

## DEVELOPMENT POTENTIAL OF SMALL AND MEDIUM ENTERPRISES BASED ON SPATIAL CONCENTRATION IN SARBAGITA AREA

### POTENSI PENGEMBANGAN INDUSTRI KECIL DAN MENENGAH BERBASIS KONSENTRASI SPASIAL DI KAWASAN SARBAGITA

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#### ABSTRAK

Peningkatan produktivitas agroindustri keripik Sanjai turut berkontribusi terhadap meningkatnya emisi dalam Beberapa penelitian menemukan bahwa masih terdapat kesenjangan antar wilayah di Kawasan Sarbagita. Sebagai penggerak perekonomian daerah, peran Industri Kecil dan Menengah (IKM) penting untuk dikembangkan berdasarkan potensinya dalam menyelesaikan permasalahan tersebut. Penelitian ini bertujuan untuk mengidentifikasi potensi masing-masing jenis IKM berdasarkan aspek spesialisasi jenis usaha dan konsentrasi spasialnya dengan menggunakan metode analisis Krugman Index, Hoover Ballasa Index dan LISA. Data yang digunakan dalam penelitian ini berdasarkan jumlah unit IKM di setiap wilayah Kawasan Sarbagita yang dikelompokkan berdasarkan 8 kategori jenis IKM. Hasil penelitian menemukan urutan kategori spesialisasi IKM dari tertinggi hingga terendah, yaitu jenis usaha: besi dan baja; mineral bukan logam; barang kayu; tekstil dan pakaian jadi; percetakan dan penerbitan; barang berbahan kimia dasar, pupuk, dan peralatan plastik; barang dari logam; makanan dan minuman. Hasil penelitian ini juga menunjukkan adanya konsentrasi dan pola hubungan spasial pada masing-masing jenis IKM dengan pola Tinggi-Tinggi (H-H), Tinggi-Rendah (H-L), Rendah-Tinggi (L-H) dan Rendah-Rendah (L-L). Informasi spasial ini diharapkan dapat menjadi acuan untuk mengarahkan strategi pengembangan IKM di Kawasan Sarbagita.

Kata kunci: industri kecil menengah, konsentrasi spasial, kawasan sarbagita

#### ABSTRACT

Several studies have found that disparities still exist between regions within the Sarbagita area. As a driving force for the regional economy, the role of Small and Medium Enterprises (SMEs) is important to be developed based on their potential in solving these problems. This study aimed to identify the potential of each type of SME based on aspects of specialisation and spatial concentration using the Krugman Index, Hoover Ballasa Index, and LISA analysis methods. The data used in this study is based on the number of SME units in each area of the Sarbagita Area which are grouped based on eight categories of SME types. The research found that the specialisation categories of SME types from highest to lowest, namely: iron and steel; non-metallic mineral; wood goods; textile and apparel; printing and publishing; basic chemical; fertilizers, and plastic equipment, metal goods; food and beverage. The results of this study also show that there are concentrations and spatial relationship patterns of each type of SME with High-High (H-H), High-Low (H-L), Low-High (L-H), and Low-Low (L-L) patterns. This spatial information is expected to be a reference for directing SME development strategies in the Sarbagita area.

Keywords: small and medium industry; spatial concentration; Sarbagita area

#### INTRODUCTION

Development as a complex process needs to reach the local level, such as resource systems, networks, institutions, or policies (Mantino 2022). Indonesia, as an archipelagic country, has a policy of regional autonomy that provides opportunities for each region to manage its own resources. In support of national development goals, several regions in Indonesia have been designated as National Strategic Areas. Based on the Government Regulation No. 26

of 2008 on the National Spatial Plan (PP RTRWN), areas designated as part of the National Strategic Area have an important role in certain fields. One of them is the National Strategic area: Denpasar-Badung-Gianyar-Tabanan in Bali Province or known as Sarbagita in Presidential Regulation No. 45/2011. This urban area is considered to have a role in terms of economic interests and at the same time as one of the National Activity Center areas in Indonesia. The Sarbagita area has a unique regional composition. The economy contribution in Sarbagita area is driven not

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only by the tourism sector but also by other supporting sectors such as agriculture, trade, services, and small to medium-scale processing industries.

Small and medium enterprises (SMEs) are vital to most economies around the world, especially in developing countries (Ndiaye *et al.*, 2018). As one of the main drivers of economic development (Obi *et al.*, 2018), SMEs play an important role in alleviating poverty as they can significantly provide employment opportunities for the community (Maksimov *et al.*, 2017) and contribute to the development of innovation (Mariyudi, 2019). Several studies highlight that community involvement in local development can be effectively facilitated through the growth and empowerment of SMEs (Glonti *et al.*, 2021; Audina *et al.*, 2024).

