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The Determination of Leading Sectors to Improve Bandung City's Competitiveness

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Abstract

This study aims to identify the leading sectors in 2010-2019 and future economic development strategies in order to increase the economic competitiveness of Bandung City, Indonesia. The method used is a combined analysis of static and dynamic Location Quotient (LQ), Shift-Share, Growth Ratio Model (MRP), Overlay and Klassen Typology. The results showed that 8 (eight) sectors are classified into advanced and rapidly growing sectors: construction; wholesales, retail, car and motor repair; transportation and warehousing; accommodation and food and beverage; information and communication; financial and insurance services; corporate services; health services; and social activities and others. Economic development strategies to improve the economic competitiveness of Bandung can be done in the short, medium, and long term. In the short term, it is maintaining the advanced and rapidly growing sectors and encouraging others in the advanced category sector but are depressed to be advanced and grow rapidly. In the medium term, local government can strive for potentially growing rapid sectors into advanced and growing rapidly sectors; additionally, it can support relatively lagging sectors to become potential or still develop. Furthermore, in the long-term, other lagging sectors are aimed to become advanced and grow rapidly.

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INTRODUCTION

Economic development aims to improve the community's welfare by optimizing and equalizing people's income. Economic development is generally based on the economic system and the development of leading sectors, especially those that absorb much labor and contribute export value by increasing human resources and technology's ability. It aims to strengthen the foundation of sustainable development and improve competitiveness and is oriented to economic globalization (Jhingan, 2003).

Economic development is a sustainable process to improve the community's welfare and prosperity, which always causes both positive and negative impacts (Ratnasari, 2017). Therefore, a framework is crucial to assess a region's development. In addition, regional economic development is a process where local governments and their communities jointly manage existing resources and form a partnership between local and private governments to create new jobs and develop economic activities in the region (Kuncoro, 2004).

The economic structure is a foundation that distinguishes one region from another, where such differences are closely related to the condition and potential of a region thus indirectly indicating a region's economy. In this case, various sectors' capacity to increase their production can affect a region's income and change its economic structure. Meanwhile, the idea of competitiveness is related to the concept of resilience, which is considered an effective response to unexpected disturbances, uncertainties or insecurities (Christopherson, Michie, & Tyler, 2010).

In the current era of decentralization and regional autonomy, local communities can develop independently, encouraging them to be more creative in developing the economy (Akita & Alisjahbana, 2002). Private investment and locally owned companies are expected to be the main booster of economic growth and development. In this case, investment is expected to boost regional economic growth and cause a multiplier effect on other sectors, especially those caused by the region's base and mainstay sectors.

Bandung City is the capital of West Java Province, which indirectly affects the development and economic growth of West Java. Geographically, Bandung city is strategically located near Jakarta, the center of the Indonesian economy. In addition, Bandung is one of the cities with discretion in developing the region's economic potential. Bandung's economic potential can be seen from various production sectors grouped into 17 (seventeen) business fields to calculate Gross Regional Domestic Product (GDP).

Table 1 shows that Bandung's economy between 2010 and 2019 is dominated by wholesales, retail, car, and motor repair contributing approximately 29%. Based on GDP contribution, the main potential of Bandung is the wholesales, retail, car, and motor repair sector that reflects the strength and capacity towards economic improvement, expansion of employment, and increased productivity of the community.

Table 1. Distribution of Sectoral GDP based on Constant Prices in 2010 Bandung City 2010-2019 (%)

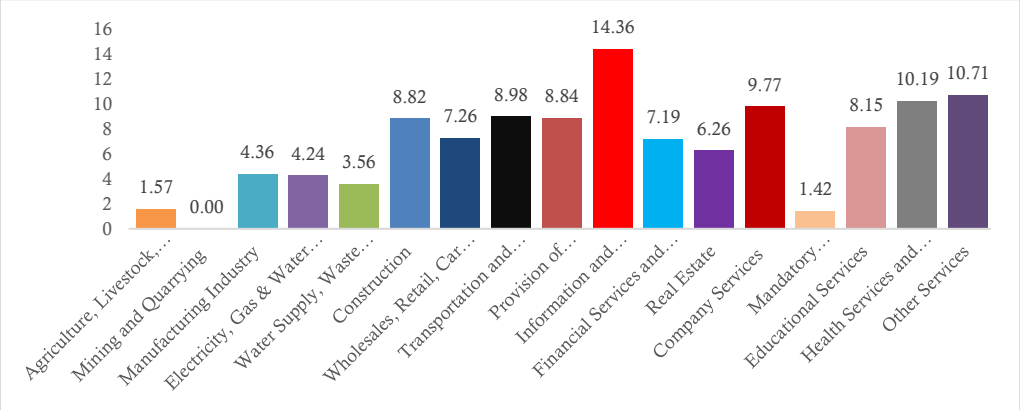
Category	Industrial Origin	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
A	Agriculture, Livestock, Forestry, Fishery	0.16	0.15	0.14	0.14	0.13	0.12	0.11	0.11	0.10	0.09
B	Mining and Quarrying	-	-	-	-	-	-	-	-	-	-
C	Manufacturing Industry	25.42	24.59	23.59	22.77	22.13	21.37	20.62	20.11	19.71	19.29
D	Electricity, Gas & Water Supply	0.12	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.09	0.09
E	Waste Management and Recycling	0.20	0.20	0.19	0.19	0.19	0.18	0.17	0.16	0.15	0.14
F	Construction	8.02	8.39	8.84	8.90	8.82	8.84	8.77	8.82	8.88	8.84
G	Wholesales, Retail, Car and Motor Repair	29.17	29.08	28.87	29.11	29.08	28.95	28.81	28.59	28.19	28.32
H	Transportation and Warehousing	6.55	6.68	7.26	7.37	7.42	7.69	7.83	7.71	7.80	7.28

