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Classifying Economic Sectors to Improve Regional Development Priorities in Indonesia

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ABSTRACT

The main aims of the study are to classify economic sectors and compare development priorities in an Indonesian district to determine suitable programs. Gross regional domestic product data for 2011-2022 was analyzed using static location quotient, dynamic location quotient, and shift-share analysis. The results of the study showed that the district's economic sectors were classified into mainstay, leading, and potential sectors. The mainstay sector consists of electricity and gas procurement, construction, wholesale and retail trade, car and motorcycle repair, and transportation and warehousing. The leading sectors are education services, manufacturing, information and communication, and financial and insurance services. The other nine sectors are potential sectors: agriculture, forestry, and fisheries; mining and quarrying; water procurement, waste management, waste and recycling; provision of accommodation and food drink; real estate; corporate services; government administration; defense, and compulsory social security; health services and social activities; and other services. The study implies that mainstay sectors are suitable as regional development priorities. Leading sectors can be the second priority. Potential sectors are not suitable as priorities for regional development.

1. INTRODUCTION

Sustainable economic growth and community welfare can be achieved through appropriate regional development strategies. The determination of regional development strategies is carried out through various means. Sustainable development aims to maximize economic and social benefits. In addition, it also protects the environment for the sustainable use of natural resources in the long term [1]. Some of the concerns are the identification of strategic sectors that have a positive impact on regional economic growth [2, 3], regional socioeconomic development to promote coordinated regional development [3], determination of regional development policies based on regional development potential and vision [4, 5], capacity building and regional innovation as well as the use of new information and knowledge [6], increasing local economic growth based on economic sector integration models [7], and urban and rural development integration policies [8].

In line with research in Finland [5], regional development planning is the responsibility of local governments. Local governments work closely with other regions, universities, and other stakeholders to facilitate the planning of regional development programs. Strategic planning is based on competitive advantage. Scarce, valuable, and unique resources influence the region's competitive advantage [9].

Regional development planning strategies are based on determining development priorities. Development prioritization is determined by sector performance: sustainable comparative advantage, faster growth, and competitiveness. Comparative advantage relates to the region's specialization. Comparative advantage can increase economic resilience and welfare. The strategy that can be done is to focus on the production, distribution, and trade of goods based on the region's comparative advantage [10]. The regional development strategy is based on sustainable comparative advantage [11]. Thus, sustainable comparative advantage is key to achieving high-quality development integration [12].

Comparative advantage is the basis for sector development and trade between regions and countries [13]. Classical trade theory emphasizes that trade relies on comparative advantage based on natural resources' potential and endowment factors [14]. Regional development priorities are linked to central policy goals, political obligations/pressures, and incentives for regions to comply with central policy [15]. In this regard, the ecological conditions of the economic potential related to land resources can determine development priorities [16]. The priority of economic development policy in agropolitan areas is to increase the economic value of strategic commodities, among others, through investment incentives [17]. Regional production systems strengthen sustainable development priorities [18].

A comprehensive and sustainable regional development strategy is built on strengthening the capacity of local communities on science, technology, innovation, coordination between actors, local business networks, and internationalization of the region [19]. The availability of natural resources as local inputs will lower production costs and increase comparative advantage [20, 21].

Nevertheless, countries or regions with large comparative advantages may have low competitiveness [22]. Comparative advantage does not always present competitive advantage. Competitive advantage is achieved through innovation capabilities and superior performance [23]. Initially, local governments build comparative advantages based on existing potential and knowledge. Furthermore, new knowledge and technologies must be developed to achieve a competitive advantage [24]. For example, the product mapping method is carried out to determine the comparative advantage of export products. After that, strategic policies must be established to support downstream products [25]. Strategies to increase productivity and competitiveness are strengthening the capacity of local communities, re-engineering production systems, developing competitive advantages, increasing income and equity, and improving the quality of life of communities [16].

Competitive advantage is also influenced by products, prices, services, distribution, and promotional strategies [26], the economic value of industrial products [27], and public policy orientation [28]. Developing the base sector in rural areas encourages interaction with the city as a marketing center. This process will have an impact on regional competitiveness, add economic value, improve farmer welfare, and increase regional incomes [29].

A sector's comparative advantage, growth, and competitive advantage are used to determine the classification of the sectors. The sector classification consists of mainstay, leading, and potential sectors. In terms of regional development, these sectors are also known as base sectors, strategic sectors, or main sectors. Research on sector classification has been carried out in previous studies [30-32].

The economic base theory can be useful for effectively implementing a regional strategy [33]. Strategic sectors can drive the growth and diversification of the region's economy [34]. Increasing the base sector's productivity impacts community income and the regional economy [29]. Strategies to increase regional productivity and competitiveness can begin with identifying strengths, weaknesses, opportunities, and threats [16].

