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**РАЗВИТИЕ РЫНКА ТРУДА КРУПНЕЙШИХ ГОРОДОВ В УСЛОВИЯХ
ДЕМОГРАФИЧЕСКОГО ПЕРЕХОДА**

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INTRODUCTION

Relevance of the research topic. Digital technology's emergence is becoming an incentive for economic transformation, inevitably leading to new imbalances in the labor market. These trends are most pronounced in the largest cities, where economic activity and labor resources are concentrated. On the one hand, the largest cities' high-density labor market has several advantages: a wage supplement, high labor productivity, knowledge-free flow, economic concentration, etc. Regional labor concentration leads to economic growth, improved social welfare due to high wages and a stable economy. On the other hand, tight labor markets also have opposing sides. Thus, density generates such negative factors as poverty and inequality.

Furthermore, suppose the economically most developed countries are forced to overcome the consequences of high-density urban labor market formation in the face of negative demographic dynamics and a reduction in the share of young people in the workforce. Then in countries with emerging markets, the situation is precisely the opposite. Here, the high-density labor markets of the largest cities are formed in conditions of population growth (primarily youth) and accelerated urbanization. Thus, according to Bappenas's¹ forecasts for 2030, Indonesia's labor supply will increase due to the demographic dividend and the major population concentrated in cities. It is predicted that by 2030, the share of young people in the workforce will be 34.26% (69.130 thousand people). The share of the population living in cities will increase to 63.4%.

Thus, the imbalance of supply and demand in the Indonesian labor market is caused by demographic factors specific to emerging market countries and urbanization acceleration. The consequence of these imbalances is the formation of an excess of young labor with low-skilled resources in urban agglomerations and their shortage in rural areas. Therefore, it is essential to study the phenomenon of high-density labor markets in the largest cities to prevent unemployment and stimulate sustainable

¹URL: https://perpustakaan.bappenas.go.id/e-library/file_upload/koleksi/migrasi-data-publikasi/file/Policy_Paper/Proyeksi_Penduduk_Indonesia_2010-2035.pdf (Date of access: 04.04.2021)

economic growth. Scientific-based regulatory measures are needed to achieve a balance in the labor market. However, despite the high relevance and practical significance, this issue has to receive significant reflection in scientific research and discussions about state policy priorities.

The circumstances mentioned earlier actualize the scientific and practical search on the issues under consideration, the development of theoretical, methodological, and managerial solutions aimed at improving the effectiveness of state regulation regarding the labor market, preventing increasing demographic and spatial imbalances in the employment structure of the population.

The degree of scientific problem elaboration. The requirement to reduce structural imbalances in the labor market determines the high interest in studying this issue. Necessary for the conducted research are works that indicate how the demographic transition affects economic growth. For example, Galor O. [1] remarked that significant transitions in per capita income accompanied demographic shifts in Western European countries. Preston S.H. and Donaldson P. [2], using the example of Bangladesh, northern India, Africa, and pre-industrial Europe, proved that a large population is usually associated with lower agricultural productivity or decreasing returns. On the contrary, Singh A.K. [3] argued that there are multidirectional trends. Population and economic growth can go hand in hand, as in China and India, or be accompanied by increased poverty and misery, as in some Latin American and African countries.

Research is being developed to study the impact of premium wages in a city on increasing the labor market density in densely populated areas. It is noted that workers receive higher wages in a more capacious urban labor market, about 33-50% higher than outside the urban zone (Gould E.D., Berlingieri F., Glaeser E.L., Maré D.C., Halfdanarson B. et al.). This term, in turn, stimulates labor productivity, attracts highly skilled labor, and explains why firms are not relocated to rural areas (Ciccone A., Hall R.E., Glaeser E.L., Puga D., Wheaton W.C., Lewis M.J., Halfdanarson B., Glaeser E.L., Maré D.C., Gould E.D., Di Addario S., Pattuchini E., Berlingieri F., Roumasset

J.R., Smith J., de la Roca J., Hofmann A., Wan G., Nathanson C.G., Moreno E.L., Ludovic J., Duranton G. et al.).

The dependences of the peculiarities of the wage distribution within the single urban labor market are revealed. The distribution position also considers the wage level, although the workers are located in a similar area. The worker's hourly wage living in megacities and the peak distribution is double that of the worker located in the metropolitan but at the bottom distribution (Gould E.D., Berlingieri F., Glaeser E.L., Moretti E.).

Several studies have analyzed the dependence of wage growth and labor productivity on spatial localization and the accumulation scale of labor in the territory. In this case, human capital may be “overabundance” (Ciccone A., Hall R.E., Glaeser E.L., Maré D.C., Glaeser E.L., Puga D., Wheaton W.C., Lewis M.J., Halfdanarson B. et al.). It is proved that productivity can be influenced by the educated people concentrated or a high level of human capital (Duranton G., Puga D., Combes P., Glaeser E.L., de la Roca J., Cortright J.). In an area with high human capital, wages are rising due to constant investments in education and training (Rauch F., Combes P., Duranton G., Puga D., Lee C., de la Roca J., Puga D.). Some researchers argue that the population concentration with a high proportion of well-educated labor force in a particular area can contribute to the economic development of this territory (Glaeser E.L., Maré D.C., Cortright J., Matano A., Naticchioni P., Resseger M.G., Duranton G., Puga D.). Thus, the knowledge flow or the concentration of knowledge carriers in a particular region is often fundamental to local productivity due to the positive correlation between human capital and economic growth (Cortright J., Glaeser E.L., Mare D.C., Glaeser E.L., Resseger M.G., Duranton G., Puga D.). As a result, a person who lives in regions with greater educated people gathered earns more on average due to higher productivity due to the rapid exchange of ideas and knowledge.

However, the opportunities available in a large city to compensate for the higher cost of living are only stimulating for some workers. Many refuse to move, and leads to poverty and inequality (Mincer J., Borjas G.L., Katz L.F., Moretti E., Dotti N.F., Nisic N. et al.). Thus, the negative consequences of high population density in large

cities are complex, including economic (poverty, inequality, costly housing), climatic (pollution, scarcer green space), social (high crowding and crime), and transport (traffic jams, heavy traffic) (Roumasset J.R., Smith J., Glaeser E.L., Resseger M.G., Tobio K., de la Roca J., Puga D., Hofmann A., Wan G., Glaeser E.L., Nathanson C.G., Moreno E.L., Ludovic J., Duranton G., Puga D. et al.). At the same time, the issues related to the specific analysis of the labor market development in the demographic transition context, the peculiarities of the labor markets functioning in the largest cities, and the employment policies formed to mitigate emerging imbalances still need to be studied.

The relevance of the topic and the insufficient elaboration of theoretical and methodological approaches and methods for studying the labor markets development problems in the largest cities with demographic transition conditions experienced by emerging countries predetermined the choice of the research topic were the basis for setting its goals and tasks, choosing the dissertation's object and subject.

The purpose and objectives of the study. The dissertation research aims to develop theoretical and methodological approaches to the analysis and scenario forecasting of the labor markets development in the biggest cities characterized by an increasing surplus of specific labor categories. To achieve this goal, the following tasks have been set and solved in the study:

1. To clarify the conceptual and categorical apparatus and to substantiate the theoretical and methodological approach to studying high-density labor markets of the largest cities in the demographic transition.
2. To develop a methodology for analyzing labor markets to assess the advantages and disadvantages of labor concentration in the largest cities.
3. To identify trends, specifics, and problems of the labor market development in the largest cities of Indonesia: Jakarta and Surabaya.
4. To develop forecast scenarios for the development of disproportionate labor markets, considering the largest cities' characteristics, the specifics of the demographic situation, and the spatial concentration of human capital.

The object of the study. The object of the study is the labor markets of the largest cities in the demographic transition conditions.

The subject of the study. The totality of socio-economic relations arising in the functioning and regulating the labor market development in the largest cities with an increasing surplus of specific workers categories.

The research polygon. The cities of Jakarta and Surabaya. These are the two largest cities in Indonesia. The Jakarta population as of 01.01.2022 was 11.075 million people, and the Surabaya population was 3.005 million people. Labor markets are considered within the boundaries of urban agglomerations, the allocation of which is carried out by the state statistics authorities of Indonesia.

Research area. The study was conducted within the framework of the scientific specialty 5.2.3. – Regional and sectoral economy (population economy and labor economy):

8.7. Spatial settlement of the population. Ethno-regional peculiarities of population reproduction. Processes of urbanization and deurbanization.

8.14. Labor market, its functioning, and development. Employment of the population. Unemployment. Mobility in the labor market.

Methodology and research methods. The thesis uses methodological provisions of the theories of labor economics, urbanization, human capital, demographic transition, spatial and regional economics, as well as the results of fundamental and applied research of labor markets and employment policy in highly urbanized economically active areas. General scientific methods of analysis and synthesis, system and comparative analysis, induction and deduction, and scientific abstraction were used to substantiate the results obtained during the study. The main quantitative research methods include regression analysis and spatial correlation. Microsoft Excel, GeoDa, and STATA 15 software products were used for the examination.

The information basis of the dissertation. The information base of the study is the official statistical data of Statistics Indonesia (Badan Pusat Statistik-hereinafter BPS). The individual characteristics of the labor force are obtained during a particular study of the labor market, namely the “National Labor Force Survey” (SAKERNAS) conducted by the BPS. SAKERNAS microdata includes employment data in terms of

such parameters as employment opportunities, education, job type, employment status, number of hours worked, unemployment, underemployment, etc. These data are used to analyze the nature of work and the education level. Macro data at the national level, such as population, working-age workforce, and poverty level, are formed based on BPS macro-data. The minimum wage data are obtained from official materials published by local governments.

The scientific novelty of the research. The scientific novelty of the dissertation research consists in the development of the theoretical and methodological provision for the urban labor markets study in the context of demographic transition, expanding scientific ideas about the mutual influence of urbanization and employment, and increasing the effective regulation of labor supply and demand imbalances of specific workers categories.

The provisions of the dissertation work submitted for defense:

1. A theoretical and methodological approach to the study of high-density labor markets in the largest cities is substantiated, which comprehensively reflects the specifics of a high-density economic space in conditions of demographic transition: the importance of labor market density for the development of the national economy; the presence of a demographic dividend in the form of an excess of capable young workers; the active flow of poorly educated and unskilled labor to cities; city "surcharge" to wages; growing differentiation in the level of remuneration and labor productivity both in urban and rural areas and within the boundaries of the urban labor market (p.8.7 and p.8.14).

2. A methodology has been developed for analyzing urban labor markets, which makes it possible to study the influence on labor productivity at the citywide level, on the one hand, the specific factors characterizing the labor force, and on the other hand, factors indicating the economy of the largest city in whose space the labor market operates. It is shown that the flow of labor, on the one hand, leads to increased efficiency and productivity, as well as to the growth of the city's economy; on the other hand, it provokes an increase in poverty and inequality (p.8.14).

3. Trends and problems in the labor markets development in the largest cities of Indonesia, Jakarta and Surabaya, have been identified, reflecting the specific relationships between the city's population, wages, labor productivity, poverty and inequality, and individual characteristics of workers, such as education, age, sector of employment (p. 8.14).

4. Scenarios for the development of disproportionate labor markets have been developed, taking into account the characteristics of the largest cities, the specifics of the demographic situation, and the spatial concentration of human capital, making it possible to increase the efficiency of labor market regulation through the interconnection of measures in the field of regulation of urbanization processes, income policy and education policy (p.8.14).

The theoretical and practical significance of the study is to substantiate the approach to the analysis of high-density labor markets in large cities with an excess of specific labor categories, to clarify ideas about the specifics of the labor markets functioning in the demographic transition, to assess the complex consequences of labor concentration in the largest cities.

The results obtained can be used by authorities at various levels, whose functions include forecasting and regulating the processes of urbanization, labor markets, and urban development. They will also be necessary for implementing student training programs in “Economics” and “State and Municipal Administration”.

Subsequently, the results presented in the dissertation can be used for further fundamental research fields in labor economics, sustainable development, and spatial economics and for the applied study of the processes of managing labor market development in highly urbanized territories.

Degree of reliability. The reliability of the study results is confirmed by the use of theoretical and statistical information obtained from reliable sources, the research results by scientists working in the labor economics sphere, using a wide range of research methods: general scientific methods, economic and mathematical methods and procedures for analyzing data obtained from relevant and reliable sources; positive approbation of the study results.

Approbation of the results. The main provisions of the dissertation research are presented at scientific and practical events held in Russia, Indonesia, and China, including the symposium “One Belt and One Road” at Harbin Polytechnic Institute, 2018 (Harbin, China), the XIV and XV International Conference “Russian Regions in the focus of Change, 2019; 2020”, (Yekaterinburg, Russia), “1st Conference on Sustainable Development: the Industrial Future of Territories, IFT 2020”, (Yekaterinburg, Russia), 1st International Conference on Engineering and Management in the Industrial System (ICOEMIS) 2019, (Malang, Indonesia), The 3rd International Research Conference on Economics and Business (IRCEB) 2019, (Malang, Indonesia), and the International Conference on Economics, Business, and Economic Education, Science (ICE-BEES) 2019, (Semarang, Indonesia).

Publication of Dissertation Research. The main provisions of the dissertation research were published in 9 scientific publications including 4 articles published in peer-reviewed scientific journals, included in the list of the Higher Attestation Commission of the Russian Federation and the Attestation Council of UrFU, including 2 articles published in the journals indexed in the international Scopus database.

The total volume of publications is 9.09 printed sheets, including 6.22 author's printed sheets.

The personal contribution of the candidate is to substantiate the theoretical and methodological approach to the labor market study in the largest cities, which comprehensively reflects the specifics of the demographic transition; development and testing of a procedure for the urban labor markets analysis and assessment based on the treatment of the author's regression functions configuration; recommendations development to improve the labor market regulation effectiveness by linking measures in the regulation field of urbanization processes, income policy, and education policy.

Dissertation Structure. The structure of the dissertation work consists of an introduction, three chapters, a conclusion, and a bibliography of 175 titles. The main content of the thesis is presented on 162 pages and includes 19 figures and 21 tables.

The introduction substantiates the relevance of the topic, gives a characteristic of the labor market structure in Indonesia, and defines the goal and objectives,

theoretical and methodological foundations, the novelty of this research and practical significance.

In **the first chapter** “Theoretical Foundations of Local Labor Market and National Economy” identify the development and trend of labor market in Indonesia and clarify why Indonesia is an essential country, particularly in South-east Asia region. Briefly view of relationship of labor market and city in Indonesia, particularly in two megacities, namely Jakarta and Surabaya. Also, the possibilities relation between labor density, urban premium wages and knowledge spillover to ensuring the sustainable economy in those megacities.

In **the second chapter** “Forms of Interaction between Factors of the Labor Market: Methodological Aspects of the Analysis” formulates methodological principles for role of labor market on productivity in urban area; a methodological for assessing the significance of wage in urban to labor market, productivity and other impacts such as knowledge spillover, poverty and inequality.

In **the third chapter** “Urbanization and Local Labor in Indonesia” explains the condition of two metropolitans in Indonesia. Moreover, elaborate the connection between variables that related to labor market in urban area. Furthermore, the relation between the findings and the Indonesia’s policy regarding labor market.

The conclusion formulates the main findings and results of the study.

Chapter 1. THEORETICAL FOUNDATIONS OF LOCAL LABOR MARKET AND NATIONAL ECONOMIC

ASEAN is one of the calculated geopolitical blocs and the fastest growing economic region in the world [35]. The ASEAN land territory is 4,493,515.64 km² with 649.1 million inhabitants. In the global value chain, ASEAN ranks fourth after the EU, China, and the US in global goods trade with a share of 7.2% and 6.8% share in global service trade². Based on table 1.1, the nominal GDP of ASEAN is 2,986.4 billion USD and put ASEAN in the fifth rank in the world. Moreover, the position and nominal GDP of ASEAN make it attractive to investors, inevitable FDI inflows of ASEAN is ranked third in the world with a value of 154.7 billion USD or accounted for 11.9% in the global share (see table 1.1). On the population side, ASEAN is also facing a transition demographic structure [40]. Therefore, ASEAN has become one of the vigorous economic regions in the world.

Table 1.1 – The economic situation in ASEAN³

Indicator	Rank		Value (USD billion)		Global Share (%)	
	2015	2018	2015	2018	2015	2018
Nominal GDP	5	5	2,455.6	2,986.4	3.3	3.5
Trade in goods	4	4	2,727.9	2,817.4	6.8	7.2
Trade in services	4	4	640.2	778.6	6.5	6.8
FDI inflows	5	3	118.7	154.7	5.8	11.9
FDI outflows	8	6	69.6	69.6	4.1	6.9

Notwithstanding, ASEAN's economy is led by several countries- Indonesia, Malaysia, Thailand, Singapore and the Philippines- with the share of ASEAN more than 10% (see table 1.2). Indonesia has become one of the vast contributors to ASEAN's economy, although they are facing several problems, such as a tremendously populated country with more than 10% of people living below the poverty line. This

² URL: <https://asean.org/storage/2019/11/ASEAN-integration-report-2019.pdf> (Date of access: 04.04.2022).

³ URL: <https://asean.org/storage/2019/11/ASEAN-integration-report-2019.pdf> (Date of access: 04.04.2021)

situation is better compared with Philippines that have more than 20% of society live in poverty. Further, Indonesia experienced astounding physical growth and population for several years to providing their economic. Undoubtedly, this condition is boosting by the big cities in Indonesia. Unavoidably, cities have a main position in encouraging the country's economic growth. Hence, Glaeser and Xiong [41], in their work regarding cities in developing countries, concluded that urbanization continues to appear at growingly high-speed rates in developing countries.

Table 1.2 – Condition of GDP, Population and Poverty in ASEAN²⁴

Country	Nominal GDP, USD billion	Share to ASEAN, %	Total Population	Poverty at national poverty line, %
Indonesia	1,041.6	34.9	267,663,435	10.6
Thailand	505.1	16.9	69,428,524	8.6
Singapore	364.1	12.2	5,638,676	-
Malaysia	358.4	12	31,528,585	0.4a2015
Philippines	342.7	11.5	106,651,922	21.6
Vietnam	241	8.1	95,540,395	9.8
Myanmar	77.3	2.6	53,708,395	32.1
Cambodia	24.6	0.8	16,249,798	17.7
Lao PDR	18.1	0.6	7,061,507	23.4
Brunei Darussalam	13.6	0.5	428,962	-

Moreover, Combes, et al. [24] and Lee, et al. [30] argued that the importance of population density has an impact on the localization economy and the urbanization economy. World Bank (2016) proclaimed that quickly Indonesia urbanized and eventually till the mid-term. Moreover, Indonesia's population prognosticated will approximately 67.5% of them live in urban areas by 2025. Urbanization in Indonesia rises across the country at varying rates, although Java island still dominated. Admittedly, Java leads Indonesia's economy with Jakarta as a pivot of all activities.

⁴ URL: <https://databank.worldbank.org/indicator/SI.POV.NAHC/1ff4a498/Popular-Indicators>
http://hdr.undp.org/en/2019-MPI?fbclid=IwAR2_9vYHaF5_ZPhGYRq6mSMYgXXN85XSV1__D-tNVRQ04MP6n6fwfvGkw6w (Date of access: 15.02.2022)

Notes: Singapore has not adopted an official poverty line or participated in international relative poverty reports such as those of the OECD's, and Brunei doesn't have data of poverty

1.1 The labor market and trends in its development in modern economy

White [42] defined that work is generally considered as inevitable, forced, and essential. Furthermore, Jacobsen and Skillman [43] elaborated work is a human condition fundamental phase, in which the activity utilizing which nature is metamorphosed to fulfill human needs and wants. A person who wants to maximize their wealth will provide more time and effort to work with a higher payoff [44]. The majority of people are interested in paid labor of some form, spend most of their lives working, sacrifices their leisure, and depend on their livelihoods on the income secured through labor [43].

Jacobsen and Skillman [43] defined labor is most adults have or seek compensated work in these economies. White [42] stated that it embraces practically all paid employment, besides person would take on even if unpaid, much house maintenance and housework, child care, shopping, schoolwork, and even activities flowing from being unemployed. Lucassen [45] divided work becomes two, rather its paid or unpaid. Furthermore, Lucassen [45] clearly described if a person works and gets paid with exchanged for a wage or salary called labor. Contrarily, for unpaid work that usually occurs in a domestic context or other unpaid voluntary work. However, Lucassen [45] also restricted the concept of work until those people do not get rich without doing any work. For instance, the international banker, as long as the banker doesn't get rich without doing any work, includes work. Therefore, persons whose willingness sacrificed their time and effort to get remuneration for some activities could create the labor market.

The labor market is no different from other markets, like each market has buyers and sellers. The actor of this market is employers and workers, which the employers are buyers, and the workers are sellers. At a brief time, some of these actors may not be active in looking for new employees or new jobs, yet in the market, many firms and workers will be trying to transact. Ehrenberg and Smith [46] evaluated that employers and workers seek each other throughout the nation; it would define as a national labor market. On the other hand, if both seek locally, the labor market is a local one [46]. Brunetta [47] tracked back to classical economists (Adam Smith, Ricardo, Malthus,

John Stuart Mill) to understanding labor economics concepts' fundamental ideas. Their analysis revealed that the emergence and the beginning of industrial system growth in Great Britain unavoidably indicate the great transformation's contradictions [48].

Ehrenberg and Skillman [46] underlined that the labor market is the mechanism by which workers and jobs are matched. Over a half-century, the number of job types has expanded, and others have contracted. Both employers and workers have had to alter these changes in acknowledgment of the labor market signals shifting. Advancement of technical, production and distribution methods changed to a historically unparalleled accumulation of investment or wealth. Hence, the continual need to reach a re-investable surplus [47]. In his *Wealth of Nations*, Smith noted the necessity of sufficient profit margins to persuade entrepreneurs to carry risks, particularly in capital-intensive sectors. This condition created requisite machinery that assures control over the labor force as the principal factor of production [47].

Likewise, “Economic development with unlimited supplies of labour” by Arthur Lewis [49] about 'surplus labor'. Lewis's economic development depends on the transference of excess labor from the livelihood to the capitalist sector. The volume of worker absorption in the capitalist sector is a limitation by sufficient capital. As there is an unlimited supply of labor at a subsistence wage rate, employment helps assets accumulate in the hands of the capital sector. Lewis concluded that the connection from savings into investment by the capital formation in economic growth occurred only in the capital sector and only through profit [50]. The additional capital accumulated influenced the productivity growth that helps more labor migration from the subsistence to the capital sector. Therefore, the capital sector identically related to urban area as a place that capital accumulated and agglomeration economic activities happen [51,52].

Heretofore, technology advancement has become more remarkable and able to transform the industry, the labor market, the lifestyle, the private sphere, and various aspects. Solow, Ramor, Nelson, and others explained that technological advances accelerate economic growth and productivity, lead to structural changes, and positively impact employment [53,54]. This change leads to shifting the production process from

heavy industry to a new technology-based economy called the new economy or digital economy.