The Sarbagita area as the economic center in Bali not only encourages opportunities for the growth of SME units, but also contributes to absorbing a lot of labor. It is known that the absorption of SME labor in Sarbagita reached 69.2 percent of the total SME labor in Bali Province in 2023 or around 60,419 workers (DPMPSTP Bali Province, 2023). Based on the percentage distribution of SME units in Bali Province, the accumulated growth of SMEs in the Sarbagita area is higher than in other regions, with Denpasar (19.89%), Badung (32.75%), Gianyar (11.10%), and Tabanan (5.52%) leading. Meanwhile, regencies outside the Sarbagita area show lower percentages, such as Buleleng (6.58%), Bangli (4.47%), Jembrana (13.27%), Klungkung (3.48%), and Karangasem (2.93%).

In general, the few reviews of studies about SMEs in Bali that have been discussed focus on specific types of SMEs or on their production determinants. Winangun & Wenagama (2024) analysed the impact of capital, raw material, and labour factors on wood handicraft production in Tabanan Regency. Dewi *et al.* (2023) analysed the determinants of brick production in Kediri District, Tabanan Regency. Furthermore, Fasanta & Karmini (2022) analysed the factors affecting productivity and labour wages of ikat weaving industry in Blahbatuh District, Gianyar Regency. Indarwasih (2023) analysed the factors affecting the production of metal handicraft SMEs in Gianyar Regency. From previous studies, the discussion of the growth of SMEs in Bali, especially in the Sarbagita area, has never been analysed by considering spatial aspects.

Table 1. SME Industry classification based on ISIC/KBLI standards

Categories	ISIC/KBLI	Descriptions
31	10-12	Food and beverage industry
32	13-15	Textile, apparel, yarn spinning & fur processing, leather goods industry
33	16	Wood products, and woven rattan/bamboo industry
34	17-18	Pulp, paper, paper goods, printing & publishing, and recorded media industries
35	19-22	Coal industry, petroleum refining, basic chemicals, fertilizers, medicine/pharmaceutical products, rubber and plastic goods
36	23	Non-metallic minerals industry
37	24	Basic iron and steel industry
38	25-33	Metal goods and equipment, computer, optical, electrical components, furniture, and motor vehicle repair industries

Sources: UN (2008) and BPS (2021)

The novelty of this research shows the potential for SME development in the Sarbagita area by considering a spatial approach. In public policymaking, spatial approach is essential as a foundation for identifying industrial growth clusters, analyzing regional interconnections, or assessing external factors that influence local industrial development. Analyzing the specialization potential and spatial concentration of local SMEs not only deepens the understanding of market competitiveness but also supports long-term business continuity planning, particularly in dynamic market environments. This approach supports more targeted and data-driven policies to improve regional economic outcomes. This research was conducted with two objectives, namely: 1) analyzing the specialization of SME types and their spatial concentration in Sarbagita Area from the aspect of unit distribution; and 2) the spatial distribution pattern of SMEs in Sarbagita area. This research is expected to inform SME development strategies in Bali, particularly in the Sarbagita Region, by emphasizing local economic potential and spatial industry linkages.

## RESEARCH AND METHODS

### Data Resources

This research uses a quantitative approach using secondary data with descriptive analysis. The object of research is Small and Medium Enterprises (SMEs), with sub-districts as the unit of analysis. The data used consists of the number of SME business units at the sub-district and district/city level in the Sarbagita area in 2023 obtained from the Department of Industry and Labor of Badung Regency, the Department of Industry and Trade of Gianyar Regency, the Department of Industry and Trade of Tabanan Regency, and the Department of Industry and Trade of Denpasar City. The business type classification used is following the KBLI 2020 at the two-digit level which refers to the International Standard Industrial Classification of All Economic Activities (ISIC) Rev. 4 published by the United Nations of Statistical Division (UNSD) in 2008, and adjusts the business type classification category based on references from Akkemik & Göksal (2014) with the arrangement as Table 1.

## Research Method

Industrial specialization was analyzed using the Krugman Index, while spatial industrial concentration was examined using the Hoover-Balassa Index. Both indices were calculated using their respective formulas in Microsoft Excel. The results were then visualized with the ArcGIS application, using the Rupa Bumi Indonesia (RBI) map based on sub-district administrative boundaries within the Sarbagita Region. Meanwhile, spatial autocorrelation was analyzed through LISA (Local Indicators of Spatial Association) using the GeoDa application.

The first objective, SME specialisation was analysed based on 8 classifications using Krugman Index analysis with the following formula (Traistaru *et al.*, 2002):

$$K_j = \sum_i |S_{ij} - S_i| \dots\dots\dots (1)$$

$$S_{ij} = \frac{E_{ij}}{E_j} = \frac{E_{ij}}{\sum_i E_{ij}}; S_i = \frac{E_i}{E} = \frac{\sum_j E_{ij}}{\sum_i \sum_j E_{ij}} \dots\dots\dots (2)$$

where,  $E_{ij}$  is number of SME units of type  $j$  in sub-district  $i$ ;  $\sum_i E_{ij}$  is number of all types of SMEs in sub-district  $i$ ;  $\sum_j E_{ij}$  is number of SME units of type  $j$  in all districts/cities (Bali Province);  $\sum_i \sum_j E_{ij}$  is total number of SMEs in all districts/cities (Bali Province);  $i$  is district/city area; and  $j$  is type of industry. The Krugman index value is between 0 and 2. The closer the index value is to 2, the greater the divergence in industrial structure or composition, indicating a stronger specialization in certain types of SMEs. However, in determining the high or low level of specialisation between one type of SME and another, the overall average specialisation index is used as a comparison (Payapo *et al.*, 2022).