Category	Industrial Origin	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
I	Accommodation and Food and Beverage	4.52	4.48	4.48	4.57	4.72	4.74	4.90	5.04	5.12	5.00
J	Information and Communication	7.84	8.58	8.95	9.42	10.04	10.86	11.64	12.29	12.82	13.54
K	Financial Services and Insurance	5.41	5.36	5.29	5.27	5.27	5.20	5.23	5.20	5.22	5.22
L	Real Estate	1.41	1.40	1.39	1.38	1.35	1.31	1.27	1.27	1.26	1.26
M, N	Company Services	0.68	0.70	0.71	0.73	0.75	0.75	0.75	0.77	0.79	0.82
O	Mandatory Government Administration, Defense, and Compulsory Social Security	3.80	3.51	3.33	3.09	2.89	2.72	2.55	2.39	2.27	2.23
P	Educational Services	2.96	2.95	2.92	2.93	2.93	2.93	2.94	2.98	3.01	3.10
Q	Health Services and Social Activities	0.85	0.86	0.87	0.89	0.92	0.95	0.97	0.99	1.01	1.05
R, S, T, U	Other Services	2.89	2.96	3.03	3.14	3.25	3.29	3.34	3.48	3.57	3.74
	Gross Domestic Product	100	100	100	100	100	100	100	100	100	100

Sources: Central Bureau of Statistics, (2019) (processed)

Meanwhile, GDP growth rate in Bandung during 2010-2019 shows that the information and communication sector is the highest at 14.36%, as seen in Figure 1 that shows the average Gross Domestic Product (GDP) development in Bandung City 2010-2019.

Figure 1. Average GDP Development in Bandung City 2010-2019



Sources: Central Bureau of Statistics, (2019) (processed)

On average, although the main potential of Bandung is the wholesales, retail, car, and motor repair sector, the growth is still low compared to the information and communication sector. The substantial contribution of the information and communication sector is in line with the development of the digital economy and peer-to-peer-based economic activities (P2P) to obtain, provide, or share access to goods and services facilitated by community-based online platforms (sharing economy). In addition, high growth is dominated by tertiary sectors such as" information and communication; transportation and warehousing; accommodation, food and beverage; and education and health services sectors. Meanwhile, primary and secondary sectors such as agriculture, livestock, forestry and fishery; processing industry, and trade still showed positive growth performance, but not as strong as the tertiary sector economic growth. This indicates a potential for a shift in economic structure from primary and secondary sectors to tertiary.

The increasing contribution of the information and communication sector to Bandung's economy indicates that wholesales, retail, car, and motor repair sector are still not utilized optimally. These conditions indirectly affect the economic growth in Bandung as development with limited resources implies that development would be focused on potential sectors, giving a large multiplier effect on other sectors.

Previous research regarding leading sectors, like the analysis of Manado's mainstay economic sector in 2001-2010, is known to increase economic structure. It increased the 4 (four) leading economic sectors to 5 (five) (Hidayat, 2013). The SLQ-DLQ, Shift-Share, and spatial analysis showed that the leading sectors in the Kerto Susila Gate Area (GKS) during 2009-2010 were the agricultural sector, processing industry, trade and restaurant, and services (Santoso, Aulia & Rahmawati, 2012). SLQ analysis in the Kebumen District showed no shift in economic structure. Klassen Typology results showed that the advanced and rapidly-growing sectors are the excavation and services sector and the mining sector. However, the agricultural and financial sectors, rentals and services companies were classified as an advanced but depressed sector. Manufacturing is a potential sector (Ratnasari, 2014). (Basuki & Gayatri, 2009) The MRP, Shift-Share, LQ, Overlay, and Typology Klassen results showed that Ogan Komering Ilir Regency's economic potential is the agricultural sector and the manufacturing industry and is the dominant sector growth. In addition, the sector also showed an improvement in the structure of economic growth. Putra & Yadnya (2018) used Klassen, LQ, and Overlay Typology data analysis techniques in the Sarbagita Region to identify the leading sectors.

Those sectors are wholesale and retail, the financial and insurance servicess, education services, accommodation and food and beverage, information and communication, processing industry, government administration, defense, and compulsory social security. Hajeri, Yurisinthae, & Dolorosa, (2015) using Klassen Typology analysis tools, Location Quotient (LQ), Dynamic Location Quotient (DLQ), and Shift Share. The Klassen typology analysis results show that sectors classified as advanced and fast-growing sectors (quadrant I) are manufacturing sector, the electricity, gas, clean water sector, and the transportation and communication sectors. The Location Quotient analysis results show that the manufacturing sector, the electricity, gas, and water supply sector, the transportation and communication sector are the primary sectors. The Dynamic Location Quotient analysis results show that the sectors that can be expected in the future are the agricultural sector, the mining, and the quarrying sector. The results of the Shift Share analysis show that there has been a change in the economic structure of Kubu Raya from the manufacturing sector (secondary) to the transportation and communication sector (tertiary) and then to the agricultural sector (primary).

It is crucial to identify the potential economic sectors in Bandung to support economic development policies and regional competitiveness. Thus, this study aims to identify the potentially developed leading sectors between 2010-2019 and make a strategy for future economic development to improve Bandung's economic competitiveness.

The mainstay sector is the leading sector as the driving force for a region's economic growth. It can contribute significantly, competitively, and encourage other sectors' growth, so it is instrumental in developing and achieving its goals. Previous research aligns the highlights in this research, namely the current research focuses on determining the base economic sectors located in Bandung, then classifying based on the potential level then create strategies for future economic development to improve the economic competitiveness in Bandung.

RESEARCH METHODS

The data used in this study are the GDP of Bandung City and West Java during 2010-2019, using constant prices in 2010. Data obtained from the Central Bureau of Statistics (BPS) of Bandung City and West Java (2019). In answering the research problems, this research used several methods of data analysis, namely: Static Location Quotient (SLQ) Analysis, Dynamic Location Quotient (DLQ) Analysis, Combined SLQ and DLQ Analysis, Shift-Share Analysis, Growth Ratio Model (MRP) Analysis, Overlay Analysis, and Klassen Typology.

