including establishing rural industries intricately linked to the persistent efforts, policies, and conduct of industrial stakeholders that have been refined over time. These characteristics enable the industry in that location to adapt and evolve in response to changing consumer expectations.

Industry refers to transforming raw materials into semi-finished or finished commodities, increasing their worth. In general, industry refers to the business sector that utilizes specialized skills and technology to manufacture goods or provide services to generate financial gain. MSMEs, short for Micro, Small, and Medium Enterprises, are economic enterprises held by people or commercial entities, as defined by Law No. 20 of 2008 regarding MSMEs. MSMEs are classified according to their yearly turnover, total

assets, and number of workers. Micro enterprises have a net worth of at least IDR 50,000,000.00, not including the value of the buildings and land on which the business operates. The maximum yearly sales revenue is IDR 300,000,000.00. Small enterprises are defined as businesses with a net worth ranging from IDR 50,000,000.00 to IDR 500,000,000.00. Medium-sized firms, independent entities not affiliated with giant corporations, contribute significantly to the economy. They are defined by a net worth of more than IDR 10,000,000,000.00, excluding the value of the buildings and land where the business operates.

According to the Cooperatives and UMKM Service website, as of May 2024, the number of MSME units in West Sumatra has nearly surpassed 600,000, distributed over the province. Utilizing information technology in the current era of digitalization can significantly expand the scope of marketing. However, despite the availability of numerous media platforms that can assist micro, small, and medium enterprises (MSMEs), some players still fail to comprehend this. One such platform is the collaboration between Mbizmarket and the West Sumatra Provincial Government, which has been catering to the needs of the small and medium industrial segment since 2019. Mbizmarket has partnered with the Provincial Governments of West Java, Bali, Yogyakarta Special Region, and Riau. This collaboration is advantageous as it eliminates transaction and subscription fees for both the government and government partners who utilize it. Mbizmarket has received funding help from multiple financial institutions. This collaboration can also cater to the requirements of regional and national governments as users of APBD/APBN to enhance transactions through integrated e-markets.

Mbizmarket is a B2B marketplace platform that operates as an integrated

ecosystem, providing three distinct roles. Initially, the directory function is a valuable tool for business professionals to enhance and broaden their business connections. Secondly, the transactional function encompasses the actions of demand and supply. Furthermore, e-procurement is a dependable alternative for firms to digitize procuring goods and services. Every transaction on Mbizmarket is meticulously logged and can be thoroughly audited due to a comprehensive e-procurement feature. Mbizmarket offers MSMEs the chance to enhance their business by serving as sellers of goods and services. Using online media to market MSME items in West Sumatra will create more prospects. Government collaboration with MSMEs at various administrative levels (Nagari/villages, sub-districts, districts/cities, and provinces) can facilitate the ongoing growth of MSMEs and enable them to address customer demand fluctuations proactively.

RESEARCH METHODS

This research methodology is qualitative, meaning it focuses on producing analytical procedures without relying on statistical analysis or other quantitative approaches (Creswell, 2014). It is also a descriptive-analytical research type, which aims to depict phenomena or social realities related to the problem and unit being examined. The data is derived from interviews, field notes, photographs, films, personal records, notes or memos, and other official materials. The informants were selected by purposive sampling, which involved pre-determined criteria or factors related to the research's goals, objectives, and relevance. Specifically, the informants included the Nagari Simarasok, Wali Jorong, and KAN (Nagari Traditional Village) officials and data on MSME actors. Primary data is collected from research informants using observations and interviews and examining papers, reports,

journals, and other relevant material.