In addition, the Hoover Balassa Index (HBI) analysis is used to determine the distribution of the concentration of each type of SME in each local area/sub-district. This analysis uses the same components as the Krugman Index analysis with a slightly different structure. The formula for the Hoover Balassa Index (IHB) in this study is as follows (Traistaru *et al.*, 2002):

$$HBI_{ij} = \left( \frac{E_{ij}}{\sum_j E_{ij}} \right) / \left( \frac{\sum_i E_{ij}}{\sum_i \sum_j E_{ij}} \right) \dots\dots\dots (3)$$

The concentration level value calculated from the Hoover-Balassa index is between 0 and 4 with the following categories: (a)  $HBI > 4$ , then highly concentrated; (b)  $HBI$  from 2 to 4, moderately concentrated; (c)  $HBI$  from 1 to 2, weakly concentrated; and (d)  $HBI$  value from 0 to 1, no concentration occurs (Putri *et al.*, 2024).

The second objective is to analyze the distribution patterns of each SME type in the Sarbagita area using the LISA (Local Indicators of Spatial Autocorrelation) method. This analysis identifies local spatial autocorrelation based on the number of SME units in each sub-district. The calculation of LISA in

this study analysis is done with the following formula (Rachmadsyah, 2024):

$$I_i = Z_i \sum_{j=1}^n W_{ij} Z_j; \quad Z_i = \frac{(x_i - \bar{x})}{\sigma_x}; \quad \text{and } Z_j = \frac{(x_j - \bar{x})}{\sigma_x}$$

where,  $I_i$  is LISA Index;  $Z_i$  and  $Z_j$  are standardised data;  $W_{ij}$  is weighting between locations  $i$  and  $j$  using the Queen Contiguity method (1 = if  $i$  adjacent  $j$ ; 0 = if not); and  $\sigma_x$  is standard deviation value of variable  $x$ . The presence or absence of spatial autocorrelation is tested by hypothesis testing on the LISA parameters with the following conditions. The significance test is conducted by comparing  $Z(I)$  and  $Z$ -table with the test criteria:  $H_0$  is rejected if the value of  $Z_{\text{count}} > Z_{\text{table}}$  (there is a correlation), where  $Z_{\text{count}}$  is  $Z(I)$  and  $Z_{\text{table}}$  is  $Z_{\alpha/2}$ . In this context, the  $H_0$  means that there is no autocorrelation between regions, while the hypothesis  $H_1$ , means that there is autocorrelation.

The visualisation of the LISA cluster map shows spatial relationships in four categories: (1) High-High (H-H): areas with high values surrounded by other high-value areas; (2) Low-High (L-H): low-value areas surrounded by high-value areas; (3) Low-Low (L-L): low-value areas surrounded by other low-value areas; and (4) High-Low (H-L): high-value areas surrounded by low-value areas.

## RESULTS AND DISCUSSION

### Specialization and Spatial Concentration of Small and Medium Enterprises (SMEs)

The Krugman Index analysis in this study shows the variation of specialisation level of SMEs in Sarbagita Area. The value obtained ranges from 0 to 0.60, which reflects that the level of specialisation of types of SMEs in this region is not so high. The comparative value of the level of specialisation of the types of SMEs used is based on the results of the average value of the Krugman Index, which is 0.306. The results of the analysis of the Krugman index are shown in Figure 1.

Figure 1 shows that several types of SMEs tend to be more specialised than others, including basic iron and steel industries (category 37), such as gold and silver crafts; non-metallic mineral products (category 36), such as pottery and ceramics; and wood products (category 33), such as wood carving and rattan crafts. These examples reflect local industrial traditions and suggest regional specialisation influenced by natural resources and cultural heritage. For each of these SME types, the Krugman Index value is above the average for all SME categories. This indicates that their distribution across sub-districts is uneven, with a tendency to cluster in specific areas—hence, they can be considered as specialised SMEs.

Several literature studies have revealed that the existence of these types of handicrafts has long been developed in Bali with its historical and cultural values and contributes to tourism (Mudra, 2018; Wijaya *et al.*, 2019; Wijaya and Suasih, 2023).