On the other hand, novelty and emerging digital technologies disrupt traditional means of work views and cause a more massive work revolution globally. These impacts are known as disruptive technology proposed by Christensen and Bower. Disruptive technology causes upheaval in existing market structures and dominant companies by being cheaper, simpler, and more comfortable than the dominant technology [55]. The duplication of human abilities, such as thinking and moving, becomes real and capable of digital technologies. Unquestionably, the substitution or complementary of human labor and software or digital machines is able to be fulfilled by firms. Thomson [56] elaborated that the substitution part is by risking the occupation as an impact of digitalization and the complementary part is by increasing the number of tasks.

Historically, in the 1800s, emerging the first Industrial Revolution in Western Europe [57]. This revolution transforms the production activity from muscular to mechanical. Then, mechanical technologies create a big wave in jobs and work. Nowadays, technology development relies on the digital sphere and creates a disruption era in jobs and work [56]. Current studies imply that the lowest education and skill significantly face technology development disruption [8,57,58]. Therefore, the new digital economy's first causality is workers with the lowest education and skill level.

Efficiency and low costs emerging from technological progress will be improving the productivity and output of the firms. Digital technologies are promptly showing their capability to accomplish an expanding number of tasks and jobs. Digital technologies reinforce workforce jeopardy among workers who shortage the financial and social assets demanded for retraining or advanced education. Furthermore, technological advancement leads to decreasing aggregate labor hours in the future, while aggregate demand increases [59,60]. However, this situation has contradictory impacts on labor markets. On the one hand, countries that are dealing with population aging phenomena (such as Japan, Singapore, or Germany) will have other problems

related to the labor market. On the other hand, a country such as Indonesia, which has a demographic bonus is facing other problems, especially the labor market.

This assumption is particularly faithful for Indonesian workers who exemplify the workforce division that is most helpless to work digitization and joblessness. Considering the population, Indonesia is the fourth most populous nation globally, with 264 million people and the third most populous in Asia after India. The continually increasing population can have a generous impact both in social and economic aspects.

In addition, more than 50% Indonesia's workers are located in urban areas due to the urban premium wages in this region. Another situation in Indonesia is experiencing the demographic dividend in the automated digital era. Hence, urban area has the big role of preventing the unemployment and boost the economic growth. In fact, the rising of urban residents has not been balanced with the population's readiness with the percussion situation, education level, and skills that needed in recently era.

Moreover, Indonesia's economic structure has changed considerably. Historically, in the 1950s and 1960s, Indonesia had government policies to promote agricultural self-sufficiency or *swasembada pangan* [61–63]. Thus, the economy started with weighted towards the agricultural sector and achieved this program's result in 1984 [61,62]. Consequently of this policy, historically, most of the employment in Indonesia is a farmer. Meantime, in the late 1960s, a gradual process of industrialization and urbanization began and accelerated. Then, Java was rock stepped for started the industrialization.

Similarly, Lewis' idea, the development of industry in Java, was also followed by farmers who attempted to move to the industrial and urban areas as an agglomerate of industry. Michaels et al. [64] research that structural change from agriculture to non-agriculture inflates inhabitant growth at greater densities with below shares of agriculture workers. Hence, as the result of the localization economy and the urbanization economy followed by population density [24,30]. Duranto and Puga [13] asserted that a dense environment could sustain firms' and workers' productivity, particularly in agglomeration economies spots. The advantages of density for innovation via spillovers are difficult to measure but also considered valuable.

Additionally, positive economic growth is not followed by increased employment opportunities in Indonesia. Based on table 1.4, in 2008, Indonesia's GDP was contributed by the manufacturing industry, agriculture, and trade, hotel, and restaurants. Simultaneously, almost half of the workforce is working in the agricultural field. Next, followed by trade, hotels and restaurants, and the services sector. Manufacturing only contributes 12.19% of the total workforce and slightly less than the services sector. Afterward, in 11 years, manufacturing becomes essential to the Indonesian economy. However, manufacturing could not significantly absorb the workforce. This sector is still inferior to the agriculture and wholesale trade sectors. Hypothetically, Indonesian manufacturing productivity does not depend on labor-intensive but also into capital-intensive, i.e., machines, new technology, digitalization, AI, etc. Eventually, manufacturing sectors move to labor-saving innovation, particularly low-paid jobs [21,65–67]. However, working in the manufacturing sector has become more captivating for the workforce.

Table 1.3 – Population amount, distribution and density in Indonesia by Island, 2010

Rank	Island	Population	Percentage of Population Distribution, %	Density, people/km ²
1	Java	136,563,142	57.49	1,055
2	Sumatera	50,613,947	21.31	105
3	Sulawesi	17,359,398	7.31	92
4	Borneo	13,772,543	5.80	25
5	Bali and Nusa Tenggara	13,067,599	5.50	179
6	Maluku and Papua	6,179,734	2.60	12
	Indonesia	237,556,363	100	124

Source: BPS Population Census (2010)

Unavoidably, Java, as well known as the economic sector leader and concentrated place of manufacturing and other sectors in Indonesia. Therefore, Java is Indonesia's most populated island, with more than 50% or more than 136 million population distribution. Then, Sumatera has a portion of 21.31% or more than 50 million habitats in Indonesia (table 1.3). Likewise, several studies asserted that the concentration of socio-economic activities is also followed by population density

[9,11–13,21,68]. Hence, the processes of agglomeration create workers in density place more high-yielding than their non-urban peers. Ciccone and Hall [14] proved that the density of employment and productivity has a positive relationship. On the other hand, Henderson [69] stated that urban does not have a causal effect on per worker output, and GDP growth is not wholly encouraged by urbanization rate per se. Therefore, it is interesting to understand how the massive density in Java or the vast labor market in Indonesia supports Indonesia's sustainable economic development, particularly, the two metropolitans in Java namely Jakarta and Surabaya.

Indonesia's most populated island is Java, with more than 50% or more than 136 million population distribution. Then, Sumatera with a portion of 21.31% or more than 50 million of habitats in Indonesia. On the density side, Java Island still is the leader with 1,055 people/km² (Table 1.3). The density of Sulawesi and Borneo is smaller than Bali and Nusa Tenggara, while the population amount of those islands is vaster than Bali and Nusa Tenggara. On the grounds that those islands' territory is more massive than Bali and Nusa Tenggara. Simultaneously, the reason for Java becomes the populated island concentrated on socio-economic and government activities. Likewise, Ludovic et al. [12] asserted that the concentration of socio-economic activities is also followed by population density. About 1985, according to Akita [70], around half of Indonesia's economic activities and population are concentrated on Java Island. At that time, the agriculture sector's economic-based agriculture shifted to other areas, such as industrial and services [62,70–72]. For instance, Jakarta, West Java, and East Java are focusing on expansion manufacturing activities [73,74]. Meantime, the increases in labor-intensive and export-oriented manufacturing industries are the main reason for boosting the high growth in Java [74,75]. Resosudarmo and Vidyattama [74] affirmed that the provinces outside of Java are lagging regions marked by per capita income. Maryaningsih et al. [76] also claimed that the Java economic corridor is legitimately dominant amidst other provinces, and Jakarta becomes the center of it. Hence, managing the dense area is an essential matter because it can impact the national economy and society.

Figure 1.1 shows the development of the labor force or labor market situation by the province in Indonesia, which is 2008 the available workforce was over 3.276 million, most of which were on the island of Java and several areas in Sumatra. After 11 years, regions with a high labor force have not changed. In 2008, North Kalimantan did not have data because this area was formed in 2012. However, this area contributed 356,282 to the workforce in 2019. When viewed as a whole, the development of the workforce for 11 years has increased significantly. The lower limit side increased from 344,205 (which is occupied by West Papua as the youngest province) to 356,282, while the upper limit increased from 20,117,245 to 23,835,770. On the supply side of labor, an increase in the labor force indicates workers' potential resources in stimulating economic activity.

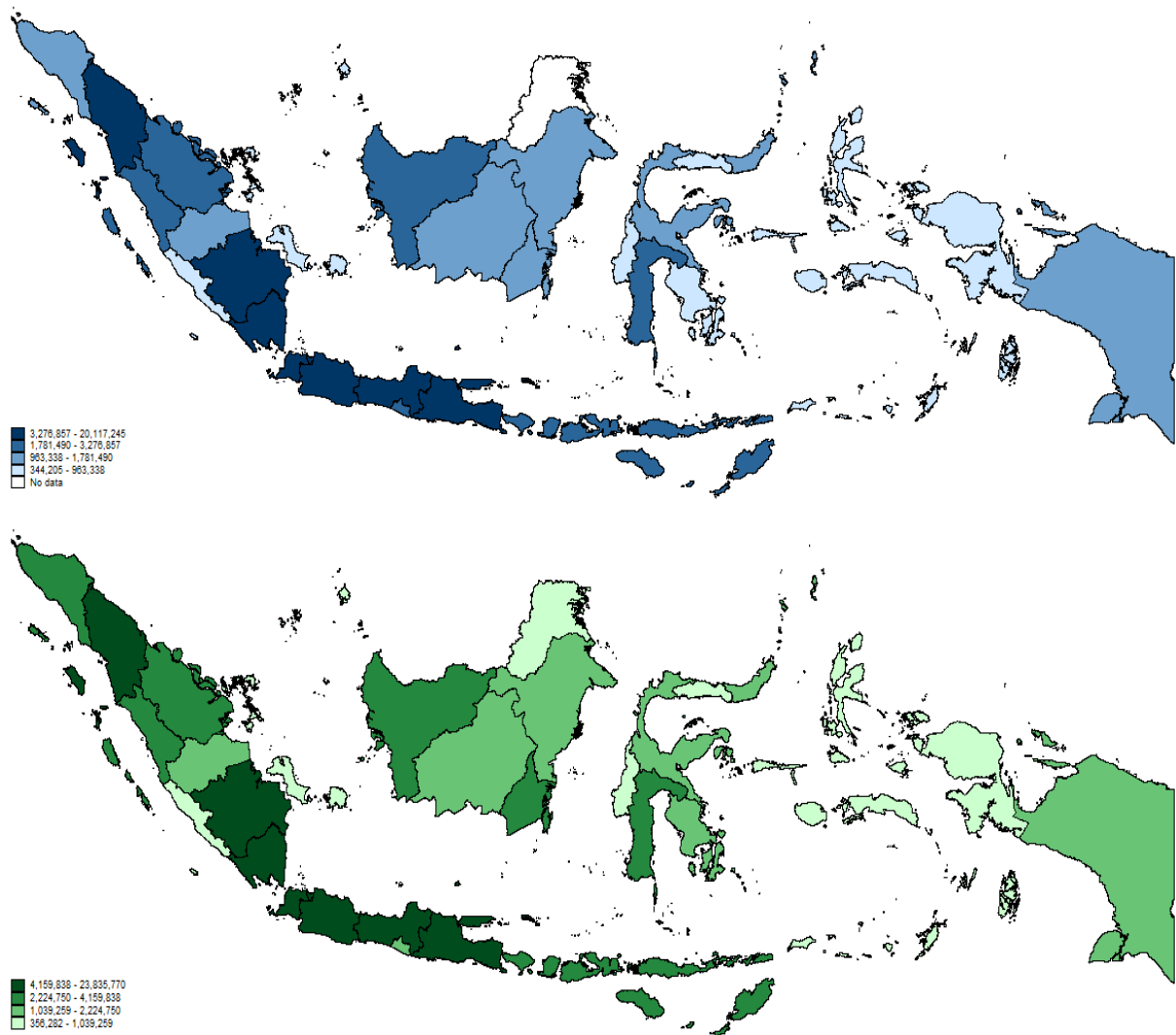


Figure 1.1 Indonesia Labor workforce, 2008-2019
Source: Author's calculation based on BPS, 2020

Table 1.4 – GDP and Workforce, 2008

Sector	2008			
	Billion Rupiahs	%	Workforce	%
Agriculture, Livestock, Forestry, Fishery	284 619.1	13.67	42 689 635	41.83
Mining and Quarrying	172 496.3	8.28	1 062 309	1.04
Manufacturing Industry	557 764.4	26.78	12 440 141	12.19
Electricity, Gas & Water Supply	14 994.4	0.72	207 909	0.20
Construction	131 009.6	6.29	4 733 679	4.64
Trade, Hotel & Restaurants	363 818.2	17.47	20 684 041	20.27
Transport and Communication	165 905.5	7.97	6 013 947	5.89
Finance, Real Estate, Business Services	198 799.6	9.55	1 440 042	1.41
Services	193 049.0	9.27	12 778 154	12.52
Total	2 082 456.1	100.00	102 049 857	100.00

In addition, on the density side, Java Island still is the leader with 1,055 people/km². The density of Sulawesi and Borneo is smaller than Bali and Nusa Tenggara, while the population amount of those islands is vaster than Bali and Nusa Tenggara. Claiming those islands' territory is more massive than Bali and Nusa Tenggara. Meantime, about 1985, according to Akita [70], around half of Indonesia's economic activities and population are concentrated on Java Island. At that time, the economic-based shifted from the agriculture sector to other fields, such as industrial and services [62,70–72]. For instance, Jakarta, West Java, and East Java focused on expansion manufacturing activities [73,74] Meanwhile, the increases in labor-intensive and export-oriented manufacturing industries are the main reason for boosting Java's high growth [74,75]. Resosudarmo and Vidyattama [74] affirmed that the provinces outside of Java are lagging regions marked by per capita income. Maryaningsih et al. [76] also claimed that the Java economic corridor is legitimately dominant amidst other provinces, and Jakarta becomes the center of it. Hypothetically, the population's

density is not only followed by boosting economic activities but also creates inequality between provinces in Indonesia (table 1.4, 1.5).

Table 1.5 – GDP and Workforce, 2019

Sector	2019			
	Billion Rupiahs	%	Workforce	%
Agriculture, Forestry and Fishing	1 354 957	12.37	38 109 196	29.46
Mining and Quarrying	806 206.2	7.36	1 375 035	1.06
Manufacturing	2 276 683	20.79	18 228 162	14.09
Electricity and Gas	111 436.7	1.02	312 261	0.24
Water supply, Sewerage, Waste Management and Remediation Activities	9 005.5	0.08	415 278	0.32
Construction	1 108 425	10.12	7 624 749	5.89
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	1 440,523	13.16	24 468 769	18.91
Transportation and Storage	463 254.8	4.23	5 202 667	4.02
Accommodation and Food Service Activities	333 358.2	3.04	8 796 831	6.80
Information and Communication	589 435.2	5.38	942 258	0.73
Financial and Insurance Activities	443 041.6	4.05	1 784 361	1.38
Real Estate Activities	316 837.1	2.89	337 609	0.26
Business Activities	206 936.2	1.89	1 690 871	1.31
Public Administration and Defence; Compulsory Social Security	365 678.2	3.34	5 148 575	3.98
Education	341 328.5	3.12	6 599 165	5.10
Human Health and Social Work Activities	127 506.6	1.16	1 983 783	1.53
Other Services Activities	204 998.5	1.87	6 346 622	4.91
Total	10 949 244	100.00	129 366 192	100.00

Moreover, several studies asserted that the labor productivity earned by agglomeration across countries is stable, while the length to which these earnings accumulate to labor shows a substantial option [19,20]. In other words, urban density is also followed by expanding innovation and productivity, developing a way to goods

and services, reducing travel times, restoring more energy-efficient constructions and modes of transport, and allowing wider sharing of limited urban facilities [10,13,19,77].

The revolution of density also creates vast hazards such as poverty, inequality, pollution, congestion, more significant congestion and crowding, overpriced floor space for tenants and firms, and rarer green area indicate that density also has disadvantages [13, 16, 19, 68]. Hence, community or labor density is frequently used as a brief statistic to represent the spatial convergence of economic activity. Likewise, the Indonesian population density also showed economic activity concentration, particularly in Java.

On the one hand, this case showed how urbanization creates significant opportunities for Indonesia. On the other hand, urbanization can advance local economic growth and generate echo cities or metropolitan areas. Thus, essential elements in Indonesia's development are urbanization and agglomeration economies. Essentially, World Bank (2011) asserted that Indonesia's urbanization could increase its economic returns. Even though Indonesia experienced each 1% of urban population increase related to 2% GDP per capita growth which less than an average more than 5%⁵. Remarkably, each urbanization and economic growth country's patterns have been unprecedented and unpredictable on a wide range of variables. In the state of Indonesia, an archipelagic territory becomes a vast challenge to connecting growth centers.

At the same time, the issue of labor is one of the government's concerns and added to a large Indonesian population, particularly at the urban level. Several distinct urbanization processes usually form an urban territory. On urban process is based on self-organization and collectivity, includes aspects of illegality, informality, and social struggle, and grows gradually by the steady progression of residences and communities [78]. Unfortunately, the urban process and labor movement to cities create a new area called a slum. 'Slum,' one of the most popular phrases to portray neighborhoods with

⁵ URL:<https://www.worldbank.org/en/news/feature/2016/06/14/indonesia-urban-story> (Date of access: 12.01.2022).

poor living conditions, only represents a substance structure and does not embrace urbanization's progressive aspect. Moreover, it becomes identical with precarity and poverty, and its use has been thoroughly studied for contributing to the marginalization of such areas and veiling the heterogeneity of urban experiences [79–82]. In other words, a combination of urban and tremendous population or employment density is possibly hampering a sustained economy in the metropolitan area.

However, population density becomes one of the significant advantages of the labor market [83,84]. On the demand side, the firms could quickly get the labor that they needed with high qualifications. On the other hand, the household as a supply-side should be struggling with the competition, high-cost living, and congestion in the urban area. Hence, the Indonesian demographic transition and dividend create a massive opportunity for the Indonesian labor market, particularly on the supply side. For making the equilibrium, Indonesia should boost the demand side. If the excess labor supply that occurs will positively impact, it can also be harmful if it is not appropriately managed.

Additionally, since 2001, the appearance of implementation decentralization has had essential connections for the labor market. Provincial governments are now responsible for all policy matters, excluding international relations, justice, national security, religion, national planning, monetary and fiscal, macro policies, state administration, and institutions (Law No. 22/1999). The provincial has a more direct command of policy related to labor or human resource, implying that labor market performance at the regional level depends on local leaders' styles and capabilities [85]. Based on Sugiyarto et al. [85], most of the utmost provincial government insignificant governing human resource or poverty reduction agendas. Moreover, this transition affects the differences in minimum wage setting with a complicated and confusing system. Unsurprisingly, the increasing minimum wage in several provinces has been questionable, despite employer associations suppressing their cooperation from the local wage chambers [85]. They have also not considered the repercussions of inflating user expenses to provide public services in education and health or force various taxes and user prices on businesses inside their regions. Bad judgments given at district levels

may well present the more vulnerable terms of labor market outcomes later. Therefore, the transition of authority could affect the labor market, particularly in urban areas.

Moreover, acknowledging that urbanization is an instrument of sustainability and globalization. Amenities by consumption patterns, investment waves, and urban forms are configured to sustain such flows and schemes. By way of information and knowledge movement, intelligent discussion, and alliances between public institutions, urbanization turns into a globalization agent of values and standards. Consequently, disagreement, competition, and screening in globalization start in urban areas. Diverse global situations and global solidarity are seriously opposed to the globalization of free trade. By the concentration of population in Java, especially in Jakarta, inevitable that Java Island is an important area to create a sustainable economy in Indonesia. Undoubtedly, Maryaningsih et al. [76] claimed that the Java economic corridor is legitimately dominant amidst other provinces, and Jakarta becomes the center of it. Jakarta is Indonesia's capital city, and indeed, Jakarta becomes a tremendously populated area in Indonesia (table 1.6). Thus, Bekasi, Depok, Tangerang, and South Tangerang received the effect of Jakarta's neighborhood. Meantime, other cities have a vast population, and most of them are the capital province. Surabaya is well known as the second biggest city in Indonesia and also the center of transportation, financial, industrial, commercial, and entertainment hub of East Indonesia. Additionally, the Port of Tanjung Perak is Indonesia's second-busiest harbor placed in northern Surabaya. Those reasons create Surabaya to become a populated area.

Table 1.6 – Major Cities in Indonesia (projections for 2018)

Rank	City	City Population	Province
1	Jakarta	10 467 629	Jakarta
2	Bekasi	2 931 897	West Java
3	Surabaya	2 885 555	East Java
4	Bandung	2 503 708	West Java
5	Depok	2 330 333	West Java
6	Tangerang	2 185 304	Banten
7	Medan	2 264 145	North Sumatera
8	Palembang	1 643 488	South Sumatera
9	S. Tangerang	1 696 308	Banten
10	Semarang	1 786 114	Central Java

Notwithstanding, the increasing percentage of urban residents also followed by many facilities such as marvelous public health, transportation, education, etc. Contrarily, rapid growth population, urban and promised facilities in urban areas does not guarantee the population's readiness with the percussion situation, education level, culture, and residence place they choose. Why does this happen? Hypothetically, urban has a negative side, namely, inequality or slum area. Therefore, these reasons can influence labor market conditions in urban areas.

However, urban has its charming for the labor market. Based on the World Bank report, Indonesia's employment in urban areas rose by 45% since 2001, versus 6% growth in rustic areas. Over the last decade, the growth of urban labor continuously outpaced rustic areas. Since 2008, vacancies in urban have been expanding quicker than the working age. Significantly, urbanization has been related to formality's rise, with 72% of jobs formed in metropolitan being formal (World Bank 2013). Statistics Indonesia shows that more than 50% of the workforce is concentrated in urban areas (see Figure 1.2). In 2015-2016 urban employment decreased by around 1.5%, but in 2017 the employment rate increased, and the trend was getting down until 2019. However, this was followed by the unemployment rate fluctuation. In 2016, the urban unemployment rate was decreasing 0.7 from 2015, and in the next year, it was slightly increasing 0.19, aftermath getting down. Hence, hypothetically, urban has a contribution to reducing unemployment. The other assumption is that most of the labor force is migrating to rural areas, causing the high cost of living in urban areas. Furthermore, Figure 1.2 shows the rural area's employment rate decreased only in 2017 by 0.43, and in other years it is increasing by more than 0.5. Next, the unemployment rate in rural is slowly decreasing, except in 2018, that slightly increases. In 2018, the labor force and the rural area's unemployment rate were increased by 0.66% and 0.3%. In other words, most of the labor who migrated the previous year went back to the rural area. Hypothetically, urban areas facing excess labor supply and most abundant people chose to return to the rustic. This phenomenon was shown by the rising employment rate and decreasing unemployment in rustic in 2019. On the one hand, in metropolitan was facing a decrease in employment and unemployment. Hence, the labor market

movement within space persuades the issue regarding the urban high competitiveness, labor's welfare and the urban productivity, particularly in Indonesia.

In details, unemployment in urban area is significantly higher than in rural areas. This situation showed by unemployment rate that unemployment was also concentrated in urban areas, with a higher 2% rate than in rural areas. Meanwhile, the percentage was decreasing since 2015 in rural. This phenomenon pictured the government's rural human empowerment program (*Pemberdayaan Masyarakat Desa*) has a significant impact on reducing unemployment. The gap unemployment between urban and rural broadened over the past four years due to rural unemployment has declined more rapidly than urban unemployment. On the one hand, the simplification for this is that most rural people move to the cities searching for employment opportunities. On the other hand, an assumption is that most people who migrated to the urban area cannot compete with others or face the high competitiveness caused by the low education or skill, moreover exacerbated by high living standards in urban areas. Therefore, an urban area in Indonesia is also facing inequality and poverty threat.