Static Location Quotient is used to determine the base and non-base sectors in Bandung, the Static Location Quotient (SLQ) analysis method was used. SLQ method is commonly used in the base economic model as a first step to identify which sector is a growth

booster in the Bandung PDRB (Bendavid-Val, 1989). Thus, SLQ is often used to determine the base sector, defined as a sector that will encourage other sectors' growth or development and impact job creation.

Static Location Quotient (SLQ) is the ratio of a particular local sector's role to the same sector at the broader benchmark economy level, which in this research is the economy of West Java. The formula is as stated (Mura, Havierniková, & Machová, 2017):

$$SLQ = \frac{V_{ik}}{V_k} / \frac{V_{ip}}{V_p} \quad \text{..... (1)}$$

Where, Vik is Output value (GDP) of sector i in Bandung City in a given year, Vk is Total Gross Regional Domestic Product (GDP) in Bandung City, Vip is Output value (GDP) of sector i in West Java in a given year, and Vp is Total Gross Regional Domestic Product (GDP) in West Java.

The calculation of Static Location Quotient (SLQ) can show the concentration of activity in a region with the following criteria: First, if the SLQ value for a sector in the local economy > 1, then it can be considered that local production in the concerned sector is relatively higher than the average production of the referenced region or the base sector. Second, the value of SLQ < 1 can then be considered that local production in the concerned sector is relatively lower than the average production of the referenced area and includes non-base sectors. Third, the value of SLQ = 1 means that the level of specialization of sector I in the Bandung area is the same as the same sector in the economy of West Java.

Dynamic Location Quotient (DLQ) is the development of SLQ. DLQ is an SLQ analysis done in the form of time series/trend (Herath, Schaeffer, & Gebremedhin, 2013). In this case, SLQ development can be seen for a particular sector at different periods, decreasing or increasing. DLQ is a modification of SLQ by accommodating the amount of GDP from time to time. The formulation is as follows:

$$DLQ = \left[\frac{(1+g_{ij})/(1+g_j)}{(1+G_i)+(1+G)}\right]^t = \frac{IPPS_{ij}}{IPPS_i} \quad \text{..... (2)}$$

Where, g_{ij} is growth rate of sector i in Bandung City, g_j is average growth rate of GDP sector in Bandung City, G_i is Growth rate of sector i in West Java, G_t is Average GDP growth rate in West Java, and t is Number of years for analysis.

With the following criteria: first, when the DLQ = 1. The growth of sector i with the GDP of Bandung City is potentially comparable to West Java. Second, if dlq < 1. The growth of sector i with PDRB Bandung City has a lower potential than West Java. Third, c) if dlq > 1. The sector's growth with the GDP of Bandung City is potentially faster than West Java.

Combined SLQ and DLQ analysis aims to determine the sector's current and future condition, whether or not there will be a shift in the economic sector conditions (Widodo, 2009). The combination of SLQ and DLQ values is grouped into 4 (four) criteria: whether the economic sector is classified as featured, prospective, mainstay, and underdeveloped. Below is a matrix of mapping the results of the combined of SLQ and DLQ (see Table 2).

Table 2. SLQ and DLQ Matrix

Criteria	SLQ - 1	SLQ and 1
DLQ > 1	Featured Sectors	Mainstay Sector
DLQ<1	Prospective Sector	Underdeveloped Sectors

Source: Satria, (2017)

According to Nugroho (2010), The interpretation of the following model are as follows: first, Featured sectors. This means that the sector will remain as the base, both for now and in the future. Second, Prospective sector. This means that the sector will shift from a base sector to a non-base in the future. Third, Mainstay sector. This means that the sector will shift from a non-base sector to a base sector in the future. and the fourth, Underdeveloped sector. This means that the sector will continue to be non-base both now and in the future.

Shift-share analysis is a traditional tool for interregional comparison, measuring and

evaluating sectoral performance. The Shift-Share analysis results will describe the sector performances in Bandung's GDP compared to West Java. Any irregularities from the comparison will then be analyzed. A positive deviation means that a sector in the Bandung GDP has a competitive advantage or vice versa (Dogru & Sirakaya-Turk, 2017).

The data used in this Shift-Share analysis are Bandung and West Java's GDP in 2010-2019 based on constant prices in 2010. The price data is constant with the same base year so that its weight is equal, and the comparison becomes valid (Bendavid-Val, 1991). Mathematically, components of Provincial Share (PS), Proportional Shift (P), and Differential Shift (D) can be formulated as follows (Sjafrizal, 2008):

Provincial Share (PS)

$$PS_{i,t} = E_{r,i,t-n}\left(\frac{E_{N,t}}{E_{N,t-n}}\right) - E_{r,i,t-n} \ldots\ldots\ldots (3)$$

Proportional Shift (P)

$$P_{r,i,t} = (E_{N,i,t}/E_{N,i,t-n}) - (E_{N,t}/E_{N,t-n})x\, E_{r,i,t-n} \ldots\ldots\ldots (4)$$

Differential Shift (D)

$$D_{r,i,t} = (E_{r,i,t}(E_{N,i,t}/E_{N,i,t-n})E_{r,i,t-n}) \ldots\ldots (5)$$

Total Growth

$$\Delta E_{r,i,t} = (PS_{i,} + P_{i,r,t} + D_{r,i,t}) \ldots\ldots\ldots (6)$$

Where, $E_{r,i,t-n}$ is GDP of Bandung sector i year 2010, $E_{r,i,t}$ is GDP of Bandung sector i year 2019, $E_{N,t}$ is Total GDP of West Java in 2019, $E_{N,t-n}$ is Total GDP of West Java in 2010, $E_{N,i,t}$ is GDP of West Java sector i in 2019, $E_{N,i,t-n}$ is GDP of West Java sector i year 2010, and $E_{r,i,t}$ is Regional job growth sector i in 2019.

The Growth Ratio Model (MRP) is an alternative analysis tool used in regional planning and obtained by modifying the Shift-Share analysis model (Pratomo, 2014). This model is derived from the initial equation of the main components in Shift-Share analysis, namely, Differential Shift and Proportionality Shift. This MRP analysis is further divided into two criteria: Study Area Growth Ratio (RPs) and Reference Area Growth Ratio (RPr).

