The Analysis of Economic Sector Potential in Surabaya using Location Quotient, Shift Share, and Klassen Typology in 2015-2019

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A B S T R A C T

Economic development in an area requires encouragement between the local government and the community to grow regional economic activities by managing existing resources, establishing relationships between government and private agencies, and encouraging development related to regional economic activities. The development of a region cannot be separated from national development because regional governments and local communities need coordination to utilize, create, develop, and produce existing resources. This study aimed to describe the potential of the economic sector in Surabaya in the period of 2015-2019. This research uses secondary data for five years in the 2015-2019 period. The analytical method used analyzes location quotient, shift share, and Klassen typology. The results of the study revealed that five sectors were included in quadrant I, and two sectors were included in quadrant IV. In conclusion, Surabaya has fifteen economic sectors that drive economic progress, ten sectors grow relatively fast, nine industries have outstanding location advantages, and five sectors belong to quadrant I. This research is used as a reference in making policies related to economic progress in Surabaya, which impacts increasing employment and per capita income.

1. Introduction

Economic development in an area requires encouragement between the local government and the community to grow regional economic activities by managing existing resources, establishing relationships between government and private agencies and encouraging development related to regional economic activities (Feldman et al., 2014). The development of a region cannot be separated from national development because regional governments and local communities need coordination to utilize, create, develop, and produce existing resources. High economic growth significantly affects the continuity of economic development and increased welfare. Gross regional domestic product (GRDP) is used as a benchmark for the success of regional development. Other indicators include growth rates, per capita income, and changes in economic structure (Sjafrizal, 2016).

Economic growth can be an indicator of the success of the development of a region (Juhandi et al., 2021). Regional economic growth is marked by an increase in people's per capita income and the general standard of living of the area, namely an increase in the total real gross domestic product (GDP). Regional economic development is also inseparable from national reforms aimed at increasing the employment opportunities of citizens. Therefore, to realize good national reforms, there must be cooperation between stakeholders and the private sector in regional economic planning and

development (Aghion et al., 2014). The leading sector is a sector that has a comparative advantage so that it can contribute to accelerating regional development and accelerating regional economic growth from sectoral resources by contributing to the formation of regional GRDP; the ability of the leading sector to contribute to GRDP can be seen from employment absorption, export commodities, and inter-sectoral linkages. Sectors with more tremendous advantages will be able to develop faster (Reuveny et al., 2001). With increased economic growth, it can be shown that Surabaya is experiencing economic progress (Figures 1 & 2). The higher the regional gross domestic product, the better the economic growth rate. This study aimed to describe the potential of the economic sector in the city of Surabaya in the period of 2015-2019.
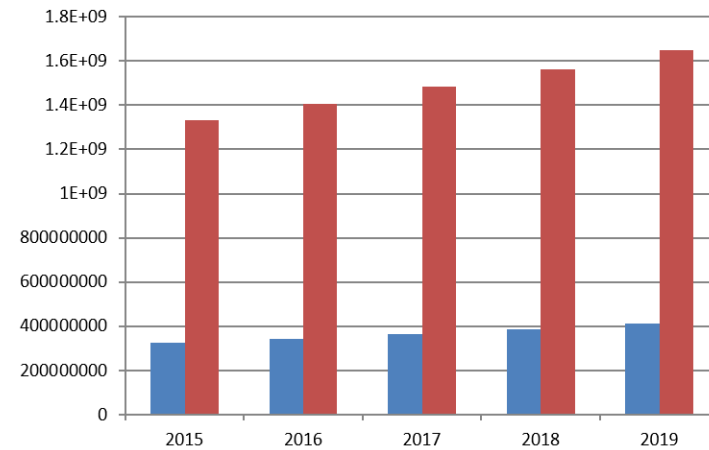