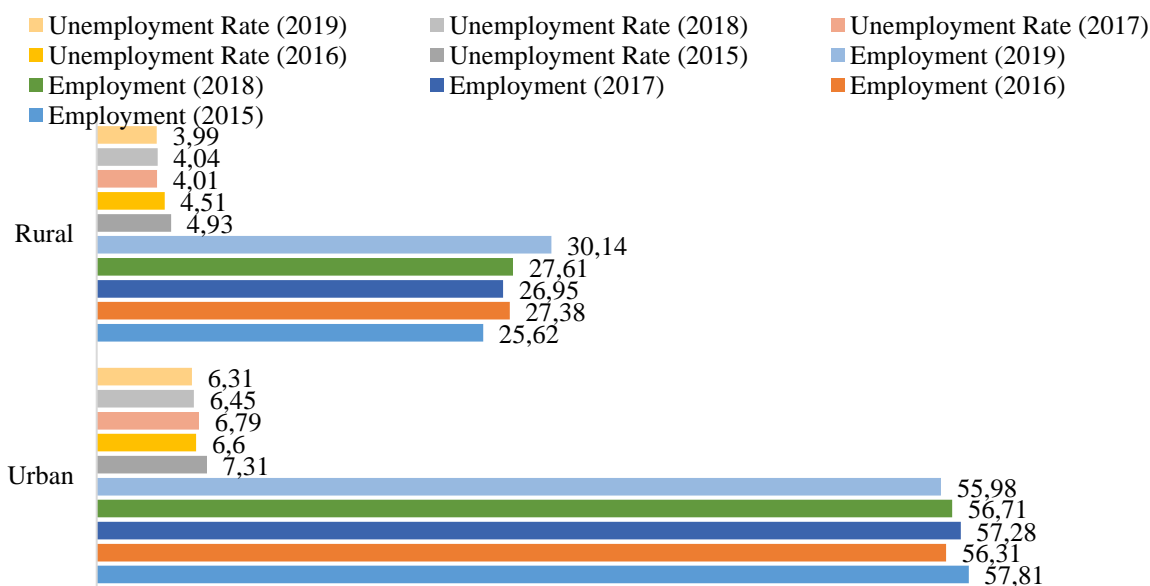


Figure 1.2 Employment and Unemployment Rate in Urban and Rural (2015-2019)

Overall, in the equilibrium view, labor market disparities between areas remain in the long run, and some other regional characteristics compensate for high unemployment. In the disequilibrium view, differences between regions diminish in the long run and might disappear eventually, depending on the adjustment speed. The

equilibrium view focuses on compensation factors, such as wages, amenities, and industrial composition. In contrast, the disequilibrium view draws attention to factors affecting the speed of adjustments, such as the population's age structure and skill composition, employment growth, population density, and housing market structure. Thus, it is inevitable that urban can facilitate the adjustment speed between labor readiness and the developing era to ensure a sustainable economy.

Figure 1.3 shown that the highest HDI in Indonesia is Jakarta by 80.76, but the Gini ratio is 0.399. Meantime, the second-highest HDI is Jogjakarta with 79.99, and unfortunately, the inequality is the highest in Indonesia in Gini ratio of 0.434. Papua has become the lowest HDI in Indonesia, with a value of 60.84 and a Gini ratio is 0.392. Furthermore, the lowest Gini ratio is 0.262 obtained by Kep. Bangka Belitung, while their HDI not really high, around 71.3. Thus, each province in Indonesia has its own uniqueness and factors. Therefore, based on slight data, we can determine that the valuable labor market is concentrated in Jakarta and is also followed by inequality between them.

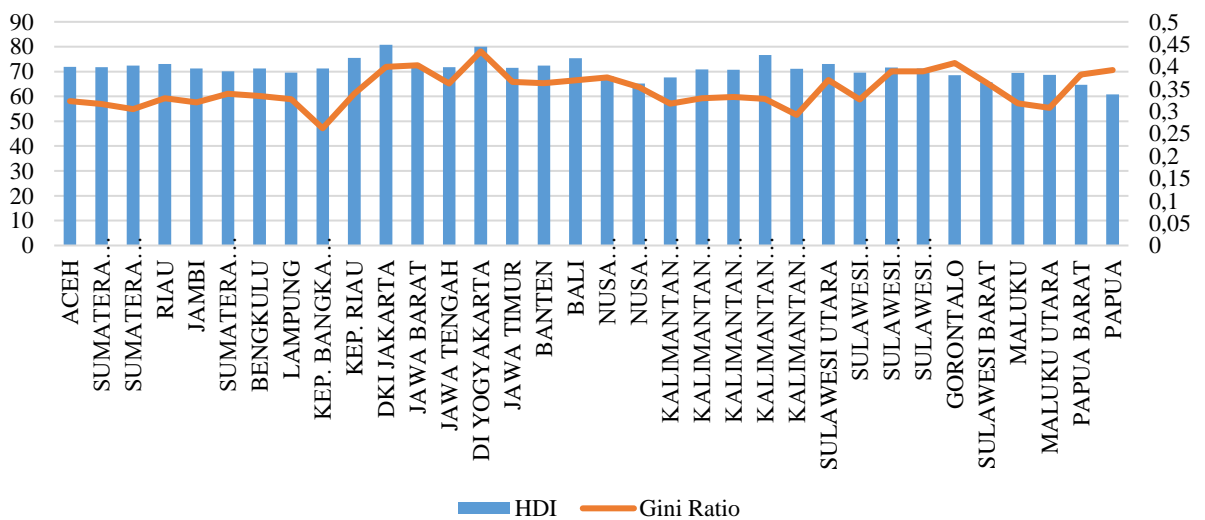


Figure 1.3 HDI and Gini Ratio in Indonesia by Province, 2019

Additionally, Indonesia's demographic conditions are currently undergoing a demographic transition, marked by a decline in birth rates and a decrease in mortality rate (figure 1.4). From figure 1.4 could concluded that the population's ongoing transition slowly changed the Indonesian population's face by shifting the population's

age structure. Thus, figure 1.5 showed the proportion of young people is declining, the ratio of the working-age population is increasing rapidly, and the proportion of the elderly population is moving up slowly. Undoubtedly, Indonesia's current population is relatively young and has a bonus demographic condition. Therefore, the excess labor supply that occurs will have a positive impact, but it can also be harmful if it is not appropriately managed.

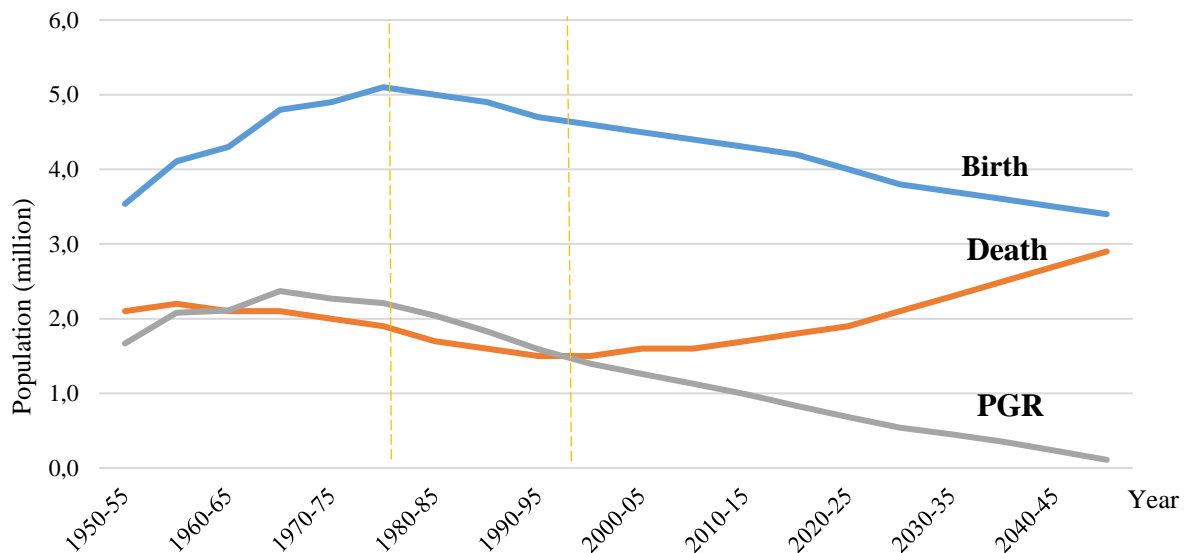


Figure 1.4 Indonesia's Demographic Shifting⁶

Indonesia's demographic dividend could be a misfortune for Indonesia in the automated digital era. This calamity happens whenever human resources have insufficient abilities to support the digital industry and worsen disparity between districts. As we see in Figure 1.4, a demographic transformation of Indonesia was established with the family planning act in 1970 to defeat the growing birth rate. Then, in the continuous years, Indonesia's population growth encountered a downturn trend. Nevertheless, beginning in 1990, the death rate had grown as a result of the rising quantity of older people who died (Figure 1.4). Hence, this situation affecting Indonesia to have high productive age society. Subsequently, in 2020, it is prophesied that people of productive age (15-64) will hit 65% and higher (The Ministry of National

⁶ World Bank Document (2011). URL:

<https://documents1.worldbank.org/curated/en/548511468260133592/pdf/684550ESW0P11900Urbanization0shifts.pdf>
(Date of access: 10.12.2021).

Development Planning – Bappenas, 2017⁷). That time is also referred to as the window opportunity that can boost to improve public welfare and economic development.

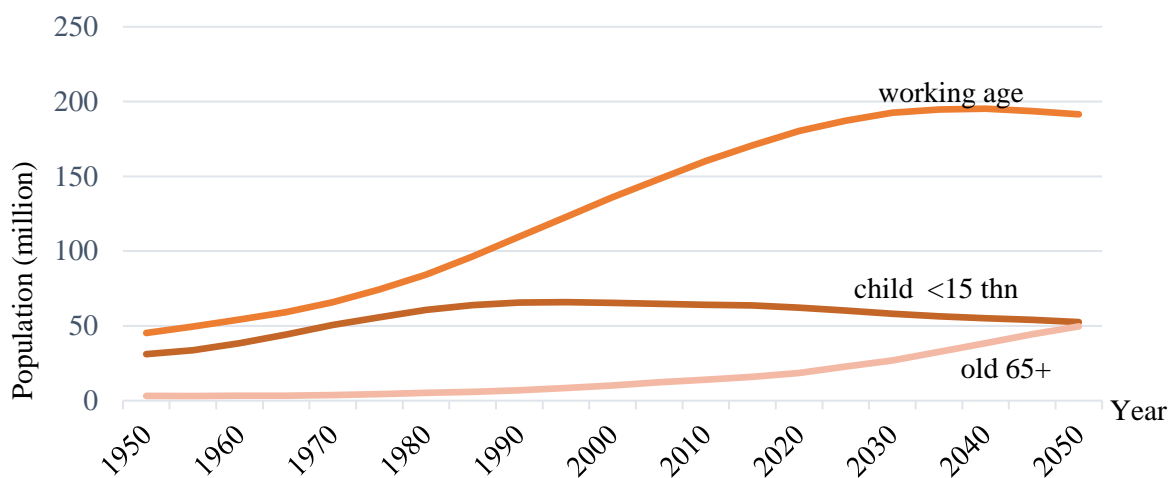


Figure 1.5 Working age, old and children, Indonesia, 1950-2050⁸

Besides, Indonesia will gain generously with a circumstance of 64% of productive age or 190 million out of 297 million of total population (see Figure 1.5). Nevertheless, the overflowing stock of productive-age needs symmetry with improved capabilities such as skills and education, including its connection with an openness of the labor market. Considering that Indonesia unmanaged these sources, the demographic dividend can twist become a hazard by producing technological unemployment [172]. This circumstance was realized by various economists such as Keynes, Frey, and Osborne [86], Degryse [87], Walwei [53], and Bühler and Hagist [54]. Otherwise, demographic dividends are valuable assets if people have adequate abilities for industry revolution 4.0, particularly in urban. As a result, urban earns fastest and newest technology and information, agglomeration economies, developing region, etc. Therefore, the cosmopolitan area can maintain the abilities gap in the labor market. With the improving knowledge that the city facilitates. This potential can be prognosticated that numerous entrepreneurs will occur in this new era, especially in urban.

⁷ URL: https://www.bappenas.go.id/files/9215/0397/6050/Siaran_Pers_-_Peer_Learning_and_Knowledge_Sharing_Workshop.pdf (Date of access: 10.12.2021)

⁸ World Bank Document (2011) retrieved from [URL:https://documents1.worldbank.org/curated/en/548511468260133592/pdf/684550ESWOP11900Urbanization0shifts.pdf](https://documents1.worldbank.org/curated/en/548511468260133592/pdf/684550ESWOP11900Urbanization0shifts.pdf) (Date of access: 25.07.2021)

By 2017, BPS published the working-age inhabitants hit 128.06 million people or 48.51% of the Indonesian inhabitant. The quantity rose by 2.62 million, linked to the position in 2016 that around 125.44 million people. At the same time, the labor force participation rate grew by 0.33% from 66.34% in 2016 (Figure 1.6). In other words, Indonesia's labor supply would have plenty of resources. The window of opportunity will be a waste if the government passes this moment. Therefore, Indonesia is creating the right strategies, policies, and rules to improve human quality for facing the new industrial era.

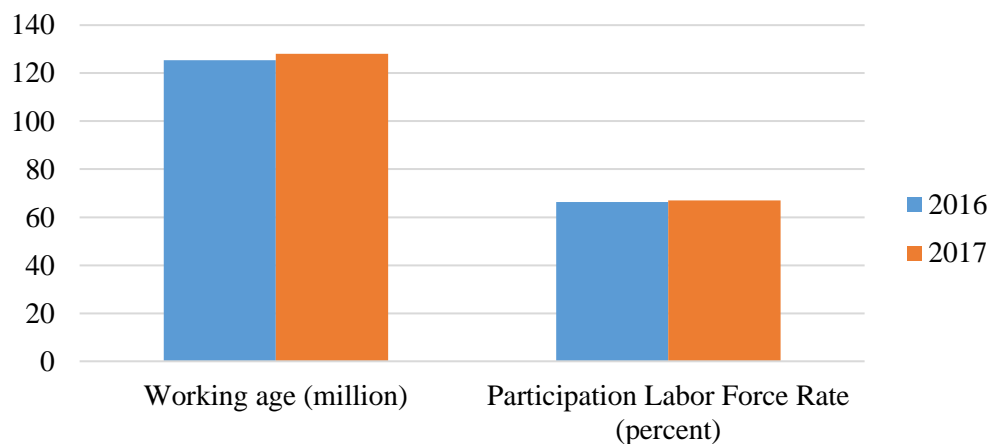


Figure 1.6 Working age and Participation Labor Force Rate, 2016-2017

Nonetheless, in achieving these goals, education is needed echoing all sides in the ecosystem of the industrial revolution. The demographic dividend presence addresses Indonesia as a precious market for industry players. Yet, assume that human resources are not prepared, next the Indonesian society only become consumers or viewers, not actors in the new era, and powerless to fight globally. Therefore, urban labor has a significant role in boosting Indonesia's economic sustainability, particularly lifting out from poverty. On the other hand, the urban's well-being also depends on its labor market development going on. The greater the market, the more productive, innovative, and sustainable the urban will be.

1.2 Local labor market and city

The spatial role in encouraging local growth and productivity has proven to be a significant concern in the experimental and theoretical findings, so the two essential

spatial determinants reviewed are urban agglomeration and sectoral specialization. Duranton and Puga [29] stated that productivity gains because of specific industries' concentration in certain locations. The reason can summarize in the following three categories. Firstly, learning is the abundance of technology and knowledge owned by industries or firms conducting in specific locations with the same sectors. Secondly, sharing the benefits obtained by partaking the identical industry-specific risks, intermediate inputs, and facilities that cannot be yielded. Finally, matching, namely the higher performance achieved in the matching process between employees and employers. All of these are a consequence of the density in the same location.

In recent years, the agglomeration economy's impact has brought up the assumption that the exchanged goods sector in urban areas leads to 'increased returns'. Wheaton and Lewis [18] divide into three categories of these conditions: 1) urbanization economics from the convergence of diverse economic action; 2) localization economies resulting from the convergence of similar economic activity; 3) the founding economies from factory level increasing returns. Agglomeration in these conditions may compose a once more tremendous or consistent increase in productivity and a higher level of innovation, technological change and cause productivity to grow.

Based on the World Bank report, Indonesia is attaining solely a 4% GDP increase for each 1% of urbanization⁹ caused the congestion, pollution, and disaster jeopardies emanating from inadequate amenities financing. Hence, Indonesian towns are not expanding enough or adequately on their infrastructure development. Meanwhile, in the mid to late 2000s, the nation's economy rose by a proportion of 5.8%, yet infrastructure assets increased by a solitary 3%. Contrarily, over the past decade, China financed 10% of its GDP in its infrastructure. Inadequate investments in infrastructure leave many districts vulnerable to poverty. Therefore, Indonesia's urban worker typically experiences the dilemma between long commuting and the excellent salary promised in the metropolitan area.

⁹ URL: <https://www.worldbank.org/en/news/feature/2016/06/14/indonesia-urban-story> (Date of access: 10.10.2020)

The urban agglomeration, formed by Abdel-Rahman and Fujita [88], states that the local market's size can produce productivity gains. Alike Duranton and Puga [29], the economic devices that portray city agglomeration are indistinguishable from those defined for specialization (matching, learning, sharing). The economic variety of urban agglomeration is internal to cities but external to industries, hence, the cross-industry economy. Numerous studies have analyzed the spatial position in increasing payments and labor productivity [6,14–17]. However, Matano and Naticchioni [31] argued that this study did not consider workers' and firms' spatial sorting. Indeed, many reasons for proficient employees center in the city. The first reason is the opportunity to enjoy various facilities such as events, museums, cultural activities, etc., which allure proficient employees [7,18]. Next, returning to education (both public and private) is frequently higher in towns. Last, the human capital collection is more accelerated in metropolitans due to face-to-face communications [6,32]. As for firms' spatial sorting, the idea is that when business size develops, labor market competition becomes tighter, only allowing the most productive firms to withstand. Therefore, firms can hire more high-quality workers, so the firm will growing bigger [30–32].

Moreover, according to Gobillon et al. [89], the urban labor market's problems can be viewed from two sides, i.e., the worker's and the firm's. And from the worker point of view are as follows:

1. long commuting can force workers to refuse job opportunities after conducting a cost-benefit analysis;
2. observing efficiency can lessen by distance to the workplace;
3. examination intensity can also be altered by length to the workplace; and
4. high observation costs can let workers limit their exploration to restricted areas.

From the point of view of firms, the main points are:

1. stigma or intolerance can initiate firms differentiate against an employee who resides in particular locations;
2. management can pay more moderate salaries or decline to contract an employee who commutes very far because commuting can reduce their potency; and

3. firms probably have prejudices toward specific employees due to the preferences demanded of their clients.

On the other hand, urbanization is continuously related to emerging technology, and this innovation creates a fear that human labor could be changing with technology. It is essential to know how it changes and what people can do to adapt to the new environment. Another effect of labor is creative destruction. Coined by Schumpeter, creative destruction shows a loss for the economy due to increased automation. Meanwhile, McArthur and Sachs [90] reveal that innovative countries have the highest income and are better than other countries in the world. The second level of countries that adopt technology quickly has increased revenue but still significantly follows the innovators. If a government does not innovate or adapt well, it lags in poverty.

Historically, Indonesia has been experiencing an alteration from a rustic to a metropolitan economy [91]. With a rate of 4.1% per year, Indonesian cities are expanding rapidly than in other Asian countries. By 2025 or less than ten years, Indonesia can presume that 68% reside in cities. In East Asia, Indonesia has the third-largest amount of urban property after Japan and China. Between 2000 and 2010, Indonesia's urban territory readjustment was 1.1% each year or from 8,900 km² to 10,000 km² [92]. It is the most massive readjustment of the metropolitan area after China. Hence, Indonesia can get more advantages of urbanization through formal employment. As a result of urbanization, other nations have attained immense economic boosts via formal jobs and greater labor potency. For instance, each 1% growth of urban population is associated with GDP per capita rise of 7% for Thailand, 10% for China, and 13% for India¹⁰.

In addition, urbanization's Indonesia increased massively supporting the nation's active development in the 1970s [74]. Since then, Indonesia has been experiencing a tremendous urbanization value accelerated by rural-urban migration. In 1995, Indonesia's community inhabited in cities was around 36.1%. After 25 years later, in 2019, this number is almost doubled to 55.99% (Figure 1.7). Based on the BPS

¹⁰ URL: <https://www.worldbank.org/en/news/feature/2016/06/14/indonesia-urban-story> (Date of access: 10.12.2021)

projection, only another 16 years or in 2035, Indonesia would increase the urban population to 66%.¹¹

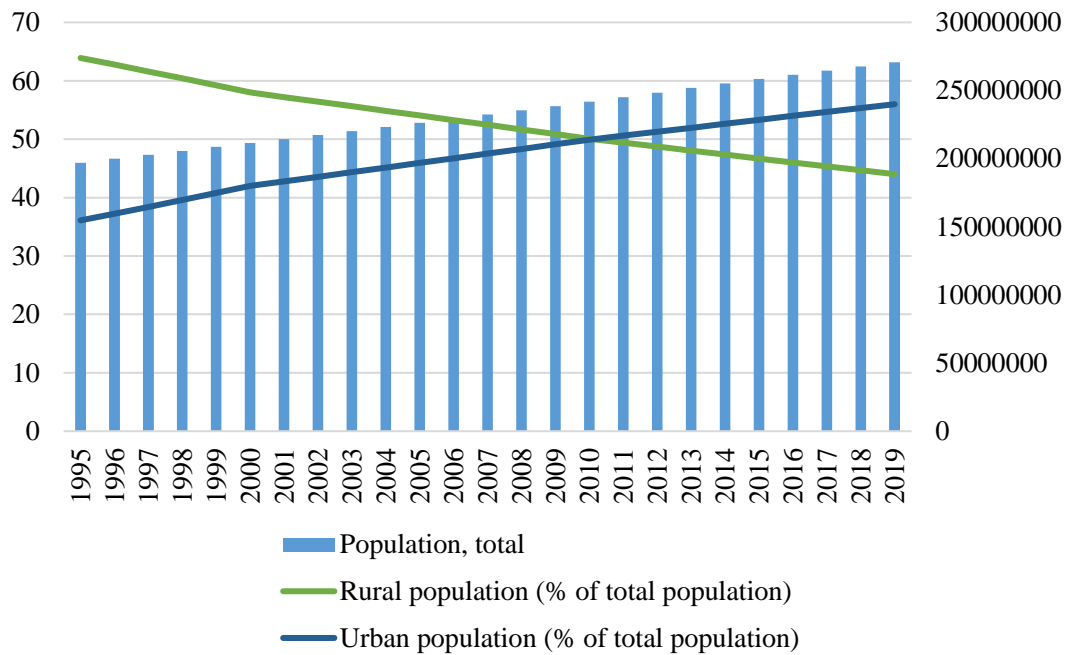


Figure 1.7 Population in Rural and Urban, 1995-2019

Meantime, based on World Bank data (2020), in the last 25 years, Indonesia's number of inhabitants progressed from 196.9 million to 270.6 million, while the urban residents rose to start 71.046 million to 151.509 million throughout the same time with a yearly growth rate of 0.8%. Moreover, the urbanization level progressed outstandingly from 36.1% to 55.99% in that time. In other words, about half of Indonesia's population is urban. Nevertheless, a remarkably uneven distribution of the urban population is due to 56.82% or about 145.14 million of Indonesia's population living in Java, and the rest live on other islands (BPS projection, 2010). Acknowledge that foreign and domestic investments fuel urbanization and urban development, particularly in massive cities similar to Jakarta, Surabaya, and Bandung. Economic movements have been frequently concerted in these areas, most prominently the manufacturing, services, finance, trade, and property spheres.