Sustainable comparative advantage, growth, and sector competitiveness are often analyzed according to location quotient, dynamic location quotient, and shift-share analysis method. Base sector identification among academics widely using location quotient (LQ) [35-38]. However, because LQ is static (SLQ), in its development, base sector analysis is equipped with the dynamic LQ (DLQ) to analyze sector development prospects [39]. In subsequent developments, the comparative advantage (measured by SLQ) and the sustainable comparative advantage (measured by DLQ) base sector are considered insufficient to determine development priorities. Therefore, shift-share analysis (SSA) integrates economic sectors' growth rate and competitiveness.

SSA was developed by Daniel Cramer in 1943 and then used by Edgar S. Dunn in 1960 to calculate labor changes in the U.S. [40]. SSA still plays an important role in regional planning analysis and has been widely used for area analysis in various fields [41]. SSA compares, measures, and evaluates the performance of inter-regional economic sectors [42] and become the most widely applied alternative method for understanding the region's economy [41]. In addition, SSA is also used to measure the relationship between industry and regional characteristics [43], analyze the sectoral contribution of the local labor market to economic resilience [44], elaborate on changes in solar energy-related investments [45], and determine the most favorable spatial clusters in the region's construction [46].

Research on the competitiveness of the economic sector has been widely conducted. Some of the research is regarding the competitiveness of the tourism sector management [47, 48], changes in rural economic development [49], analysis of import changes [42], geothermal exploitation labor structure [50], the economic impact of ports and changes in annual gross value added [51], the gross value added of regions and the performance of macroeconomic components [52], sector growth rates [16], changes in energy investment [45], the relationship of industrial structure with regional characteristics [43], changes in green investment [53], and the effects of production and employment from the region's clean energy [54].

Previous studies have widely used the combination of SLQ, DLQ, and SSA. Some of the research is about the identification of leading sectors and economic competitiveness [55, 56], agricultural leading sectors and development priorities [57], comparative and competitive advantages of processing industry subsectors [58], growth classification and sector competitiveness [59], and base sector and regional economic potential [56].

The development of mainstay and leading sectors determines regional economic growth. These sectors are suitable as priority sectors in the planning and implementation of regional development. Sector classification is carried out through the identification of mainstay and leading sectors in an empirical study. Therefore, the preparation of short and medium-term regional development planning documents must be preceded by an empirical study of the performance of economic sectors. The results of the empirical study become a reference for determining regional development priorities.

However, the problem is that the classification of economic sectors is not used to determine regional development priorities. Therefore, the mainstay and leading economic sectors are not included as regional development priorities in planning documents. The lack of empirical studies partly causes this condition to be a basis for determining regional development priorities. According to Pérez-González and Valiente-Palma [46], the result of the study can provide tools for implementing regional development policies, strategies, and initiatives.

This research is important because classifying economic sectors is a strong basis for determining regional development priorities. In addition, the classification of economic sectors will guide local governments in preparing development planning documents based on the performance of the economic sector. This study uses three analytical tools to determine the economic sector classification of the Toba District. The classification of economic sectors is established based on comparative advantage (measured by SLQ), sustainability of comparative advantage (measured by DLQ), and combined with sector growth and competitiveness (measured by SSA). The classification of economic sectors is

recommended to determine the priorities of regional development programs.

The main objectives of this study are to (1) classify the economic sectors of the Toba District, (2) identify mainstay, leading, and potential sectors and comparing to current development priorities, and (3) determine appropriate and inappropriate sectors as regional development priorities in the district. The classification of economic sectors has been widely carried out in various studies. However, for the Toba District, this study is the most complete with a longer data period analysis. In addition, the novelty of this study is the addition of a comparative analysis of sector classification with development priorities in the current planning document. Furthermore, the study recommends improving priorities in subsequent development planning.

Based on the objectives of the study, the paper successively presents the methodology, results and discussion, conclusions, and references. In the results and discussion section, the main findings of this study are outlined based on objectives, namely the classification of economic sectors, identification of mainstay, leading, and potential sectors, comparison with current regional development priorities, and finally, determining appropriate and inappropriate sectors as development priorities. In conclusion, it is strongly recommended that local governments improve regional development priorities based on mainstay sectors and leading sectors.