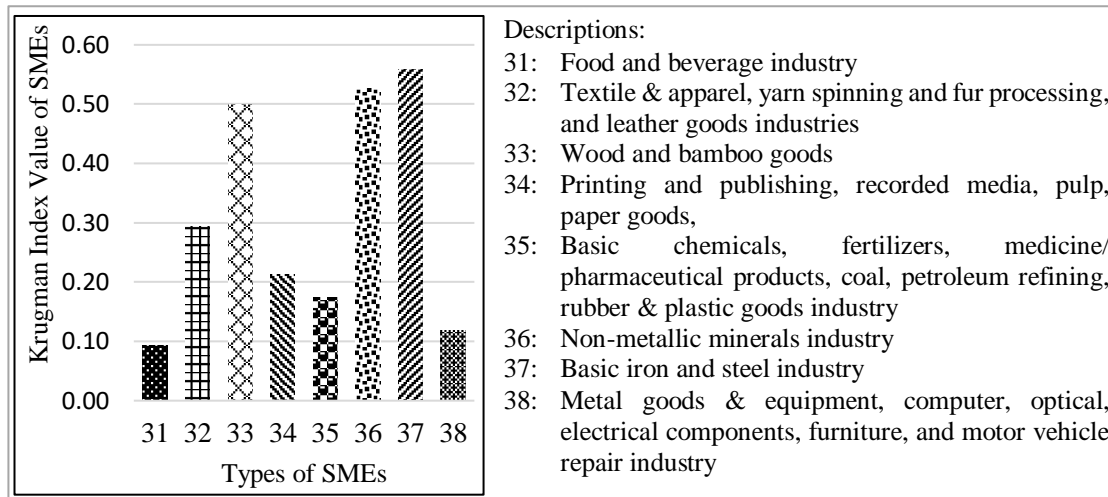


Figure 1. Specialization in SME Industry Types Based on Krugman Index Values

These identified SMEs can potentially drive the local economy through their specialised products. Several studies have identified that the specialisation approach has a positive relationship with the regional economy so it is important for each local area to focus on its strengths in planning development priorities (Gamidullaeva *et al.*, 2022; Liu *et al.*, 2023). Meanwhile, other SME types with below-average Krugman Index values include the food and beverage industry (category 31), textile and apparel (category 32), printing and publishing (category 34), basic chemicals, fertilisers, and plastics (category 35), and metal goods (category 38). These results suggest that the distribution of these SMEs is less specialised and more evenly spread across the Sarbagita area. Furthermore, the locational concentration of SMEs in each sub-district within the Sarbagita area is identified using the Hoover-Balassa Index, as shown in Figure 2.

The results of the Hoover Ballasa Index analysis in Figure 2 support the explanation of the results of the specialisation analysis of the types of SMEs from the previous Krugman Index analysis. The types of SMEs that tend to be specialised appear to have a more diverse composition of the distribution of SMEs than other types of SMEs seen from the concentration category. The results indicate that wood and bamboo goods SMEs (Figure 2c), non-metallic mineral SMEs (category 2f) as well as precious metals, basic iron, and steel SMEs (category 2g) have 4 categories of concentration, namely strong, medium, weak, and unconcentrated.

As shown in Figure (2c), locally, goods and wood SMEs have a strong concentration in several sub-districts such as: Selemadeg, East Selemadeg, West Selemadeg, Marga, Penebel, and Baturiti. These areas tend to be in Tabanan district. As previously mentioned by Winangun *et al.* (2024), this type of SME significantly contributes to the regional GDP. Wood and woven bamboo crafts are often passed down through generations as part of family traditions, highlighting the cultural continuity and development

potential of SMEs in this sector. Craftsmen continue to preserve the historical culture of wood carvings and ornaments typical of the region even with raw materials from outside Tabanan. In addition, the results of the analysis show that there are other sub-districts with moderate concentrations, namely Kerambitan, Tampaksiring, Pupuan and Tegallalang.

In Figure (2f), a strong concentration of non-metal mineral SMEs is found in Kediri sub-district. SMEs in the non-metallic mineral sector typically produce roof tiles, bricks, and craft products with functional or utilitarian value, using local materials such as clay and stone. Additionally, this sector also produces construction materials made from cement and lime. Other than that, there are several other areas with a medium concentration category, namely Selemadeg, West Selemadeg, Kerambitan, Marga, Baturiti and Tegallalang sub-districts. These areas have the potential to be considered as integration areas in the development of non-metal mineral SMEs.

Figure (2g) shows the concentration of basic iron and steel SMEs. A strong concentration is identified in Sukawati Sub-district in Gianyar Regency. In Gianyar Regency, SMEs in the precious metals, iron, and steel sector are predominantly engaged in silver and gold handicrafts. Metal crafts in Gianyar Regency have the largest production value among other regencies in Bali Province (Indarwasih 2023), precisely in Celuk Village, in Sukawati sub-district. The craftsmen pour their creative ideas into silver products inspired by plant and animal motifs. This craft business has also been passed down through generations of local families and its development has created a spatial concentration in the area. In addition, there are several areas identified with moderate and weak concentrations, namely the sub-districts of Gianyar, Tegallalang, Abiansemal, East Denpasar and North Denpasar. These areas can be potential locations for the development of this type of SMEs by integrating marketing or production locations.