¹¹ URL: <https://www.bps.go.id/statictable/2014/02/18/1276/persentase-penduduk-daerah-perkotaan-hasil-proyeksi-penduduk-menurut-provinsi-2015---2035.html> (Date of access: 10.12.2021)

Undoubtedly, Java is the most urbanized region, with more than 70% of its residents inhabiting urban areas, followed by Kalimantan, Bali and Kep. Nusa Tenggara with 48.43 and 47.47%, respectively (BPS projection, 2010). Meantime, several scientists prognosticated that Java would shift to the Cities Island, and nowadays, it was rising with substantial urban zones attaching big cities. Between 2010 and 2015, the population growth rate slumped from 1.38% to 1.19% during 2015-2020. Yet, the yearly urban resident growth rate, which had touched 4.40% from 1990 to 2000, declined significantly to 2.41% throughout 2015–2019 (BPS projection, 2010; World Bank, 2020[93]) [93]. Currently, urban population growth in Indonesia is decreasing. In 2000-2010, the city habitant growth in Java knocked at 3.17%, while the other islands were slightly larger at 3.66%. Further, in 2010-2020, BPS announced that city habitant growth in Java lightly decreased become 3.06% and outer islands at 3.54%. Hypothetically, the amount of cities with populations of more than a million-plus has risen densely.

Additionally, the statement that said cities are fundamentally labor markets is not wrong. Unquestionably, the temptations granted by the facilities of a metropolitan cannot be rejected. Hence, the entire picture seems solely a point where firms seek employees and individuals seeking jobs. Idson and Oi [94], stated that workers in large firms are more productive due to high labor competition. This logic is similar to the large cities' employees are more effective [95–97]. Melitz and Ottaviano [98] used variable price-cost markups in their study and showed broader markets allure more firms, making the competition more robust. Hence, the convergence of firms and workers in one place offers them more productivity [25,29]. Therefore, the tremendous productivity of broader labor markets is stimulating the cities development.

Prud'homme and Lee [99] asserted that labor productivity could increase by reducing the commute time via advancing transportation. For instance, the impact of labor market size, travel speed, and vacant distribution on metropolitan productivity decisively proved for USA, Korean, and European cities [30,99,100]. Thus, several studies asserted the essential factor of increasing large cities' productivity and their workers' welfare reduces mobility time [30,99–103]. Tadjoeuddin and Mercer-

Blackman [103] evidenced that congestion in Jakarta is one factor in decreasing labor productivity. Large workers' agglomeration unguaranteed high productivity without worker mobility. Hence, in large cities, commuting time should be the primary indicator.

Furthermore, insufficient infrastructure investments bequeath many inhabitants vulnerable to poverty and create a lot of crime. Consequently, in Indonesia, urban has a substantial part in reaching sustainable development goals. Motions that can aid Indonesia's advantage more from urbanization encompass prioritizing urbanization concerns in the national development plan and marking problems with a thorough strategy. The local option to get the benefits is by financing urban infrastructure. As a result of this option is strengthened the managerial capacity of urban governments. Hence, the reformation of implementation policy becomes flexible for investors to invest in the development of infrastructure. The advancement of the infrastructure also improves labor productivity [13]. Therefore, labor across municipalities with different density levels is not remarkably extra to start with; instead, operating in other towns essentially produces their incomes deviate from time to time [13].

In 1980, Jakarta, Surabaya, Bandung, and Medan were municipalities with over 1 million residents [93]. Eventually, in 2010, there were 12 cities with 1 million or higher inhabitants in Indonesia. Still, 9 of 12 cities were in Java, namely Jakarta, Bandung, Bekasi, Bogor, Depok, Semarang, Surabaya, South Tangerang, and Tangerang. Moreover, by 2018, BPS projected that seven cities would populate more than 2 million, namely Jakarta, Bekasi, Surabaya, Bandung, Depok, Tangerang, and Medan (table 1.5). Interestingly, four of the large cities in Java settle in the Jakarta Metropolitan or Jabodetabek Megacity.

As a result, approximately 34.58 million with an area of 6,437 km² Jabodetabek become the second megacity globally and share 12.83% of Indonesia's population in 2019. In other words, it took 22.8% of Java's urban residents, which creates this cosmopolitan region the most populous in the country or a metropolitan city. Another metropolis area is Surabaya metropolitan.

Acknowledge the second most significant metropolitan located in East Java, called Gerbangkertosusila (Gresik–Bangkalan–Mojokerto–Surabaya–Sidoarjo–Lamongan), and Surabaya is the core of this area. This region's population is almost 9.9 million, and the area is 5,693 km² with a density of 1,738 people/km². Meanwhile, the dense of Surabaya is approximately 8,262 people/km². Additionally, the immediate improvement of the Surabaya-Malang urban corridor indicates the current urban alteration in East Java.

Notably, the dense cities settle in several provinces in Java, such as DKI Jakarta, West Java, and East Java. Not only do these provinces contribute to the population, but these provinces also make a vast contribution to Indonesia's GDP. In 2020, Jakarta contributed around 17.56%, East Java at 14.57%, and West Java at 13.23%¹². Meanwhile, other provinces contribute less than 10%. Furthermore, Jabodetabek and Bandung metropolitan become the pivot of Jakarta and West Java economy, while East Java sustained by Surabaya metropolitan or called Gerbangkertosusila. These urban areas contribute more than 50% to the province's GDP. Inevitable, the role of metropolitan regions is significantly boosting the country's economy.

In addition, from GDP's side presented that Jabodetabek contribute significantly by 25.48% or more than 2 billion rupiah. Next, the second metropolitan reached the half of Jabodetabek's share. Whereas, Surabaya has important role to link the distribution to east part of Indonesia. Meantime, the Bandung Basin only contribute 3.27% to GDP of Indonesia (Figure 1.8). The differences between Bandung and other metropolitans is the municipality surrounding this metropolitan. Bandung mostly surrounding by municipality which core activity is agriculture. Meanwhile, Jakarta and Surabaya are surrounding with area that basic economic is industry, services and trade sector.

¹² URL: <https://www.bps.go.id/indicator/52/289/1/-seri-2010-distribusi-pdrb-terhadap-jumlah-pdrb-34-provinsi-atas-dasar-harga-berlaku-menurut-provinsi.html> (Date of access: 05.11.2021)

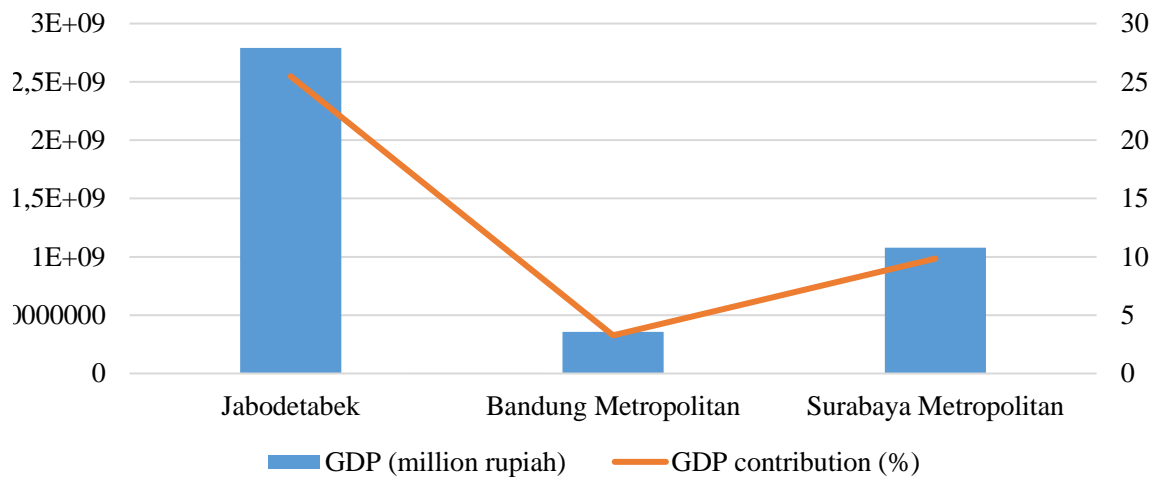


Figure 1.8 Total GDP and GDP contribution in Jabodetabek, Bandung Metropolitan and Surabaya Metropolitan, 2019

Additionally, the area with large labor markets is more productive than smaller ones. More than 50% of the workforce concentrates in urban areas (see Figure 1.2). Nevertheless, based on Figure 1.2, in 2018, the labor force and the rural area's unemployment rate were increased by 0.66% and 0.3%. In other words, most of the labor who migrated the previous year went back to the rural area. We can also assume that urban areas facing excess labor supply and most abundant people chose to return to the rustic. This phenomenon showed by the rising employment rate and decreasing unemployment in rural in 2019. On the one hand, metropolitan was facing a decrease in employment and unemployment.

Meanwhile, in 2025, the growth population forecasting predicted that the total adolescent population would rise and peak with 68.7% of the 15-64 years old productive workforce. This state notes as a demographic bonus. Indonesia's population policy interpreted this as an abundant resource. In addition, in 2010, BPS recorded the labor market situation in Indonesia that the amount of youth in urban is 33 million, while in rural is 28 million. Based on the ILO report [104], a large share of young Indonesians (19%) is neither in the labor force nor education, with young ladies three times higher reasonable than guys to be inactive.

Additionally, based on the 2005 and 2007 National Survey, the average education level of Indonesian youth showed that the enrollment rate of secondary level

or cohort of 16-18 years old is rising from 53.9% to 54.1%. At the same time, the enrollment rate of youth in bachelor degree level or cohort 19-24 years old also slightly increasing from 12.2% to 12.6%. Unfortunately, during 2007-2008, the literacy rate decreased from 2.6% to 0.9%. Remarkably, in 2007, there was a larger illiterate population of female youth than male youth, by 3.1% and 2.1%, respectively [105]. Based on BPS in 2010, 67.17% of urban youth classifies as labor or employees (Figure 1.9, Table 1.7). Meanwhile, 9.8% of urban youth working as self-employed and 13.4% for rural youth. But, the second option for 30.78% of rural youth is working as a family worker. Next, 2.8 million rural youth working as an entrepreneur or four hundred higher than urban youth.

Table 1.7 – Total of Working Youth based on Living Location, 2010

Work Status	Urban	Rural	Urban+Rural
Entrepreneur	2 401 338	2 816 860	5 218 198
Non-permanent/ non paid	264 451	1 556 247	1 820 698
Permanent/paid	463 762	370 263	833 989
Employee	10 928 028	4 169 897	15 107 975
Self employed	1 478 967	2 139 368	3 618 335
Family worker/non paid	738 081	4 914 040	5 652 121
Total	16 284 591	15 966 675	32 251 266

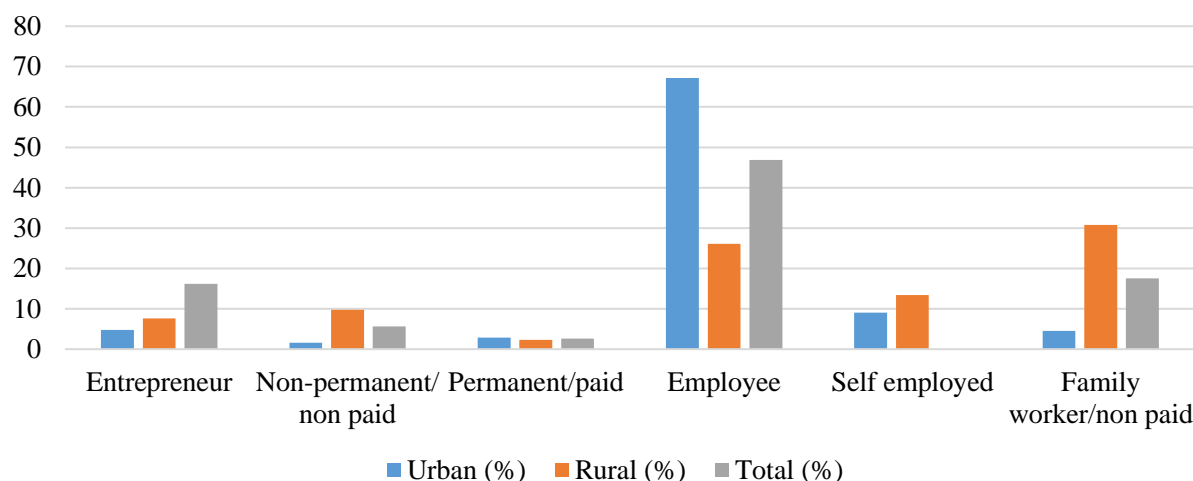


Figure 1.9 Work Status of Working Youth, %

This current situation will be a great opportunity, particularly in urban or city areas. Nevertheless, the challenge depends on how to assure a work possibility for youth labor. Would their future rely on their employer? Table 1.7 also shows that

approximately 17 million urban youth and 16 million rural youth are unemployed – despite the fact that it should be remarked that the sum includes youth who is a student and not yet joined the labor market. To handle the demographic bonus time, prepping the quality and distinguishing these youth's comparative advantages is a difficulty for all urban authorities. Procurement of education amenities, formal or informal or nonformal, vocational education is highly needed. Another point is the low penetration of the adolescent workforce in the urban labor market. Insufficient job chances and large quantities of young workers moreover double the unemployment rate. This difficulty, nevertheless, has been marked in several big cities. The city regulations have been encouraging the creative industries development that is principally done by adolescence.

Another way to improve urban life's values is through labor markets function with more appropriate land use and advancing the transport system. For instance, short commuting could help the labor owns time for discretionary plans. A flexible labor market that enables switching jobs to find intriguing and/or substantially rewarding expert liveliness has been secured. The easiness and quickness to access social life as a residence. Moreover, this value urban life followed by scale economies is plausible in municipalities with a massive labor market. The urban spillovers are knowledge spillover and urban premium wage. Knowledge spillovers happen when numerous related activities stay nearby. Unique ideas of doing something in a firm are duplicated immediately by other firms and then by other sectors due to close contact between heterogeneous firms and sectors worker inside the urban economy. For example, the first users of computerized spreadsheets in the eighties were largely accountants, auditors, and financial analysts. The worth of spreadsheets forthwith enhanced standard in all spheres of the economy, but the spillover happened beginning in big cities. Knowledge spillovers are liable for agglomeration economies, i.e., improved productivity caused the accelerated diffusion of new thoughts in regions where various workers are in close connection. Agglomeration economies likewise emerge from lower transaction costs in more populous towns due to the contiguity of struggling suppliers and consumers.

Furthermore, the impact of urbanization is not all positive. In the profile of the city's rapid development and restrained resources, the requirement for services, job opportunities, and another human necessity becomes a severe difficulty [106]. In Jakarta, for instance, with the prompt rise of inhabitants, slum districts have sprung up due to a lack of housing. Most of the slum residents are economically and socially peripheral to the thriving city economy. Generally, it is argued that extraordinary levels of absolute poverty are affiliated with urbanization [107]. A question arises concerning the effect of urbanization on city employment. Thus, the Indonesian government has a plan to move the capital city to Borneo.

In principle, urbanization tends to shift from agricultural to non-agricultural occupation as the economy pushes towards greater productivity. There is also a tendency for uneven growth in sectorial productivity [63,85,106–108]. To some extent, the shift to manufacturing and services responds to low productivity in the agricultural sector. However, despite this adjustment on the broader economy, many people are still connected in the low-productivity industry. This phenomenon is not only in agriculture but also in metropolitan where industries have a low rate of labor absorption, particularly in the industrial revolution era. Therefore, local labor in urban demanded to have high skill and productivity. Then, the compensation for their high agility and productivity is a high wage promised by urban.

1.3 Local labor market, wages, and new skill

Prussia, in the late of the 19th century, Weber (1899) in [6] documented rural-urban wage differences in both income earners sufficient to be taxable and their earning distribution, and about the daily income of unskilled employees over urban areas. All of these juxtapositions show more considerable income in the city. Current research shows that average salaries are much more prominent in metropolitans than in rustic places, and “raw” urban wage premium increases in city size. In agglomeration, the correlation between city density and income is understood as the main reason metropolitans subsist. The relationship between productivity and area size and income per worker, according to Glaeser [19], is an essential matter in the heart of urban

economics. Particularly the question of why productivity increases in line with population size in regions with many skilled workers, although not for unskilled regions? Glaeser and Resseger [32] hypothesize that the relationship between regional size and productivity reflects the inclination of more proficient individuals to settle in the metropolitan area.

Nevertheless, even in places where more skilled workers are concentrated, controlling regional skill levels can only be explained by a fraction of the measurable effect of agglomeration. If unobserved abilities explain the correlation, Glaeser and Resseger [32] assume that real wages will increase along with the city's population. On the other hand, that impact only describes 30% of the relationship among productivity or income with city size. The Glaeser and Maré [6] report and Gould [4] states that the average wage in a metropolitan area with more than 1 million people is around 30 percent higher than outside this region and the raw urban wage premium for small cities is around 21 percent. Related results were reported by Combes et al. [24] for the case of France and Dapena et al. [109] for the Spain case.

The urban wage premium that applies in urban areas is the effect of labor productivity in urban locations, or whether they originate from the point that employees prefer more favorable jobs and live in cities. According to Halfdanarson et al. [7], this condition affects each region in the proportion of their labor force, with metropolitan employees on ordinary more tutored than those in rural areas. Due to workers are usually free to migrate inter-country, individual locations are not random, and well-organized discrepancies within urban and rural labor are certainly the outcome of endogenous place settlements. The principal framework complexity with this sorting mechanism to a precise location is that labor is different in terms of observable characteristics and some characteristics that are not easily observed.

Previous studies confirmed the positive and meaningful links within productivity and urban agglomeration and impacted premium urban wage in urban areas. This was confirmed by Jofre-Monseny [110] and Martinez-Galarraga et al. [111] particularly study the connection amid work density and productivity, discovering that when an agglomeration multiplies its size, the influence on productivity is constantly accurate

and usually modifies in the scope of 2-6%, which is a result quite related to obtained in a universal analysis or precise investigations of Ciccone [15]. As well by Martinez-Galarraga et al. [111] and Jofre-Monseny [110], de la Roca and Puga [8] which concentrate on analyzing premium wages related to urban rate, presume that high productivity in urban areas will have an impact on increasing individual earnings, even though they use a period different and a different data set.

Likewise, Matano and Naticchioni [31] tested that spatial externalities can have unequal impacts simultaneously with the payment distribution. On the one side, it has been debated that skillful employees can get the most advantage from spatial externalities because they are properly qualified to receive from face-to-face synergies and human capital collection [6,32]. On the other side, it has also been claimed that uneducated employees receive vaster advantages because they have a below human resources accumulation, so they can accept bigger yields from face-to-face synergies with proficient employees [6,112].

Wheeler [112,113], who empirically examines the influence of manufacturing specialization and density on salary imbalance in the US at the aggregate level (metropolitan and state regions), applies another measure of wage disparity. His verdicts confirm that the influence of spatial externalities is not symmetrically spread via several classifications of labor: industrial density and specialization diminish salary disparity. Another relevant study is Möller and Haas [114], who managed a quasi-quantile approach to investigate the relationship within density and salary differences in various percentiles of the earnings distribution. Their verdicts determine that the density influence rises with the decile of the salary spreading, which undoubtedly impacts salary disparity.

Nevertheless, the relationship between wage inequality and spatial externalities suffers because the variable prejudice is omitted. After all, it does not restrain the heterogeneity of labor and firms. It has been proven that worker and firm sorting can catch most spatial externalities' impact on differences in average salaries between places. For example, Combes et al. [24] reveal that a breakdown to consider for sorting workers heads to an overestimation of the spatial externality coefficient of around

100% in the French labor market. Meantime, Mion and Naticchioni [115] point out that around 75% of wage disparities among provinces with immense and profound density in Italy are considered for labor segregation, while the share is due to the sorting of firms only 5.6%.

Matano and Naticchioni [31] show that spatial externalities cause an increase throughout the wage distribution due to the sorting of workers. In times of sectoral sorting, they prove that it does not always occur homogeneously across sectors. More clearly, Combes et al. [24] insofar as the dimensions of spatial sorting density apply in all sectors, but judging from the dimension of specialization, the sorting of spatial labor is more diversified beyond sectors, especially in the service sector.

The sure correlation amid work location and salaries is not in doubt and is not new. In the 19th century, Weber stated that wages in urban areas in Germany were 50% higher than in suburban areas. Moreover, Kuznet also stated that families living in metropolitan areas were 36% more than the periphery areas in 1970. Moreover, Glaeser and Maré [6] claimed that metropolitan also offering a high salary. Therefore, the income gap between workers in urban and outside urban areas is still higher than among races or union members and not union members. Many researchers said that the urban wage premium existed as compensation for higher living costs in urban areas. Afterward, not all workers want to move to areas with high wages.

As Lee, et al. [30] assumed, one of the reasons for the low impact on labor density salaries and the total employment in the region and the effect of discouraging wages from the heterogeneity of regional manufacturing structures was Korean workers were prompt to receive lower payments in return for the passion for living in big regions with extraordinary work density and greater diversity. Labor settling there to enjoy a tremendous life quality due to various user services, particularly education, is possible in big cities (with large labor density) and experience the smoothness of switching jobs due to the diversity of available occupation possibilities. Consequently, employees in that regions might be prompt to receive lower salaries correlated to their productivity.

In other side, the existence of urban wage premium shows that operational costs are expensive for the firm, which operate in urban or metropolitan areas, however, firms remain in cities. This is due to several reasons, particularly the large scale of sales and high productivity in cities. On the one hand, it will be easier for forms having a scale of sales in the national market to distribute goods with the compensation that firms are willing to offer high wages. On the other hand, if cities offer low productivity, firms will look for other areas or hire fewer workers. Therefore, the premium wages offered must be comparable to the needs of the firm.