RESULTS

Identify type and scale of industry

Industry type refers to the primary economic sector that serves as the foundation for the production process. Each type possesses distinct characteristics and faces specific problems shaped by economic activity and resources. MSMEs primarily conduct small-scale industry in Nagari Simarasok. These businesses are characterized by relatively small production and are owned independently by people or small groups. The production process is typically manual or assisted by simple technology. Below is a concise overview:

1. Embroidery Industry

Approximately 50% of the population engages in embroidery, particularly unmarried women and housewives, to generate income and occupy their leisure time. The Embroidery MSMEs in Nagari Simarasok are regarded as a defining characteristic of women, implying that it would be unusual for women to idle away without engaging in any hobbies or acquiring any skills. Within a group, individuals assume distinct duties, including the father samang (leader) and several members serve as workers. The embroidery sector is considered tiny in scale and kind, employing fewer than 20 persons. The biweekly income is contingent upon the number of completed fabrics unless there is further income from sewing for specific clients. The salaries, distributed to a group of 3-4 individuals, amount to a total of 1-2 million throughout 2 weeks. The raw material source for this embroidered fabric is Jakarta, priced at 30-50 thousand rupiah per meter. After being bought, the design is illustrated on the cloth and given to the worker for sewing. Motifs can be replicated from literary works or generated from one's imagination. Indrak provides his workers various abilities, including

demonstrating images of flowers and leaves and recommending appropriate colours for specific patterns. Creating a motif involves adhering white oil paper to the material and sketching the pattern onto the paper. After drawing, it is pressed with an iron to ensure optimal design adhesion to the fabric. The resultant motifs would be collected and transported to the workers for embroidery. Once the embroidered fabric is completed, it is typically sold at Bukit Tinggi Market. In addition to marketing, some consumers specialize in sewing outfits for specific purposes, such as social gathering attire, PKK attire, and other official attire.

2. Sugarcane Industry

The sugarcane industry is categorized as a cottage industry due to the employment of only two workers. There are no specific abilities required. Observe and study the work of others and then attempt to replicate it. The assets consist of sugarcane milling equipment valued at Rp. 4,500,000 and a cart valued at Rp. 1,500,000. The daily income ranges from IDR 80,000 to IDR 100,000. There is a rise in sales turnover throughout the month of Ramadan. Sugarcane is purchased from neighbouring individuals at IDR 1,000 for each piece, provided the cane is of substantial size. In the case of smaller stalks, three stalks are considered equivalent to two stalks.

Additionally, the purchase includes plastic, rubber bands, and ice cubes. The technique consists of a sugarcane machine that filters peeled sugarcane to extract sugarcane juice. The juice is then packaged in plastic containers and cooled with ice cubes. The sugarcane juice is sold at Simpang Canduang for IDR 2,500 per pack.

3. Tobacco Industry

The tobacco industry has been in operation since 1948, spanning seven generations. It is classified as a cottage industry due to its small workforce of less

than four individuals. I acquired the skill to process tobacco leaves through hereditary transmission from my father rather than through training or study. The assets consist of a knife valued at Rp. 250,000.00 and a tobacco leaf cutting machine valued at Rp. 400,000.00. Once a compact device has fragmented the leaves, they are further compressed to enhance their smoothness. After achieving a smooth texture, the leaves are subjected to a drying process under direct sunlight for 4 hours. This drying process is carried out on specially formed rattan structures. Once the drying process was completed, the Payakumbuh representative arrived to purchase the tobacco at a rate of 50,000 per kilogram, equivalent to the value of three tobacco leaves dried on a bed made of long rattan. The monthly quantity of tobacco leaves ranges from 300 to 500 kg, contingent upon the rate of sun drying. Once the tobacco leaves reach Payakumbuh, they undergo further processing, which involves the addition of preservatives and other chemicals. They are then carefully packaged and sent to Malaysia, where they are utilized as ingredients in cigarettes and as food for fishermen. This is done to enhance their durability when exposed to the ocean.

4. Organic Rice Milling Industry

This industry is collectively held and classified as a medium-sized industry due to its total assets of IDR 500,000,000, excluding land and buildings. Additionally, it employs a workforce of 36 individuals. This organic rice is cultivated without the use of pesticides, ensuring the production of natural and nutritious rice that promotes good health. During the processing of organic rice, no chemicals are employed. This group is a recognized organization in Nagari Simarasok that relies on the agricultural season for its marketing. The harvest season lasts 3-4 months and yields a production of 0.5 tons per bag weighing 75 kg. Workers are

selected from the local community, focusing on recruiting moms. There are 36 members, consisting of 33 women and three men. This group has obtained certification and approval from the Agam Regency Government. Before its formation, the members of this group underwent specialized training and education conducted by professionals from relevant agencies. The group's total assets mainly originate from the Agam Regency Government's financial aid of IDR 500,000,000. This support includes (a) the construction of a heel valued at IDR 35,000,000.00, (b) one grinding machine, (c) two tractor engines, and (d) three composter machines. In addition to organic rice, rice is specifically created for individuals with diabetes. This rice is processed using traditional methods, such as mill pounding. The cost of organic rice is IDR 60,000 for a 5 kg quantity. Meanwhile, diabetic-friendly rice is available for purchase at IDR 75,000 for a 5 kg bag.