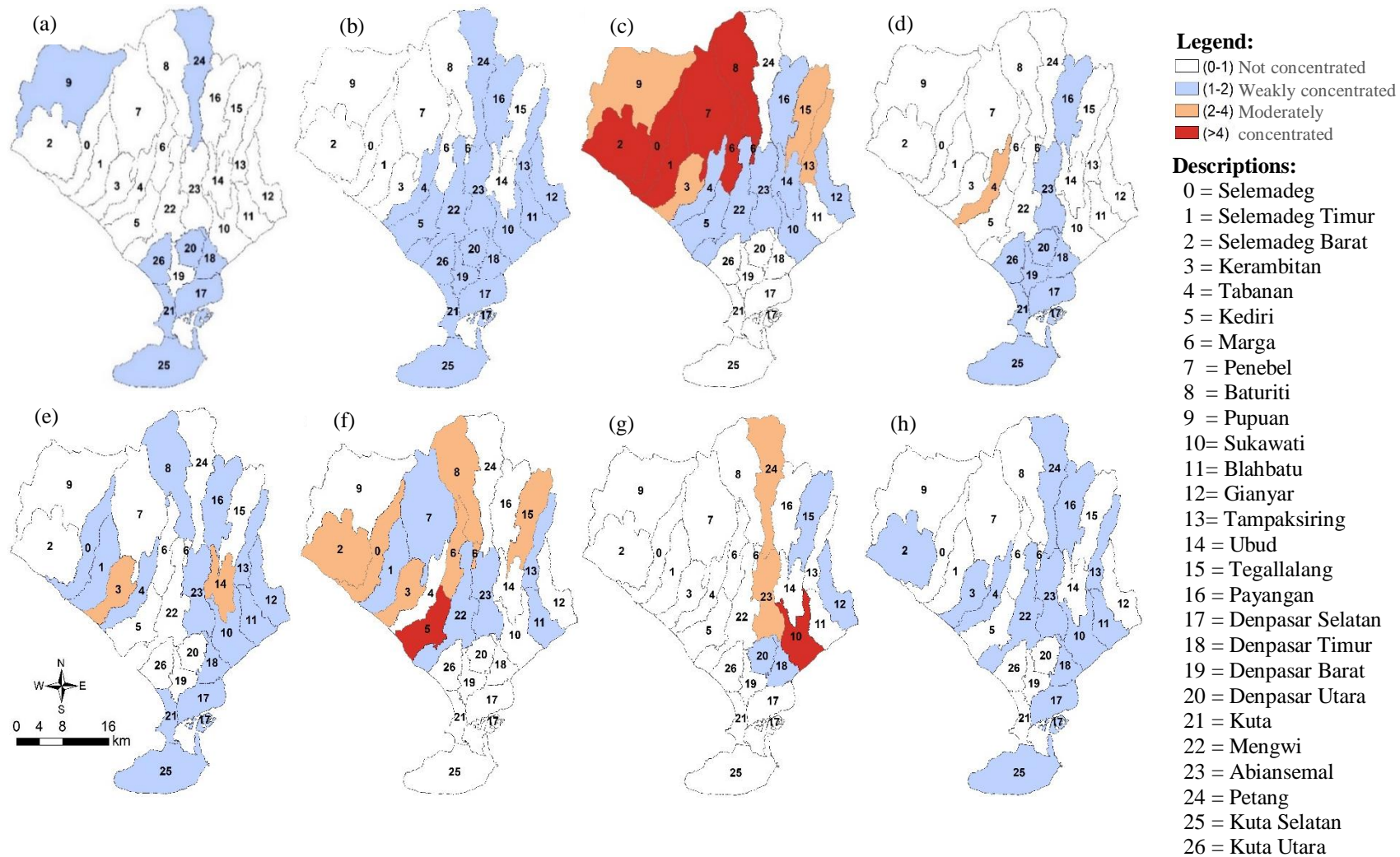


Figure 2. Spatial Concentration Map of SMEs Types in Sarbagita Region (from left to right): (a) Food & Beverages; (b) Textiles & Apparel; (c) Wood and bamboo goods; (d) Printing & Publishing; (e) Basic Chemicals, Fertilizers, Plastic goods; (f) Non-Metallic Minerals; (g) Basic iron and steel industry; (h) Metal goods & equipment, optical, electrical components, furniture, and motor vehicle repair industry

The results of the HBI analysis in Figure 2 indicate that food and beverage SMEs (Figure 2a), textile and apparel SMEs (Figure 2b), and metal SMEs (Figure 2h) are distributed across the unconcentrated and weakly concentrated categories. This is in line with the results of the specialisation analysis, which shows that the composition of these types of SMEs in the Sarbagita area tends to be similar because most areas are divided into unconcentrated and weakly concentrated categories only. Unconcentrated reflects that the development of these types of SMEs grows evenly or does not cluster. However, some areas are weakly concentrated, indicating that there is a tendency for the growth of these types of SMEs to cluster in certain locations.

As shown in Figure 2a, food and beverage SMEs tend to be moderately concentrated in center sub-districts such as South Denpasar, East Denpasar, North Denpasar, South Kuta, Kuta, North Kuta, Petang, and Pupuan. This area is generally a shopping and tourism area. Therefore, this can encourage this area to potentially become a center for the development of food and beverage SMEs in the Sarbagita area.

Meanwhile, textile and apparel SMEs (Figure 2b) show a weak concentration across a broader range of sub-districts, such as South Denpasar, West Denpasar, East Denpasar, North Denpasar, Sukawati, Blahbatuh, Gianyar, Tampaksiring, Payangan, Kuta, Mengwi, Abiansemal, Petang, South Kuta, North Kuta, Tabanan, and Kediri. These types of textile and apparel SMEs tend to grow in the southern region of the Sarbagita area and are close to the city centre, airport, and harbor.