In table 1.7, the gap between urban and rural areas are eventually decreasing. Hypothetically, the gap reducing due to suburbanization as an effect of expansion urban area. Moreover, based on the provinces that big metropolitan located showed that mining and quarrying receive the highest salary. Meantime, the gap between Jakarta and other provinces is tremendously board. For instance, see table 1.6, the gap wage in mining sector in Jakarta to West Java is 32% and to East Java is 71.61%. Another example in manufacturing sector, difference between Jakarta and West Java is 28.38%, while with East Java is 42.25%. Meanwhile, the gap between West and East Java in mining sector is 58.25%, while in manufacturing sector is 19.36%. Generally, the average gap between Jakarta and East Java is more than 40%, while for Jakarta and West Java around 25%. This circumstance is support by close distance between Jakarta and West Java. Moreover, West and East is 21%

The existence of a premium wage in Indonesia is shown in the table below (Table 1.8). In the 2015, urban wage started on the 12,776 rupiah/hour, while the rural was 8,785 rupiah/hour or the gap was 45.43%. The next year, the gap was slightly decreasing to point 44.31% or 4,803 rupiah/hour. In the 2017, the gap improves became 53.37% or 5,869 rupiah/hour and next year became 50.44% or 5,830 rupiah/hour. This phenomenon occurred due to the crisis economic global. Further, it impacts to 2019-2020 and create the wage gap between urban and rural was decreasing to 46.05% and 37.97%, respectively. Generally, the gap between urban and rural areas is more than 40-50% in 2015-2018, but declining eventually since 2018 caused by crisis global. This situation is related to Glaeser and Maré [6] statement about firms' willingness to pay

high wages in cities. Furthermore, the reducing gap between this area is the result of Indonesia's policy project called *Kebijakan Pembangunan Desa* (Rural Development Policy). This policy aimed to improve the welfare of rural area. Hence, this policy attracted people to going back to village, while they cannot struggle with high competitiveness in city.

Table 1.8 – Average wage per hour in urban and rural in Indonesia, 2015-2020

Location	Average wage per hour (Rupiah/hour)					
	2015	2016	2017	2018	2019	2020
Urban	12 776	15 643	16 865	17 389	17 825	19 651
Rural	8 785	10 840	10 996	11 559	12 205	14 242

Heretofore, Dijkstra & Poelman [116] classified the type of area, i.e., densely, intermediate, and thinly populated areas. Further, the indicator to classify the areas are based on population size, density, border of local administrative, rural-urban migration, and reclassification [103,116–120]. Hence, the cities are recognized as densely populated areas. Thus, the densely-populated area is an adjacent set of local neighborhoods, each of which has a density exceeding 500 residents per square kilometer, and the total population for the faction is at least 50,000 inhabitants [116]. Their definition is similar to the Indonesia National Report for Habitat III in 2016. However, Statistics Indonesia (Badan Pusat Statistik-BPS) defines urban and rural by their population density, percentage of households working in the agriculture sector, and urban facilities availability.

Nonetheless, figure out the layers and divisions of administrative government units in Indonesia is essential. Indonesia is composed of 34 provinces, each headed by a governor and composed of numerous districts (subprovincial units). There are two classifications of the district: Kota (predominantly urban) and Kabupaten (predominantly rural). In English, Kota is ordinarily called a city or municipality and managed by a mayor. In contrast, Kabupaten is typically called a “rural” district and managed by a regent or a district head. Governor, mayor, and regent are elected by the majority of direct votes in local elections.

The product of technological advancement is digitalization. The emerging of digital technology brings us up to a new aspect, where electronic devices connect people, workers with machines, and machines with machines. Based on Bartel [121], the prominent roles of digitalization through ICT are reducing setup time and leading to new forms of economy or business. Those advantages create it inexpensively to transpose production from one product to another and reform business plan into more customized production. Moreover, Sabbagh et al. [122] highlighted that digitalization is the primary driver of economic growth and facilitates job creation. Therefore, technological developments lead us to the era of digitalization, where things are faster and more efficient.

Indonesia's demographic dividend could be a misfortune for Indonesia in the automated era. This calamity happens whenever human resources have insufficient abilities to reinforce the digital industry and worsen disparity between districts. A demographic transformation of Indonesia was established with the family planning act in 1970 to defeat the growing birth rate. Then, in the continuous years, Indonesia's population growth encountered a downturn trend. Nevertheless, beginning in 1990, the death rate had grown as a result of the rising quantity of older people who died (see Figure 1.4). Hence, this situation affecting Indonesia to have high productive age society. Subsequently, in 2020, it is prophesied that people of working age (15-64) would hit 65% and higher (The Ministry of National Development Planning – Bappenas, 2017¹³). That time is also cited to as the window opportunity that can boost to improve economic development and public welfare.

Nonetheless, mining wage is the highest salary, Jakarta economic activities are concentrated in manufacturing, trade, construction and financial services¹⁴ with share more than 10% (Table 1.9). Whereas, the bone of West Java economic is industry with share 41.19% and trade around 14.55%¹⁵. This state caused by most of municipalities

¹³ URL: https://www.bappenas.go.id/files/9215/0397/6050/Siaran_Pers_-_Peer_Learning_and_Knowledge_Sharing_Workshop.pdf (Date of access: 10.10.2021)

¹⁴ URL: <https://jakarta.bps.go.id/indicator/52/60/1/distribusi-pdrb-atas-harga-berlaku-menurut-lapangan-usaha.html> (Date of access: 08.11.2021)

¹⁵URL: <https://jabar.bps.go.id/indicator/52/491/1/distribusi-pdrb-triwulanan-provinsi-jawa-barat-menurut-lapangan-usaha.html> (Date of access: 11.12.2021)

or cities are manufacturing areas, such as Bekasi city, Bekasi municipality, Depok city, Bogor municipality, while Bandung city, Bandung municipality, and Bogor city are lay on in trade sector. Contrarily with others, highest salary in East Java is electric and gas sector. Meanwhile, East Java that dominated by manufacturing and trade sectors by 30.23% and 18.66%¹⁶, respectively. This state due to several regions that specialty in industry sector such as Sidoarjo (47.86¹⁷) and Gresik (47.95¹⁸). Additionally, Surabaya as an essential city of East Java hang on trade sector amount 28.31% and manufacturing 18.81%.

Table 1.9 – Wage by sectors in DKI Jakarta, West Java, and East Java

Sector	DKI Jakarta	West Java	East Java
Agriculture, Forestry, and Fishing	3,361,851	1,672,222	1,459,274
Mining and Quarrying	10,942,112	7,440,066	3,106,188
Manufacturing	4,166,043	2,983,552	2,405,898
Electricity and Gas Supply	5,020,418	3,623,513	3,785,833
Water Supply, Sewerage, Waste Management, and Remediation Activities	3,115,795	2,711,524	2,353,127
Construction	5,112,816	3,150,601	2,447,271
Wholesale Trade and Retail Trade; Repair of Motor Vehicles and Motorcycle	3,784,796	2,660,295	2,037,104
Transportation and Storage	4,325,136	3,685,167	2,592,840
Accommodation and Food Service Activities	3,195,810	2,160,771	1,597,564
Information and Communication	4,851,867	5,066,555	3,113,272
Financial and Insurance Activities	5,524,184	4,746,881	3,574,757
Real Estate Activities	3,905,489	3,189,739	3,013,615
Business Services	5,056,485	3,690,707	2,831,706
Public Administration and Defense; Compulsory Social Security	5,988,679	4,507,666	3,741,910
Education	4,056,197	2,858,021	2,355,820
Human Health and Social Work Activities	5,385,868	3,745,810	3,214,998
Other Service Activities	2,437,809	1,887,556	1,515,137

¹⁶URL: <https://jatim.bps.go.id/indicator/52/475/1/-seri-2010-distribusi-persentase-pdrb-atas-dasar-harga-konstan-2010-menurut-lapangan-usaha.html> (Date of access: 10.11.2021)

¹⁷URL: <https://sidoarjo.kab.bps.go.id/statictable/2019/07/31/62/distribusi-persentase-pdrb-kabupaten-sidoarjo-atas-dasar-harga-berlaku-menurut-lapangan-usaha-2010---2020-.html> (Date of access: 07.12.2021)

¹⁸ URL: <https://gresikkab.bps.go.id/indicator/52/37/1/distribusi-persentase-pdrb-kabupaten-gresik-atas-dasar-harga-berlaku-menurut-lapangan-usaha.html> (Date of access: 10.09.2021)

Generally, metropolitans are economically more productive and competitive than town and village areas due to concrete externalities called agglomeration. There are two kinds of agglomeration economies: localization and urbanization economies. Metropolitans generate possibilities for the founding of localization economies by the clustering of relevant enterprises. In contrast, urbanization economies probably develop in metropolitans, where the profound transaction business cost and knowledge spillover possibilities are high. Therefore, the dense area following the dynamic economic activities. Hence, the wage and high education are walking in the same line.

Meanwhile, Glaeser and Maré [6] hesitated two things about the existence of urban wage premium. Firstly, does the city salary premium just consider the workers' ability to prefer to stay in urban areas? Next, if the salary premium is true, then is it a salary level or a salary growth phenomenon? Glaeser and Maré [6] believed that if a city's salary is biased, the urban theory needs describe why municipalities are more charming to employees than why urban regions are more efficiency and productive. Yet, if the city salary is existed and is recognized as a salary level impact, labor who come to the urban accepted greatly benefit and workers who leave the city accepted greatly loss or vice versa. In other word, if urban wage occurs because of a wage growth effect, the urban theory must focus on the reasons why wages grow rapidly in urban areas. Due to assumption of wage growth in cities occurred several motives why higher skills workers might come to municipalities. An existence of a premium wage in Indonesia is shown by the table above (recall Table 1.3). In fact, the disparity amid rural and urban regions is more than 50% in 2018 and increasing eventually since 2015. This situation is related to Glaeser and Maré [6] about firms' willingness to pay high wages in cities. Hence, decentralization of minimum wage also take a part. On the one hand, Wheeler [113] affirmed that premium earning in urban also allure the educated labor to come. Therefore, educated labor will convergence in one space [6,26,84,123,124].

Glaeser and Maré [6] stated that there are two main reasons why labor is concentrated in urban areas. First, the speed of information flow in cities, which is very valuable for individuals who have high human capital. Second, urban area is the center

of consumption, especially for rich people. In consequence, individuals with high human capital will be concentrated in urban areas. This urban areas condition will lead a competition between individuals with high human capital and the company gains by arranging high-ability requirements as well. Glaeser and Maré [6] stated that there are also factors could lead a move to cities that are not correlated with individual abilities and higher wages.

Furthermore, in the theory of wage growth explained that synergy between labor market expertise and working are positive in metropolitan regions. All of these theories explain why the company remained in the city despite urban wages premium. Glaeser and Maré [6] concluded that city benefits might only rise over time, and employees who abandoning the downtown might not handle salary disadvantages anymore. In wage differences between regions, Glaeser and Maré [6] state that there are two reasons that must be explained about the labor demand and supply in metropolitan. First, the phenomenon of workers that does not move to urban areas with wages that are higher than nominal wages. Second, understanding why firms do not run away from regions with high wages.

Firms would prevail in high-salary spaces if these areas have more expensive product prices or have more economical production costs. In cosmopolitan areas, firms could have higher prices due to the transportation expense to the big downtown market is cheaper or due to technological externalities in centers that stimulate productivity. Glaeser and Maré [6] formalize this, considering that the corporation maximizes profit, or where capital is available anywhere and labor estimated in the efficiency unit. Regional productivity involves higher prices and real externalities. For companies to persist in high-wage regions, either labor in those regions must have immense talent or high productivity levels. Glaeser and Maré [6] recognize whether there are notable productivity disparities amid dense metropolitan and other areas, or whether dense urban areas only have tremendous salaries due to they have talented employees.

Another explanation for why cities exist is in urban areas where there is an increase in human capital accumulation. Glaeser and Maré [6] quoted Marshall (1890) as saying that urban agglomeration spurred accumulation of skills. In other hand,

Glaeser [125] formulates that metropolitan density can stimulate the synergy rate between people with extraordinary abilities that can be imitated or the pace at which somebody has new expertise. Moreover, Chinitz [126], metropolitan can also expand the experience range of an employee and expand a compilation of latent role models. Similar to Becker and Murphy [127] also asserts that metropolitan can also aid coordination and let individuals concentrate, leading to higher earnings eventually. The urban density existence could make it more natural for employees to gain the most suitable occupations, and metropolitan earnings can grow rapidly due to better labor market coordination. It can be concluded that there is an urban salary increase outcome.

Glaeser and Maré [6] have underlined the sense of identifying the spatial sorting of labor by individual abilities in sequence to evaluate the urban wage premium. On the other hand, Leuven and Oosterbeek [128] argued that the skill mismatch had discovered an actual association within standards of personal skill and overqualification. Considering high-ability workers could be more likely to subsist in metropolitans and have a greater job match, sorting labor beyond regions could drive to an overestimation of the impact of urban rate on the job match.

Berlingieri [5] states that more dense areas usually have a larger portion of high-skilled individuals. Meanwhile, people want to banish the effect of abilities from the agglomeration economy; till now, this is the effect of pure composition [129]. People with high-skilled may be over-represented in urban due to their appreciation of urban facilities more or due to the historical migration of highly proficient individuals (with their skills partially transferred to their descendants). Besides, people can shift more skilled by inhabiting metropolitans, becoming containers for more active learning impacts in dense regions. Faster learning and dissemination of proficiency is one of the main systems of agglomeration economics [8].

Economists have frequently enhanced thought in the sense that urban facilities of human capital forges and innovation incubators [23]. This sense has been blended with the human capital spillovers notion and specific location. Numerous well-educated or intelligent people could theoretically impact productivity since those people provide many concepts [19,23,27]. Hence, another mark in this field examines

the earnings determinants inside the urban. Rauch [28] revealed that salaries grow in an area with tremendous human capital by constantly handling individual human investment. Therefore, an individual who lives in more educated districts earning more indicates immense productivity in those regions because ideas exchange rapidly.

Another evidence is local productivity with knowledge-based resources always seen in urban growth models. Regional knowledge is frequently fundamental for local productivity because it is the firm bond between primary human capital in space and economic growth. Numerous skills in a region are the reliable indicators of which metropolitan will flourish, prominently in the old areas. This indirect proof has struggled economists to observe that differences in locational productivity probably owe something to the gains that talented individuals embrace from socializing with and learning from each other [19].

Furthermore, based on BPS (2020) announced that ratio of university gross enrollment rate in rural area is higher than urban, contrarily, the ICT skill rate in urban is higher than rural (see Figure 1.10). This circumstance due to lack of ICT infrastructure and difference of image between urban and rural. Nonetheless, this supports the statement of several studies – Glaeser, etc. – stated that urban facilitate the high knowledge which related to technology. Hypothetically, the lower enrollment rate in urban due to the high cost of university enrollment than in rural area.

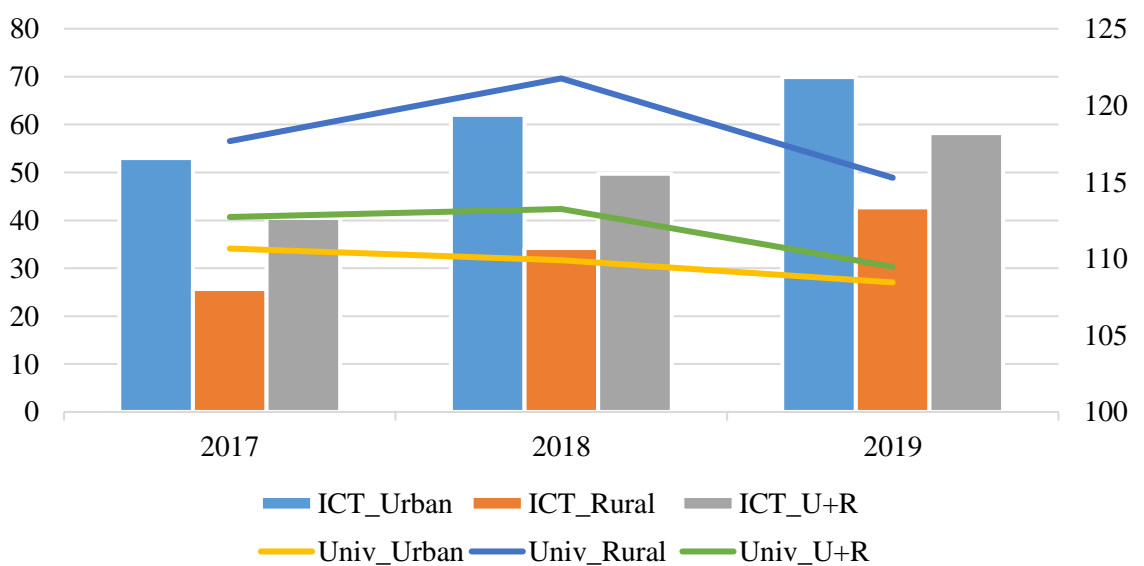


Figure 1.10 ICT skill and University Gross enrollment rate by Living Area, 2017-2019

More prominent and more compact urban regions unreasonably lure more skilled or educated labor. Meanwhile, a variable control for education and other observable features, but unobservable labor qualities also can influence productivity might alter orderly beyond municipalities. Accordingly, Glaeser and Maré [6] and Combes, et al. [24], the standard approach is to carry labor fixed-effects when linking personal incomes to density. The productivity advantage of density is recognized from the shifts in incomes given labor expertise when switching occupations. Higher unobserved skills might be fundamental to a labor due to upbringing or natural ability, yet they might also evolve gradually as the labor accumulates job experience.

Important matters, which are the government's responsibility, are establishing Indonesia's human resources related to labor abilities (experience and knowledge). Thus, regional human resources quality can be developed by boosting healthcare and education. As a result, solid human capital could attract investors because investors favor investing in a state where the quality of labor is extraordinary. Therefore, to not miss the chances in job creation, particularly in the bonus demographic era, the Indonesian government should be concerned about our human development.

Regrettably, Indonesian workers are in low education. BPS explained that Indonesia has 90% of workers with education under the university (see Figure 1.11). Exacerbated in 2019, approximately 41% of employees in Indonesia are ungraduated from elementary school, or in other words, Indonesia has workers abundantly with under skill and education. This situation is undoubtedly caused a misfortune labor market in Indonesia. Furthermore, almost 10% of labor has university education level. The most significant hurdle when sustaining investment in education is how much the lifetime return used to study. Overestimations in education can lift the probability of obtaining a brilliant forthcoming workplace sturdy financial risk on investors.

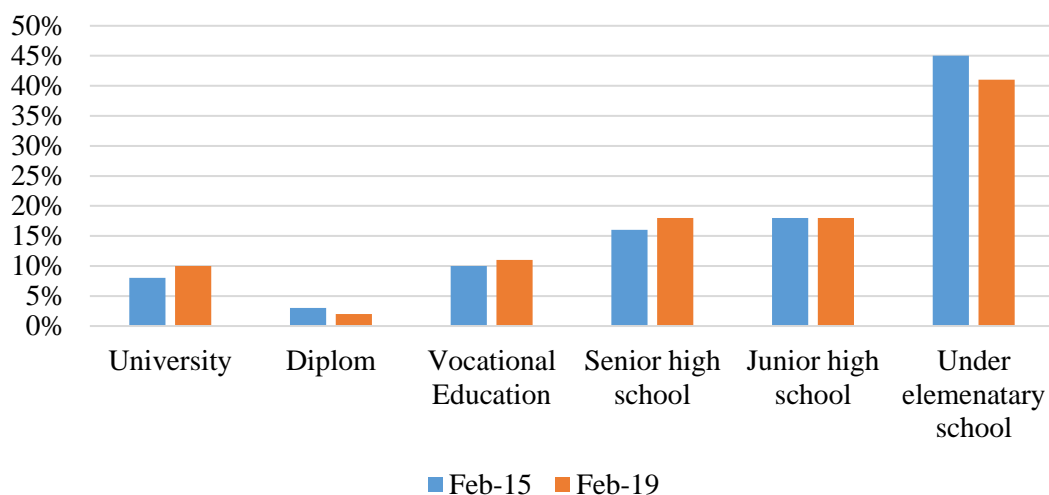


Figure 1.11 Worker Education Level, Indonesia, 2015 and 2019

Unavoidably, outstanding engagement between the private and education providers is obliged to assure graduates suffice the labor market demands. Significantly, Indonesia is grappling with a drastic skills shortage, with majority of the workforce underneath the requirements for their careers and labor market needs. Notwithstanding, between 2015 and 2019 has improved educational attainment (see Figure 1.11), while numerous older workers, notably not yet finishing secondary school. Another fragility is that Indonesian youth cannot get proper skill education to meet the labor market in Indonesia. Consequently, the authorization action in revitalizing the student talent to responsiveness and readjust the education policy. Meantime, the gap of average wage per hour between high education and no education is so wide (table 1.10). Hypothetically, education is one of determination the salary.

Table 1.10 – Average wage per hour based on education level in Indonesia, 2015-2018

Education Level	Average wage per hour by education level (in Rupiah)			
	2015	2016	2017	2018
Elementary school	6 662	8 199	8 538	9 310
Junior high school	7 634	9 257	10 263	10 789
Senior high school	10 778	13 632	15 117	15 325
Vocational school	10 921	13 252	14 871	15 068
College	18 080	21 914	21 690	22 461
University	25 068	28 234	29 217	29 509

The local labor market is established by the collaboration of firms and labor with heterogeneous abilities in several areas, given the strong interaction between housing and labor markets [130]. Likewise, Barufi and Haddad, Wheaton and Lewis [18] prove the idea that the local labor market forms the basis of increasing returns. If workers are highly productive, then salaries must reflect this advantage. They also explained that when more workers are in certain occupations or industries, and matching is raised, workers prefer to deepen rather than expand their human capital, resulting in productivity and innovation.

Duranton and Puga [29] categorized three systems beyond greater productivity in big cities: faster learning and better dimensions of knowledge, compatibility between firms and workers, and sharing facilities and risks. Puga [17] argues that better compatibility is an essential factor in economic agglomeration. Bleakley and Lin [83] attempted to scale it indirectly via the share of work and industrial change, while Andersson et al. [131] and Dauth et al. [132], throughout classify matching in times of labor and firm quality proved better compatibility in urban areas.

According to Glaeser and Maré [6] and Glaeser and Resseger (2010), this event appears due to skillful employees being allured by cities and cities, causing them more proficient at obtaining face-to-face connections and more productive and rapid buildup of human capital. They highlight that individual skills (in terms of education) constitute one-third of the difference in income inequality (proxied by the Gini index) in all cosmopolitan areas. Subsequently, the correlation between the employee's educational attainment and the probability of migration is positive. The significant influence of education on migration may increase due to highly educated labor probably be more systematic in studying employment chances in alternative labor [44]. Notwithstanding, its caused the brain-drain phenomenon in the rural area.

With the impact of the Industrial Revolution, labor demand with higher skilled has emerged, particularly employees who possess digital literacy or knowledge of ICT. The ICT competence index is a proxy of the index growth of citizens' expertise levels in ICT. Based on data of BPS from 2012 to 2015, generally Indonesia at a high and moderate level (see Figure 1.12). Partially, the majority of provinces in Sumatra Island,

Kalimantan Island and Java Island have high and moderate skill growth rates. Otherwise, the islands in the east part have a low index. This inequality is caused by unbalanced economic growth and activities and the concentrated development infrastructure in Java, Kalimantan and Sumatra. Therefore, the rest of Indonesia is still struggling to connect. Further, we can recognize that regions with low levels of digital literacy could not improve their regional economy, particularly they could not create new business opportunities. Therefore, Indonesia is facing tremendous inequality between west and east part.



Figure 1.12 ICT competence index (2012-2015)

According to Figure 1.13, generally, the dimension of youths and adults with ICT abilities enhanced by a proportion of 4.79%. A notable improvement was detected in Kalimantan, wherein in 2015, the portion possessed was 28.11% and improved by 5.97% the following year. On the one hand, Java still rules with 39.83% and surpasses Indonesia's rate by 31.83% in 2016 and was followed by Kalimantan. Hypothetically, the crowd area in Indonesia is also followed by educated people and technological advances. Otherwise, eastern Indonesia (Maluku and Papua) with points under 25% imply a scarcity of inhabitants with sufficient ICT abilities, prompting an underdeveloped economy in these regions.