These reasons provide more evidence of the industry's growth in Nagari Simarasok, particularly in the form of small or household enterprises. However, other sectors can also be established if the conditions are suitable.

Industrial Development with Integrated Information Systems

The development of MSMEs in Nagari Simarasok is facilitated by an integrated information system that offers information access services and utilizes spatially linked maps. This refers to a map integrating and enhancing spatial data from several sources and types, including topographic maps, road network maps, satellite image data, geographic data, and other data, into a unified Geographic Information System (GIS). This map consolidates spatial data from various sources into a unified and cohesive perspective. This function enables users better to comprehend the spatial connections among different geographical

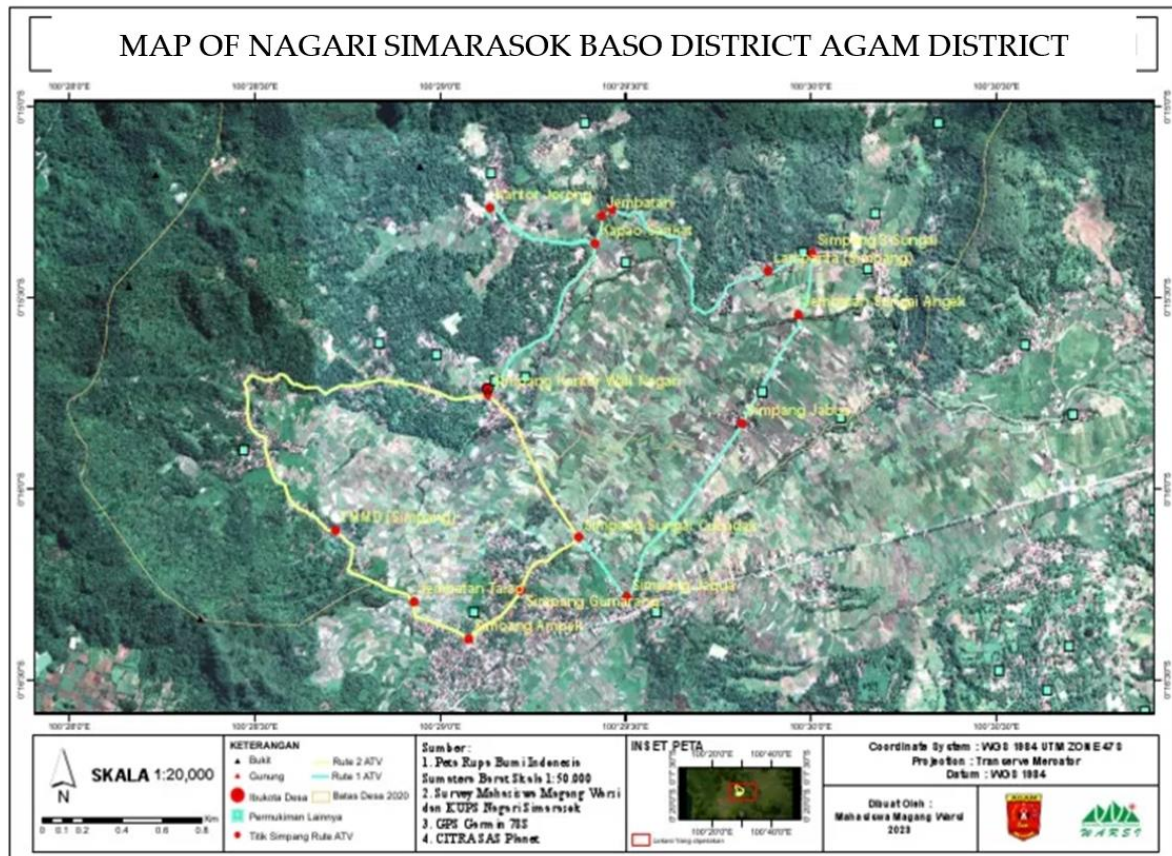
elements. It facilitates more efficient analysis and decision-making in cartography, urban planning, and natural resource management. Users and information seekers can utilize this spatially integrated map to interact with and access specific locations within Nagari Simarasok by clicking on the map. The map will consist of an industrial asset ownership map, an agricultural land potential map, an economic potential map, a natural resource potential map, and various additional maps. In 2011, the Nagari Simarasok administration and its community were recognized as the top-performing village in a national competition for towns and sub-districts. This achievement was attributed to their innovative initiatives and improved accessibility.