2. METHODOLOGY

2.1 Data

This study was carried out in Toba District from February to April 2023. The study used secondary data, namely gross regional domestic product (GRDP) economic sectors for 2011-2022. Sector GRDP secondary data is collected from online publication of the Central Bureau of Statistics (CBS) of Toba District (https://tobakab.bps.go.id) and CBS of North Sumatra Province (https://sumut.bps.go.id). The online publication is a book on GRDP by Sector 2011-2022 for Toba District and North Sumatra Province, each of which consists of four books. The terminology of sectors is based on the Regulation of the Head of the CBS of the Republic of Indonesia Number 57 as follows:

A.	Agriculture, forestry, and fisheries
B.	Mining and quarrying
C.	Manufacturing
D.	Electricity and gas procurement
E.	Water procurement, waste management, waste and recycling
F.	Construction
G.	Wholesale and retail trade, car, and motorcycle repair
H.	Transportation and warehousing
I.	Provision of accommodation and food and drink
J.	Information and communication
K.	Financial services and insurance
L.	Real estate
M, N.	Corporate services
O.	Government administration, defense, and compulsory social security
P.	Education services
Q.	Health services and social activities
R, S, T, U.	Other services

2.2 Data analysis

The identification of mainstay, leading, and potential sectors is carried out through secondary data analysis of GRDP with a combination of three methods. SLQ determines the sector's comparative advantages. DLQ determines the sustainable comparative advantage. The shift-share analysis determines the growth rate and competitiveness of sectors. Previous research [46, 60] used gross domestic product (GDP) and gross regional domestic product (GRDP) to identify leading sectors. SLQ is a comparison of the contribution of each sector in the GRDP of Toba District to the GRDP of North Sumatra Province. The SLQ > 1.2 means the sector has a significant comparative advantage, 1 < SLQ ≤ 1.2 means the sector has a slightly significant comparative advantage, and (0 ≤ SLQ ≤ 1) means the sectors have no comparative advantage [65]. The SLQ equation refers to Eq. (1) [35, 58, 61]:

$$SLQ=\left(\frac{GRDP_{dsi}}{GRDP_{dt}}\Big/\frac{GRDP_{psi}}{GRDP_{pt}}\right) \quad (1)$$

where, SLQ is the SLQ index, $GRDP_{dsi}$ is the first sector GRDP in the district, $GRDP_{dt}$ is the total GRDP in the district, $GRDP_{psi}$ is the first sector GRDP in the province, and $GRDP_{pt}$ is the total GRDP in the province.

DLQ analysis is used to determine the sustainable comparative advantage with the formula in Eq. (2):

$$DLQ=\left(\frac{\frac{(1+GSD)}{(1+GTD)}}{\frac{(1+GSP)}{(1+GTP)}}\right)^{t}=\left(\frac{IPPSd}{IPPSp}\right)^{t} \quad (2)$$

where, GSD is the average GRDP growth of a particular sector in a district, GTD is the average GRDP growth of a particular sector in a district, GSP is the average GRDP growth of a particular sector in a province, GTP is the average growth of total GRDP in a province, IPPSd is the index of sector development potential in the district, IPPSp is the index of sector development potential in the province, and t is the number of years. DLQ > 1 means the sector has a sustainable comparative advantage. Conversely, DLQ < 1 means the sector's comparative advantage is unsustainable.

The SSA is divided into components: district growth effect (DGE) shows the growth of sector GRDP in the district that must be achieved according to the level of sector change in the province. A positive DGE indicates that sectors in the district have a growth advantage and vice versa. The sectoral structure effect (SSE) represents the difference in sector growth rates between districts and provinces. A positive SSE means the sector has a structural advantage and good growth, and conversely, a sector has a structural disadvantage and poor growth if the SSE is negative. Sectoral competitive effect (SCE) represents competitive sectors in districts based on differences in sector GRDP changes between districts and provinces. A sector is strongly competitive if SCE is positive, and conversely, a sector is weakly competitive if SCE is negative [49]. A positive (negative) SSE also indicates that the sector in the district is growing faster (slower) than the same

sector in the province [53]. The SSA is formulated as in Eq. (3), Eq. (4), Eq. (5), and Eq. (6) [48, 49]:

Changes in i-sector income in the district:

$$(\Delta isreg_i)=DGE+SSE+SCE \quad (3)$$

$$DGE=\left(\frac{iprov22}{iprov11}-1\right) \quad (4)$$

$$SSE=\left(\frac{isprov22_i}{isprov11_i}-\frac{iprov22}{iprov11}\right) \quad (5)$$

$$SCE=\left(\frac{isdis22_i}{isdis11_i}-\frac{isprov22_i}{isprov11_i}\right) \quad (6)$$

where, DGE is the district growth effect, iprov22 was the province's income (GRDP) in 2022, iprov11 was the province's income in 2011; SSE is the sectoral structure effect, $isprov22_i$ is the income of the i-sector in the province in 2022, $isprov11_i$ is the income of the i-sector in the province in 2011, SCE is the sectoral competitive effect, $isdis22_i$ is the income of the i-sector in the district in 2022, $isdis11_i$ was income of the i-sector in the district in 2011.