Overlay analysis is used to to identify superior sectors in terms of contribution and growth by combining LQ analysis and MRP analysis results (Pratomo, 2014). Thus, this analysis consists of two components: Location Quotient (LQ) and Study Area Growth Ratio (RPs). Each component is then equated with a positive notation (+) or a negative notation (-). If the coefficient of a component is more than one, it is given a positive notation (+), and if the component coefficient is less than one, it is given a negative notation (-). The MRP's calculations can be classified as follows: RPs more than one and LQ (≥1) means a dominant growth activity and comparative advantages, if RPs more than one and LQ (≤1) means a dominant growth activity but does not have a comparative advantage, if RPs less than one and LQ (≥1) means a low growth activity but has a comparative advantage, and if RPs less than one and LQ (≤1) means a low growth activity and is not potential.

Klassen Typology analysis is a combination of location share analysis tool or Location Quotient (LQ) with Growth Ratio Model (MRP) (Darma Putra & Yuli Pratiwi, 2019). Klassen typology can be used through two approaches: sectoral and regional. The data commonly used in this analysis is the Gross Regional Domestic Product (GDP) (see Table 3).

Table 3. Classification of Typology Klassen Sectoral Approach

Quadrant I	**Quadrant II**
The sector is advancing and rapidly growing gi>g, si>s	Advanced but depressed sectors gi<g, si>s
Quadrant III	**Quadrant IV**
Potential sector or still can grow rapidly gi>g, si<s	Relatively lagging sector gi<g, si<s

Source: Sjafrizal, 1997

Klassen typology with a sectoral approach resulted in four classifications of sectors with different characteristics as follows (Sjafrizal,

1997). In this research, the referenced region is West Java and the study area is Bandung.

A rapidly growing sector (Quadrant I). This quadrant shows a GDP growth rate (gi) greater than the referenced regional GDP growth or national value (g). It has a GDP contribution (si) greater than the value of the sector's contribution to the referenced regional GDP or national value (s). This case means that the sectors' GDP growth rate in Bandung is higher than similar sector's growth rate in West Java, and its contribution to Bandung's GDP is higher than similar sectors' contribution to West Java's GDP.

Advanced but depressed sector (Quadrant II). The quadrant has a lower GDP growth value (gi) than the growth of referenced regional GDP or national value (g). However, it contributes to the regional GDP (si) greater than the value of the sector's contribution to the referenced regional GDP or national value (s). This case means that the sectors' GDP growth rate in Bandung is lower than similar sector's growth rate in West Java, and its contribution to Bandung's GDP is higher than similar sectors' contribution to West Java's GDP.

Potential sector or still can grow rapidly (Quadrant III). This quadrant groups sectors with a GDP growth value (gi) higher than the growth of referenced regional GDP or national value (g). However, the sector's contribution to GDP (si) is less than the value of the sector's contribution to the referenced regional GDP or national value (s). This case means that the sectors' GDP growth rate in Bandung is higher than similar sector's growth rate in West Java, and its contribution to Bandung's GDP is lower than similar sectors' contribution to West Java's GDP.

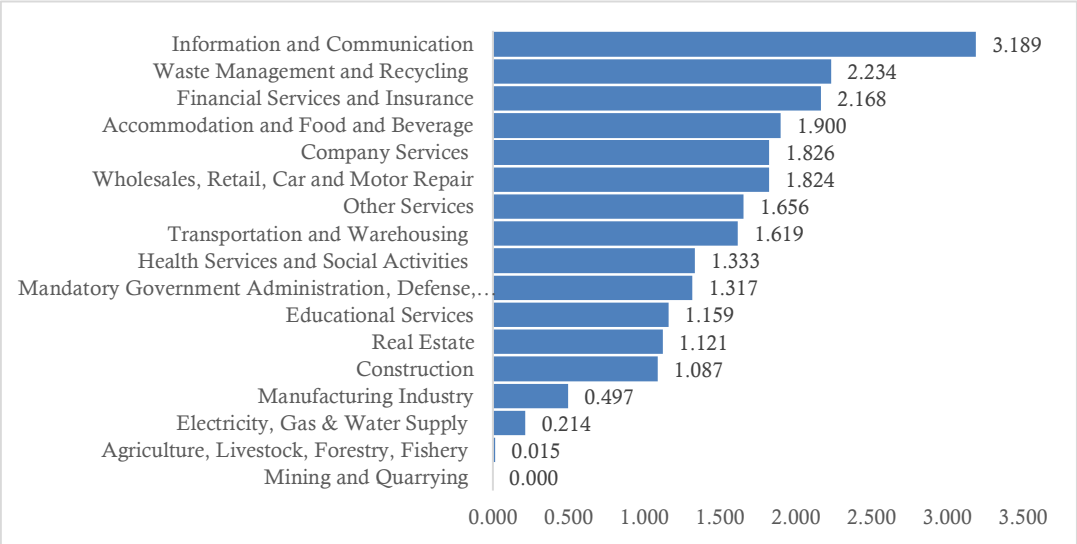
4. The highest relative sector (Quadrant IV). This quadrant groups sectors with lower GDP (gi) growth value than the growth of referenced regional GDP or national value (g). It also has a lower contribution to the GDP (si) than the value of the sector's contribution to the referenced regional GDP or national value (s). This case means that the sectors' GDP growth rate in Bandung is lower than similar sector's growth rate in West Java, and its contribution to Bandung's GDP is lower than similar sectors' contribution to West Java's GDP.

RESULTS AND DISCUSSION

The basic theory of the economic base model holds that the determinant of economic growth of a region is directly related to demand from other regions (Guimarães, Sousa, Dentinho, & Boski, 2014). Therefore, the demand for goods and services can stimulate the growth of an industry or other sectors that utilize local resources, both in labor and materials, which will revive the regional economy. This study used a Static Location Quotient (SLQ) analysis to determine the base and non-base sector's economic sector. The method has been widely used because it is quite simple and does not require much data.