In Figure 2h, Metal products, optical, electrical components, furniture, and motor vehicle repair industry SMEs exhibit a pattern of weak concentration in several sub-districts, namely South Denpasar, East Denpasar, South Kuta, Abiansemal, Petang, Mengwi, Sukawati, Blahbatuh, Tampaksiring, Payangan, West Selemedeg, Kerambitan, and Tabanan. The types of SMEs that are developed are quite diverse such as the type of aluminium metal goods industry, the computer equipment and assembly industry, electrical equipment, the ship and boat industry and various other processing industries. The distribution of these SMEs shows that the development of these SMEs is more dominant in areas close to urban access and harbours. This indicates the location of the dominant market area for the demand of these SME products.

Furthermore, consistent with the results of the specialization analysis, the printing and publishing SMEs (Figure 2d) as well as the basic chemicals, fertilizer, and plastic equipment SMEs (Figure 2e) show varied distribution patterns. These SMEs are spread across some subdistricts with different levels of concentration, namely moderate, weak, and unconcentrated. This indicates a more dispersed spatial presence. In the type of printing and

publishing SMEs, there is one area with moderate concentration, namely Tabanan sub-district, while there are nine areas with weak concentration, namely South Denpasar, East Denpasar, West Denpasar, North Denpasar, Payangan, Kuta, Abiansemal, South Kuta, and North Kuta. While other sub-districts are not concentrated. In the basic chemical, fertiliser, and plastic equipment SMEs, there are two areas with moderate concentration, namely Kerambitan and Ubud sub-districts. There are 14 sub-districts with weak concentration category, namely South Kuta, Abiansemal, Kuta, South Denpasar, East Denpasar, Sukawati, Blahbatuh, Gianyar, Tampaksiring, Payangan, Selemedeg, East Selemedeg, Tabanan, and Baturiti. While other areas are not concentrated. From the results of this identification, areas with weak concentration categories can be considered to synergise with local areas with moderate concentration to build business partnerships and marketing centres for products and raw materials.

### Spatial Distribution Pattern of SMEs in the Sarbagita Area

The distribution of SMEs is not the same in every local area. The Hoover-Balassa Index is used to identify the spatial concentration of SMEs, while LISA (Local Indicators of Spatial Association) analysis detects spatial linkages through autocorrelation, revealing whether sub-districts and their surrounding areas form spatial clusters or exhibit random distribution patterns. This analysis provides a comprehensive view of SME distribution and helps identify areas with potential for specific SME development. Based on the results of the LISA analysis, the autocorrelation pattern between sub-districts for each type of SME is presented in Figure 3.

In Food and Beverage (FnB) SMEs (3a), several sub-districts are in the High-High (H-H) pattern, namely West Denpasar, Kuta and Mengwi sub-districts. These areas not only have a high number of FnB SMEs but are also surrounded by other sub-districts with similarly high values, indicating strong regional clustering and potentially shared market or infrastructure support. On the other hand, several sub-districts with Low-Low (L-L) autocorrelation patterns are East Selemedeg, Tabanan, Kediri and Marga sub-districts. This pattern suggests these areas have a relatively low number of FnB SMEs and are also surrounded by other low-performing areas, which may indicate limited market access or demand for food and beverage due to limited proximity.

Textile and Apparel SMEs (3b) have 2 autocorrelation patterns, namely High-High (H-H) which consists of sub-districts: Kuta, West Denpasar, East Denpasar, North Denpasar, Mengwi and Petang; Low-Low (L-L) which consists of sub-districts: East Selemedeg, Kerambitan, Tabanan, Kediri, Marga and Payangan.