Figure 1. Gross regional domestic product of Surabaya and East Java in 2015-2019. Notes: blue bar: Surabaya; red bar: East Java.
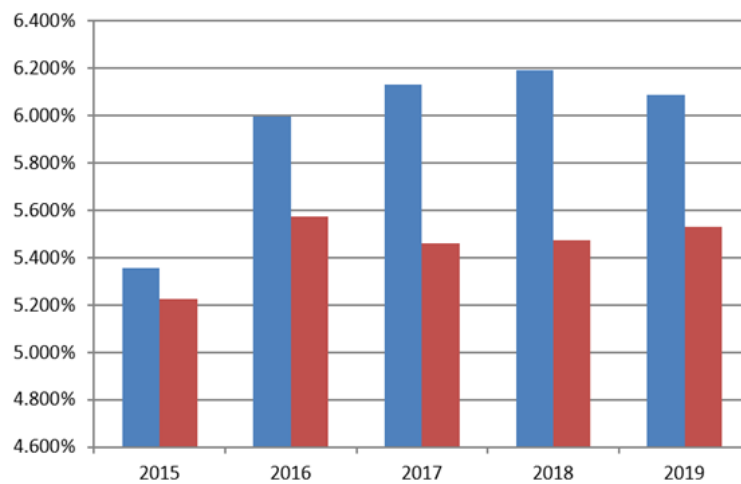
Figure 2. Economic growth in Surabaya and East Java in 2015-2019. Notes: blue bar: Surabaya; red bar: East Java.

2. Literature Review
Regional economic potential

Economic potential is the economic capacity that exists in the region to be developed and continues to be developed so that it becomes a source of regional income and a source of economic livelihood for the local community. The development of existing potential can even encourage regional economic

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development. Todaro et al. (2006) stated that there are three main factors or components in every nation's economic growth, they are capital accumulation, population, and workforce growth, and technological advances.

Regional economic development

According to Aghion et al., (2014) regional economic development is a process in which local governments and communities manage existing resources and form a partnership pattern between local government and the private sector. This process aims to create new jobs and stimulate the development of economic activity or economic growth in the region. The main problem in regional development lies in the emphasis on development policies based on the characteristics of the area concerned (endogenous development) by utilizing the potential of natural resources, local or regional, e.g., human, institutional, and physical resources. This orientation directs us to take initiatives originating from the regions in the development process to create new jobs and stimulate increased economic activity (Audretsch et al., 2006).

Location quotient (LQ)

Location quotient (LQ) is an analysis used to obtain basic and non-base sectors to find comparative advantage or how a region determines its superior sectors. These calculations can help identify the strengths and weaknesses of the region compared to the broader region through this study using the province of East Java. The formula used to calculate LQ is as follows (Davis, 2010):

$$LQ = \frac{V_i/V_t}{Y_i/Y_t}$$

V_i = GRDP value of sector i at a lower regional level;
V_t = Total GRDP at the lower regional level;
Y_i = GRDP value of sector i at a higher regional level;
Y_t = Total GRDP at a higher regional level.

Shift share analysis

Shift share analysis basically shows the performance and productivity of the reciprocal economic sector in a region by measuring it against the performance of sectors in a broader area (Taniu et al., 2020). Shift share analysis is divided into three parts that are measured, which are the potential of regional (PR), proportional share (PS), and differential share (DS). The potential of regional (PR) is the pattern of the economy in the region by measuring it based on an assessment model in sectoral shifts in the economy compared to shifts in similar sectors in other regions.

$$PR = Q^o_{ij\left\{\frac{Y_t}{Y_0}-1\right\}}$$

Y_t = The amount of GDP for the year t province;
Y_o = The amount of GDP in the provincial base year;
$Q_{ij}{}^o$ = The amount of GDP in the base year of the city.

Proportional share (PS) describes a proportional shift by measuring changes in economic conditions, decline, or growth in one area compared to a much broader reference area. This calculation allows regional economic conditions to be concentrated in industries faster than the reference economy (Hassan et al., 2011; Goschin, 2014).

$$PS = Q^o_{ij}\left\{\frac{Q^t_i}{Q^o_i} - \frac{Y_t}{Y_o}\right\}$$

Y_t = The amount of GDP for the year t province;
Y_0 = The amount of GDP in the provincial base year;
$Q_i{}^t$ = GDP value of sector i year t province;
$Q_i{}^0$ = GDP value of sector I provincial base year;
$Q_{ij}t$ = GDRP value year t city;
$Q_{ij}{}^0$ = The amount of GDP in the base year of the city.