The Static Location Quotient (SLQ) analysis calculates by comparing a region's economic condition and the reference economy that covers a wider area. In this case, it is done by comparing the economy of Bandung with West Java's economic condition as the referenced area. If the calculation results show a value of more than one (SLQ>1), then the sector is the base sector. Conversely, if the result shows less than one (SLQ <1), the sector is a non-base sector. The calculation of the average Static Location Quotient (SLQ) of Bandung from 2010-2019 can be presented in figure 2 below.

Figure 2. SLQ of Bandung City, 2010-2019



Source: Bandung Central Bureau of Statistics (processed)

The Static Location Quotient (SLQ) analysis for 2010-2019 in Bandung City indicates there are 4 (four) economic categories of non-base sector (SLQ<1): processing industry; electric and gas Supply; agriculture, livestock, forestry and fishery; and mining and quarrying. This indicates that these sectors are non-base because they do not have a competitive advantage, thus unable to compete with other districts/cities in West Java and are likely to import from other regions.

The processing industry sector is one of the significant contributors to Bandung's GDP. Nevertheless, despite its high contribution, 2010-2019 showed a volatile growth trend, especially in 2013-2017. In 2019, Bandung's processing industry also showed a downward pattern due to increasing national and global competition, affecting its performance, especially in labor-intensive sectors, such as textiles and textile products. In addition, external pressures, such as the ASEAN China Free Trade Area (ACFTA) agreement, also suppressed Bandung's processing industry's performance. The industrial sector's problem stems from (RPJMD Bandung, 2019): the high price of raw materials production of industrial businesses, limited access to capital for small and medium industrial businesses (SMEs), low product competitiveness, marketing and quality of small and medium industrial business products (IKM), and limited utilization of appropriate technology in product management.

Meanwhile, as Bandung City is not a central area of agricultural production, livestock, forestry, and fisheries, its contribution to Bandung's GDP is minimal and non-base, so it tends to import from other regions. In addition, during 2010-2019, the sectors of: agriculture, livestock, forestry, and fishery; electric and gas supply all continue to decline.

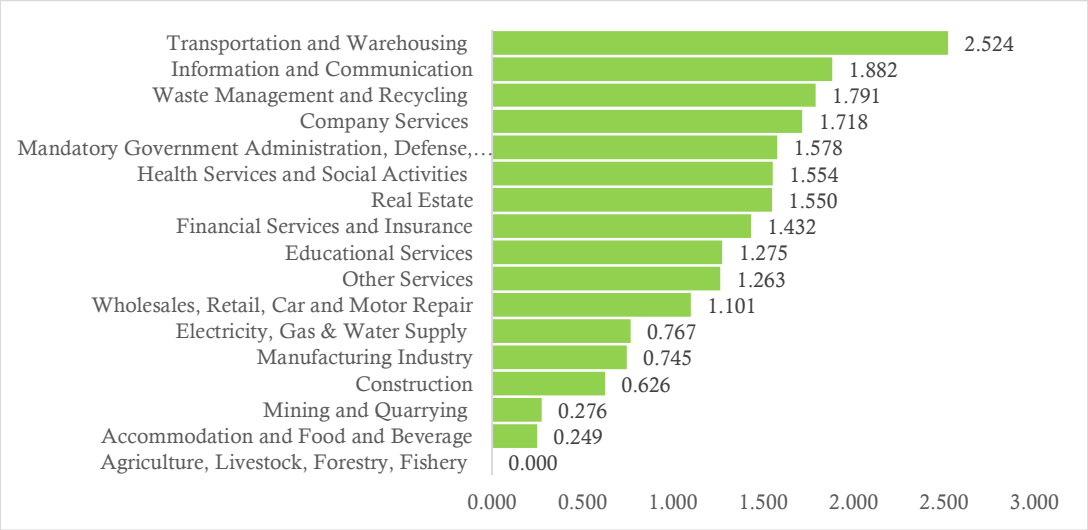
The average coefficient of the Static Location Quotient (SLQ) from the highest to lowest shows 13 (thirteen) economic categories as base sectors (SLQ>1): information and communication is ranked first with a value of 3.19, followed by water supply, waste management, waste, and recycling; financial and insurance services; accommodation and food and beverage; corporate services, wholesales, retail, car, and motor repair sector; other services, transportation and warehousing; health services and social activities; government administration, defense, and compulsory social security; education services; real estate; and construction. Various base sectors showed a competitive advantage and contributed significantly to Bandung's economy to compete with other districts/cities in West Java.

The information and communication sector has an essential contribution to Bandung's economy. Its growth indirectly corresponds with population growth and high economic activity in Bandung. In addition, Information and Communication Technology (ICT) has become an inseparable part of Bandung's lives, as proven with the benefits of improving efficiency, effectiveness, transparency, and accountability of an activity. In addition, through the internet, applications and even information systems connect to form a much more complex network.

Figure 3 shows the Dynamic Location Quotient (DLQ) analysis in Bandung City during 2010-2019 of sector positions' shifts. Eleven sectors are expected to be the leading sector in the future with the potential to develop faster than similar sectors in West Java (DLQ1), namely information and communication; other services; health services, and social activities; corporate services; transportation and warehousing; accommodation and food and beverage; construction; educational services; wholesales, retail, car, and motor repair; financial services and insurance; real estate. Thus, based on the Dynamic Location Quotient (DLQ) calculation, these sectors are expected to be the leading sectors for Bandung's City future.

Meanwhile, 6 (six) other sectors: processing industry; electric and gas supply; water supply, waste management, waste, and recycling; agriculture, livestock, forestry and fishery; government administration, defense, and compulsory social security; and mining and quarrying, are not expected to be the leading sector in the future for Bandung City as the dynamic location quotient (DLQ) is less than 1 (one). Therefore, various sectors cannot export their products out of the region and only meet their own regions' needs

Figure 3. DLQ of Bandung City, 2010-2019



Source: Bandung Central Bureau of Statistics (processed)

Identifying the position change of each economic sector in Bandung can be done by combining two previous analysis methods, namely Static Location Quotient (SLQ) and Dynamic Location Quotient (DLQ) methods. Furthermore, the combined analysis results can determine changes in each sector's position based on superior, prospective, mainstay, and underdeveloped criteria.