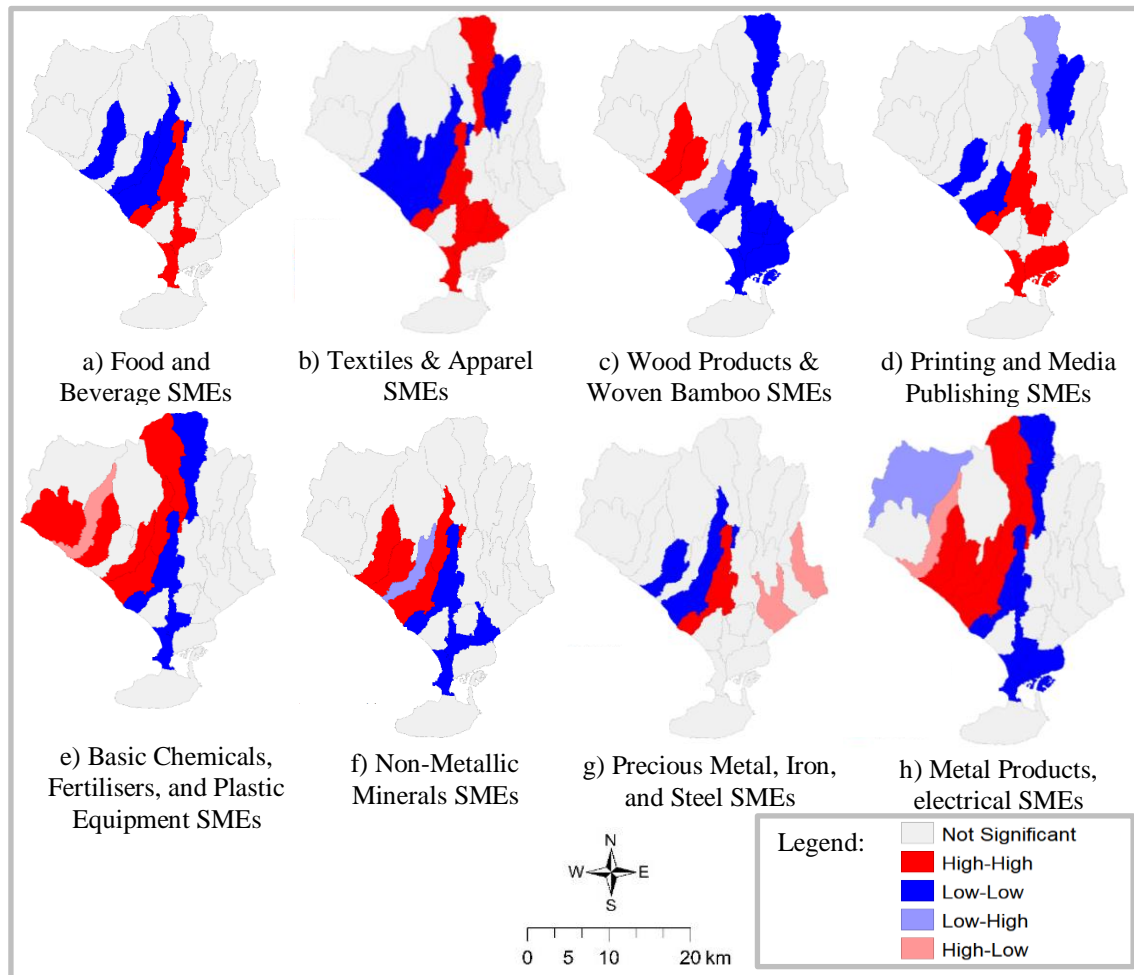


Figure 3. LISA spatial autocorrelation analysis results for each type of SME in sarbagita

The High-High pattern indicates that the areas with this pattern have high textile and apparel SME values and are surrounded by areas with high values as well. These areas tend to be in urban areas, which means that markets and distribution networks are higher in these areas. Meanwhile, areas in the Low-Low category indicate that the textile and apparel industry is relatively rare in these sub-districts, as well as in the surrounding areas.

The results of the Wood Goods SMEs (3c) concentration have three categories. First, the High-High (H-H) category are Selemadeg Timur and Kerambitan sub-districts. This pattern shows that in these areas the value of the type of SMEs of Wood Goods is high and can have implications for the centre of activity of these SMEs in the Sarbagita Region. Second, the Low-High (L-H) pattern is Kediri sub-district. Areas that have L-H patterns that are close to H-H patterned areas can be synergised to develop this type of SMEs in Sarbagita. Meanwhile, Low-Low (L-L) category consists of East Denpasar, West Denpasar, North Denpasar, South Denpasar, Kuta, Mengwi and Petang sub-districts. This distribution suggests that wood product SMEs are less dominant in urban cores, possibly due to limited land

availability, cost factors, or a shift toward service-based economies in these areas.

Printing and publishing SMEs (3d) produce 3 spatial autocorrelation patterns. First, areas with High-High (H-H) category are in South Denpasar, North Denpasar, Kuta and Mengwi sub-districts. These areas have high values of printing and publishing SMEs and tend to be surrounded by areas with high values as well. These areas are areas with administrative activities. Secondly, areas with the Low-Low (L-L) category are Kerambitan, Kediri and Payangan sub-districts. This pattern shows that these areas have low values of printing and publishing SMEs and tend to be surrounded by areas with low SME values. Third, the Low-High (L-H) pattern is Petang sub-district. The economic activities of this region are more involved in the agricultural sector. The development of printing and publishing SMEs in this region may be influenced by a spillover effect from neighboring sub-districts with higher SME growth in the same sector. This suggests that the spatial proximity to more advanced or established SME clusters can stimulate the emergence and expansion of similar business activities in adjacent areas, driven by shared market access, labor mobility, knowledge transfer, or local demand.

SMEs of basic chemicals, fertilisers, and plastic goods (3e) have three categories of spatial relationship patterns: High-High (H-H), Low-Low (L-L) and High-Low (H-L). The sub-districts included in the High-High (H-H) pattern category are clustered in the sub-districts of West Selamadeg, East Selamadeg, Tabanan, Kediri, Marga and Baturiti. These High-High areas have a high value of SMEs and tend to be surrounded by areas that have a high value of SMEs as well. Furthermore, areas with the Low-Low (L-L) category are Kuta, West Denpasar, Mengwi and Petang sub-districts. Meanwhile, areas with the High-Low (H-L) category are Selamadeg sub-district. This pattern shows that these sub-districts have high values of SMEs variables of basic chemicals, fertilisers, and plastic goods, but are surrounded by neighbouring areas with lower values of variables, which can occur by the spillover effect.