A sector is classified as a mainstay sector if it has a sustainable comparative advantage, grows faster, and is strongly competitive. The leading sector has a sustainable comparative advantage and grows faster but weakly competitive. The rest are potential sectors. The criteria for sector classification are based on comparative advantage (DLQ), growth, and competitiveness (SSA). The criteria in Table 1 are the authors' formulations from previous studies [35, 48, 49, 55-59, 61].

Table 1. Criteria for the economic sectors classification

DLQ	Shift-Share		Interpretation	Classification
	Growth	Competitive		
>1	+	+	Sustainable CA, grows faster, strongly competitive	Mainstay sector
>1	+	-	Sustainable CA, grows faster, weakly competitive	Leading sector
>1	-	+	Sustainable CA, grows slower, strongly competitive	Leading sector
>1	-	-	Sustainable CA, grows slower, weakly competitive	Potential sector
<1	+	+	Unsustainable CA, grows faster, strongly competitive	Leading sector
<1	+	-	Unsustainable CA, grows faster, weakly competitive	Potential sector
<1	-	+	Unsustainable CA, grows slower, strongly competitive	Potential sector
<1	-	-	Unsustainable CA, grows slower, weakly competitive	Lagging sector

Source: Authors's formulation (2023)

3. RESULTS AND DISCUSSION

3.1 Regional overview

Toba District was a new autonomous region in 1998 and was divided into two regencies in 2003, namely Toba Samosir and Samosir. This district became Toba District in 2020. Toba District includes 16 subdistricts, 231 villages, and 13 city villages (Central Bureau of Statistics/CBS of Toba District, 2023). The area of Toba District is 2,021km^2. The population in 2021 is 208,754 people (CBS of Toba District, 2022). Balige City, as the capital, is a strategic city in developing Lake Toba tourism as one of Indonesia's Super-priority Destinations. Lake Toba's beach and aquatic areas in Balige City have become a venue for the Formula 1 motorboat world championship (F1H$_2$O) in February 2023.

The performance of regional development in Toba District is as follows (CBS of North Sumatra, 2023): the number of poor people 8.89% (North Sumatra Province/NSP=8.42%), open unemployment rate 1.39% (NSP=6.16%), human development index 75.96 (NSP=72.71), GRDP growth 4.24% (NSP=4.73%), and GRDP per capita based on current prices IDR42.16 million (NSP=IDR63.19 million).

The contribution of the agriculture, forestry, and fisheries sectors to the GRDP of Toba District in 2022 is the largest at 31.24%, although in the same year, it experienced negative growth (Figure 1). The contribution of the large trade and retail sector and the repair of cars and motorcycles is 18.80%, the construction sector (13.87%), the processing industry sector (11.34%), the government administration, defense, and compulsory social security sector (8.70%). Other sectors provide a relatively small contribution of 16.05% (CBS of Toba District, 2023).

Growth of all sectors is positive in 2022 (CBS Toba District, 2023). The highest growth was in the information and communication sector (6.29%), followed by the large trade and retail, car and motorcycle repair (6.09%), construction (6.01%), manufacturing (5.64%), transportation and warehousing (5.60%), electricity and gas procurement (5.15%), water procurement, waste management, waste, and recycling (5.13%), mining and quarrying (4.88%), other services (4.46%), and corporate services (4.24%). In 2020, during the COVID-19 pandemic, the growth of some sectors was negative, including transportation and warehousing (-4.64%), construction (-4.25%), other services (-1.90%), and agriculture, forestry, and fisheries sector (<-1%).

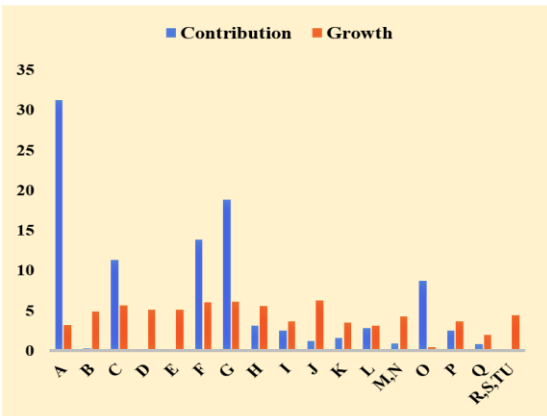

Figure 1. Contribution (%) and growth rate (%) of the economic sectors on GRDP in 2022

Investment has a significant impact on the growth of the agricultural sector [62]. Agricultural investment must be in line with the principles of responsible land management [63]. In addition, for agricultural and tourism development, the previous research recommends rural development policies based on agro-ecotourism and incorporating economic, social, cultural, institutional, ecological, and technological aspects [64].