The combined analysis of the Static Location Quotient (SLQ) and Dynamic Location Quotient (DLQ) shows 11 (eleven) leading sectors, 2 (two) prospective sectors, and 4 (four) underdeveloped sectors. The leading sector has a comparative advantage in the present and can remain superior in the future. In addition, the mainstay sector is the base sector with rapid growth, as seen from the Static Location Quotient (SLQ) and Dynamic Location Quotient

(DLQ) values that have more than one value (SLQ>1 and DLQ>1).

The leading sectors in Bandung City include: construction; wholesales, retail, car and motor repair; transportation and warehousing; accommodation and food and beverage; information and communication; financial services and insurance; real estate; corporate services; educational services; health services; and social activities and other services. Meanwhile, the prospective sector currently has an advantage (SLQ>1) but is not expected to be the leading sector in the future (DLQ<1). The prospective sector can be the leading sector in the future as seen in the comparative excellence (SLQ) in one year or the 5-year average, despite showing a lack of growth during the start and end of the 5 years. Therefore, Bandung's regional government can focus on the prospective sector to shift into a leading sector in the future. Prospective sectors in Bandung City include water supply, waste management, waste and recycling, and government administration, defense, and compulsory social security.

Underdeveloped sectors in Bandung City include agriculture, livestock, forestry, fisheries; mining and quarrying; electric and gas supply. These sectors are not superior in the present and do not have the potential to be a leading sector in the future, as characterized by Static Location Quotient (SLQ) and Dynamic Location Quotient (DLQ) values that are less than one (SLQ<1 and DLQ<1). More details can be seen in Table 4 below.

Table 4. Matrix of Static Location Quotient (SLQ) dan Dynamic Location Quotient (DLQ)

Criteria	SLQ > 1	SLQ < 1
DLQ > 1	**Featured Sectors:** • Construction • Wholesales, Retail, Car and Motor Repair • Transportation and Warehousing • Accommodation and Food and Beverage • Information and Communication • Financial Services and Insurance • Real Estate • Corporate Services • Education Services • Health Services and Social Activities • Other services	**Mainstay Sector:**
DLQ < 1	**Prospective Sector:** • Water Supply, Waste Management, Waste and Recycling • Government Administration, Defense, and Compulsory Social Security	**Underdeveloped Sector:** • Agriculture, Livestock, Forestry and Fishery • Mining and Quarrying • Processing Industry • Electric and Gas Supply

Source: Bandung Central Bureau of Statistics (processed)

Meanwhile, shift-share analysis is used to determine the economic growth process of Bandung City related to the referenced regional economy during 2010-2019, namely, west Java. Shift-share analysis decomposes the change of employment (or income) in aparticular region into three components: the national share component (NC), the sectoral shift component (SC), and the regional shift component (RC) (Márquez, Ramajo, & Hewings, 2009).

The shift-share analysis combines dual principals, i.e., spatial and sectoral elements applied in a time dimension framework (Oyewole, 2016). Shift-Share analysis assumes that a wider region's economic structure influences changes in a region's structure or economic performance. Relative changes in the structure or economic performance of a region to the wider region are influenced by several components, namely regional economic growth (Nij), industrial mix (Mij), and competitive advantage (Cij).

Shift-share analysis results in Table 5 shows that in 2010-2019, Bandung's GDP

developed from its provincial growth (Nij), industrial mix (Mij), and competitive advantage (Cij). Provincial economic growth (Nij) has affected the economic growth of Bandung by 65,913,325 million rupiahs, or 69.03 percent. However, Bandung's GDP's actual development amounted to 95,487,790 million rupiahs as two other components: industrial mix and competitive advantage, influence it. The sector with the highest growth in Bandung, wholesales, retail, car, and motor repair, is influenced by the growth of similar sectors in West Java during 2010 - 2019 of 19,228,863 million rupiahs.

Table 5. Analysis Shift-Share Bandung City, 2010-2019 (million)

Category	Industrial Origin	Components			Shift Structure Economic
		Growth (N_{ij})	Mix Industry (M_{ij})	Competitive Advantage (C_{ij})	Growth D_{ij}
A	Agriculture, Livestock, Forestry and Fisheries	104,907	(76,494)	(4,826)	23,587
B	Mining and Quarrying	-	-	-	-
C	Processing Industry	16,752,220	(1,454,913)	(3,137,659)	12,159,649
D	Electricity and Gas Supply	76,994	(76,123)	52,942	53,813
E	Water Supply, Waste Management, Waste and Recycling	128,944	3,696	(60,132)	72,509
F	Construction	5,284,559	2,964,793	1,036,597	9,285,949
G	Wholesales, Retail, Car and Motor Repair	19,228,863	654,699	6,280,531	26,164,093
H	Transportation and Warehousing	4,315,684	1,726,044	1,653,710	7,695,438
I	Accommodation and Food and Beverage	2,982,033	1,124,289	1,161,481	5,267,802
J	Information and Communication	5,169,411	11,434,522	2,150,562	18,754,495
K	Financial Services and Insurance	3,564,886	878,278	349,548	4,792,711
L	Real State	928,230	457,385	(340,691)	1,044,924
M, N	Corporate Services	450,502	339,856	127,043	917,401
O	Government Administration, Defense and Compulsory Social Security	2,504,726	(1,657,912)	(327,441)	519,373
P	Education Services	1,953,658	2,124,821	(979,953)	3,098,525
Q	Health Services and Social Activities	559,720	599,856	49,874	1,209,451
R, S, T, U	Other services	1,907,988	1,585,658	934,423	4,428,070
Amount		65,913,325	20,628,455	8,946,011	95,487,790
	Persentase to growth (D_{ij})	69.03	21.60	9.37	100,00

Source: Bandung Central Bureau of Statistics (processed)

The industrial mix component states a change in the regional economy due to the industrial mix. The analysis showed that the industrial mix has a positive influence on the economic development of Bandung City by 20,628,455 rupiahs or 21.60 percent. This positive value indicates that Bandung's GDP composition tends to create an economy rapidly growing compared to West Java. Furthermore, the sectors affected by the industrial mix: water supply, waste management, waste and recycling; construction; wholesale, and retail; cars and motorcycles repair; transportation and warehousing, accommodation and food and beverage, information and communication; financial and insurance services; real estate, corporate services; educational services; health services; other social and service activities.