Despite its rural location, Nagari Simarasok, situated 17 km from the capital city of Bukit Tinggi, 20 km from Payakumbuh City, and 96 km from Padang City, has implemented spatial technology to create an integrated information system for mapping the state of MSMEs. Within this village, one can access comprehensive thematic maps that adhere to particular map criteria based on various themes. These themes include maps displaying ownership of industrial assets, prospective agricultural land, economic potential, natural resource potential, and other related maps. By the comprehensive nature of this map, it becomes more readily accessible to buyers, consumers, and other interested parties. This town offers an exclusive innovation that is not accessible even in the central sub-districts of the metropolis.

Therefore, the initial and fourth issues have been resolved, precisely the initial issue of suboptimal product marketing due to marketing deficiencies and the decline in capital and purchasing power for woven/socket products. The fourth product marketing strategy relies on

interpersonal connections and proximity, reducing reliance on online sales. The collaboration between the West Sumatra Government and the Mbizmarket vendor enhances this opportunity. By implementing e-procurement, one can acquire a wide range of IT products/services, office equipment, HR

outsourcing services (such as security personnel, specialists, customer service representatives, SPGs, and cleaners), event organizers, vehicle rentals, construction services, and procurement of chemical materials or health-related products, including those produced by MSMEs in this village.



Challenges of Integrated Information Systems

Creating an information system by incorporating maps with spatial data, as has been accomplished in this hamlet, offers both benefits and drawbacks. A spatially integrated information system utilizes GIS (Geographical Information System), a comprehensive system designed to store, manage, analyze, and visualize geographic or spatial data. This data can include information about specific locations, regions, or other geographic phenomena with a geographic area or coordinates.

How GIS works involves several main components:

1. Geographic Data: (a) Spatial data of location or geometry, such as coordinates, maps, satellite images, or administrative boundaries; (b) Attribute Data, characteristics of geographic entities, such as population, temperature, or soil type.
2. Data management includes (a) data input Processes from various sources entered into the system and (b) data storage, which is stored in an appropriate format and organized in a structure that allows access.
3. Analysis (a) Data Manipulation, using various algorithms and analysis functions to extract new information, and (b) Spatial Analysis, analyzing the

analysis of spatial relationships between geographic entities, such as distance, overlay, or interpolation.

4. Visualization, (a) Map Making, namely the work of changing geographic data into maps that can be visualized using various symbols, colours and legends; (b) Data Visualization, in the form of graphs, diagrams or three-dimensional models.
5. Output and Interpretation: (a) Results Interpretation Process, which is presented to the user, who then interprets the information for decision-making or other purposes; (b) Output, in the form of maps, reports, graphs, or other visualizations according to the user's needs.

GIS facilitates a deeper comprehension of the geographical surroundings, and its applications span across many domains such as cartography, urban planning, natural resource management, transportation, and others. By comprehending the functioning of GIS, one can discern that in addition to its notable advantages, it also possesses several limitations that necessitate consideration. Some of the benefits of GIS include:

1. Better, in-depth analysis of the spatial relationships between various geographic entities, which can help make better decisions in different fields.
2. Effective Visualization: geographic information can be visualized through attractive, easy-to-understand maps. This makes it easier to communicate complex data to various related parties.
3. Data integration from various sources, including spatial non-spatial data and historical and real-time data, helps understand a more complete picture of the geographic environment.
4. More Efficient Mapping: the mapping process can be carried out more quickly and efficiently, saving time and costs.