Nonetheless, the small amount of the creativity element reveals that pupils are scarcely facilitated in improving and sharpening creativity either at home or at school

(Siberkreasi Kemkominfo, 2018). Therefore, the regeneration of Indonesia's education system becomes a critical schedule of fronting the demographic dividend and digital era. The availability of an education system that can support students' creativity would assist them in creating unique startups and strengthen the Indonesian economy [163]. Therefore, the Indonesian community becomes the users and producers that can fight at the ASEAN and global levels.

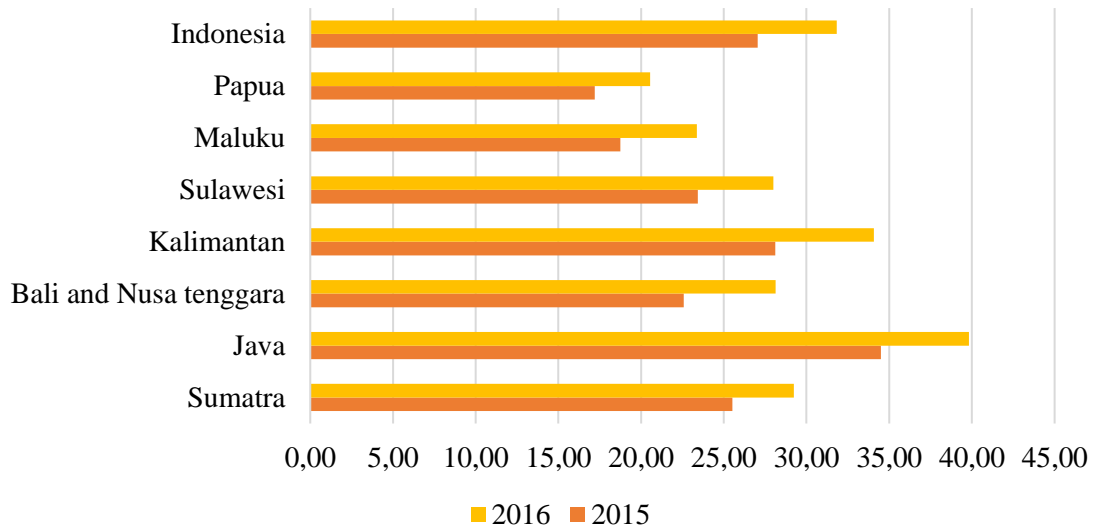


Figure 1.13 The proportion of Youth and Adults (15-59) with ICT Skills by Island (%)

Additionally, at the province level, the ICT skill is dominated by Jakarta as Indonesia's capital city, even though the university enrollment is moderate (see Figure 1.14). The anomaly of the situation in Indonesia is mostly of provinces with high ICT skills following with low university enrollment rates. Another hypothesis about this situation is that human resources with low education dominate Indonesia's labor market. In other words, dense areas provide facilities that improve ICT skills that can push youth society to enter the labor market earlier. On the other hand, these facilitations also create stigma about unnecessary and high cost for university enrollment.

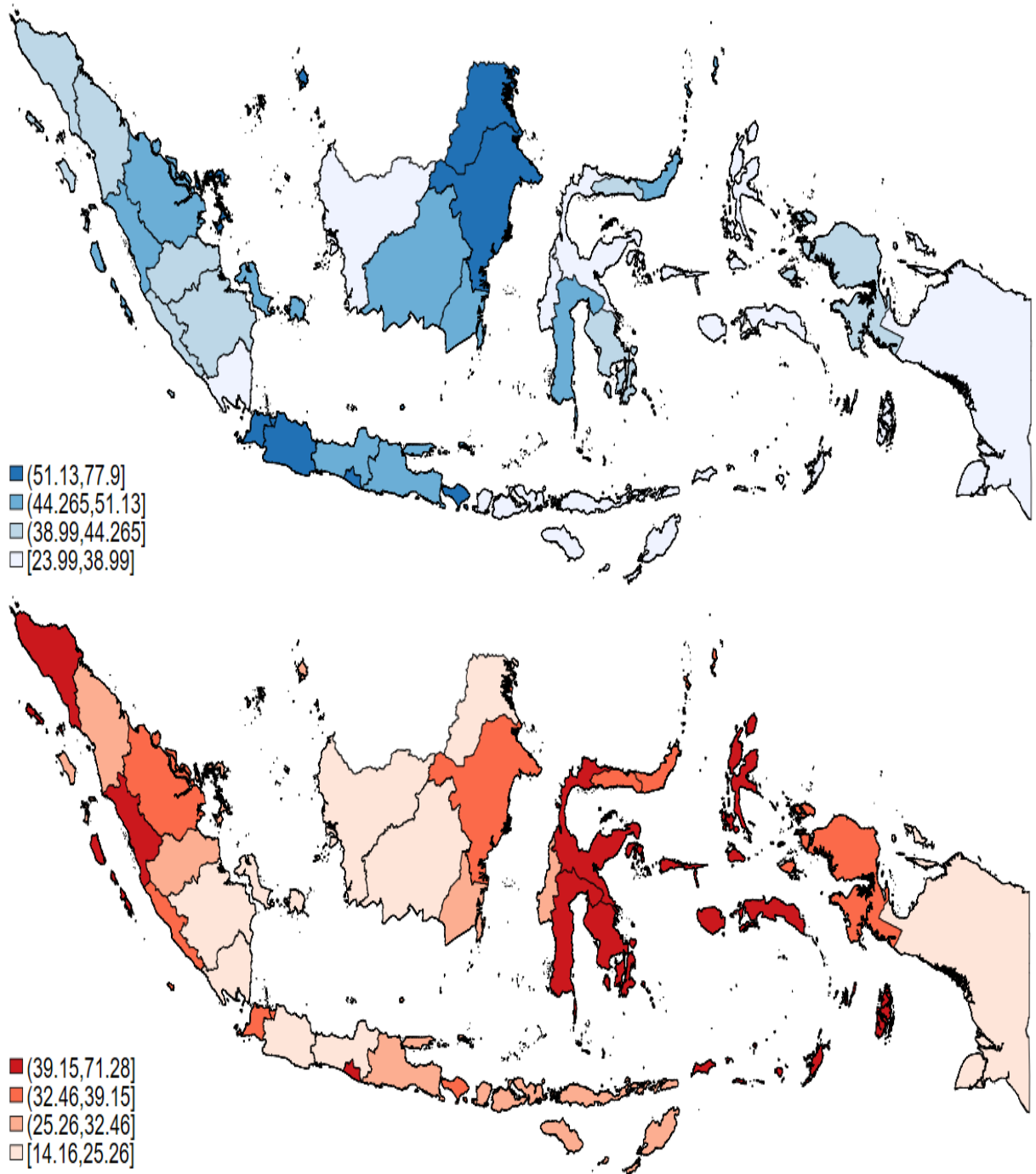


Figure 1.14 ICT skill and University Gross enrollment rate by provinces, 2019

Generally, the urban wage premium that applies in urban areas is the effect of labor productivity in urban locations, or whether they arise from workers who prefer more favorable jobs and live in cities. Further, Glaeser and Ressenager [32] hypothesize that the relationship amid productivity and regional size mirrors the propensity of more talented people to locate in the metropolitan area. According to Halfdanarson et al. [7], this condition affects each region in the proportion of their labor force, with urban labor

on average more educated than those in rural areas. Hence, Glaeser [125] formulates that metropolitan density can stimulate the rate of synergy between people with extraordinary abilities that can be imitated or the pace at which somebody has new expertise. Hypothetically, the wage becomes one factor in attracting the local labor market and improving urban productivity.

Meanwhile, the segmentation of working in metropolitan in Indonesia also attract the low education worker. Hence, this attraction could boost the productivity and economy of urban areas and create other problems such as slum areas. The high productivity and promising premium wage would be demanded of high skill labor. Urban is equipped with the great amenities that could accelerate the interaction between people with the capable skills or high education. Hence, hypothetically, urban is a place where people with education or new skill are gathering. The convergence of educated people in one area and their ability to adjust with new era could be the catalyst of sustainable economic development in Indonesia and particularly in urban areas. On the other hand, not all of people in urban could get the standard education. Hence, those complexities create the difference of productivity in each area. Assume that all people in urban areas could get the standard education for facing the new industrial revolution or we called as knowledge spillover, so it would improve the urban development and support the sustainable economic growth. Consequentially, other areas could have an impact on the improvement of urban areas.

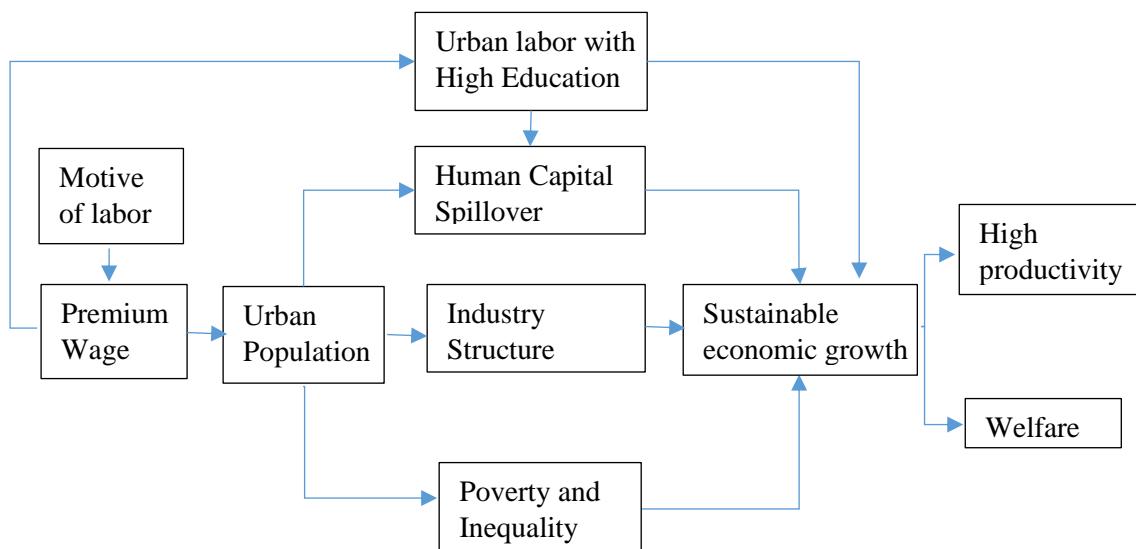


Figure 1.15 Research Framework

CONCLUSIONS ON CHAPTER 1

Indonesia is a vast contributor to ASEANs economy and the higher population. The speed of economy growth supported also by the urbanization promptness, particularly in Java Island. Several metropolitans are located also in this island, such as Jakarta and Surabaya. Another endowment of Indonesia is demographic dividend. Indonesia acknowledges by one of countries with mass population, thus, bonus demographic is another optimism to boost Indonesia economy and welfare. Notwithstanding, Indonesia's endowment could be a disaster, if they are mismanagement and have low quality. Regarding the Indonesia's labor market structure, which 90% of workers with education under the university and almost half of them are ungraduated from elementary school. Conclusively, the Indonesia's labor market is shortage with educated labor.

Agonizingly, more than of 50% of workers are located in Java and in urban areas. Hence, these regions have benefit such as great economy, but also have problem with the density and labor market quality. The motive of these workers migrates to urban because of the urban premium wage. Unquestionably, the urban circumstances led not only brilliant people to move to urban, but also uneducated labor. Undeniably, urban areas have problem, such as disequilibrium labor market, poverty, and inequality. Hence, those complexities create the difference of productivity in each area. Therefore, it is inevitable that urban can facilitate the adjustment speed between labor readiness and the developing era to ensure a sustainable economy.

Chapter 2. FORMS OF INTERACTION BETWEEN FACTORS OF THE LABOR MARKET: METHODOLOGICAL ASPECTS OF THE ANALYSIS

2.1 Methodological approaches variables of the local labor market in cities

Several studies believe that location is a factor in maximizing profit and the catalyst of a sustainable economy [133–136]. Historically, a great location was a location with port and fertile land; then, firms and people agglomerated [134,136]. Over time, this location becomes massive; hence Wheeler [113] concluded that productivity and geographic density are connected. Pragmatically, the two are firmly connected – productivity, estimated in several methods (e.g., total and average factor, and labor incomes), raises positively with density. Theoretically, either of some underlying sources might drive the connection. Hence, agglomeration economics is a profound thought that involves any consequence that progresses firms' and workers' income when the local economy's size expands.

Theoretically, agglomeration economies have several classifications for the numerous schemes following them. Pioneered by Marshall (1890), who classified agglomeration influences into intermediate input linkages, labor pooling, and technological spillovers, transformer to typology introduced by Duranton and Puga [29]. They acquainted that agglomeration effects should consider matching, learning, and sharing outcomes. Firstly, matching consequences resemble the development of any quantity or quality of equilibrium amid firms and employees. Meanwhile, learning impacts entangle the youth, outspread, and knowledge agglomerate. The sharing effects are currently well-known; this effect produces the benefits from a more comprehensive kind of inputs and industrial specialization, the general method of regional inseparable goods and facilities, and risk fusing. Eventually, these components need an empirical assessment of their respective roles behind agglomeration economies.

To determining the overall influence of a regional attribute, alike the consequence of regional work density on regional productivity, cannot recognize whether the predicted influence appears mostly from learning, matching, or sharing

mechanisms, or all of them concurrently. Mainly concrete agglomeration outcomes can alter to negative beyond some city size inception or provoke associated negative effects. It cannot be concluded whether negative impacts counterbalance some positive outcomes because only the total net impacts are estimated. In addition, while some schemes intend to direct static accumulation from agglomeration, other outcomes are dynamic and impact regional growth. Acknowledged all of these theoretical dilemmas in the analysis framework, essentially, it is required to suitably pick the relevant empirical terms, interpret the outcomes precisely, and review forecast enigmas. Importantly knowing even if the outcomes of the systems associated with agglomeration economies are not distinguished individually. For example, how much productivity grows when one increases the number of workers per km² in a town is critical to knowing both firms' and workers' choice of place or economic policy scheme.

Firstly, analyzes a perspective of outwardly singular heterogeneity amidst firms and workers. Assign $Y_{c,t}$ be the outcome of a firm characteristic settled in market c at time t . The firm utilizes two inputs, labor ($L_{c,t}$) and capital ($K_{c,t}$), like intermediate inputs or land. Hence, the firm's profit can be calculated using the following formula (1):

$$\pi_{c,t} = p_{c,t}Y_{c,t} - \omega_{c,t}L_{c,t} - r_{c,t}K_{c,t}, \quad (1)$$

where $p_{c,t}$ — the output price;

$\omega_{c,t}$ — the salary rate in the regional labor market;

$r_{c,t}$ — the value of other inputs.

Assume that Cobb–Douglas production function can be written using the following equation (2):

$$Y_{c,t} = \frac{A_{c,t}}{\alpha^\alpha(1-\alpha)^{1-\alpha}} (s_{c,t}L_{c,t})^\alpha K_{c,t}^{1-\alpha}, \quad (2)$$

where a parameter is $0 < \alpha < 1$;

$A_{c,t}$ — the local TFP;

$s_{c,t}$ — regional labor abilities.

Assumed that all regional labor and firms are alike, these sizes depend on c and t solely. Consecutively, this also implies for $p_{c,t}$, $\omega_{c,t}$ and $r_{c,t}$. In competitive equilibrium, the first-order conditions for optimal input use are reduced to the following equation (3):

$$w_{c,t} = \left(p_{c,t} \frac{A_{c,t}}{(r_{c,t})^{1-\alpha}} \right)^{1/\alpha} s_{c,t} \equiv B_{c,t} s_{c,t} \quad (3)$$

Combes and Gobillon [129] asserted that labor skills, $s_{c,t}$ influenced the regional average nominal wage and a compound local productivity impact, $B_{c,t}$. Equation (3) is adequate to embrace nearly all agglomeration influences inquired. Following Buchanan (1965) in [129], towns are the location where users and firms share inseparable commodities like airports, universities, and hospitals, which appear in a first-type agglomeration economy. Hence, the medley labor productivity impact, $B_{c,t}$, and the regional average salary are bigger in more populated regions because $A_{c,t}$ is more prominent because of regional (public) goods. Combes and Gobillon [129] resemble the first character of pure regional externality because the market does not mediate it. The second character of pure regional externality, quite varied. Appearances spatial concentration provokes regional expertise spillovers that produce firms more fruitful [13,68,125]. In line with the early endogenous growth model by Lucas [137]. Remarkably, this character of scheme performs $A_{c,t}$ more significant in bigger municipalities. Nowadays, all these consequences are immediate and change the current values of $A_{c,t}$ solely [13,68,125].

Equation (3) displays pure and market agglomeration systems that include the local economy's size. The employment, structure, production, or population could be the suitable general variable to estimate the regional market dimension. Nonetheless, the association within certain variables is frequently extremely significant to identify their own outcomes individually, and one ought to restrain the interpretation to one of them. Employment is ordinarily favored to the people first due to it suitably mirrors the size of regional economic activity. Next, Combes and Gobillon [129] claimed that several variables could only be formed from the workforce, such as density.

Notwithstanding, employment also formed other variables, for instance, density, market potential, human capital externalities, and industrial specialization.

Furthermore, Ciccone and Hall [8] dispute that the local economy's capacity should be estimated by people per land or interpreted as density. Admittedly, there is ordinarily mass heterogeneity in the spatial scope of the geographic parts applied, caused by these parts are frequently related to official borders. This can also perform random border impacts linked to the changeable areal unit problem. Several conclusions pointed out that empirical works could rely on the spatial categorization applied in their studies, particularly the spatial units' shape and size. Utilizing density should minimize issues about the local economy's mismeasurement, relative to Briant et al. [138]. They present that applying more consistent empirical approaches broadly decreases changeable areal unit obstacle matters.

Moreover, Combes and Gobillon [129] evaluated the whole influences on regional results of spatial convergence and plenty of other aspects of the regional economy, such as workforce formation, industrial form, or contiguity to prominent locations. Historically, representation of "space as a boundary" is segregation of home and workplace, which in the study is used to determine labor market lines as regions in commuting distances from population centers [139,140].

Further, regional productivity and salaries were the central point of observation, yet local characteristics also influence employment decisions and company location. Furthermore, Fernandez and Su [141] asserted that the central labor market concept is thought of battling amid people who may presumbaly be switched in certain vacancies [142]. Notwithstanding the labor market acknowledged on a national or international level, it is often more local for many jobs. Therefore, labor markets identified can vary notably in people's residences' spatial scope pulled into one another. The role of spatial areas in competition conceptualization is to form a frame of the arena in which labor competition happens.

Several practical agglomeration studies have concentrated on the urban and manufacturing size as productivity indicators and knowledge spillovers as an agglomeration economy motive. Sveikauskas [143] argued that the numerous

straightforward methods of establishing large municipalities' labor productivity benefits might arise throughout regressions associating to $\log(V/L)_c$ and $\log Pop_c$. Nevertheless, due to workers' quality commonly rising with urban rate, it is mandatory to allow for this effect by including a labor quality condition in the approach. Thus, the equation (4) examined is

$$\text{Log}(V/L)_c = \alpha + \beta_1 \log Pop_c + \beta_2 \log Edu_c + \varepsilon_{ct}, \quad (4)$$

where V/L – the value added by manufacture divided by labor or labor productivity in c region;

Edu_c – the average education years obtained by persons aged 25 or above inside each urban region and admitted as a labor quality index;

β_1 – the coefficient of main concern, is assumed to be remarkably greater than zero. This coefficient represents the percentage progress in labor productivity that is related to an urban size doubling.

Moreover, Segal [144] showed an interest in economic differences, from a production viewpoint, between small and large cities. He used a dummy variable for size to detect amidst the two size classifications. When it comes to comparing production relations in the small and large cities, we note three possibilities. Both the large and small towns may have the same production function, with the same constant term. Second, the production function may be identical across the two size categories, but the continuous terms may differ. Finally, the production functions themselves may differ. Using the data of standard metropolitan Statistical Area and census government area, Segal formed his model as follow:

$$Q_c = \alpha + \beta_1 K_c + \beta_2 L_c + \beta_3 L * Education + \beta_4 L * Female + \beta_5 L * Age + \beta_6 L * White + \beta_7 Size + \beta_8 L * Education + \beta_9 (K/L)_c + \beta_{10} D_1 + \beta_{11} D_2 + \varepsilon_{ct} \quad (5)$$

$$(Q/L)_c = \alpha + \beta_1 K_c + \beta_2 L_c + \beta_3 L * Education + \beta_4 L * Female + \beta_5 L * Age + \beta_6 L * White + \beta_7 Size + \beta_8 L * Education + \beta_9 (K/L)_c + \beta_{10} D_1 + \beta_{11} D_2 + \varepsilon_{ct} \quad (6)$$

Equation (5) and (6) showed the productivity in the metropolitan area depend on several factors,

where Q – city output as an indicator of productivity;

K – capital;

L – labor;

K/L – capital-labor ratio.

Moreover, Segal [140] adds labor characteristics such as the labor education level ($L*Education$), age ($L*Age$), race ($L*White$), and gender ($L*Female$). Furthermore, the Size has represented a city with 2 million inhabitants. Also, Segal added two dummies, namely the region type as urban or not (D_1) and the mining sector or not (D_2). Therefore, Segal uses equation (5) to explain the city's productivity, while equation (6) is to understand labor productivity in the city. Hence, the results showed that city population or city size on productivity has a positive relationship. Henderson [134] found that firms' productivity improves with the industry's size as marked by industry hiring. Additionally-following former theoretical and empirical study-they focus on the return to urban size, not the density. Meanwhile, Ciccone and Hall [8] examined spatial density directly as an accurate determinant.

Moreover, understanding the consequences of economic density on productivity can start with Ciccone and Hall [8] model. To get an essential measure of thickness and a sensible specification for the spillovers' geographical extent, they use much more detailed data by county. Ciccone and Hall [8] claimed that doubling labor density in a municipal results 6% rise in mean worker productivity. This level of regionally increasing returns can reveal more than half of the product per worker's difference beyond lands. Ciccone and Hall [8] started with understanding the productivity without capital, hence the production function means the output produced in an area by employing amount of workers or describing by $f(n, q, a)$, where n is amount of labor, q is output of production, and a is an area. In their function where $\frac{\lambda-1}{\lambda}$ describes the elasticity of land's output per unit concerning economic convergence. Moreover,

Ciccone and Hall [8] formulated that the nation's average labor productivity can be presented using the formula (7, 8):

$$\frac{Q_s}{N_s} = \frac{\sum_{c \in C_s} n_c^\gamma a_c^{-(\gamma-1)}}{N_s} \quad (7)$$

$$\text{with density index } D_s(\gamma) = \frac{\sum_{c \in C_s} n_c^\gamma a_c^{-(\gamma-1)}}{N_s}, \quad (8)$$

where Q_s – the output in a s ;

s – nation;

N_s – amount of labor in nation s ;

n_c – the labor amount in county c ;

γ – the product of the production elasticity;

a_c – the area in county c .