3.2 Result of data analysis

3.2.1 SLQ analysis

Based on the average SLQ value for 2011-2022 (Figure 2), five sectors are the base sector (SLQ > 1), namely the agriculture, forestry, and fisheries sector (Sector A = 1.42); construction sector (Sector F = 1.04); accommodation and food & drink sector (Sector I = 1.33); government administration, defense, and compulsory social security sectors (Sector O = 2.20); and the education services sector (Sector P = 1.40). Sector A was the base sector for 2011-2022, with the highest SLQ of 1.64 in 2020. Sector F became the base sector for 2015-2022, with the highest SLQ of 1.16 in 2022. Sector I was also the base sector throughout 2011-2022, with the highest SLQ of 1.42 in 2021. The O sector was the base sector of 2011-2019, with a high SLQ of 2.96 in 2014. At the same time, Sector P is the base sector in 2011-2022, where the highest SLQ reached 1.56 in 2022.

Based on the previous study [65], sectors A, I, O, and P have a significant comparative advantage (SLQ > 1.2). Sector F has a slight comparative advantage (1 < SLQ ⩽ 1.2). The other 12 sectors have no comparative advantage (0 ⩽ SLQ ⩽ 1) over the same sector in the province. The analysis continued with the DLQ method to determine the sustainability of the comparative advantage of each sector. Sustainable comparative advantage is one of the criteria for compiling a sector classification. DLQ > 1 interprets that the sector has a sustainable comparative advantage over the next 5-10 years.

3.2.2 DLQ analysis

Sustainable comparative advantage (CA) was measured using DLQ analysis (Table 2). The sectors with a sustainable comparative advantage have good prospects for development in the next 5-10 years. Sectors that have a sustainable CA with DLQ > 1 are manufacturing, electricity and gas procurement, construction, transportation and warehousing, wholesale and retail trade, repair of cars and motorcycles, information and communication, financial and insurance services, and education services. Other sectors with DLQ < 1 are those whose unsustainable CA.

3.2.3 Shift-share analysis

Economic sector growth rate and competitiveness are determined based on SSA. Table 3 shows that all sectors have a positive SSE, which means that all sectors are growing faster than the same sector at the province. According to the SCE, only four sectors are strongly competitive: electricity and gas procurement; construction; wholesale and retail trade, car and motorcycle repair; and transportation and warehousing. Thus, only four sectors grow faster and are strongly competitive than the same sector at the provincial level. The four sectors are electricity and gas procurement, construction, large and retail trade, car and motorcycle repair, and transportation and warehousing.