5. Better Resource Management, helping to monitor and manage natural resources such as forests, water and land in a more effective way

Besides having the benefits of GIS, it also has weaknesses, namely:

1. Dependence on Technology, computers and geographic information can be an obstacle for users with insufficient access or technical skills.
2. High implementation costs include building, procuring, and maintaining expensive GIS infrastructure, especially for small organizations that do not have sufficient budgets.
3. Data Errors: Poor or inaccurate data quality can result in inappropriate analysis or wrong decisions, so it is necessary to maintain and update GIS regularly.
4. Limitations of Interpretation: even though GIS provides various analytical tools, interpretation of analysis results still requires better knowledge and understanding, especially of the geographical context and problems faced.
5. Privacy and Security Issues: the use of GIS involves sensitive data. Therefore, data privacy and security are essential and must be managed carefully.

Utilizing its advantages and foreseeing its limitations is the appropriate and prudent approach to enhance the development of village industry through a comprehensive information system. Furthermore, upon further examination, there is a need for improvement in the availability of human resources in rural regions, particularly in Nagari Simarasok. This improvement should focus on enhancing the quality of education and expertise, specifically on using spatial technology. However, industrial actors show a limited inclination towards adopting this integrated information system technology.

Industrial players in this village face challenges in utilizing spatial information technology, namely:

1. Among the four jorongs in Nagari Simarasok, namely Simarasok, Kototuo, Kampeh, and Sungaiangek, certain jorongs lack sufficient technological infrastructure, particularly those near the Bukit Barisan cluster. These jurors lack reliable and high-speed internet access and a consistent electricity supply. This poses a challenge for industry stakeholders in utilizing technology that relies on internet connectivity or access to electricity.
2. The village is home to industrial players who lack an understanding of modern technology and its potential to enhance corporate operations. Training or assistance in comprehending the functionality of gadgets and programs to cater to their specific requirements is necessary.
3. Cost of Implementation: Industry companies may incur significant expenses while implementing advanced technology, particularly if they have limited financial resources. While technology has the potential to enhance efficiency and production, the upfront cost of implementation poses a significant obstacle.
4. Physical infrastructure constraints, such as deteriorated roads or inadequate transit access, have posed challenges for industry stakeholders in this hamlet to adopt technology that relies on efficient logistics, such as online delivery of goods. While the percentage remains low, it challenges industrial players to integrate spatial information technology effectively.

To address this difficulty, it is necessary to take a comprehensive approach that involves the collaboration of the government, non-governmental organizations, and the private sector. This

approach should focus on providing sufficient infrastructure access, technological training, financial support, and policy development that promotes technology adoption at the village level.

CONCLUSION

The diverse challenges MSMEs face in Nagari Simarasok, Baso District, Agam Regency, and West Sumatra can be effectively addressed by implementing an integrated information system to foster the growth and development of these enterprises. In Nagari Simarasok, spatial technology has been employed as an integrated information system for mapping MSMEs. This allows for the creation of comprehensive maps with diverse specifications, which can be readily accessed by buyers, consumers, and other interested parties. This condition facilitates the growth of the village industry in alignment with advancements and consumer needs. In 2011, Nagari Simarasok was recognized as the first accomplished Nagari/village at the national level due to its industrial progress, which was closely tied to the policies and efforts of industrial stakeholders. Online media collaboration has been implemented to promote MSME products in West Sumatra, encompassing various levels of government (Nagari/village, sub-district, district/city, and province). This initiative aims to address client shortages and expand market potential proactively.

This site is home to various minor companies, including embroidery, sugar cane processing, tobacco production, and organic rice processing. Every industry possesses distinct traits and characteristics that set it apart. Remarkably, the advancement of MSMEs in Nagari Simarasok is facilitated by an integrated information system that grants access to information and fosters the growth of MSMEs through spatially integrated maps. This system enables users and information seekers to interact

with maps that depict ownership of industrial assets, potential for agricultural land, economic potential, and natural resource potential. Consequently, the initial and final issues have been effectively overcome.

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