

Potency Analysis of the Batik MSMEs Industrial in Surabaya Using Geographic Information System

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Abstract—Behind the slowing global economic growth, MSME sector plays a very important role in maintaining the stability of national economy. In 2016 the contribution of the MSME sector reaches 60.34% for the national gross domestic product (GDP). Batik itself is a cultural heritage of the archipelago that has been recognized by the world through UNESCO as a masterpiece of humanitarian heritage for oral and nonbendawi culture (Masterpiece of The Oral and Intangible Heritage of Humanity). So in order to support and develop the sector of batik MSMEs in Surabaya required a system to monitor and analyze the potential of MSMEs in Surabaya batik is the construction of geographic information systems. The purpose of this research is to make a potential map of MSMEs of Surabaya city batik and GIS potency of batik MSME Surabaya city, which obtained by using scoring method based on distance parameter to transportation access, price range and completeness of batik product MSMEs in Surabaya. As reference and recommendation for related parties in developing potency of batik MSMEs in Surabaya. The results of the potential analysis of batik MSMEs in Surabaya are classified into 3 priority classification of high, medium, and low priority. Results of regional analysis that has MSMEs batik with high priority that is 13 MSMEs spread in South Surabaya amounted to 5 MSMEs, Central Surabaya amounted to 6 MSMEs, and North Surabaya amounted to 2 MSMEs. Then the medium priority of 24 MSMEs spread in South Surabaya amounted to 5 MSMEs, Central Surabaya amounted to 17 MSMEs, and North Surabaya amounted to 2 MSMEs. While the low priority of 4 MSMEs spread across Central Surabaya amounted to 1 MSMEs and North Surabaya amounted to 3 MSMEs.

Keywords—Potential of MSMEs Batik, Geographic Information System, Scoring Analysis.

I. INTRODUCTION

Recent global economic growth is in a slowing trend. In 2016 global economic growth only reached 3.2%. This figure is far when compared to global economic growth in 2011 which reached 5.4% [1]. The slowing down of the global economy has become one of the impacts of the economic downturn in Indonesia. Public purchasing power has decreased almost in all business sectors [2].

UMKM is an abbreviation of micro, small and medium enterprises. UMKM is regulated based on Law Number 20 of 2008 on micro, small and medium enterprises. Where

UMKM is a stand-alone productive economic enterprise, carried out by an individual or business entity that is not a subsidiary or a branch of a company owned, controlled, or becomes part directly or indirectly with a Small Business or a large business with a net worth or the results of annual sales as stipulated in the Act [3]. Behind the current economic slowdown, the MSME sector is one of the excellent contributors to the stability of the national economy. The ability of UMKM has proven able to sustain the economy during the economic crisis of 1997-1998. In 2016 the contribution of the MSME sector reaches 60.34% for the national gross domestic product (GDP) national [4][5].

Surabaya is one of the metropolitan cities as well as the capital of East Java province. Therefore, Surabaya became the center of economic activity in East Java and its surroundings, so that Surabaya has a big role in creating jobs for people of Surabaya and other areas around Surabaya [6]. Batik is a cultural heritage of the archipelago (Indonesia) which has a high value and fusion of art, loaded with philosophical meanings and meaningful symbols that show the way of thinking of the creator community. Batik is a craft that has become part of Indonesian culture (especially Java) since the first [7]. Batik skills are used as a livelihood and exclusive work for Javanese women until the discovery of batik cap and printing that allows the entry of men in this batik work. Batik development in Indonesia peaked on October 2, 2009, namely UNESCO (United Nations Educational, Scientific and Cultural Organization) set Batik Indonesia as a whole technique, technology, development of motifs and cultures associated with the batik as a masterpiece of humanitarian heritage for oral culture and non bendawi (Masterpiece of The Oral and Intangible Heritage of Humanity) is the international recognition that Indonesian batik is part of the wealth of human civilization.

