Spatial pattern of industrial region development in Sidoharjo Sub-district, Sragen Regency

Ghesa Meilinda Rachmawati and Dewi Susiloningtyas
Department of Geography, Faculty of Mathematics and Natural Science, Universitas Indonesia, Kampus UI Depok, Depok 16424, Indonesia
E-mail: ghesamr@gmail.com

Abstract. The industrial sector is one of the main regional income and is the pre-eminent sector of Sragen regency especially Sidoharjo Sub-district which has increased in recent years. Regional development is required to pay attention to its leading sectors based on its potential to bring benefits to the region. The purpose of this research is to understand the pattern of spatial industrial development through the direction of industrial area development in Sidoharjo Sub-district based on its market orientation and the impact of industrial development on employment and income generation. The method used in this research is quantitative method and descriptive method of spatial. The result of research shows the development of industrial area in Sidoharjo Sub-district based on the orientation of its market area where the impact of industrial development absorbs the workforce from around industrial area. Textile industry oriented to local market and international market which have high level of employment. The international market-oriented apparel industry has a moderate rate of employment. The regional-oriented food industry has a low rate of employment. The national market-oriented processing industry has a low rate of employment.

Keywords. Regional Development; Industrial Region; Sidoharjo Sub-district; Spatial Pattern.

1. Introduction

Indonesia's development has a tendency on sectoral development based [1]. Development sectorally, especially in industrial sector. Gross Regional Domestic Income (PDRB) of Sidoharjo Sub-district gets the largest regional revenue and tends to increase from the industrial sector to sustain development in Sidoharjo Sub-district to become the leading sector of local government in terms of regional income. Sidoharjo Sub-district is one of potential industrial region, viewed from the trend of revenue of Sidoharjo Sub-district in 2014 until 2015 tends to increase the previous trend of Rp. 2,271,119,000,000 to Rp. 2,601,222,000,000 in the industrial sector to become the leading sector of local government in terms of regional revenue, according to the BPS of Sragen Regency [3].
The development has tremendous impact on public welfare, its reflect on Adebayo and Olawande statement that the purpose of industrial development of any region though is to provide opportunities of better living and employment to the people, the possibilities of adverse effects on the environment also increased if their adverse effects are not properly contained or reduced to minimum [4].

The research question consists of (1) how the direction of industrial area development in Sidoharjo sub-district is based on its market orientation, and (2) how the spatial pattern of industrial estate development in Sidoharjo Sub-district in the absorption of labor affecting income increase in Sidoharjo Sub-district. This study aims to answer the research question is to know the pattern of industrial development spatially through the direction of the development of industrial areas in Sidoharjo Sub-district based on market orientation and the impact of industrial development on employment and income generation. The industry discussed in this study is a large industry, according to the number of its workforce totaling more than 100 workers. In conducting this study, the authors use this diagram of thinking described in the figure below:

![Diagram of thinking](image)

**Figure 1.** Diagram of thinking.

2. **Sidoharjo Sub-district**

2.1. **Administration of Sidoharjo Sub-district**

Sidoharjo Sub-district is one of the sub-districts in Sragen Regency, Central Java that has potential region in industrial development. Location of Sidoharjo Sub-district between 7°22'30" S – 7°26'30" S and 110°55'30" E – 111°0'30" E. Sidoharjo Sub-district borders with other areas,

- Northern part is bordered by Tanon Sub-district, Sukodono Sub-district, and Gesi Sub-district.
- The southern part is bordered by Karangmalang Sub-district, and part of Masaran Sub-district.
- The eastern part is bordered by Sragen Sub-district.
- The western part is bordered by Plupuh Sub-district, and part of Masaran Sub-district.

Sidoharjo Sub-district administration is divided into 12 villages, 133 dukuh, 24 Rukun Warga (RW), and 317 Rukun Tetangga (RT) with an overall area of 4,589 Ha. The villages are Bentak Village, Purwosuman Village, Patihan Village, Duyungan Village, Jetak Village, Sidoharjo Village, Singopadu Village, Jambanan Village, Taraman Village, Tenggak Village,
Sribit Village, and Pandak Village. The topographic condition of Sidoharjo Sub-district is at an altitude of 86 m above sea level and relatively flat.

2.2. Industry in Sidoharjo Sub-district

The industrial region in Sidoharjo Sub-district currently consists of 9 industrial companies spread in the southern part of Sidoharjo Sub-district. First industry that established in Sidoharjo Sub-district is PT. Bumi Angkasa Textile Industries which is a textile industry by its kind was established in 1983 and located in Purwosuman Village precisely which is currently as PT. Bintang Asahi Textile Industries. The industries are divided into 4 types of large industries, consists of apparel industry, textile industry, processing industry, and food industry.

3. Industrial Location Theory

Krugman explain the definition of core-periphery to simply explain about basic of new economic geography as “…a core-periphery pattern, defined as one where all manufacturing is located in the core and all agricultural production is located in the periphery, is sustainable with some combination of (1) large internal economic of scale, (2) low transportation costs, and/or (3) a large share of the regional population that is employed in manufacturing.”[6]. Krugman explain how the region keep the existence in international trade by “… allows countries to specialized in producing narrower ranges of goods, giving them greater efficiencies of large-scale production.”[5]. Krugman also explain the region benefits in international trade as trade provides benefits by allowing countries to export goods whose production makes relatively heavy use of resources that are locally abundant while importing goods whose production makes heavy use of resources that are locally scarce [2].