Non-metallic mineral SMEs (3f) based on the results of LISA analysis have 3 spatial autocorrelation patterns that cluster together. The High-High (H-H) patterned area consists of East Selamadeg, Kerambitan, Kediri, and Marga sub-districts. This pattern shows areas that have high non-metallic mineral SMEs values and tend to be surrounded by areas with high values as well. In addition, the Low-Low (L-L) patterned region consists of Mengwi, Kuta, West Denpasar and East Denpasar sub-districts. These areas have low values of non-metallic mineral SMEs and the surrounding areas have low values as well. However, these areas tend to be close to urban centres that can be used as marketing locations for these SMEs. Furthermore, one area identified with a Low-High (L-H) pattern is the Tabanan sub-district. This pattern indicates that while Tabanan itself has a relatively low concentration of non-metallic mineral SMEs, it is surrounded by neighboring sub-districts with higher concentrations.

Based on the LISA analysis results, Precious Metals, Iron, and Steel SMEs (Figure 3g) show a High-High (H-H) spatial autocorrelation pattern in Mengwi Sub-district. This indicates that Mengwi not only has a high concentration of these SMEs, but it is also surrounded by neighboring sub-districts with similarly high values. Such clustering may reflect the presence of supporting infrastructure, skilled labor, and market accessibility, making Mengwi a potential hub for metal-based craft industries in the Sarbagita area. Meanwhile, some areas with Low-Low (L-L) category are Kerambitan, Kediri and Marga sub-districts. This indicates that iron and steel SMEs activities have a low concentration in those areas and are surrounded by areas with low values as well. In addition, there are 2 areas that have High-Low (H-L) autocorrelation pattern, namely Sukawati and Gianyar sub-districts. This pattern reflects that the development of iron and steel SMEs in these two areas has a high concentration but around them are areas with lower activities of Precious Metal, Iron and Steel SMEs.

SMEs Metal goods, computer, optical, electrical components, furniture, and motor vehicle repair industry (3h), has 4 patterns of spatial autocorrelation relationship: first, High-High (H-H) consists of East Selamadeg, Kerambitan, Tabanan, Kediri, Marga and Baturiti sub-districts. These areas have high values of SMEs of metal goods, etc., and are surrounded by areas with high SME values as well. Second, the area with High-Low (H-L) category is Selamadeg sub-district. This pattern shows that the area has a high value of SMEs of metal goods, etc. but is surrounded by neighbouring areas with lower values. The third is Low-High (L-H), which is Pupuan sub-district. This autocorrelation pattern shows that the area has a low value of metal goods SMEs but its neighbouring areas have a high value of SMEs. Fourth, the Low-Low (L-L) pattern. This pattern consists of South Denpasar, West Denpasar, Kuta, Mengwi and Petang sub-districts. Some of these areas tend to be in urban areas with a low concentration of metal goods SMEs and are surrounded by neighbouring areas that have low values of these SMEs.

## CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

The results of the study indicate that the Sarbagita region holds diverse potential for the development of small and medium industries (SMEs). Based on the Krugman Index analysis, three types of SMEs demonstrate above-average index values and are categorized as specialized industries: basic iron and steel SMEs, non-metallic mineral product SMEs, and wood and bamboo craft SMEs.

A further synthesis using the Hoover-Balassa Index and spatial autocorrelation (LISA) analysis identifies specific sub-districts as potential development centers for each SME type. Basic iron and steel SMEs show potential in Sukawati Sub-district, non-metallic mineral SMEs in Kediri Sub-district, and wood product SMEs in Selamadeg Timur Sub-district. These areas exhibit strong industrial concentration according to the Hoover-Balassa Index, as well as high spatial interconnectivity, categorized as High-High and High-Low patterns based on LISA results.

To support SME development across the Sarbagita region, these locations may serve as strategic centers for each specialized SME type. In order to broaden development efforts, other sub-districts identified as having spatial concentration and autocorrelation can be considered for establishing partnerships or enhancing business synergies. These initiatives may be pursued by business actors through capital investment and product marketing or by government intervention through targeted SME development programs.



## Recommendations

This study identifies local areas or sub-districts in the Sarbagita region with strong SME development potential based on spatial concentration and autocorrelation patterns, which help determine centers of specialized SME activity as a basis for regional development planning. However, to better explain the dynamics behind SME growth, future research should incorporate additional factors such as infrastructure quality, socio-economic conditions, environmental capacity, and existing industrial networks to provide a more comprehensive understanding. An integrated approach would enable policymakers and practitioners to design more targeted interventions, such as prioritizing sub-districts with both high SME concentration and strong infrastructure as market zones or industrial clusters, and identifying strategically located but underdeveloped areas for SME expansion or support initiatives. This combination of spatial and contextual analysis can lead to more effective policy decisions regarding SME financing, marketing, capacity building, and inter-sub-district collaboration, ensuring that SME growth is inclusive, regionally balanced, and aligned with local development goals.

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