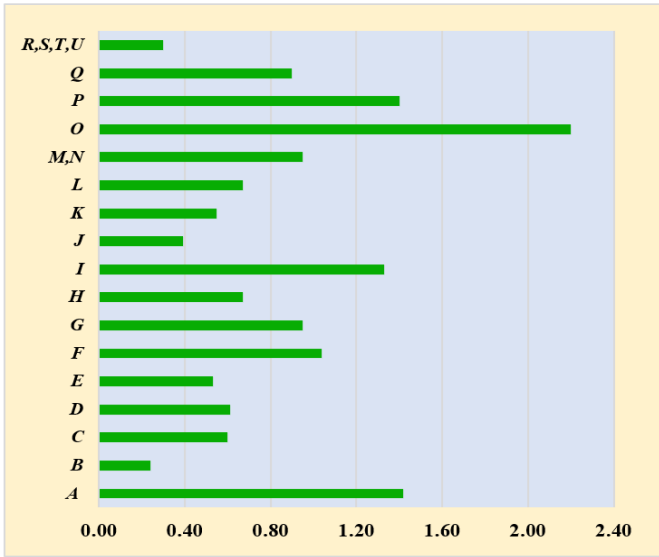

Figure 2. Average SLQ of economic sectors in 2011-2022

Table 2. DLQ of Toba District economic sectors in 2011-2022

No.	Sector	GSD	GSP	IPPSd	IPPSp	(IPPSd/IPPSp)	DLQ	CA
1	A	2.85	4.33	0.76	1.05	0.72	0.02	unsustainable
2	B	3.29	4.74	0.85	1.14	0.75	0.03	unsustainable
3	C	2.37	2.28	0.67	0.65	1.02	1.33	sustainable
4	D	5.17	3.75	1.22	0.94	1.30	22.28	sustainable
5	E	3.07	4.35	0.80	1.06	0.76	0.04	unsustainable
6	F	4.94	3.51	1.17	0.89	1.31	26.59	sustainable
7	G	4.72	4.42	1.13	1.07	1.05	1.86	sustainable
8	H	4.00	2.65	0.99	0.72	1.37	42.33	sustainable
9	I	3.03	3.16	0.79	0.82	0.97	0.67	unsustainable
10	J	7.58	7.46	1.69	1.67	1.01	1.14	sustainable
11	K	5.01	3.95	1.19	0.98	1.21	9.99	sustainable
12	L	4.03	4.55	0.99	1.10	0.90	0.29	unsustainable
13	M,N	3.61	3.89	0.91	0.97	0.94	0.48	unsustainable
14	O	2.22	2.69	0.63	0.73	0.87	0.19	unsustainable
15	P	5.07	4.47	1.20	1.08	1.11	3.36	unsustainable
16	Q	4.20	4.24	1.03	1.04	0.99	0.88	unsustainable
17	R,S,T,U	3.65	4.51	0.92	1.09	0.84	0.13	unsustainable

Notes: 1. GSD=sector growth in districts, 2. GSP=sector growth in provinces, 3. IPPSd=index of sector development potential in districts, 4. IPPSp=index of sector development potential in provinces, 5. DLQ=dynamic location quotient, 6. CA=comparative advantage

Table 3. SSA of the economic sectors (2011-2022)

No.	Sector	DGE	SSE	SCE	Total
1	A	2170.86	2806.91	-451.93	4525.84
2	B	19.23	35.79	-12.10	42.92
3	C	806.01	1036.18	-186.84	1655.35
4	D	4.40	2.86	0.94	8.21
5	E	3.24	4.92	-1.57	6.59
6	F	653.76	1199.57	31.45	1884.78
7	G	912.86	1662.13	2.50	2577.49
8	H	162.51	261.80	1.17	425.48
9	I	171.97	253.03	-51.31	373.69
10	J	65.86	114.75	-8.27	172.34
11	K	87.05	133.46	-3.89	216.63
12	L	163.05	334.27	-70.70	426.62
13	M,N	48.64	105.38	-17.86	136.16
14	O	586.00	778.27	-111.21	1253.06
15	P	149.39	195.16	-2.59	341.95
16	Q	46.54	91.66	-13.16	125.05
17	R,S,T,U	8.80	17.49	-3.99	22.31

3.3 Classifying and identifying economic sectors

The classification of economic sectors in the Toba District is determined based on a combination of DLQ (sustainable or unsustainable comparative advantage and SSA, namely the growth and competitiveness of the sector (Table 4).

DLQ is a measure of comparative advantage that is sustainable (DLQ>1) or unsustainable (DLQ <1). SSA mainly determines two components. The first component is a faster growth rate (SSE positive) or slower growth (SSE negative). The second component is higher competitiveness (SCE positive) or less competitiveness (SCE negative). Mainstay and leading sectors are the priority in regional development, while potential sectors are the next priority. The combination of DLQ, growth, and competitiveness of economic sectors determines the sector classification in Table 5.

Table 4. Determine the classification of the economic sectors (2011-2022)

No.	Sector	DLQ	SSA		Interpretation			Classification
			Growth	Competitive	CA	Growth	Competitive	
1	A	0.02	2,806.91	-451.93	unsustainable	faster	weakly	potential sector
2	B	0.03	35.79	-12.10	unsustainable	faster	weakly	potential sector
3	C	1.33	1,036.18	-186.84	sustainable	faster	weakly	leading sector
4	D	22.28	2.86	0.94	sustainable	faster	strongly	mainstay sector
5	E	0.04	4.92	-1.57	unsustainable	faster	weakly	potential sector
6	F	26.59	1,199.57	31.45	sustainable	faster	strongly	mainstay sector
7	G	1.86	1,662.13	2.50	sustainable	faster	strongly	mainstay sector
8	H	42.33	261.80	1.17	sustainable	faster	strongly	mainstay sector
9	I	0.67	253.03	-51.31	unsustainable	faster	weakly	potential sector
10	J	1.14	114.75	-8.27	sustainable	faster	weakly	leading sector
11	K	9.99	133.46	-3.89	sustainable	faster	weakly	leading sector
12	L	0.29	334.27	-70.70	unsustainable	faster	weakly	potential sector
13	M,N	0.48	105.38	-17.86	unsustainable	faster	weakly	potential sector
14	O	0.19	778.27	-111.21	unsustainable	faster	weakly	potential sector
15	P	3.36	195.16	-2.59	sustainable	faster	weakly	leading sector
16	Q	0.88	91.66	-13.16	unsustainable	faster	weakly	potential sector
17	R,S,T,U	0.13	17.49	-3.99	unsustainable	faster	weakly	potential sector