Differential share (DS) is a differential shift calculation that can describe how far the regional (local) industrial sector is from the comparison/reference area. If the industrial sector in the local area has a differential shift with a positive value, then the industrial sector has higher

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competitiveness than the same industrial sector in the comparison/reference area (Rice et al., 2010; Maspaitella et al., 2021).

$$DS = Q_{ij}^o \left\{ \frac{Q_{ij}^t}{Q_{ij}^o} - \frac{Q_i^t}{Q_i^o} \right\}$$

Q_i^t = GDP value of sector i year t province;

Q_i0 = GDP value of sector I provincial base year;

$Q_{ij}t$ = GDRP value year t city;

$Q_{ij}0$ = The amount of GDP in the base year of the city.

Klassen typology (KT) analysis

Klassen typology (KT) is used to classify sectors according to their advantages (Katti et al., 2019). This analysis is carried out by calculating the ratio of the growth rate of the economic sector in the city of Surabaya and the contribution of each sector to the formation of GRDP. The results of the calculation are classified as follows: (1) If ri > R and yi > Y, they are classified as quadrant I (developed and fast-growing areas). Its indicators have a higher rate of economic growth and per capita income compared to the district/city average; (2) If ri > R and yi < Y it is classified as quadrant II (a rapidly developing area). The indicator has a high growth rate, but the per capita income level is below the district/city average; (3) If ri < R and yi > Y it is classified as quadrant III (developed but depressed area). The indicator has a higher per capita income, but the growth rate is below the district/city average; (4) If ri < R and yi < Y it is classified as quadrant IV (underdeveloped areas). Its indicators have a lower economic growth rate and income per capita below the district/city average.

3. Methods

This research was conducted using a descriptive approach through quantitative analysis. This research was conducted in Surabaya, one of the big cities in East Java province. This research was conducted for five years, from 2015 to 2019. The variables used are the GRDP of Surabaya in 2015-2019 based on constant prices. Regional gross domestic product, namely the increase in the gross added value obtained from the entire production of the economic sector of a region. Three analytical methods used in this study include location quotient (LQ), shift share, and Klassen typology.

4. Results and Discussion

Table 1 presents the LQ analysis in Surabaya. Twelve sectors dominate with LQ barometer > 1, meaning that the related sector can dominate competition competitively. The seven sectors that reach the LQ barometer < 1 mean that the related sector has yet to be able to compete. The data processing results show potential regional shifts in the table below for 2015-2019, which received the highest score in the corporate service sector because this sector can support the people's economy in Surabaya. Meanwhile, the regional potential that tends to hinder the growth of provincial GRDP is in the mining and quarrying sector. This potential makes perfect sense because Surabaya is a provincial city, so mining and quarrying are not a priority sector. The data processing results show a differential shift for 2015-2019, getting the highest score in the manufacturing industry sector which can provide a positive value; most people work as factory employees. Industrial areas surround the city of Surabaya. The data processing results show that there are 12 sectors with a proportional shift with a value of PS> 0; the related sector is developed quickly compared to similar sectors in other regions. The five sectors that dominate the PS <0 criteria mean that the related sector produces slow growth in the same sector in other regions. In the 2015-2019 period, the proportional shift received the highest score in the information and communication sector, which can provide positive value by growing relatively fast at the provincial level.

Table 1. Location quotient analysis result.

