Typology Analysis and Leading Sector of East Nusa Tenggara Province in 2017

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Abstract. Economic growth and sector contribution of regional income can illustrate the potentials and infirmity of a region. This research aims to analyze typology and leading sector in 21 regencies and 1 city in East Nusa Tenggara Province. This study uses secondary data of Gross Regional Domestic Product (PDRB) on constant price from 2010 to 2016 sourced from BPS in every regency / city in NTT region. The methods that used are klassen typology analysis, Statictic Location Quentiont, Dinamic Location Quentiont and Shift Share Classic and Shift Share Esteban Marquillas. The result of this study indicates that 54% of the regions in NTT are included in stagnant typology, Based on the combined results of 3 methods (LQ, Shift Share Classical and Shift share Esteban) shows that the Mining and Quarrying, Agriculture, Forestry, and Fisheries sectors are the leading sectors in NTT region. South of Timor Tengah Regency, East Flores, Sikka, Ngada, West Mangarai and Southwest Sumba have no leading sector. The result of the relationship between the region typology and the leading sector shows that Kupang is in quadrant I with the number of 13 leading sectors, while the other areas are still very lagging.

1. Introduction
Province of East Nusa Tenggara (NTT) is one of the areas that is located in the southern Indonesia. Established since 1958, it is part of the Nusa Tenggara and Bali region. The position of NTT is very strategic, because vicinally it describes the face of Indonesia in neighboring country’s point of view. Some regencies border on the country either by sea or by land. The land position of Belu Regency, North Timur Tengah, Kupang that is bordered on Timor Leste, while the Alor Regency’s sea is adjacent to Timor Leste, and Rote Ndao is adjacent to Australia [1]. The sea in NTT is part of the Lesser Sunda Ecoregion, part of the Coral Triangle Initiative. The strategic position of NTT, has not responded to the challenges of regional development both from social and economic. According to Central Bureau of Statistics (BPS, 2008) data from 33 provinces in Indonesia, NTT is at the bottom 3 of 63.73 in 2017. The poor population of NTT is 23% of 4.6 million (BPS).
Support to development must be based on potential regional. The development region is very fluctuating, thus that causing imbalances between different regions of the government's role must provide optimization of the leading sectors [2]. The development of a regionally-based economy based on spatial sectors has become an alternative in development. The problem in NTT occurred in 2017, where 2% inflation happened, caused by inflation in East Nusa Tenggara was driven by the increase of price index in education, recreation and sports spending group, spatial improvement occurred in Kupang City and Maumere City [3]. From 24 cities sampled in Eastern Indonesia Region in 2017, NTT is ranked 4th (kupang city). This figure shows that, the economic area in NTT left behind compared to other provinces.

The agriculture, forestry and fisheries sector are one the sectors with the largest contribution compared to 16 other sectors, this is supported by the use of land in NTT is dominated by dry land agriculture in the amount of 44%. The direction development based by sector, it will bring NTT from the slump of development, multi collaboration stakeholder in determining the leading sector to be one of the top priorities to increase economic growth and reduce regional inequality. The balance of the region can be realized if there is collaboration between sectorial and spatial approaches [4]. The focus of the sectorial approach is on improving the economic structure, while the spatial approach focuses on the location aspect that can be developed in accordance with the resources endowment [5].

Area based on interaction can be categorized into two parts: the central and suburb regions (John Freidman (1966) [6], regional growth can occur due to specialization, ran-size ruel and settlement dynamics. The inter-centre and suburb linkages will give multiplier effects.

Differences of economic potential and spatial territory in 21 regencies and 1 city in NTT (in this study, regencies / cities are called spatial territory) are become attention in development of the region. The issues raised in this study are how connection of leading sectors that linked to regencies / cities to development in NTT. The objectives of this study are to know the leading sectors, classify the region based on the typology of economic development and identify impacts on development in NTT.