Table 5. Classification and identification of economic sectors

Mainstay Sectors *(sustainable CA, grows faster, strongly competitive)*:	**Potential Sectors** *(sustainable/unsustainable CA, grows faster/slower, weakly competitive):*
Electricity and gas procurement	Agriculture, forestry, and fisheries
Construction	Mining and quarrying
Wholesale and retail trade, car, and motorcycle repair	Water procurement, waste management, waste and recycling
Transportation and warehousing	Provision of accommodation and food & drink
Leading Sectors *(sustainable CA, grows faster, weakly competitive)*:	Real estate
Education services	Corporate services
Manufacturing	Government administration, defense, and compulsory social security
Information dan communication	Health services and social activities
Financial service and insurance	Other services

The sector classification consists of mainstay, leading, and potential sectors. There are four mainstay sectors: electricity and gas procurement, construction, wholesale and retail trade, car and motorcycle repair, and transportation and warehousing. The leading sectors are manufacturing, information and communication, financial services and insurance, and education services. The potential sector consists of agriculture, forestry, and fisheries; mining and quarrying; water procurement, waste management, waste, and recycling; provision of accommodation, food, and drink; real estate; corporate services; government administration; defense, and compulsory social security; health services and social activities; and other services.

The leading sector has a sustainable comparative advantage and is fast-growing but must be more competitive. The leading sectors are educational services, manufacturing, information and communication, and financial and insurance services. These leading sectors are expected to become mainstay sectors in the future with a strategy to increase competitiveness. Several leading educational institutions support the education sector as a leading sector. Some of them are DEL Institute of Technology, Bibelvrow College, Deaconess College, Nursing Academy (owned by HKBP church), Bintang Timur Junior High School, Tunas Bangsa Soposurung Foundation, SMA Negeri 2 Balige, and SMA Unggul Del.

3.4 Sector classification and current priorities

The sector classification of the results of this study was compared with the current Toba District development planning document (Table 6). Based on the Regional Medium-term Development Plan (RMDP) of Toba District for 2016-2021, development priorities are health, education, agriculture and the environment, infrastructure, electricity power, and tourism.

The study's main findings suggest that mainstay sectors are suitable as development priorities, namely electric and gas procurement, construction, wholesale and retail trade and car and motorcycle repair, and transportation and warehousing. If the district budget is adequate, then the leading sectors can become development priorities in the second order, consisting of education services, manufacturing, information and communication, and financial and insurance services.

Table 6. The comparison of the sector priorities

Priorities Sectors Based on the Study	Priorities in the Current Planning
Electric and gas procurement	
Construction	Health
Wholesale and retail trade and car and motorcycle repair	Education
Transportation and warehousing	Agriculture and the environment
Education services	Infrastructure and electricity power
Manufacturing	Tourism
Information and communication	
Financial and insurance services	

The construction sector is the mainstay sector, and education services are the leading sector in the Toba District. The mainstay and leading sectors are suitable as regional development priorities in the 2016-2021 RMDP of the Toba District. In contrast, determining sectors related to health and agriculture, forestry, and fisheries is less suitable as a priority in the planning documents. The 2016-2021 planning document shows that infrastructure provision receives considerable annual financing. Adequate infrastructure can attract investors and play a positive role in the economy of Toba District.

3.5 Improve regional development priorities

The mainstay sectors are suitable as regional development priorities. Leading sectors can be the second priority. Potential sectors are not suitable as priorities for regional development. The determination of priority sectors in the current regional development planning is different from the results of the study, except for infrastructure and electricity. The agriculture and health sectors, based on the results of this study, are not suitable as priority sectors of the first group. The education sector is a priority sector in the second group. Therefore, the recommended regional development priorities in the next regional planning are electricity and gas procurement, construction, wholesale and retail trade, car and motorcycle repair, transportation and warehousing, education services, manufacturing, information and communication, and financial service and insurance.

The mainstay sector is a sector that has sustainable comparative advantages is fast-growing and is competitive. The construction sector, for example, is a sector that provides basic infrastructure, especially road infrastructure. Infrastructure development will encourage increased activity in other sectors. The development of transportation infrastructure has an impact on economic development. In addition, infrastructure investment policy must be linked to regional development strategies [66]. With this in mind, economic infrastructure investment and social infrastructure spending significantly reduce poverty rates. Increased infrastructure investment can be key to enhancing the effects of poverty reduction [67]. The availability of transportation and infrastructure is the most sensitive attribute of the sustainability of the agro-ecotourism community [64]. Transportation infrastructure improvements can support sustainable rural tourism [68], promote an effect on economic development in the long run [69], and reduce poverty [67].