Industrial field	Mean	Description
A. Agriculture, forestry, and fisheries	0.014	Non-base
B. Mining and excavation	0.001	Non-base
C. Processing industry	0.647	Non-base
D. Procurement of electricity and gas	1.379	Base
E. Water procurement, waste management, waste, and recycling	1.564	Base
F. Construction	1.079	Base
G. Wholesale and retail trade; car and motorcycle repair	1.538	Base
H. Transportation and warehousing	1.660	Base
I. Provision of accommodation and food and drink	2.773	Base
J. Information and communication	1.151	Base
K. Financial services and insurance	1.881	Base
L. Real estate	1.536	Base
M,N. Company services	2.916	Base
O. Government administration, defense, and compulsory social security	0.566	Non-base
P. Education services	0.885	Non-base
Q. Health services and social activities	1.168	Base
R,S,T,U. other services	1.006	Base
Gross regional domestic product	1.000	Base

Table 2. The potential of regional (PR) of Surabaya in 2015-2019.

Sector	Potential of regional		
	PR	Q_{ij}	Category
A. Agriculture, forestry, and fisheries	130850.4582	147040.8566	Tend to push
B. Mining and excavation	4645.612176	1931.248424	Tends to inhibit
C. Processing industry	15184089.31	16039508.38	Tend to push
D. Procurement of electricity and gas	366198.405	354159.6562	Tends to inhibit
E. Water procurement, waste management, waste, and recycling	119335.3036	142549.2951	Tend to push
F. Construction	7715549.749	9333063.96	Tend to push
G. Wholesale and retail trade; car and motorcycle repair	22030443.76	27678857.69	Tend to push
H. Transportation and warehousing	3779322.214	5521485.655	Tend to push
I. Provision of accommodation and food and drink	10985534.97	15560988.85	Tend to push
J. Information and communication	5014084.462	6514558.392	Tend to push
K. Financial services and insurance	3819259.738	4719579.395	Tend to push
L. Real estate	2077421.26	2648876.854	Tend to push
M,N. Company services	1767647.038	2344265.895	Tend to push
O. Government administration, defense, and compulsory social security	998159.7608	1195396.309	Tend to push
P. Education services	1817159.827	2468756.667	Tend to push
Q. Health services and social activities	598743.2816	798756.8787	Tend to push
R,S,T,U. other services	1157064.562	1330040.016	Tend to push

From Table 2, it can be seen that Surabaya has 15 economic sectors that drive economic progress, including agriculture, forestry, and fisheries; processing industry; water procurement, waste management, waste, and recycling sector; construction sector; wholesale and retail trade sector; car and motorcycle repair; transportation and warehousing sector; accommodation and food and drink provision sector; information and communication sector; financial services and insurance sector; real estate sector; corporate service sector; education services sector; health service sector and social activities, other services.

Table 3 shows that ten sectors are growing relatively fast, namely: agriculture, forestry, and fisheries; processing industry; transportation and warehousing sector; accommodation and food and drink provision sector; financial services and insurance sector; real estate sector; corporate service sector; government administration, defense, and compulsory social security sector; education services sector and health services sector and social activities.

Table 3. Proportional shift (PS) of Surabaya in 2015-2020.

Sector	Proportional shift		
	PS	Percent	Category
A. Agriculture, forestry, and fisheries	4116.758313	411676%	Relatively fast
B. Mining and excavation	1282.533649	-128253%	Relatively slow
C. Processing industry	4072046.302	407204630%	Relatively fast
D. Procurement of electricity and gas	8692.883553	-869288%	Relatively slow
E. Water procurement, waste management, waste, and recycling	26402.61561	-2640262%	Relatively slow
F. Construction	2109760.346	-210976035%	Relatively slow
G. Wholesale and retail trade; car and motorcycle repair	5840549.279	-584054928%	Relatively slow
H. Transportation and warehousing	930431.8219	93043182%	Relatively fast
I. Provision of accommodation and food and drink	3897283.348	389728335%	Relatively fast
J. Information and communication	1595375.779	-159537578%	Relatively slow
K. Financial services and insurance	730665.2152	73066522%	Relatively fast
L. Real estate	481185.1518	48118515%	Relatively fast
M,N. Company services	474655.9432	47465594%	Relatively fast
O. Government administration, defense, and compulsory social security	156744.0532	15674405%	Relatively fast
P. Education services	446864.1992	44686420%	Relatively fast
Q. Health services and social activities	173559.6348	17355963%	Relatively fast
R,S,T,U. other services	255478.9408	-25547894%	Relatively slow