Geographic Information System can be utilized to support UMKM activity in batik field in Surabaya city. Spatial analysis of SMEs generated from GIS can make it easier for the parties involved in making a decision. Information generated GIS can be made in detail so that the need for information will be very fulfilled.

II. RESEARCH METHOD

A. Research Sites

The research location of this final project is in Surabaya City, East Java Province. The city of Surabaya has an area of about 350.5 km² and is geographically located between 7 ° 09 's to 7 ° 21' S and 112 ° 36 's to 112 ° 54' E.

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Figure 1. Research Sites (Google Maps, 2017).

B. Data and Equipment

Data needed in this research are:

1. Spatial data in the form of digital map of Surabaya city in format (. Shp) and coordinate result from GPS
2. Non spatial data used are primary data (questionnaire survey) and secondary data about batik SMEs in Surabaya city from Surabaya Small and Medium Business Cooperative Office

Equipment used in this research is as follows:

- a) Operating system windows 7, used for preparing reports and preparation database SMEs Surabaya batik ArcGIS 10.0,
- b) ArcGIS 10.0, used to perform the process of making database and analysis of batik SMEs Surabaya
- c) CarryMap, an open source application used to design and display simple to complex maps that are portable so easy to use by common people.

C. Research Method

The processing stage is described with the following explanation:

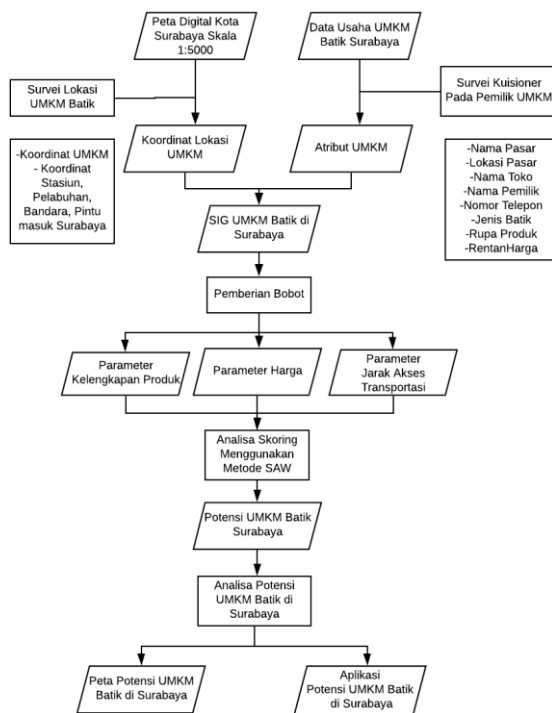


Figure 2. Flow Chart of Data Processing Stages.

Explanation of the data processing diagram above is:

1. Secondary data required is spatial data in the form of digital map of Surabaya city scale 1: 5000 and non spatial data in the form of business data of batik UMKM in Surabaya.
2. Survey Location of UMKM Batik
At this stage conducted a field survey to obtain primary data in the form of coordinates of SMEs batik and verification of existing batik UMKM locations.
3. Survey of Questionnaires to MSME Owners
This stage is done simultaneously during survey location of SMEs batik by using questionnaire addressed to owner of UMKM, questionnaire question related to attribute which will be used when compilation of SME Batik GIS.
4. Preparation of SMEs in SMEs Batik Surabaya
Preparation of GIS SMEs batik is a merger and preparation of spatial data in the form of coordinates and non-spatial data in the form of attributes obtained into SMEs batik SIG that will be used to analyze the potential of SMEs batik.
5. Giving Weight
Giving weight is an activity that aims to determine the weight of each with potential parameters that affect for SMEs batik.
6. Scoring Analysis Using SAW Method
Analysis conducted to obtain information about batik SMEs that potentially become a place of recommendation of batik SMEs in Surabaya.
7. Potential Analysis of SMEs Batik
Analysis of potential UMKM batik based on criteria of batik UMKM parameters in Surabaya.
8. Potential Map of SMEs Batik in Surabaya
Map of potential batik SMEs in Surabaya can be obtained after obtaining the results of the potential analysis of batik SMEs in Surabaya.
9. Potential Application of SMEs Batik in Surabaya
Potential applications of batik SMEs in Surabaya made using CarryMap to facilitate users in using batik SIG in Surabaya