2. Methodology
The balance of the region becomes an important role in overall development, in order to reduce inequality regions [7]. Integrated development efforts are carried out by identifying the leading sectors/basic sectors. The leading sector is a sector that has a comparative and competitive leading [8]. Determining the leading sector is based on two things, first the economic potential of region related to the sector contribution to scale shape and the regional economic growth. The greater is the sector role, thus the greater the ability to increase the economy [9]. Both the potential for relative competitiveness, the local economic sector compared with wider region. The method in determining the leading sector is determined by analysing by using Klassen Typology Analysis. Determining leading Sector is carried out by Shift Share (SS) and Location Quotient (LQ) method.

2.1. Klassen Typology Analysis
Klassen typology aims to find out the relative position of economy in a broader region based on indicators of economic growth and per capita regional income[10]. The data that used are PDRB data on constant prices in regencies and cities in NTT. The following is the classification of regional typology according to Klassen [11].

| GRDP per Capita (y) | Yi > y | Yi < y |
|---------------------|--------|--------|
| Growth rate(r)      |        |        |
| Ri> r               | Quadrant I (Developed Sector) | Quadrant II (Stagnan Sector) |
| Ri< r               | Quadrant III (Developing Sector) | Quadrant III (Underdeveloped Sector) |
2.2. Analysis Shift Share

Shift Share Analysis, aims to determine the elements that affect the economic growth of the district and show the growth and economic ratings of city districts within the province of NTT. This analysis identifies regional, sectorial, and competitive effects. [12] Shift share is divided into two, the classical shift share and then developed by Esteban Marquillas in 1972, by adding elements of the structure of the position of the region and the wider region, the structure of the region can be lower, smaller and equal to a large area [13]. The effect of sectors developing in a larger area is called proportional shift (PS) and the location factor which is the district's competitive advantage is called differential shift (DS). The classical shift-share formula is mathematically as follows [14]:

$$D_j = E_{ijt} - \left[ \left( \frac{E_{it}}{E_{io}} \right) \times E_{ijo} \right]$$

Information:

- $D_j$ : Shift Value
- $E_{ijo}$ : The sum of certain activities production in the initial year
- $E_{ijt}$ : Total production of certain activities in the initial year
- $E_{it}$ : Total production of certain activities in the end year
- PS : Proportional shift
- DS : Differential shift

| Differential Shift (DS) | Proportional Shift (PS) | DS, > 0 | DS, < 0 |
|------------------------|-------------------------|---------|---------|
| PS, > 0                | Quadrant I (Winner)     | Quadrant II (Mixed Winner) |
| PS, < 0                | Quadrant III (Losers)   | Quadrant IV (Mixed Losers) |

The Shift Share Esteban modifications covers redefinition position or competitive leading as the third component of the shift share technique and create the fourth shift share component. The Esteban-Marquilas shift share formula is [15]

$$D_{ij} = N_{ij} + M_{ij} + C'_{ij} + A_{ij}$$

1. $D_{ij}$ positive and large shows the performance of the sector is superior to the economic performance of the region that became comparison.
2. $C'_{ij}$ measures competitive advantages and disadvantages in sector i in the regional economy j by the formula: $C'_{ij} = E'_{ij} \left( R_{ij} - R_{in} \right)$

Information:

- $D_{ij}$ : Performance of sector i region j
- $N_{ij}$ : Growth of sector i region j
- $M_{ij}$ : Mix Industry of sector i region j
- $C'_{ij}$ : Leading competitive of sector i in region js
- $A_{ij}$ : Measures of leading and infirmity
- $E_{ij}$ : Employment opportunities of sector i in area j
- $R_{ij}$ : Growth rate of in sector i in area j
- $R_{in}$ : Growth rate in sector i in regional area
- $E'_{ij}$ : Homothetic PDRB in sector i in area j

| Code | Criteria                          | Component      | Effect Location |
|------|-----------------------------------|----------------|----------------|
| 1    | Competitive disadvantage, specialized | Positive, Negative | Negative       |
| 2    | Competitive disadvantage, not specialized | Negative, Negative | Positive       |
2.3. Analysis Location Quotient
Location Quotient aims to determine the ability of a region in an activity of particular sector. LQ is one of the most popular and widest analyses that used [16]. It is divided into two analyses: Static Location Quotient (SLQ) is used to determine the level of sector specialization in the planning area compared to the larger area. Dynamic Location Quotient (DLQ) is used to determine the sector growth level in the planning area compared to the larger area. LQ is usually known by other names of ratio analysis, where the measurement results can see the relative concentrations of regional economies [17]. The two calculations are then merged, thus obtaining the criteria of each location in table 4 [18].