Table 4 shows that nine industries have an excellent location advantage or grow faster than the same industry in other places, including the following: agriculture, forestry, and fisheries sectors; transportation and warehousing sector; accommodation and food and drink provision sector; financial services and insurance sector; real estate sector; corporate services sector; government administration, defense, and compulsory social security sector; education services sector; health services and social activities sector; education services sector and health services sector and social activities.

Table 4. Differential share (DS) of Surabaya result in 2015-2019.

Sector	Differential shift		
	DS	Percent	Category
A. Agriculture, forestry, and fisheries	12073.64007	1207364%	Location advantage
B. Mining and excavation	-3996.897401	-399690%	No location advantage
C. Processing industry	-3216627.235	-321662724%	No location advantage
D. Procurement of electricity and gas	-20731.6323	-2073163%	No location advantage
E. Water procurement, waste management, waste and recycling	-3188.624199	-318862%	No location advantage
F. Construction	-492246.1349	-49224613%	No location advantage
G. Wholesale and retail trade; car and motorcycle repair	-192135.3451	-19213535%	No location advantage
H. Transportation and warehousing	811731.6196	81173162%	Location advantage
I. Provision of accommodation and food and drink	678170.5257	67817053%	Location advantage
J. Information and communication	-94901.84816	-9490185%	No location advantage
K. Financial services and insurance	169654.4423	16965444%	Location advantage
L. Real estate	90270.44183	9027044%	Location advantage
M,N. Company services	101962.9144	10196291%	Location advantage
O. Government administration, defense and compulsory social security	40492.49525	4049250%	Location advantage
P. Education services	204732.64	20473264%	Location advantage
Q. Health services and social activities	26453.96234	2645396%	Location advantage
R,S,T,U. Other services	-82503.48679	-8250349%	No location advantage

From the Klassen typology value, five sectors belong to quadrant I, namely the transportation and warehousing, accommodation and food and beverage provision, financial services and insurance, corporate services, health services, and social activities sector (Table 5). These sectors are pillars of community economic activity in Surabaya. Two sectors are still in quadrant IV, so it needs to be further improved, namely mining and excavation and processing industry sector. In the future, it is necessary to have an even distribution of sectors so that they are not dependent on sectors that are already superior.

Table 5. Typology Klassen result.

Sector	Description	Quadrant
A. Agriculture, forestry and fisheries	Potential sector or can still grow rapidly	3
B. Mining and excavation	Relatively lagging sector	4
C. Processing industry	Relatively lagging sector	4
D. Procurement of electricity and gas	Developed but depressed sector	2
E. Water procurement, waste management, waste and recycling	Developed but depressed sector	2
F. Construction	Developed but depressed sector	2
G. Wholesale and retail trade; car and motorcycle repair	Developed but depressed sector	2
H. Transportation and warehousing	Advanced and rapidly growing sector	1
I. Provision of accommodation and food and drink	Advanced and rapidly growing sector	1
J. Information and communication	Developed but depressed sector	2
K. Financial services and insurance	Advanced and rapidly growing sector	1
L. Real estate	Advanced and rapidly growing sector	1
M,N. Company services	Advanced and rapidly growing sector	1
O. Government administration, defense and compulsory social security	Potential sector or can still grow rapidly	3
P. Education services	Potential sector or can still grow rapidly	3
Q. Health Services and Social Activities	Advanced and rapidly growing sector	1
R,S,T,U. other services	Developed but depressed sector	2

5. Conclusion

Surabaya has fifteen economic sectors that drive economic progress, ten sectors grow relatively fast, and nine industries have outstanding location advantages, and five sectors belong to quadrant I. This research is used as a reference in making policies related to economic progress in Surabaya, which impacts increasing employment and per capita income.

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