III. RESULT AND ANALYSIS

A. Analysis

1. Transport Access Criteria

Criteria of distance to access transportation aims to know UMKM Batik is close to access transportation. In this study the transportation access is referred to the stations, terminals, and ports in Surabaya. Assuming that a person walking has an average speed of 5 - 10 km / h when traveling a distance of 2.5 km then it takes time for him to reach the location of MSME is 15-30 minutes. While people who ride the vehicle in the city has an average speed of 20 - 40 km / h if the distance of 2.5 km then it takes time for up to the location of MSME is 4 - 7.5 minutes. So a distance of 2.5 km is considered reasonable by the author to obtain the highest score with a score of 15 and the lowest score of more than 5 km with a score of 5.

TABLE 1.
 TRANSPORT ACCESS DISTANCE PARAMETERS

No	Transportation Distance Parameters Distance	Score
1	0 – 2.5 km	15
2	2.5 – 5 km	10
3	> 5 km	5

Then the result of data processing above is as follows:

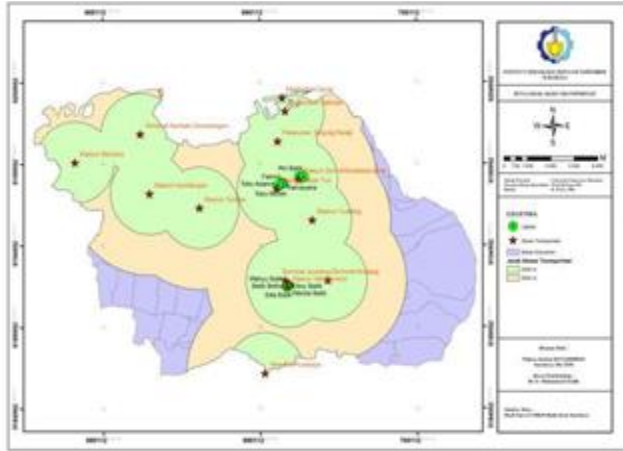


Figure 3. Map of MSMEs Distance on Transportation Access.

Based on the criteria of distance to access transportation, all batik SMEs have a high score with a score of 15, because UMKM batik has a distance <2.5 km from transportation entrance entrance of Surabaya, among others, stations.

TABLE 2.
 CALCULATION OF UMKM BATIK BASED ON DISTANCE

No	Distance	Score	UMKM Total	Presentation (%)
1	0 - 2.5 km	15	41	100
2	2.5 - 5 km	10	0	0
3	>5 km	5	0	0
Total			41	100

2. Price Criteria on Community Purchasing Power

Price criteria to public purchasing power aims to find out MSMEs that have economic prices that can be reached by people from middle to lower economic society up to middle and upper economic communities

TABLE 3.
 PRICE PARAMETERS TO PUBLIC PURCHASING POWER

No	MSME Price Range	Class	Score
1	Rp. 30.000 – 100.000	ekonomis	9
2	Rp. 100.000 – 200.000	menengah ke bawah	7
3	Rp. 200.000 – 300.000	menengah	5
4	Rp. 300.000 – 500.000	menengah ke atas	3
5	Rp. 500.000 <	atas	1

Based on price criteria, batik SMEs have the highest presentation that is with a score of 7 a number of 26 SMEs, while those who have the lowest presentation with a score of 3 a number of UMKM.