The SLQ mathematical formula is:

\[
SLQ = \frac{V_{ik}}{V_{kp}}
\]

V<sub>ik</sub> : PDRB of sector i in study area k
V<sub>k</sub> : PDRB of all sectors in the study area k
V<sub>ip</sub> : PDRB (Labor) of sector i in reference area p
V<sub>p</sub> : PDRB (Labor) of all sectors in the reference area p
SLQ<sub>ik</sub> > 1 : Sector whose level of specialization is higher than reference level
SLQ<sub>ik</sub> < 1 : Sector whose level of specialization is lower than reference level
SLQ<sub>ik</sub> = 1 : The level of planning area specialization is the same as the reference area.

Formula of DLQ:

\[
DLQ = \frac{(1+g_{ij})(1+g)}{(1+G)(1+G)}
\]

G<sub>ij</sub> : Growth rate of sector i region j
G<sub>j</sub> : Growth rate of region j
G<sub>i</sub> : Growth rate of sector i reference area
G : Growth rate of reference region
DLQ<sub>ij</sub> < 1 : The growth rate of sector i in area j is higher than growth rate of the sector in other areas of the region reference
DLQ<sub>ij</sub> > 1 : The growth rate of sector i in area j is lower than growth rate of the sector in other areas of the region reference
DLQ<sub>ij</sub> = 1 : The growth rate of sector i in area j is proportional than growth rate of the sector in other areas of the region reference

| Code | Criteria | Specialization | Competitive Advantage | Effect Location |
|------|----------|----------------|-----------------------|-----------------|
| 3    | Competitive advantage, not specialized | Negative | Positive | Negative |
| 4    | Competitive advantage, specialized | Positive | Positive | Positive |

Table 4. Classical Sector classification based on combination SLQ and DLQ

| SLQ | DLQ |
|-----|-----|
| SLQ > 1 | Superior |
| SLQ < 1 | Mainstay |
| DLQ > 1 | Prospective |
| DLQ < 1 | Drop Behind |

3. Result and Discussion
Results and discussion are divided into 3 main parts, including; first, the analysis of typology klassen uses PDRB data on the constant price of the year 2010-2016 in which has been averaged, that is
growth and data of GDP per capita in every regency / city (region). Second, leading sector analysis which is a combination of LQ (Leading Sector), Shift Share Classical (Leading Sector), and Shift Share Esteban (Competitive advantage specialized). Third, it is the analysis of relationship between the typology of the region and the leading sectors.

3.1. Analysis Location Quotient
The result of klassen typology analysis shows that 63% of NTT area was classified as advanced area but it is depressed. There are 2 areas that includes developing and fast growing area, advanced but depressed areas are 14 regions, and 5 regions of relative left behind area (table 5).

3.2. Leading Sector Analysis
From result of analysis of LQ and Shift Share shows that there are 6 regencies do not have sector that can be led, it is very influential on the development of future area. The six regencies are; South Timor Tengah, East Flores, Southwest Sumba, Ngada, Sikka, West Mangarai. Other regions have a minimum Sector of 1 Sector (table 6).