Therefore, the productivity depends on the total of counties, labor, area and elasticity production. Hence, Ciccone and Hall [8] concluded that its equal to the density index in nation s ($D_s(\gamma)$).

Ciccone and Hall [8] formulated a model related density effect at each spatial level. The result claimed that the county density effect is a country impact product. County effect depends on the connection of average county density to country density and density inequality beyond regions. Thus, the state density has raised the power with the weight of employment density at the municipal level. For instance, the mean density in region s is indistinguishable from the nation's mean density, $D_s = D$. Next, applicable to the government, productivity in the area relies solely on the region's labor distribution. Beneath neoclassical circumstances, with $\gamma < 1$, the density determinants would prognosticate lower productivity in regions with a higher mean density and even lower productivity in areas, especially dense and congested zones. But if agglomeration effects surpass overcrowding outcomes, density has the inverse impact. Zones with higher mean density and higher density inequality will have higher productivity levels.

Ciccone and Hall [8] also considered the labor capability relies log-linearly on workers' education average years. $h_c e_c = h_c^\eta$, where η is the elasticity of schooling. Hence, they obtained aggregating to the state level:

$$\frac{Q_s}{N_s} = \phi A_s^\omega D_s(\theta, \eta), \quad (9)$$

$$\text{where } D_s(\theta, \eta) = \frac{\sum_{c \in C_s} (n_c h_c^\eta)^\theta a_c^{1-\theta}}{N_s} \quad (10)$$

Regarding the stochastic specification in equations (9, 10), Ciccone and Hall [8] consider that province productivity A , is scattered log-normally throughout an underlying national level. To prevent the mismeasurement in province productivity, they assume that the estimation error has a log-normal scattering with zero average. They were using this stochastic term in the calculation (9) and getting a new form with logarithms (equation (11)).

$$\log \frac{Q_s}{N_s} = \log \phi + \log D_s(\theta, \eta) + u_s \quad (11)$$

Under neoclassical assumptions, density should be identical omnipresent. The marginal product of labor is lower in a more crowded area. There is arbitrage gain, or a higher living standard is possible by moving an employee from an overgrown area to an uncrowded one. In contrast, the labor is more productive when moved to a congested area with θ greater than one. Vacant other thoughts, the sole equilibrium is for vocation to accumulate in one area. The most straightforward answer, and a realistic one, is that labor prefers to live in the regions that switch off to be uncrowded. These laborers are willing to receive lower salaries in those places.

Moreover, the marginal production cost is adjusted beyond all provinces. The reduction in marginal cost correlated with a tremendous density is counterbalanced by higher product efficiency fees and property rates. The difference of Ciccone and Hall's model with Sveikaskus and Segal is the indicator of urbanization not only population but also the region's density.

In 2002, Ciccone elaborated his previous work (8) and introduced a model with spatial externalities on productivity affected by the region's economic density. Begin from the following calculation, simplifying production by a part of the area in the geographical unit or sub-state s that refers to a broader state c :

$$q = \Omega_s f(nH, k, Q_{sc}, A_{sc}) = \Omega_s ((nH)^\beta k^{1-\beta})^\alpha \left(\frac{Q_{sc}}{A_{sc}} \right)^{\frac{\lambda-1}{\lambda}}, \quad (12)$$

where q expresses the output per unit area\$

Ω_s – a total factor productivity region index;

A_{sc} – the whole façade;

- n – the region number of workers employed;
- H – the mean level of the human labor capital per land;
- k – the physical capital density;
- α – the capital and labor results;
- β – a parameter distribution.

The practical term of calculation (12) implies that spatial externalities are operated by the region's production density Q_{sc}/A_{sc} , as quoted previously $\frac{\lambda-1}{\lambda}$, designing the elasticity of output per area regarding economic density [8,9]. In this term, spatial externalities appear when $\lambda > 1$ [8,9,109].

Remarkable alterations are claimed to have a computable variant of the equation (12). Considering that the labor and capital distribution is uniform inside every spatial unit s beyond c , aggregate production could be formed as $Q_{sc} = A_{sc}q$. Labeling N_{sc} and K_{sc} as the employment and physical capital levels in s , sequentially, and thinking that the capital demand function follows the explanation (equation (13)).

$$K_{sc} = \frac{\alpha(1-\beta)}{r_c} Q_{sc}, \quad (13)$$

where r_c refers to the capital price expected to be consistent in each sub-district s inside the vast area c . Following this premise, labor productivity (Q_{sc}/N_{sc}) is yielded by:

$$\frac{Q_{sc}}{N_{sc}} = \Lambda_c \Omega_{sc}^\omega H_{sc} \left(\frac{N_{sc} H_{sc}}{A_{sc}} \right)^\theta \quad (14)$$

In equation (14), ω is a constant and Λ_c relies on the rental capital price, and is considered standard for all the geographical segments in c . Furthermore, θ estimates the influence on labor productivity of the labor density in sub-state s and it is described in such way in equation (15):

$$\theta = \frac{\alpha\lambda-1}{1-\alpha\lambda(1-\beta)} \quad (15)$$

This model adapts by Dapena et al. [109] in Spain using NUTS-3 statistical regions of the European Union. To attain a Ciccone and Hall's model, Dapena et al. [109] assumed that variations beyond broad areas could be pictured by dummy variables at the large areas level. Hence, by applying logarithms in equation (14),

inserting dummy variables for huge territories and adding the equation (15), they can accomplish the next linear equation (16):

$$\log\left(\frac{Q_{sc}}{N_{sc}}\right) = \text{large region dummies} + \theta \log\left(\frac{Q_{sc}}{N_{sc}}\right) + \gamma H_{sc} \quad (16)$$

Therefore, this equation (16) is followed by several researchers such as Dapena et al. [109], Jofre-Monseny [110] and Martinez-Galarraga, et al. [111]. Dapena et al. [109] estimated several estimations, i.e., ordinary least squares, 2SLS, quantile regressions (QR), and instrumental variable quantile regressions (IVQR) estimators. Meanwhile, Jofre-Monseny [110] using the Poisson regression model, and Martinez-Galarraga et al. [111] implemented OLS and 2SLS. Hence, Martinez-Galarraga et al. [111] found that agglomeration size positively affects labor productivity. This agglomeration size represents density, so the doubled employment density could boost 6-8% of productivity growth. This result is in line with Jofre-Monseny [110] and Dapena et al. [109].

Glaeser and Xiong [41] asserted that large metropolitan areas or denser prefectures create higher productivity. Economists explained the reason for this phenomenon is big cities luxuriate agglomeration economies due to municipal scale addresses more straightforward to dispatch goods or obtain well-matched workers or interchange ideas. Notably, these agglomeration economies are measured either with higher wages [6] or firm productivity [24]. Another research of Glaeser that collaboration with Ressenner in 2010 tried to understand the connection between talents and urban people. Started with associations between productivity, size, and skills in urban area-level supported by available data of Gross Metropolitan Product numbers, not in the individual level. Next, shift to individual-level regressions that accumulate for income data and individual controls. This movement to a familiar nexus between productivity per labor and urban size. The aim of more proficient people to dwell in cosmopolitan areas might indicate a more prominent demand for a more qualified society for city facilities, or possibly that urban disproportionately improve the more experienced workers productivity. These two theories are remarked; if this link indicated facilities demand, it will imply that urban is skilled due to the overflowing labor supply and presume to discern more economical salaries for skilled

labor in the city area [13]. A naive endeavor to restrain the adults with college degrees share at the big cities level earns the subsequent regression:

$$\log\left(\frac{\text{output}}{\text{worker}}\right) = \alpha + \beta_1 \log(\text{pop}) + \beta_2 \text{shares with BA} + \varepsilon \quad (17)$$

Equation (17) showed how productivity, represented by output per worker, is related to labor supply (proxy by population or pop) and proficiency of the labor in urban (showed by share of bachelor degree in urban). Moreover, the result from equation (17) resembles that the consequences of human capital and city size are not autonomous. Next, Glaeser and Ressenher [32] combine those variables and approximation as follow:

$$\log\left(\frac{\text{output}}{\text{worker}}\right) = \alpha + \beta_1 \log(\text{pop}) + \beta_2 \text{shares with BA} + \beta_3 \text{BA} * \text{pop} + \varepsilon \quad (18)$$

Based on equation (17) and adding the term of BA*pop has become equation (18). The term BA*Pop remarks to the interaction of log of area population and shares with college degrees. Based on these equations, Glaeser and Ressenher [32] found that the lagged fraction of the people with college degrees reveals, partially, the skilled regions inclination to become more skillful gradually, as reviewed in Berry and Glaeser [145].

Previously, we understand that higher productivity is higher in large metropolitan areas or denser prefectures, namely human externality or knowledge spillover. This effect following by the premium wage offered by cities. Glaeser and Resseger [32] claimed that substantial revenues increase significantly with abilities, which is harmonious with the idea that more proficient bodies are more productive in their work. Meanwhile, actual revenues do not improve with town capacity, and there is a positive connection beyond the whole society in certain skilled regions. This association could be defined as either indicating a more prominent level of unobserved human capital in those regions or those larger municipalities are unusually obnoxious, and higher salaries compensate for negative facilities.

Furthermore, based on equation (16), Dapena et al. [109] approximate the labor productivity or output per worker (Q_c/N_c) utilizing the average wage in each local labor market (w_c), that collected from data of revenue taxpayers. Acknowledge a

simplistic agglomeration economy model (e.g., Duranton and Puga [29], and beneath usual wage-setting systems, at the integrated regional zone (e.g., at Local Labor Markets or LLMs), the marginal labor product is shown in earnings. Accordingly, the equating to be determined and put the disturbance term could be:

$$\log(w_c) = \theta \log\left(\frac{Q_c}{N_c}\right) + \gamma H_c + \text{shares by sectors} + u_{sc}, \quad (19)$$

where θ and γ – coefficients;

H_c – human capital in the area c .

Then, share by sector is proxy by employment shares on 16 sectors based on Housing and Population Census. To estimate equation (19), Dapena, et al. [109] using several approaches such as ordinary least squares (OLS) estimation, 2SLS estimations, quantile regression (QR) estimations and instrumental variable quantile regression (IVQR) estimator.

Wheeler [146] claimed that industrial agglomeration is accompanied by productivity, on another hand the role of human externality is unconsidered. Based on US Census data from 1980, 1990, and 2000, he concluded that education and experiences-based standards of common human capital increase positively as an industry's labor in the urban area improves. However, the industry size is strongly related to wages, and this cost a doubt of knowledge spillovers.

$$w_{ict}^j = \mu_i + \mu_c + \mu_t + \beta_t X_{ict}^j + \gamma Z_{ct} + \delta M_{ict} + \epsilon_{ict}^j, \quad (20)$$

In equation (20) w_{ict}^j is the log hourly wage of labor j of sector i , urban c , in year t . Further, specific fixed effects of industry, city, and time represent by μ_i , μ_c , and μ_t ; X_{ict}^j is a vector of person-specific noticeable features, including education years, four educational fulfillment pointers (no high school, some high school, some college, college), education years associated with these four pointers, a quartic in experience, eight job dummies, and a dummy of marital status. Z_{ct} denotes a vector of city-time-varying features, embracing log population density, log resident population, the unemployment rate, the overall college fraction, and an estimate of the unionization rate. M_{ict} is a vector involving blends of city-industry labor and human capital and ϵ_{ict}^j is a residual. Remark, the vector X_{ict}^j is defined with a time-varying set of coefficients

to gradually indicate alterations in return to several features (e.g., educational attainment).

Combes et al. [24] elaborated that three factors can describe the spatial disparities in salary rates. First, the spatial wage disparities directly reveal the variation in labor skills beyond regions. Since the industries distribution varies beyond regions, there are spatial disparities in assessable human capital and non-measurable human capital who moved to the region to work in particular industries. Such skills-based descriptions naturally appropriate that the salary of labor i was given by the labor productivity, which independent of an area could describe as:

$$w_i = A s_i, \quad (21)$$

where s_i – personal skills;

A – the labor productivity in a location.

Accordingly, the average salary in the region a (w_a) is the outcome of the average abilities, \bar{s}_a , by the labor productivity or labor human capital level in the zone a , could form as:

$$w_a = A \bar{s}_a \quad (22)$$

Next, the variation in non-human benefits over areas reveals by spatial wage disparities. Non-human benefits involve promising places, beneficial atmospheres for economic activities, specific areas' natural resources, institutions and technology, public and private capital, and other production variables in the region. Hence, the labor's mean monthly salary rate in the region a , w_a , describe as:

$$w_a = A(E)_a, \quad (23)$$

where E_a indicates benefits in the region a that influences employees' productivity undoubtedly.

Then, wage differences develop due to increased productivity brought about by the interchange of ideas among employees and businesses in a given area. These agglomeration economies are separated into two types in urban economics: urbanization economies, which indicate productivity gains due to a city's aggregate market size, and localization economies, which show productivity gains due to the regional convergence of a particular industry. At least three elements contribute to

agglomeration economies: labor pooling, the sharing of intermediate input providers, and knowledge spillover. Firms with higher locational density exchange ideas with each other more frequently, increasing the likelihood of new ideas spilling over. A pooled labor market allows for more suitable job matching between labor and firms, lowers the cost of recruiting workers with specialized skills, and gives individual enterprises more flexibility in modifying the number of workers when they suffer idiosyncratic shocks. Suppliers of intermediate inputs located near where the industry is converged can benefit from economies of scale. As a result, businesses can more efficiently supply their consumers with relatively inexpensive inputs.

Moreover, Lee, et al. [30] proposed that the average monthly wage rate of workers in region j from equation (22) can be written as follows:

$$w_j = A\bar{s}_j, \quad (24)$$

where \bar{s}_j is the human capital average level among workers in area j .

Following Combes et al. [24], Lee, et al. [30] described the worker salary a , who strives in region j in sector i , where I_{aj} represents urbanization economies and I_{aij} represents localization economies. When the three components are combined, their model reveals that the monthly earning of worker a in area j in the industry i may be written using the equation (25).

$$w_{aij} = A(E_{aij}, I_{aj}, I_{aij})s_a \quad (25)$$

As Combes et al. [24], Lee et al. [30] perform a two-stage estimation process. The log value of employees' monthly salary will be regressed on independent variables such as industry, location, and localization economies variables for every industry zone and labor's characters in the first estimation stage. Hence, Lee et al. [30] seek to establish how much three indicators can describe spatial inequalities: productivity differences caused agglomeration economies, labor human capital differences, and promising benefits of places, using data from the 2006 KLPS. As a result, the first step regression can be formulate in equation (26).

$$\log w_{aij} = \beta_i + \alpha_i + X_{aij}\gamma + LE_{ij}\zeta + CM_{ij}\xi + e_{aij} \quad (26)$$

where X_{aij} — individual education level, age, worker experience, gender, labor union dummy in the enterprise, marital status (married or not), divorced or widowed,

the institution size, occupational dummies, and education quality (synergy condition among a person's education level and the institution size where an individual performance) are all included in individual worker's human capital;

LE_{ij} – the economies of localization;

CM_{ij} – the level of competitiveness in the local industry's economic structure;

β_j – the coefficient for every of the dummy variables representing the 171 cities;

α_i – the coefficient for every of the dummy variables representing the 18 major industries;

β_j – the coefficients for 171-area dummy variables generated during the first-stage regression are used as a dependent variable, while the urbanization economies variable and variables indicating local human capital and infrastructure investments are used as independent factors, in equation (27).

$$\beta_j = w_0 + UE_j\theta + E_j\mu + v_j \quad (27)$$

Lee, et al. [30] used this method to discover that in Korea, workers' earnings who work in cooperatives in large cities with a diverse local industrial structure are low. Furthermore, labor who work in institutions that are part of an area-industry where the industry concentrates get higher pay, whereas labor who work in establishments that are part of an area-industry where regional competition amidst companies is fierce earn lower earnings.

Meanwhile, in Italy, Di Addario and Patacchini [20] used a Mincerian wage function (i.e., regressing the logarithm of wages on a linear expression of years of schooling, a quadratic form of experience, and other individual variables) in urban to evaluate the presence of an urban wage premium. Hence, they used a log-linear Mincerian function enhanced with urbanization to regulate individual and local labor market factors in order to test whether the hypothesis of premium salaries in urban regions holds (equation (28)).

$$\log w_i = \alpha_0 + \alpha_1 EDU_i + \alpha_2 EXP_i + \alpha_3 EXP_i^2 + \alpha_4 TEN_i + \alpha_5 TEN_i^2 + \alpha_6 URBAN_i + Z_i\beta + u_i \quad (28)$$

The logarithm of labor' hourly payment rates from main activities, discouraged with the consumer price index for blue-collar labor and households worker, which is the inflation indicator used in national contracts, is the dependent variable of the outcome function. Mincerian variables control for the vector Z , which includes individual characteristics (e.g., sex and marital status), job qualification, family background, ability, some features of the labor's firm (e.g., firm size, industry dummies, type of contract, as in Adamson et al., 2004), the unemployment rate of the local labor market of residence (as in the 'wage gap'), unemployment rates, year dummies, and fixed effects by region, while u is the error term. Lastly, given the local labor market population mass, capture the urban effect (URBAN). By replacing OLS with IV estimate, Di Addario and Patacchini [20] address potential endogeneity concerns.

For instance, in the USA, Wheaton and Lewis [18] determined that a worker in a high-concentration, high-specialization business is effectively in a "one industry city" as well as a "one city industry". The same meaning holds true for jobs, and it is in these hypothetical conditions that the highest earnings are earned. Although the metrics of establishment specialization and concentration show negative signals, it should be emphasized that this is *ceteris paribus* in terms of employment specialization and concentration. When establishment specialization/concentration is high, more businesses employ the same number of workers in a given segment of the labor market, resulting in smaller firm size. As a result, salaries are lower, indicating that monopsony isn't an issue in regional labor markets. Rather, it advocates for some sort of increasing rewards at the establishment level that is unrelated to rising labor market returns [18].

Wheaton and Lewis [18] used the data from the MSAs census. Total salary and salary earnings were divided by the product of weeks worked last year and normal hours worked per week to calculate hourly salaries. The following is the equation that needs to be estimated:

$$\ln(w_i) = \alpha + X_i B + Z_{ij} \Lambda + Y_{kl} \Gamma + \Theta_j + \Phi_k + \Psi_l + \varepsilon_i, \quad (29)$$

where Λ , Γ , Θ , Φ and Ψ – coefficients;

i – an individual;

j – a person's profession;

k – a person's industry;

l – a person's MSA;

X_i – individual-specific characters;

Y_{kl} – sector specialization and gathering labor and enterprises;

Z_{jl} – profession specialization and accumulation.

Glaeser and Maré [6] examined the relation between city and skills. Their first step is analysis the description of the condition in cities. Next, to estimate the regression with individual-level data:

$$\log(w_{kt}) = X'_{kt}\beta + L'_{kt}\Gamma + \phi_k + \varepsilon_{kt} \quad , \quad (30)$$

where w_{kt} – the log of a person's (k) hourly pay at time time t ;

X_{kt} – a personal characteristics vector;

b – the labor market price of those features.

A dummy variable determining whether the person lives in a metropolitan region with a city of more than half-million residents, and a dummy variable catching inhabitants in a metropolitan area without a significant large city, are both included in the expression L_{kt} . The Γ signifies the boost in productivity that comes from living in diverse places. The word refers to the impacts of productivity on individuals (individual ability). Many of the following results are from OLS regressions with ϕ_k to be zero. Primary, they look at the variables' impact that is related to urban status but not necessarily to omitted ability variables. Next, they estimate individual fixed-effects regressions, using ϕ_k as a time-invariant factor that is unique to each individual. This eliminates omitted skill bias (at least the part of individual-specific and time-invariant), but they lose a lot of the important cross-individual variation in the process. Hereinafter, to simplify the previous explanation and former approaches, variables, and results by scholars that are related to urban labor market analysis, we can refer to Table 2.1.

Table 2.1 – Previous studies of approaches, variables, and results of the urban labor market

Name	Methodology	Data Source	Variable	Conclusion
Sveikauskas (1975)	Analysis of relationship between labor productivity, education and city size labor human capital with industry total employment in city and add the time-varying city level characteristics. Further, he analyzed wage depends individual characteristics, localization character and combination of city-industry human capital and employment. Estimation using US census data and OLS and dummy regression	SMAS	Productivity (Value added/labor), population, education, capital ratio, wages	Salaries are considerably more high-priced in populated cities due to higher productivity in large cities. Hence, the labor productivity level is 5.98% larger if the city size doubles.
Segal (1976)	Analysis of directly human capital with industry total employment in city and add the time-varying city level characteristics. Further, he analyzed wage depends individual characteristics, localization character and combination of city-industry human capital and employment Estimation using US census data and OLS	SMSAs, Census of manufactures	Productivity (output/labor), population (size), education, capital stock, capital ratio, wages, labor, gender, age, race, city characteristics (e.g. dummy region, mining sector)	The result shows that output per employee or productivity relies upon the capital/labor ratio, labor quality (education), population (size), race, the regional economy's area value, and how much mining takes place.
Ciccone and Hall (1996)	Analysis education and density elasticity Spatial distribution	GSP, Employment data	Output/worker, density, average education, population, railroad	A magnified employment density enhances average labor productivity by approximately 6%. More than half of the productivity (output per worker) variation beyond nations could describe by differences in the economic activity density.

Continuation of the table 2.1				
Ciccone (2002)	LS (least-squares) and 2SLS (two-stage least-squares) Spatial distribution of employment and spatial fixed effects	NUTS (1-3)	Agglomeration effects, education, and country dummies	Agglomeration impacts in these European nations are only lightly tinier than agglomeration impacts in the US. The assessed labor productivity (average) elasticity concerning labor density is 4.5%, contrasted to 5% in the US.
Wheeler (2007)	Analysis of directly human capital with industry total employment in city and add the time-varying city level characteristics. Further, he analyzed wage depends individual characteristics, localization character and combination of city-industry human capital and employment Estimation using US census data and OLS	Data from the 1980, 1990, and 2000 US Census	Human capital described by (i) average years of schooling, (ii) average years of (potential) work experience, (iii) the fraction of college graduates in total employment, and (iv) the fraction of total hours worked accounted for by college graduates.	The study produces two main outcomes. First, several of education-and experience-based indicators of average human capital raises positively as an industry's labor in urban areas improves. Hereafter, industry clusters do lead to be identified by human capital more abundant stocks. Nevertheless, after estimating the human capital level in an employee's industry, the industry's overall size prevails firmly correlated with salaries. So, outcomes figured some uncertainty on the assumption that localization economies spring from education- or experience-based education spillovers.
Dapena (2004)	Estimation of industry convergence indexes. Correlations analysis among these indexes, productivity levels, and agglomerations.	Spanish Industries Survey, INE Aggregated data at the regional level		Positive and significant relationship among industry clustering, agglomeration, and the productivity level. This association is more powerful for the industries that are specialized in education and technology.
Martinez-Galarraga et al. (2008)	Examination of the agglomeration effect (measured by average employment density) on industrial labor productivity according to Ciccone's approach using OLS and 2SLS.	Several sources and the authors' work Aggregated data at the regional level		Agglomeration size has a significant and positive influence on labor productivity. If the labor density multiplied twice, productivity growth was within 2% and 8%, based on the period and industry.