TABLE 4.
 CALCULATION OF UMKM BATIK BASED ON PRICE

No	MSME Price Range	Score	UMKM Total	Presentation (%)
1	Rp. 30.000 – 100.000	9	4	9.756098
2	Rp. 100.000 – 200.000	7	26	63.41463
3	Rp. 200.000 – 300.000	5	7	17.07317
4	Rp. 300.000 – 500.000	3	1	2.439024
5	Rp. 500.000 <	1	3	7.317073
Jumlah			41	100

3. Product Type Criteria Against Product Completion

Product completeness criteria aim to know the UMKM which have complete product. Complete product in question is starting from accessories products, fabric, kid's clothes, and adult clothes. The more complete the product, the higher the score.

TABLE 5.
 TYPE PARAMETERS

No	Types of products	Score
1	Adults, Children's Clothes, Fabrics / Accessories	3
2	Adult, Fabrics Materials	2
3	Adult, Accessories	1

Based on product criteria, batik SMEs have the highest presentation with a score of 1 a number of 22 SMEs, while those who have the lowest presentation with a score of 3 a number of 2 MSMEs

TABLE 6.
 CALCULATION OF UMKM BATIK BY PRODUCT

No	Product	Score	Total UMKM	Presentation (%)
1	Adults, Children's Clothes, Fabrics / Accessories	3	2	4.878049
	Adults, Children's Clothes		9	21.95122
	Adult, Fabrics Materials	2	7	17.07317
2	Adults, Accessories	1	1	2.439024
3	Adult	1	22	53.65854
Total			41	100

4. Potential Analysis of SMEs Batik



Figure 4. Position Map of MSME Priority in Pasar DTC.

After doing the above three analysis of the analysis of distance criteria, price, and completeness of the product can be obtained MSMEs that have the highest score and lowest score. UMKM batik which has the highest total score that is with score 26 and has the lowest total score is with score 17. The author divides the potential of UMKM batik into 3 priority that is UMKM with high priority or priority 1 that is with score 24-26, medium priority medium or priority 2 ie with a score of 20-23, and UMKM low priority or priority 3 is the score 17-19.

Position Map of MSME Priority in Pasar DTC (Fig. 4) MSMEs priority 1 is 5 MSMEs in South Surabaya in DTC market, 6 UMKM in Central Surabaya, 3 in Turi market and 3 in PGS market, and 2 UMKM in North Surabaya, 1 in Atom market and 1 in ITC market. Results of data processing can be seen in Table 7.

TABLE 7.
LIST AND TOTAL SCORE UMKM BATIK PRIORITY

FID	Shape *	Lokasi	Nama Pasar	Nama Toko	Lintang	Bujur	skortotal	keterangan
0	Point ZM	Surabaya Selatan	Pasar DTC Wonokrom	Wanda Batik	-7.30272	112.73760	24	Prioritas 1
1	Point ZM	Surabaya Selatan	Pasar DTC Wonokrom	Nindya Batik	-7.30264	112.73756	24	Prioritas 1
3	Point ZM	Surabaya Selatan	Pasar DTC Wonokrom	Silla Batik	-7.30227	112.73793	24	Prioritas 1
5	Point ZM	Surabaya Selatan	Pasar DTC Wonokrom	Batik Rara Katon	-7.30210	112.73808	24	Prioritas 1
8	Point ZM	Surabaya Selatan	Pasar DTC Wonokrom	Wahyu Batik	-7.30194	112.73821	24	Prioritas 1
13	Point ZM	Surabaya Pusat	Pasar PGS	Toko Adams	-7.24838	112.73291	25	Prioritas 1
14	Point ZM	Surabaya Pusat	Pasar PGS	Toko Hengly	-7.24832	112.73295	24	Prioritas 1
19	Point ZM	Surabaya Pusat	Pasar PGS	Keris Kencana	-7.24801	112.73243	24	Prioritas 1
24	Point ZM	Surabaya Pusat	Pasar Turi	Ramajana	-7.24536	112.73466	26	Prioritas 1
28	Point ZM	Surabaya Pusat	Pasar Turi	Rohiss Collection	-7.24513	112.73434	26	Prioritas 1
33	Point ZM	Surabaya Pusat	Pasar Turi	Nurfah Indah	-7.24491	112.73444	25	Prioritas 1
36	Point ZM	Surabaya Utara	ITC Mega Grosir	Riri Batik	-7.24154	112.74700	24	Prioritas 1
39	Point ZM	Surabaya Utara	Pasar Atom	Toko Gajah Mada	-7.24126	112.74465	24	Prioritas 1