### Table 5. Classification of Territories in NTT based on Klassen Typology Analysis in 2016

| GRDP per Capita (y) | Yi > y | Yi < y |
|---------------------|--------|--------|
| Growth rate(r)      |        |        |
| 1. Kupang City      | 1. West Sumba Regency |
| 2. Sabu Raijua Regency | 2. Kupang Regency |
|                     | 3. South Timor Tengah Regency |
|                     | 4. North Central Timor Regency |
|                     | 5. Alor Regency |
|                     | 6. Lembata Regency |
|                     | 7. Sikka Regency |
|                     | 8. Mangarai Regency |
|                     | 9. West Manggarai Regency |
|                     | 10. Central Sumba Regency |
|                     | 11. Nagekeo Regency |
|                     | 12. East Manggarai Regency |
| Ri> r               |        |        |
| 1. Belu             | 1. East Sumba Regency |
|                     | 2. Rote Ndao Regency |
|                     | 3. Ende Regency |
|                     | 4. Ngada Regency |
|                     | 5. Flores Timur Regency |
|                     | 6. Sumba Barat Daya Regency |
|                     | 7. Malaka Regency |
| Ri< r               |        |        |

### Table 6. Recapitulation Result of Calculation LQ, Shift Share Classic, Shift Share Esteban in 2016

| No | Regency/City          | Methods | LQ | SS Klasic | SS Esteban | Leading Sectors |
|----|-----------------------|---------|----|-----------|------------|-----------------|
|    |                       |         | Qyt| Code      | Qyt| Code | Qyt| Code |   |
| 1  | West Sumba Regency    |         | 3  | 7,11,14   | 1  | 14   | 7,14 | 14,7 |
| 2  | East Sumba Regency    |         | 3  | 7,15,17   | 3  | 6,14,15 | 2  | 2,15 | 15 |
| 3  | Kupang                |         | 4  | 2,4,5,9   | 1  | 2    | 1  | 2    | 2  |
| No | Regency/City                          | LQ Qyt | LQ Code | SS Klasic Qyt | SS Klasic Code | SS Esteban Qyt | SS Esteban Code | Leading Sectors |
|----|-------------------------------------|--------|---------|---------------|---------------|---------------|---------------|----------------|
| 4  | Middle Timor South Regency          | 1      | 1       | 2             | 11,14         | 0             | 0             | 0              |
| 5  | Middle Timor North Regency          | 1      | 1       | 1             | 7             | 2             | 1,2           | 1              |
| 6  | Belu Regency                        | 4      | 2,11,15,17 | 9 | 2,6,8,9,11,14 | 4,15,16       | 8             | 2,4,7,11,12,15,16,1 | 2,11,15,4 |
| 7  | Alor Regency                        | 2      | 11,14   | 2             | 7,11          | 6             | 1,2,4,7,11,13 | 11,7           |
| 8  | Lembata Regency                     | 1      | 14      | 2             | 6,14,15       | 1             | 14            | 14             |
| 9  | East Flores Regency                 | 3      | 14,15,17 | 0 | 0             | 2             | 12,17         | 0              |
| 10 | Sikka Regency                       | 0      | 0       | 1             | 6             | 1             | 1             | 0              |
| 11 | Ende Regency                        | 1      | 7       | 2             | 8,15          | 7             | 2,3,8,13,15,17 | 8              |
| 12 | Ngada Regency                       | 2      | 11,14   | 0             | 0             | 2             | 1,2           | 0              |
| 13 | Manggarai Barat Regency             | 3      | 2,11,17 | 5             | 2,7,10,14,15  | 5             | 2,5,10,14,17  | 2,17           |
| 14 | Rote Ndao Regency                   | 1      | 1       | 0             | 0             | 3             | 1,5,16        | 1              |
| 15 | Manggarai Regency                   | 1      | 1       | 0             | 0             | 2             | 2,13          | 0              |
| 16 | Sumba Tengah Regency                | 3      | 1,2,14  | 1             | 10            | 2             | 2,12          | 2              |
| 17 | West Sumba Regency                  | 1      | 1       | 3             | 7,8,14        | 0             | 0             | 0              |
| 18 | Nagekeo Regency                     | 2      | 1,14    | 2             | 10,14         | 1             | 14            | 14             |
| 19 | Manggarai East Regency              | 2      | 1,2     | 5             | 2,6,7,10,14   | 4             | 1,2,10,16     | 2,1            |
| 20 | Sabu Raijua Regency                 | 2      | 1,12    | 2             | 6,7           | 2             | 7,12          | 7              |
| 21 | Malaka Regency                      | 1      | 1       | 2             | 8,14          | 3             | 8,14,17       | 8,14           |
| 22 | Kupang City                         | 14     | 3,4,5,6,7,8,9,10,11,12,13,15,16,17 | 10 | 4,6,7,8,9,10,11,14,15,16 | 13 | 3,4,5,6,7,8,9,10,11,12,15,16,17 | 3,4,5,6,7,8,9,10,11,12,15,16,17 |