The leading sectors are expected to become a mainstay with increased competitiveness in the next five or ten years. Transportation infrastructure investment impacts competitiveness and economic growth, as reflected in labor productivity, employment, and gross regional product [70]. Intensive R&D clusters are key to regional competitiveness and impact productivity growth. Cluster-based regional development strategies are policies that can encourage regional growth [71]. The improvement of regional competitiveness is determined by citizens' satisfaction with government products and services, the effectiveness of strategic planning focused on socioeconomic development, legal compliance, and ethics of organizational actors [72]. Competitiveness is determined by the conditions of factors of production, local demand, the availability of supporting industries, and the strategy and type of competition [73].

Increasing competitiveness can be achieved through strategies for the specialization of target markets and new market segmentation [48], strengthening the capacity of local communities and re-engineering production systems [16], increasing innovation capabilities [23], development of new knowledge and technology [24], product downstream [25], promotion strategies [26], public policy orientation [28], quality of life, environmental control, and the interaction of villages and cities as marketing centers [29].

Nevertheless, the logical question that arises is why local governments include agriculture, health, and tourism sectors as priorities in the RMDP 2016-2021. Here, it is important to discuss alternative explanations for research findings. The logical argument that can be given is that such sectors should be developed, although not as development priorities. These sectors are agriculture, forestry, and fisheries; water supply, waste management, waste, and recycling; accommodation and food and drink; and health services and social activities. The agriculture, forestry, and fisheries sectors are responsible for the highest contribution to the GRDP of the Toba District (31.24% in 2022).

Investment in the agricultural sector has a positive and significant impact on the growth of the agriculture sector [62]. The government, through investments, facilitates a conducive environment for the growth of the agricultural sector. The facilitation includes strengthening infrastructure, such as road transportation, agro-industrial, and warehousing facilities. This strategy can increase employment opportunities and reduce poverty [74]. Agricultural investments need to be analyzed based on crop type, job creation, implementation status, and investor type. This analysis is important as a basis for decision-makers to increase employment [75].

Water supply, waste management, waste and recycling sector, and providing accommodation and food and drink are strategic sectors supporting Lake Toba's super-priority tourism destinations. Tourism is a multidimensional sector with rational use of human resources. The tourism sector contributes to the improvement of the population's standard of living in economic sectors-both directly and indirectly-as well as increasing employment opportunities [76]. Meanwhile, the health service and social sector are a priority because they are priority sectors at the national level.

An alternative explanation is that the analysis of comparative advantage, growth, and competitiveness of sectors is one of many determinants of regional development priorities. Some other determinants are the policies and priorities of the central government, the development of the Lake Toba tourism area, and perhaps even local political forces intervening in development planning. The limitation of the study is that these other determinants should have been included in the analysis. Consequently, recommendations for regional development priorities based on mainstay and flagship sectors can be biased. The mainstay and superior sectors are not all used as regional development priorities.

4. CONCLUSIONS

The economic sector of Toba District is classified into mainstay, leading, and potential sectors. The mainstay sector consists of electricity and gas procurement, construction, large trade and retail, car and motorcycle repair, and transportation and warehousing). The leading sectors are the manufacturing industry, information and communication, financial and insurance services, and education services. The potential sectors include nine sectors, namely agriculture, forestry, and fisheries; mining and quarrying; water procurement, waste management, waste, and recycling; provision of accommodation and food drink; real estate; corporate services; government administration; defense, and compulsory social security; health services and social activities; and other services. Based on the study, the mainstay sectors are suitable as regional development priorities. Leading sectors can be the second priority. Potential sectors are not suitable as priorities for regional development.

The determination of priority sectors in the current regional development planning is different from the results of the study, except for infrastructure and electricity. The agriculture and health sectors, based on the results of this study, are not suitable as priority sectors of the first group. The education sector is a priority sector in the second group. Therefore, the recommended regional development priorities in the next regional planning are electricity and gas procurement, construction, wholesale and retail trade, car and motorcycle repair, transportation and warehousing, education services, manufacturing, information and communication, and financial service and insurance.

The study has limitations because it only uses secondary data as a basis for analysis and conclusions. In addition, the analysis method used only compares districts with provinces, not between districts. Therefore, future research is directed to a more comprehensive analysis to determine the development priorities of the region, including the potential of the region, the needs of the community, and sustainable tourism development. More advanced analytical methods are also suggested to be able to compare the comparative and competitive advantages of sectors between districts in the province.

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