UMKM which is medium priority or priority 2 is 24 units. MSMEs in South Surabaya are divided into 2 markets in DTC, 17 MSMEs in Central Surabaya, 10 in Turi market and 7 in PGS market, and 2 MSMEs in North Surabaya are 1 in Atom market and 1 in ITC market. Results of data processing can be seen in Table 8.

TABLE 8.
LIST AND TOTAL SCORE OF UMKM BATIK PRIORITAS 2

FID	Shape *	Lokasi	Nama Pasar	Nama Toko	Lintang	Bujur	skortotal	keterangan
2	Point ZM	Surabaya Selatan	Pasar DTC Wonokrom	Amalia Batik	-7.30295	112.73771	23	Prioritas 2
4	Point ZM	Surabaya Selatan	Pasar DTC Wonokrom	Devi Batik	-7.30213	112.73809	22	Prioritas 2
6	Point ZM	Surabaya Selatan	Pasar DTC Wonokrom	Kirana Batik	-7.30205	112.73813	23	Prioritas 2
7	Point ZM	Surabaya Selatan	Pasar DTC Wonokrom	Batik Beltha	-7.30199	112.73827	22	Prioritas 2
9	Point ZM	Surabaya Selatan	Pasar DTC Wonokrom	Baliku Unique	-7.30194	112.73836	23	Prioritas 2
10	Point ZM	Surabaya Pusat	Pasar PGS	Aneka Batik	-7.24852	112.73262	23	Prioritas 2
11	Point ZM	Surabaya Pusat	Pasar PGS	Sekar Jagad	-7.24848	112.73290	22	Prioritas 2
12	Point ZM	Surabaya Pusat	Pasar PGS	Ideal Batik	-7.24845	112.73312	23	Prioritas 2
15	Point ZM	Surabaya Pusat	Pasar PGS	Toko Maatun	-7.24829	112.73292	23	Prioritas 2
16	Point ZM	Surabaya Pusat	Pasar PGS	Falroh	-7.24823	112.73276	23	Prioritas 2
17	Point ZM	Surabaya Pusat	Pasar PGS	Toko Murah	-7.24821	112.73262	23	Prioritas 2
18	Point ZM	Surabaya Pusat	Pasar PGS	Sutra Putih	-7.24809	112.73241	23	Prioritas 2
20	Point ZM	Surabaya Pusat	Pasar Turi	Rafi Collection	-7.24552	112.73439	23	Prioritas 2
22	Point ZM	Surabaya Pusat	Pasar Turi	Toko Aisyah Store	-7.24543	112.73454	21	Prioritas 2
23	Point ZM	Surabaya Pusat	Pasar Turi	Sally's Style	-7.24538	112.73449	23	Prioritas 2
25	Point ZM	Surabaya Pusat	Pasar Turi	Rumah Katur Kaira	-7.24521	112.73472	23	Prioritas 2
26	Point ZM	Surabaya Pusat	Pasar Turi	VAV Collection	-7.24517	112.73495	23	Prioritas 2
27	Point ZM	Surabaya Pusat	Pasar Turi	Aldo Collection	-7.24517	112.73477	23	Prioritas 2
29	Point ZM	Surabaya Pusat	Pasar Turi	Toko Nurhamida	-7.24512	112.73517	22	Prioritas 2
30	Point ZM	Surabaya Pusat	Pasar Turi	Rizki House	-7.24505	112.73478	22	Prioritas 2
31	Point ZM	Surabaya Pusat	Pasar Turi	Cha Cha Collection	-7.24505	112.73453	23	Prioritas 2
32	Point ZM	Surabaya Pusat	Pasar Turi	Avezel Batik	-7.24499	112.73495	22	Prioritas 2
37	Point ZM	Surabaya Utara	ITC Mega Grosir	Ahisa Batik	-7.24131	112.74821	23	Prioritas 2
38	Point ZM	Surabaya Utara	Pasar Atom	Toko Agung Lestari	-7.24128	112.74458	23	Prioritas 2