4. Methods

The methods that used in this study are quantitative method and overlay method by using the spatial approach. The data collection stage is divided into primary data collection and secondary data collection whose variables are divided into the distribution of industrial location according to the type of product it produces to see how the industry's orientation is based on markets. The next variable is the change of livelihood and earning improvement. Primary data were obtained by using several methods, such as field survey and interview using questionnaires to obtain primary data. Secondary data is obtained by using referral data, such as previous research and obtained from institutions or related industrial companies. Spatial descriptive analysis is used in this study to understand the development of industrial region by analyzing the development of industrial orientation based on their market region. Spatial descriptive analysis is used in this study also to understand the labor absorption that has impact on livelihood changes.

5. Result and Discussion

5.1. Industrial Region Development Based on Market Orientation

The direction of industrial development is based on its market orientation because in fact, according to Krugman's theory describes the establishment of industry in an area whose distribution is based on the ease of reaching the market area for the fulfillment of market demand. Krugman's theory explains how industrial locations do not always spread evenly in the market area. The results showed that large industries in the study area had different market areas based on orientation according to the type of product they produced.

5.1.1. Industrial Region Development Based on Local Market Orientation
Industrial development is based on local market orientation in this case is the development of textile industry type which has local market. Most of the market area of the textile industry is a local market area which is a type of industry that moves above its level or above its subgroup. The direction of the development of the textile industry with the orientation of the local market, which will lead to its market region is in accordance with that described on the directional map of the development of the textile industry.

5.1.2. Industrial Region Development Based on Regional Market Orientation

Regional market areas cover all areas restricted by the administrative boundaries of Central Java Province. Industries that have a regional market orientation in the development of the industry is the food industry. Food industry products that require a short time in the distribution of goods to the market because of the nature of its products that are not durable make the food industry has a tendency to have the same market area with the industrial area.

5.1.3. Industrial Region Development Based on National Market Orientation

The national market territory covers all market territories within the Republic of Indonesia border and is limited by the borders of the Unitary State of the Republic of Indonesia. The broader national market is in comparison with the local market and regional markets that make the cost of distributing goods will increase. The market type of manufacturing industry based on its market area is the national market. Development of the processing industry oriented to the national market so as to require good access in marketing its products.

5.1.4. Industrial Region Development Based on International Market Orientation

International market territories cover all areas that are not within national, regional or local market territories, and are outside the boundaries of the Republic of Indonesia border. International market territories can be reached by exporting industrial products to those markets. The garment industry markets 100% of its products exported to foreign countries so that this type of industrial market belongs to the international market.
5.2. Industrial Region Development Impact on Labor Absorption

Industrial developments have an impact on labor absorption that affects changes in the livelihoods of nearby populations. Respondents working in the industrial sector in Sidoharjo Sub-district's industrial district generally experienced a livelihood change of 98% and those without livelihood changes by 2%. The employment of each industry based on graph 4.2.1 illustrates 59% of total respondents work in textile industry, 28% of respondents work in the clothing industry, 8% respondents work on the food industry, and 5% of total respondents work in industries with the type of processing industry.

5.3. Industrial Region Development Impact on Earning Improvement

The transition of livelihoods has an impact on the increase in revenues. Increased low income, mostly occurred in respondents in this case industrial workers who have a previous livelihood
of construction workers amounted to 86.67%. Revenue increase is occurring in 95.45% of industrial workers who previously worked as farmers. Meanwhile, the high income increase is experienced by all industrial workers who formerly as unemployed.

Table 1 Industrial impact on labor absorption and earning improvement

| Livelihood            | Low (Rp. 500.000) | Moderate (Rp. 500.001 – Rp. 1,000.000) | High (> Rp. 1,000.001) |
|-----------------------|-------------------|----------------------------------------|-----------------------|
| Construction Workers  | 13 (86.67%)       | -                                      | -                     |
| Industrial workers in Karanganyar | 2 (13.33%)       | -                                      | -                     |
| Unemployment          | -                 | -                                      | 62 (100%)             |
| Farmer                | -                 | 21 (95.45%)                            | -                     |
| Carpenter             | -                 | -                                      | 1 (4.54%)             |
| Total                 | 15 (100%)         | 22 (100%)                              | 62 (100%)             |

Source: Data processing, 2017.

5.4. Spatial Pattern of Industrial Region Development

The development of industrial areas consisting of various types of industries, will have a direction of each type of industry based on its market area range and the different impacts of each type of industry. Regional development is based on industries located in the region through its development direction according to the market area based on minimal production cost efficiency.

Types of textile industries with local market orientation and local-international market orientation, have an impact on moderate to high employment. The textile industry absorbs labor that is predominantly dominated in the radius of 501 m to 1000 m, with the dominance of livelihood changes largely unemployed. The change of livelihoods into textile industry workers increases income ranging from < Rp. 500,000 to > Rp. 1,000,000 where most of the high income increase of more than Rp. 1,000,000 based on previous livelihoods are largely unemployed.

The international market-oriented apparel industry absorbs a moderate to low labor force ranging from a radius of 500 m to > 1001 m with predominant livelihood dominance is
unemployment. The national market-oriented processing industry absorbs low labor in the area > 1001 m from industrial sites with the dominant livelihood of most unemployed and construction workers. These changes increase incomes that are mostly included in the high increase. Food industries that cross regional markets absorb the low labor force spread across the region and increase moderate to high income.

6. Conclusion

The direction of industrial development is based on the orientation of its market territory by type of industry. Differences in market areas are based on the presence of product specialization produced by each type of industry which has its respective market area. The spatial pattern of industrial area development through the developmental direction that describes its impact on the absorption of labor of each industry in it by its kind that there is mobilization of labor to industrial area. Employment absorption leads to changes in livelihoods to industrial labor, which has an impact on income generation.

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