Sectors with a low competitive advantage in Bandung have a location advantage (Cij value in the sector is the highest negative), namely the processing industry. In contrast, those with the highest competitive advantage are wholesale, retail, cars, and motor repair. Competitive advantage helps determine whether the economic sector is competitive than the same sector in West Java. Bandung's GDP in 2010-2019 experienced an absolute value increase in the regional economic performance by 95,487,790 million rupiah, as seen by the positive

value of Dij in all sectors of Bandung. The largest increase occurred in the wholesale and retail sectors; cars and motorcycles repair with a real sector growth value of 26,164,093 million.

Growth Ratio Model (MRP) is used to identify which economic sectors in Bandung are potential by comparing the growth between Bandung's GDP growth and West Java's GDP growth, otherwise known as Growth Ratio of Study Areas (RPs). Growth Ratio Model (MRP). Analysis also compares the GDP growth of an economic sector in the referenced region of West Java with the total GDP growth in the referenced area, otherwise known as the Reference Region Growth Ratio (RPr). In this study, the Growth Ratio Model (MRP) was calculated based on Bandung's GDP sectoral value as a study area and West Java's GDP value as a referenced area from 2010 to 2019.

The MRP method showed that from 2010 to 2019, there were 9 (nine) economic sectors that fall into the first classification, 4 (four) economic sectors that fall into the third classification, 4 (four) economic sectors that fall into the fourth classification. The economic sectors that fall into the first classification are: construction; wholesales, retail, car and motor repair; transportation and warehousing; accommodation and food and beverage; information and communication; financial services and insurance; corporate services; health and social activities; and other services. Thus, the 9 (nine) sectors' growth in the study area (Bandung) is higher than that of the referenced area (West Java). Therefore, the 9 (nine) sectors have superior or dominant growth, both at the city and provincial levels. The economic sectors that fall into the fourth classification are: electric and gas supply; water supply; waste management, waste and recycling; real estate; and educational services. This indicates that the various sectors at the referenced area level have prominent growth, but the study area level does not stand out. The fourth classification sectors include: agriculture, livestock, forestry, and fisheries; mining and quarrying; processing industries; government administration, defense, and compulsory social security. In this case, the growth of the 4 (four) sectors, both in Bandung City and West Java, has low growth or does not stand out. The calculation of The Growth Ratio Model (MRP) in Bandung City during 2010-2019 can be shown in Table 6 as follows.

Table 6. Model Growth Ratio (MRP) Bandung City in 2010-2019

Category	Industrial Origin	MRP	
		RPr	RPs
A	Agriculture, Livestock, Forestry, and Fishery	0.27	0.83
B	Mining and Quarrying	0.00	0.00
C	Processing Industry	0.90	0.79
D	Electri and Gas Supply	4.64	0.15
E	Water Supply, Waste Management, Waste and Recycling	1.02	0.55
F	Construction	1.54	1.13
G	Large and Retail Trade; Cars and motorcycles repair	1.02	1.32
H	Transportation and Warehousing	1.38	1.27
I	Accommodation and Drinking	1.36	1.28
J	Information and Communication	3.18	1.13
K	Financial Services and Insurance	1.23	1.08
L	Real Estate	1.48	0.75
M, N	Corporate Services	1.73	1.16
O	Government Administration, Defense, and Compulsory Social Security	0.33	0.61
P	Education Services	2.06	0.76
Q	Health Services and Social Activities	2.05	1.04
R, S, T, U	Other services	1.81	1.27

Source: Bandung and West Java Central Bureau of Statistics (processed)

Overlay analysis is used to determine the leading sectors in Bandung City by combining the results of the Growth Ratio Model (MRP) method and the Static Location Quotient (SLQ) analysis method. The method assesses potential economic sectors based on growth criteria and contribution criteria. The overlay analysis in Bandung City in 2010-2019 shows various economic sectors with different values (see Table 7).

The overlay analysis from 2010 to 2019 showed 9 (nine) economic sectors classified as leading sectors: construction; wholesale and retail; cars and motorcycles repair; transportation and warehousing; accommodation, food and beverage; information and communication; financial and insurance services; corporate services; health services and other social and service activities. Those 9 (nine) sectors are dominant growth activities as it shows growth and a substantial contribution to Bandung's GDP with a comparative advantage.

The sectors of water supply, waste management, waste, and recycling; real estate; government administration, defense, and compulsory social security; education services are slowly growing with a substantial contribution. Thus, some sectors have a low growth activity but have a comparative advantage. However, this is very concerning as the sector is experiencing a decline from the lack of employment. Furthermore, the agriculture, livestock, forestry, fisheries; mining, and quarrying; processing; and gas and electric supply is not a potential sector, both in terms of growth and contributions. Thus, these various sectors have low growth and are not potential.

Table 7. Overlay Analysis on Bandung City in 2010-2019

Category	Industrial Origin	MRP (RPs)		LQ		Overlay
		Real	Nominal	Real	Nominal	
A	Agriculture, Livestock, Forestry and Fisheries	0.83	-	0.02	-	- -
B	Mining and Quarrying	0.00	-	0.00	-	- -
C	Processing Industry	0.79	-	0.50	-	- -
D	Electric and Gas Supply	0.03	-	0.21	-	- -
E	Water Supply, Waste Management, Waste and Recycling	0.55	-	2.23	+	- +
F	Construction	1.13	+	1.09	+	+ +
G	Wholesales, Retail, Car and Motor Repair	1.32	+	1.82	+	+ +
H	Transportation and Warehousing	1.27	+	1.62	+	+ +
I	Accommodation and Food and Beverage	1.28	+	1.9	+	+ +
J	Information and Communication	1.13	+	3.19	+	+ +
K	Financial Services and Insurance	1.08	+	2.17	+	+ +
L	Real Estate	0.75	-	1.12	+	- +
M, N	Corporate Services	1.16	+	1.83	+	+ +
O	Government Administration, Defense and Compulsory Social Security	0.61	-	1.32	+	- +
P	Education Services	0.76	-	1.16	+	- +
Q	Health Services and Social Activities	1.04	+	1.33	+	+ +
R, S, T, U	Other services	1.27	+	1.66	+	+ +

Source: Bandung Central Bureau of Statistics (processed)

This analysis is used Klassen typology to identify the patterns and growth structures of each economic sector. There are 4 (four) classifications of economic sectors with different characteristics: advanced and rapidly growing sectors, advanced but depressed sectors, potential sectors to grow rapidly, and relatively lagging sectors.