UMKM including low priority or priority 3 of 4 units. The spread of UMKM priority 3 is among others 1 SME in Central Surabaya that is in Turi market, 3 UMKM in North Surabaya that is in ITC market. The results of data processing can be seen in Table 9.

TABLE 9.
LIST AND TOTAL SCORE OF UMKM BATIK PRIORITY 3.

FID	Shape *	Lokasi	Nama Pasar	Nama Toko	Lintang	Bujur	skortotal	keterangan
21	Point ZM	Surabaya Pusat	Pasar Turi	Srikandi Shop	-7.24549	112.73444	19	Prioritas 3
34	Point ZM	Surabaya Utara	ITC Mega Grosir	Batik Chrisna	-7.24180	112.74713	19	Prioritas 3
35	Point ZM	Surabaya Utara	ITC Mega Grosir	Toko Riezki 2	-7.24155	112.74717	17	Prioritas 3
40	Point ZM	Surabaya Utara	ITC Mega Grosir	Njonjah Poenja	-7.24119	112.74823	19	Prioritas 3

5. GIS Application Display Potential of UMKM Batik in Surabaya

SIG Potential of UMKM Batik in Surabaya has display menu identify. Identify on the map is given to assist users in understanding the information contained in the spread of batik SMEs. The results of this identifying information will appear next to the map.

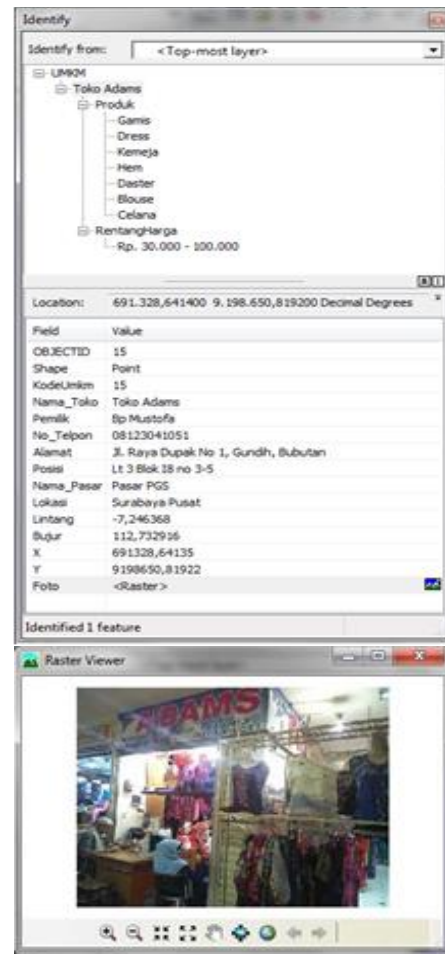


Figure 5. Display results identify.

In the application that is formed, there is a search function that in this case serves as an identify between attributes and spatial data. This search function is directly connected to the database.