*Qyt Quantity

Code’s: ¹ Agriculture, Forestry and Fishery, ² Mining and Quarrying, ³ Manufacturing, ⁴ Electri Municipality and Gas, ⁵ Water Supply, Sewerage, Waste Management and Remediation Activities, ⁶ Construction, ⁷ Wholesale and Retail Trad; Repair of Motor Vehicles and Motorcycles, ⁸ Transportation and Storage, ⁹ Accommodation and
Food Services Activities, Information and Communication, Financial and Insurance Activities, Real Estate Activities, Business Activities, Public Administration and Defence, Compulsory, Social Security, Education, Human Health and Social Work Activities Other Services Activities

In NTT areas, superior mining and excavation sectors are in the first position compared to other sectors. In the second position of agriculture, forestry and fishery sector, this is supported by 44.2% of land use in NTT is dry land farming area, 14% is protected forest and 13% is used as livestock grazing field. The service sector of the company is not an ungulate sector in one of the NTT regions, this is because the business climate in NTT is still very weak, there is only one factory that is Semen Kupang factory owned by PT. Semen Kupang located in Kupang City, but the sector has not yet competes with cement companies on a national scale, thus not having a major impact on economic development in the NTT region.

3.3. Analysis of Regional Tipology Relationships and Leading Sector
The relationship between the regional typology and the number of leading sectors, determine whether the region can be developed or not. The analysis shows that Kupang City is a region that is in Quadrat I based on Klassen typology analysis and has 13 leading sectors that can be developed. Potential of Kupang City is strongly supported by population and central government of NTT province. There are 3 districts located in Quadrant II, with the number of leading sectors 2 namely West Sumba, Alor and East Manggarai. When viewed from the number of leading sectors, Belu Regency has 4 leading sectors that can be developed, but unfortunately the unfortunate structure of the region is in quadrant III. Belu Regency is a border area between the State of Indonesia with the State of East Timor Democratic Republic.

![Figure 1. Potential of Superior Sector in NTT Province based on LQ Analysis, Shift-Share Classical, Shift-Share Esteban in 2010-2016](image)

| No | Regency/City                     | Typology | Qyt |
|----|----------------------------------|----------|-----|
| 1  | West Sumba of Regency            | II       | 2   |
| 2  | East Sumba of Regency            | IV       | 1   |
| 3  | Kupang Regency                   | II       | 1   |
| 4  | South Central Timor of Regency   | II       | 0   |
| 5  | North Central Timor of Regency   | II       | 1   |
4. Conclusion
Based on the results of regional typology and leading sector analysis, it can be concluded that:
1. Typology of regency / city in NTT is dominated by the Stagnant Sector area of 54%, this indicates that the region in NTT should be encouraged in order to shift the psission from Quadrant II to Quadrant I.
2. NTT as the southernmost territory of the State of Indonesia is very potential to the development of leading sectors in the field of mining and quarrying, agriculture, forestry and fisheries. The result of leading sector analysis shows that sector number 1 and 2 become prima donna in some regions in NTT. Not all regencies in NTT have leading sector, including north of Timor Tengah regency, East Flores, Sikka, Ngada, West Manggarai and Southwest of Sumba.
3. The most relationship between advanced regions and the number of leading sectors are only found in Kupang City, while other regencies are typologically included in quadrant II, but the number of leading sectors is still very low. Belu regency is located in Quadrant III with number of leading sector 4. Serious attention from local government to improve the regional economy in Belu Regency to rise in quadrant II and I. The regencies that are in Quadrant II that have not had leading sector that is Sikka, West Manggarai and north of middle Timor.

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