Based on the Klassen typology, 8 (eight) sectors are classified into advanced and rapidly growing sectors (quadrant 1): construction; wholesale, and retail, cars and motorcycles repair; transportation and warehousing;

accommodation and food and beverage; information and communication; financial and insurance services, corporate services; health services, and social activities; and other services. These sectors prove that the contribution and growth rate in Bandung City was more significant than the contribution and growth rate of similar sectors in West Java. The quadrant sectors can also be interpreted as potential as they have profitable economic growth and a more significant share than those referenced or the national value. Sectors in the advanced but depressed sector (quadrant 2) are the water supply, waste management, waste and recycling; government administration, defense, and compulsory social security; real estate; and education services. Various sectors classified in this category can be said to be saturated sectors. Sectors classified into relatively lagging (quadrant 4) are agriculture, livestock, forestry, and fisheries; mining and quarrying; electric and gas supply. This quadrant is occupied by sectors that have a lower GDP (gi) growth value than the referenced regional GDP's growth or national value (g), while also having a contribution to the GDP (si) that is smaller than the referenced regional GDP's growth or national value (s). More details can be seen in Table 8 below.

Table 8. Classification of Typology Klassen Sectoral Approach

Quadrant I **The sector is advancing and growing rapidly** **gi>g, si>s**	**Quadrant II** **Advanced but depressed sectors** **gi<g, si>s**
• Construction • Wholesales, Retail, Car and Motor Repair Transportation and Warehousing • Accommodation and Food and beverage • Information and Communication • Financial Services and Insurance • Corporate Services • Health Services and Social Activities • Other services	• Water supply, Waste Management, Waste and Recycling • Government Administration, Defense and Compulsory Social Security • Real Estate • Education Services
Quadrant III **Potential sector or still can grow rapidly** **gi>g, si<s**	**Quadrant IV** **Relatively lagging sector** **gi<g, si<s**
	• Agriculture, Livestock, Forestry and Fishery • Mining and Quarrying • Processing Industry • Electri and Gas Supply

Source: Bandung Central Bureau of Statistics (processed)

The Klassen typology analysis shows no sectors in the potential sectors or can still grow rapidly. Therefore, Bandung's local government needs to anticipate this by making policies to develop sectors unable to become advanced and grow rapidly to impact Bandung City positively.

The Klassen Typology is associated with formulating plans for future economic development to improve the economic competitiveness of Bandung City through added value to achieve high and sustainable welfare (Yunitasari & Firmansayah, 2019). According to the period, several development strategies can be carried out from various sectors, as divided into 3 (three) stages: short, medium, and long term.

In the short term, to spur economic growth in Bandung City, local governments can maintain advanced and rapidly growing sectors and support the advanced but depressed sectors to become advanced and growing rapidly sectors by encouraging economic growth. Meanwhile, in the medium-term, Bandung's local government can support the potential or can still develop rapidly sectors into a growing rapidly sector. For

relatively lagging sectors, they can be pushed to rapidly develop by increasing each economic sector's output share. Lastly, the relatively lagging sectors are encouraged to become advanced and growing rapidly sectors in the long term. More details can be seen in Table 9 below.

Table 9. Economic Sector Development Strategies Bandung City Short, Medium and Long Term

Short-term (1 - 5 years old)	**Medium Term (5 – 10 years old)**	**Long-term (10 – 15 years old)**
• Maintaining a fast-growing and advanced sector • Advanced but depressed sectors become advanced and growing rapidly	• The sector is relatively lagging behind the potential sector or can still grow rapidly	• Relatively lagging sector becomes advanced and growing rapidly

Source: Bandung Central Bureau of Statistics (processed)

CONCLUSION

Several findings from this study can be concluded. The Static Location Quotient (SLQ) analysis in Bandung City in 2010-2019, identified 13 (thirteen) economic categories that are the base sector. The Dynamic Location Quotient (DLQ) calculation in Bandung City showed that 11 (eleven) sectors are expected to be the leading sector in the future and can develop faster than the same sector in West Java. The combined results of Static Location Quotient (SLQ) and Dynamic Location Quotient (DLQ) showed 11 (eleven) leading sectors, 2 (two) prospective sectors, and 4 (four) underdeveloped sectors. The shift-share analysis proved that Bandung's GDP in 2010-2019 has changed. The Growth Ratio Model (MRP) identified 9 (nine) economic sectors in the dominant classification of growth and 4 (four) economic sectors with prominent growth, despite not standing out at the city level. In addition, the 4 (four) economic sectors that fall into the growth classification do not stand out. Overlay analysis showed 9 (nine) economic sectors classified as superior or very dominant sectors. Whereas the Klassen Typology showed that 8 (eight) sectors are classified into advanced and growing rapidly.

Economic development strategy to improve the economic competitiveness of Bandung City in the short term can be done by maintaining advanced and rapidly growing sectors and pursuing various sectors that fall into the category of advanced sectors but are depressed to become advanced and growing rapidly. Meanwhile, in the medium term, Bandung's local government can encourage the potential or can still develop rapidly sectors to become advanced and rapidly growing. Also, the relatively lagging sectors can be pushed to become potential sectors. In the long run, various relatively lagging sectors can be pushed to become advanced and growing sectors rapidly sectors.

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