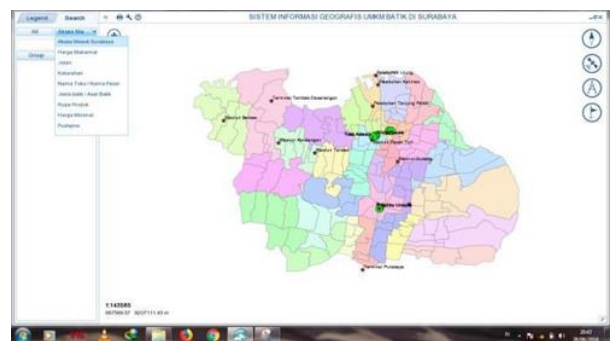


Figure 6. Display of Search Attribute Function.



Figure 7. Display Search Results Attribute Batik Type Cap.

6. Data Analysis

Based on the database and the spread of 41 SMEs Surabaya batik that can be concluded that the SMEs of Surabaya batik priority 1 or high priority are many in South Surabaya, namely DTC market, priority 2 or priority are many in Central Surabaya namely Turi market, PGS market and Atum market, whereas priority 3 or low priority is mostly found in North Surabaya namely ITC Market.

TABLE 10..
 NUMBER OF SMES BATIK IN SURABAYA

No	Market	MSMEs			Total	Explanation
		Priorit High Total	Priorit Medium Total	Priorit Low Total		
1	DTC	5	5	0	10	High Potency
2	Turi	3	10	1	14	Medium Potency
3	PGS	3	7	0	10	Medium Potency
4	Atum	1	1	0	2	Low Potency
5	ITC	1	1	3	5	Low Potency

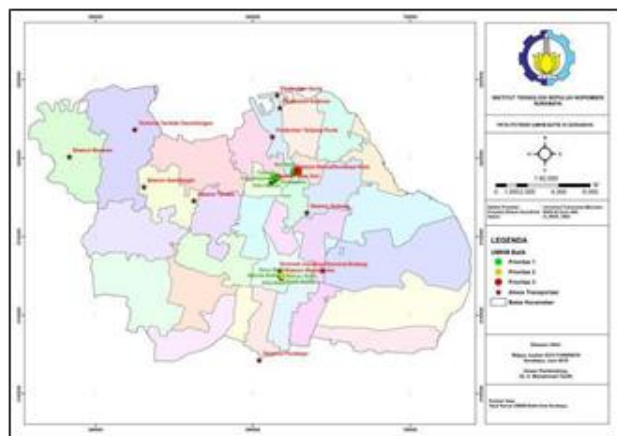


Figure 8. Map of SME Potential of Surabaya City Batik

Based on the results of research analysis has been put forward, it can be concluded as follows:

1. The potential of SMEs in Surabaya batik is divided into three priorities, among others:
 - a. High Priority or I, are batik SMEs that have a score of 24 - 26 a total of 13 SMEs with a presentation of 31.7073%.
 - b. Medium or Second Priority, is batik MSME which has score 20 - 23 number 24 UMKM with presentation equal to 58.5365%.
 - c. Low Priority or III, batik UMKM which have score 17 - 19 number 4 UMKM with presentation equal to 9.75609%.

While the spread of UMKM batik in Surabaya, among others:

- a. High Priority or I, among others, 5 MSMEs in South Surabaya are DTC market, 6 SMEs in Central Surabaya are 3 in Turi market and 3 in PGS market, 1 UMKM in North Surabaya is at Atom market, and 1 UMKM in East Surabaya in the ITC market.
 - b. Medium or Second Priority are 5 MSMEs in South Surabaya in DTC market, 17 UMKM in Central Surabaya are 10 in Turi market and 7 in PGS market, 1 UMKM in North Surabaya is at Atom market, and 1 UMKM in East Surabaya in the ITC market.
 - c. Low Priority or III, among others, 1 SME in Central Surabaya is in Turi market and 3 UMKM in East Surabaya is in ITC market
2. From the results of data collection from the questionnaire of batik SMEs in Surabaya, the results obtained in the form of Geographic Information System SMEs Surabaya Batik.

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