Continuation of the table 2.1				
Jofre-Monseny (2009)	Examination of the agglomeration effect (measured by average employment density) on industrial labor productivity according to Ciccone's approach using poisson regression model	Spanish National Social Security Registry Individual micro-data aggregated at the NUTS-2 level		Positive and significant effect of agglomeration size over labor productivity: when the employment density doubled, the productivity varied from insignificant changes (in some specific industries) to an increase of 7%, depending on the period of time and industry
Glaeser and Ressenher (2010)	Examination the relation of city effect (measured by output/labor) on skilled population Estimation using OLS model	Metropolitan Statistical Areas (MSAs) under	Productivity (output/labor), population, share with BA, experience, education dummies, real income	This fact is particularly compatible with the view that urban density is important because proximity spreads knowledge, which either makes workers more skilled or entrepreneurs more productive. Bigger cities certainly attract more skilled workers, and there is some evidence suggesting that human capital accumulates more quickly in urban areas.
Glaeser and Maré (2001)	The omitted ability bias and differences in salaries depend on individual characters with OLS and dummy regression.	CPS (Current Population Survey) PSID (Panel Study of Income Dynamics), NLSY (National Longitudinal Survey of Youth)	Hourly wage, live area, productivity, individual ability effect, migration, education, work experience	Proof on migrants and the cross-impact among urban situation and expertise indicates that a substantial part of the premium urban salary accumulates labor gradually and linger with them when they leave towns. Consequently, the urban salary premium part is earnings growth, not a salary level impact. This confirmation recommends that urban rush the human capital accumulation.
Combes et al. (2007)	The examination of variations in salaries relies on individual components and the agglomeration size. Also, it was assessed using pooled data and instrumented variables.	DADS (Annual Social Data Declarations database)	Wage, industry establishment, number of worker, specialization, shares of professional, density, land area, market potential, amenities, diversity	Personal abilities value is a significant part of existing spatial salary disparities with solid proof of spatial sorting by skills. The local density of employment primarily drives interaction effects. Not restraining labor heterogeneity drives to seriously biased judgments of interaction effects. Endowments only surface to play a small role.

Continuation of the table 2.1				
De La Roca and Puga (2017)	The examination of variations in salaries relies on individual components and the agglomeration size. Also, it was assessed using pooled data and instrumented variables.	micro- data of Spanish National Social Security Registry Individual		Agglomeration size has a significant and positive impact on wage levels: if the population size multiplied, productivity increase changed from 2% to 5% based on the model and the control variables number.
Lee et al (2017)	Examination of the convergence industry of salary diversity based on personal character and the agglomeration size using a two-stage estimation model.	Population Census 2000, KLPS 2006, Total Establishments Survey 2000 and 2005, Occupational Employment Survey (OES) 2001 and 2005	Wage, individual characteristic, localization economies (using concentration index), competition economic, urbanization economy, labor density, Herfindahl urbanization index, Ellison–Glaeser urbanization index, average education level, road ratio and local financial independency index	Refined Korea's life quality (e.g., better education services) and/or improved occupation movement in significant heterogeneous urban regions persuade labor to receive proportionately cheaper salaries in those regions. Labor salaries of those who work at enterprises dwelled in populous towns with a broad heterogeneity of regional industrial composition are low. On the one hand, labor who work at enterprises related to the area industry where the industry clusters have higher salaries. On the other hand, labor who work at enterprises refers to the industry clusters where intense local competition has lower salaries.
Di Addario and Patacchini (2008)	Analysis the relation between wage and city depending on the localization economies and individual characteristic Robustness check	Micro-data of Survey of Household Income and Wealth for the years 1995, 1998, 2000 and 2002 from the Bank of Italy	Wage, individual characteristic, experience, education, tenure, unemployment rate, job type, population, size,	Urbanization unaffected returns to experience, and it diminishes returns to education and occupation with the current firm while implementing a premium to labor supervisors.

2.2 Analysis of the effectiveness labor market in urban areas to ensuring the national economic

Cities are hubs of activity where many things happen. In such an environment, fresh perceptions and ideas, which are at the center of technical advancement, are most likely to emerge. Moreover, Combes and Gobillon [129] assessed the overall impact of spatial concentration on local results and various other factors of the local economy, such as workforce creation, industrial structure, and proximity to notable destinations. Following several studies [14,15,30,109], this research started with the density as the city size affects the productivity and human externalities in the city and their neighbor. Hence, from the point of view of the theory of agglomeration economics, a high density of economic space stimulates a faster spread of knowledge and innovation, increases labor productivity, ensures better matching of jobs between workers and firms, reduces the cost of finding workers with special skills, and provides greater flexibility in adjusting the number of workers by individual firms and ultimately contributes to establishing a balance between supply and demand in the labor market. At the same time, the theory of development economics shows that in countries with developing markets, the relationships between density, productivity, wages, population dynamics, level of education, and other characteristics of the labor market that have been identified for countries with developed market economies are often not confirmed.

To solve this problem, started by clarifying the content of the concept of “density of economic space” in relation to the analysis of the labor market. The current interpretation of the density of economic space recognizes it as a concentration of population and economic activity in a specific territory. Hence, it proposes to supplement the analysis of the economic density space by, firstly, considering the spatial unevenness of population distribution within the analyzed territorial taxa and, secondly, regarding the socio-economic and demographic characteristics of the population concentrated in a specific territory.

Table 2.2 – Factors that must be considered when analyzing the metropolises labor markets

	Factor	Impact on labor market development
1.	Differentiation of population density within the analyzed territorial taxon generated other things by natural geographical restrictions.	<ul style="list-style-type: none"> - The “surpluses of concentration” of the population circumstance, when a significant excess of density characterizes a territory compared to the average. - Overconcentration of population occurs in a relatively small area. At the same time, cities, as focal points of concentration, act as centers of magnet for the people of the entire country.
2.	The predominant type of national economy in terms of production, employment, and scale of presence in the country.	<ul style="list-style-type: none"> - Dynamics and structure of labor demand, including in terms of education level and qualifications. - Modernization of the urban agglomeration economy in the digitalization context, contributing to the growth of inequality and wage differentiation.
3.	Dynamics of demographic processes, characterizing the stage of demographic transition	<ul style="list-style-type: none"> - A high proportion of young people and the working population in general in the country's population. - Active migration processes from rural to cities, involve substantial masses of people with low education and qualifications. - The presence of a demographic dividend.
4.	Dynamics of the urbanization process and the specifics of its spatial distribution and localization.	<ul style="list-style-type: none"> - Accelerated population growth in the largest cities. - Limited opportunities for migrants from rural areas and small towns to “fit” into the economy of the largest cities.
5.	The existing model of state participation in the process of modernization of the economies of countries with emerging markets.	<ul style="list-style-type: none"> - Initiating significant institutional changes affecting the labor market - Growth of the public sector, involvement of new economy sectors, employment areas, labor market participants, and actors in the sphere of planning and programming.

Analysis of the spatial unevenness of population distribution makes it possible to acknowledge such aspects as, for example, overconcentration of the population in small areas, differences in the allocation of administrative-territorial entities at the

subnational level, and the territorial accessibility of settlements. Population characteristics analysis allows us to identify situations of concentration of certain socio-demographic and demographic groups in multi-level territorial taxa, clarify the features of urbanization, and develop public policy. Therefore, based on the theoretical and methodological approaches of agglomeration economics and development economics, factors were identified that must be assessed when analyzing the labor markets of the largest cities operating in the high-density economic space of countries with developing markets (see Table 2.2).

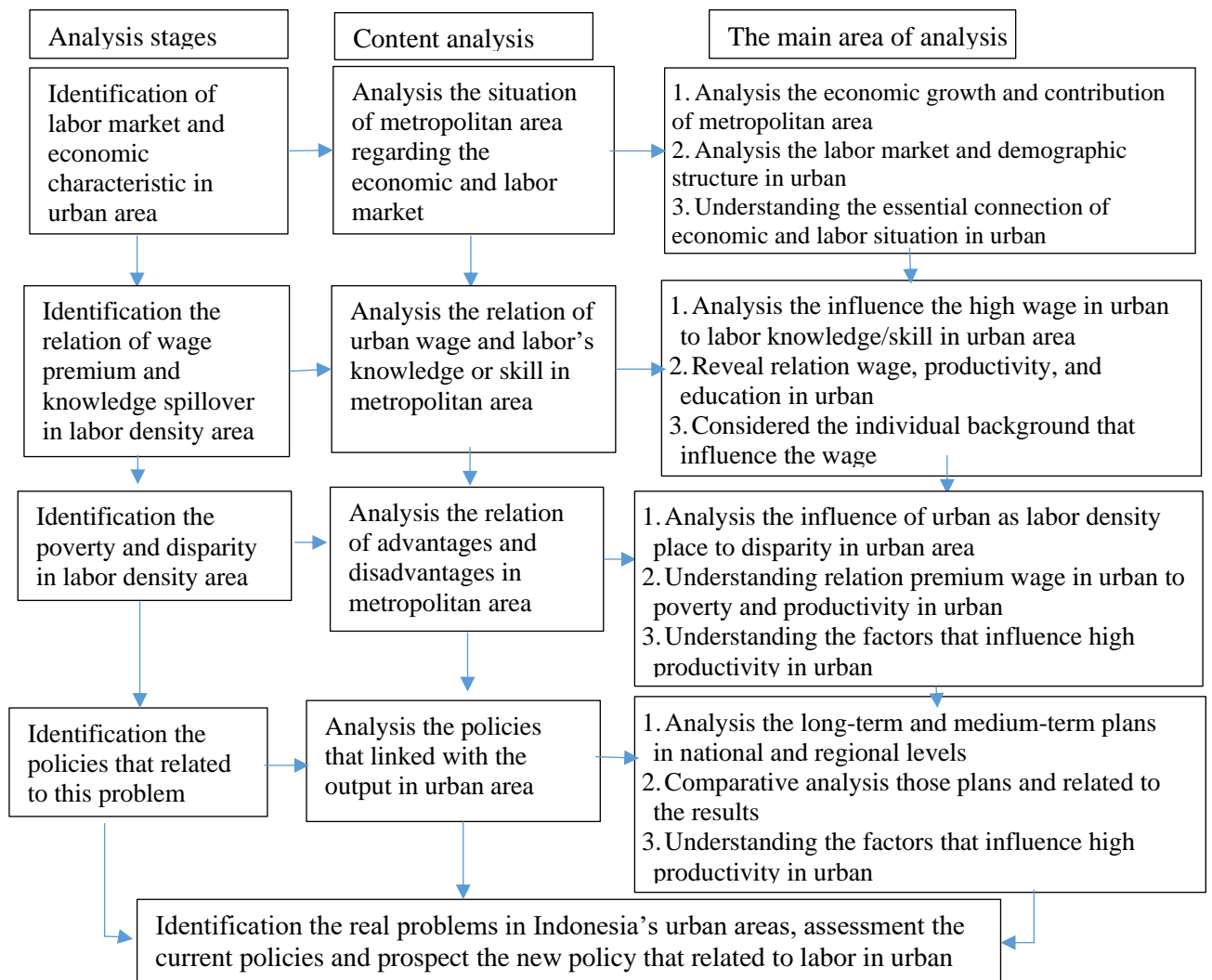


Figure 2.1 Conceptual scheme for analyzing the labor markets of the largest cities in Indonesia

A notable example of “excesses of concentration” of the population is the Republic of Indonesia, which includes Java Island is one of the most densely populated areas on the planet, with a population density of over 1000 people/km² and an average

population density of 149 people/km². The country's two largest urban agglomerations are also located on this island. Considering the above factors, a conceptual analysis scheme has been proposed that allows both to identify the features of the metropolitan labor market development in the demographic transition conditions and to formulate proposals for improving public policy (Fig. 2.1).

The development of theoretical and methodological approaches in agglomeration economics theory to analyze the density effects of economic activity at different spatial levels, the paper offered a methodology that allows us to study these outcomes in linkage to high-density labor markets of the largest cities, viewing the specific stage of demographic transition. The methodology is according to the subsequent principles. Firstly, assuming two groups of factors characterizing the specifics of the labor force and the certain of the urban economy. Secondly, expanding the list of factors used in assessing the density effects by including indicators characterizing the education level, workforce quality, wage premiums, and work experience (considering both the formal and informal sectors). Thirdly, the benefit of the analysis results is not only to elaborate the understanding of the particular object development under study but also to substantiate recommendations for improving government regulation, reflecting the specifics of the current stage of country development in demographic transition circumstances. Both microdata (in particular, individual characteristics of the labor force, i.e., education, work experience, marital status, sector of employment) and macrodata (GDP, productivity, minimum wage, population density, poverty, etc.) were used to gain insight into the urban labor market.

Based on the table 2.1, analysis of productivity and education conducted by Sveikauskas (1975) and Segal (1976), started with Sveikauskas that considered the productivity impacted by education (proxied with the median years of education completed by persons aged twenty-five or over in city) and city size (represented by population). Meanwhile, Segal upgraded it with several individual characteristic and the 2 dummies, i.e type of region and mining sector or not. The similarity between them is using the proxy of productivity and population. Furthermore, inspired by

Sveikaskus and Segal, Ciccone and Hall elaborate their model. The Ciccone and Hall's model changed the indicator of urbanization from population but the region's density (showed in equation 7-11). Next, in 2002, Ciccone elaborated his model and switched the education of labor to be human capital level in the region (showed in equation 12-15).

Then, Dapena, et al. and numerous authors adopted the Ciccone's model (showed in equation 16), while they have differences. The modifications by Dapena, et al. were added the contribution of sector. Henceforth, in this study we combined several variables that mentioned previously. The numerous variables, that applied in this study, are the productivity, density, the characteristic of economy structure and human capital level in those regions. The productivity represents by the output per labor or in another word is labor productivity. Hence, applied a notion of Ciccone and Hall, Ciccone, and Dapena et al., this research considered how is density effect the productivity and human capital as the effect of agglomeration economies also influence the productivity in region. Moreover, learned from Sagel, that put the mining characteristic, localization economic also considered by measured the industry share in GDP. Thus, based on the equation 4 and 6, we transform dummy of mining sector to the localization economic proxy by the share of industry sector of the region and population to density. Next, we considered the human development index as the human level in that region like mentioned by Ciccone, while Wheeler using (i) average years of schooling, experience, and ratio of college graduates in total employment for described human capital in a sector. Therefore, the proposed methodology includes five sequentially implemented stages. The first stage examines how the labor market density, the quality of the workforce, and the economic structure affect labor productivity in the city. The general formula for the linear regression model reflecting the relationship between productivity and other parameters characterizing the city's economy is as follows:

$$prod_c = \alpha_1 + \beta_1 D_c + \beta_2 HI_c + \beta_3 LE_c + \varepsilon \quad (31)$$

where $prod_c$ – the c region's productivity;

D_c – density;

HI_c – human development index;

LE_c – localization economic that proxy of the industrial share sectors to GDP in c region.

The structure of equation (31) resembles a standard production function model, but the inclusion of these additional variables enriches the analysis beyond the traditional approach, particularly applied the variables that can collected in the aggregate level. Moreover, assumed the neighbor also have the positive agglomeration effect, hence the spatial contiguity also considered in this research. Spatial weights are a key component in any cross-sectional analysis of spatial dependence and an essential element in the specification of the spatial variables in a model. Thus, the spatial weights w_{ij} are non-zero when i and j are neighbors, and zero otherwise. By convention, the self-neighbor relation is excluded, so that the diagonal elements of W are zero, $w_{ii} = 0$. In its most simple form, the spatial weights matrix expresses the existence of a neighbor relation in binary form, with weights 1 and 0. Formally, each spatial unit is represented in the matrix by a row i , and the potential neighbors by the columns j , with $j \neq i$. The existence of a neighbor relation between the spatial unit corresponding to row i and the one matching column j follows then as $w_{ij} = W_{ij} = 1$. For the geographic case, weight (W) could construct by the distance in terms of the Euclidean distance. Consider the equation 31 and the spatial weight with $prod_c$ is dependent variable and others are independent variables. Then, considered spatial matter of identifying the productivity, agglomeration effect, and human capital within region; hence the general form of spatial regression model can be represented as an equation (32):

$$\log prod_c = \alpha_1 + \beta_1 WD_c + \beta_2 WHI_c + \beta_3 WLE_c + \varepsilon \quad (32)$$

where W is spatial weight and ε is a vector of error.

In general, vectors and matrices can be written as follows (33-36):

$$prod_c = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{bmatrix} \quad (33)$$

$$D = \begin{bmatrix} 1 & D_{11} & \dots & D_{1p} \\ 1 & D_{21} & \dots & D_{2p} \\ \vdots & \vdots & \ddots & \vdots \\ 1 & D_{n1} & \dots & D_{np} \end{bmatrix} \quad (34)$$

$$HI = \begin{bmatrix} 1 & HI_{11} & \dots & HI_{1p} \\ 1 & HI_{21} & \dots & HI_{2p} \\ \vdots & \vdots & \ddots & \vdots \\ 1 & HI_{n1} & \dots & HI_{np} \end{bmatrix} \quad (35)$$

$$LE = \begin{bmatrix} 1 & LE_{11} & \dots & LE_{1p} \\ 1 & LE_{21} & \dots & LE_{2p} \\ \vdots & \vdots & \ddots & \vdots \\ 1 & LE_{n1} & \dots & LE_{np} \end{bmatrix} \quad (36)$$

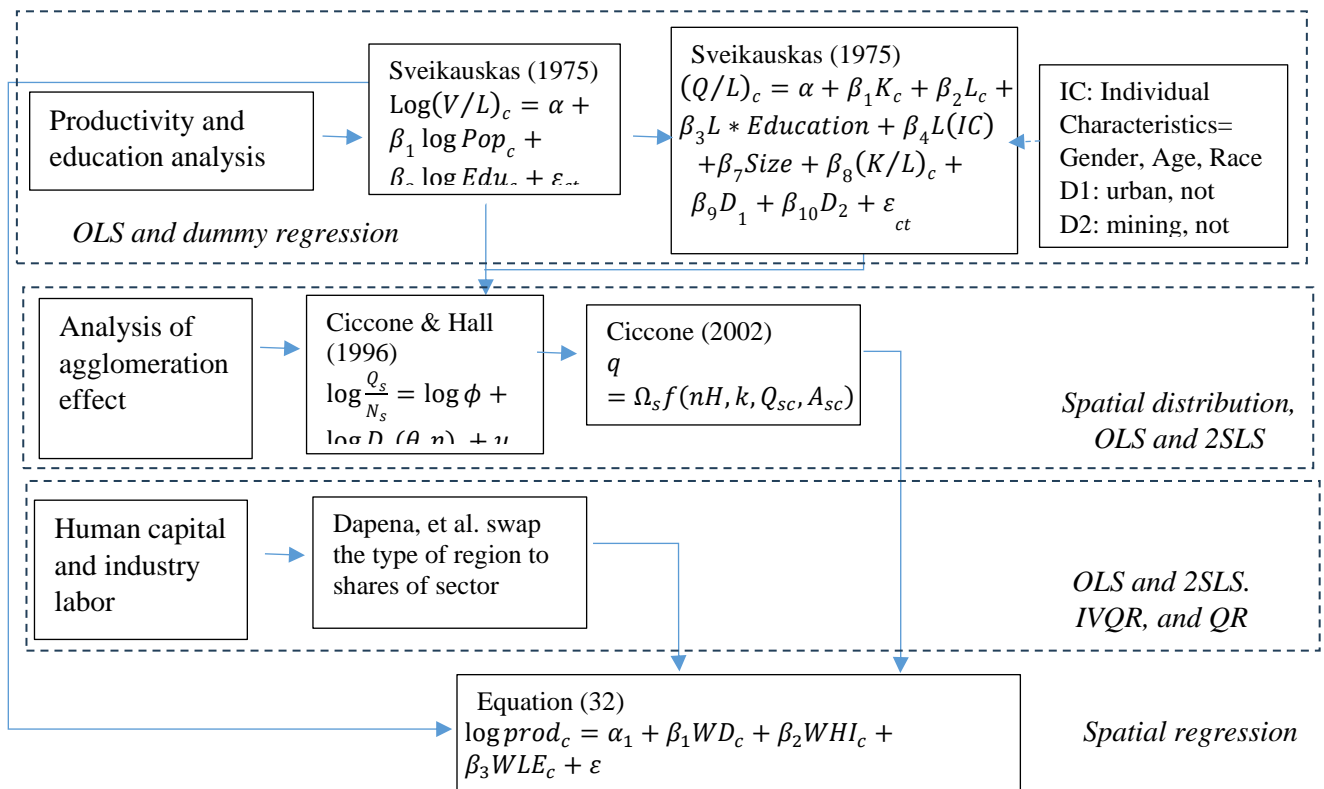


Figure 2.2 The equation (32) framework

The considered neighborhood to capture spatial dependencies represents an extension of previous models. This equation acknowledges the influence of neighboring regions, acknowledging that productivity might be affected by spatial contiguity or distance, which is often overlooked in standard econometric analyses. Hence, this model combines the productivity and education analysis that conducted by

Sveikaukas and Segal with spatial distribution and agglomeration effects that believed by Ciccone and Hall (1996), Ciccone (2002), Martinez-Galarraga et al. (2008), Jofre-Monseny (2009), and De La Roca and Puga (2017). Therefore, the equation (32) constructed, as follows:

Furthermore, such as Glaeser and Maré [6] and Glaeser and Ressenner [32] conducted analysis regarding the urbanization and skill accumulation or knowledge spillover. They used individual-level regressions that use income data and individual controls. This interchanges to well-known connection between city size and productivity per worker. The tendency of more skilled people to live in metropolitan areas might reflect a greater demand of more skilled people for urban amenities, or perhaps that cities disproportionately increase the productivity of more skilled workers. These two theories can be distinguished; if this connection reflected a demand for amenities, it would mean that cities are skilled because of abundant labor supply, and we should expect to see lower wages for skilled workers in big cities (13). A naive attempt to control for the share of adults with college degrees at the metropolitan area level is applying in this regression. Hence, the further stage is identifying the association between productivity and external effects associated with human capital quality utilizing the Glaeser equation. The benefit of this approach entitles us to recognize the dependence of the module of the function residuals on the functional forms of each regressor and to test for heteroscedasticity of the residuals of the multiple regression model used, selected to describe the extent to which the share of educated people with a bachelor's degree (BA) influences productivity gains and represented as an equation (37).

$$\log\left(\frac{Q_c}{L_c}\right) = \alpha + \beta_1 \log(Pop) + \beta_2 BA + \beta_3 BA * pop + \beta_4 \log(D) + \varepsilon \quad (37)$$

The inclusion of interaction terms BA and $BA * pop$ to study the combined effects of population and education on productivity. Hence, density sets this equation apart and surpasses previous models that might overlook the joint impact of these variables.

Although local knowledge spillovers are crucial for innovation, it is still unclear how successful they are in developing nations. Thus, Kesidou and Szirmai (147,148)

found that local knowledge spillovers enhance the performance of firms in Uruguay, particularly software companies. The research by Chen et al. (149) examining the urban distribution of knowledge in numerous emerging nations in Asia, including Indonesia, adds to it. Chen et al. (149) discovered that urban population growth enhances the propensity for innovations; regrettably, their research was conducted in Jakarta as a province rather than just the city proper.

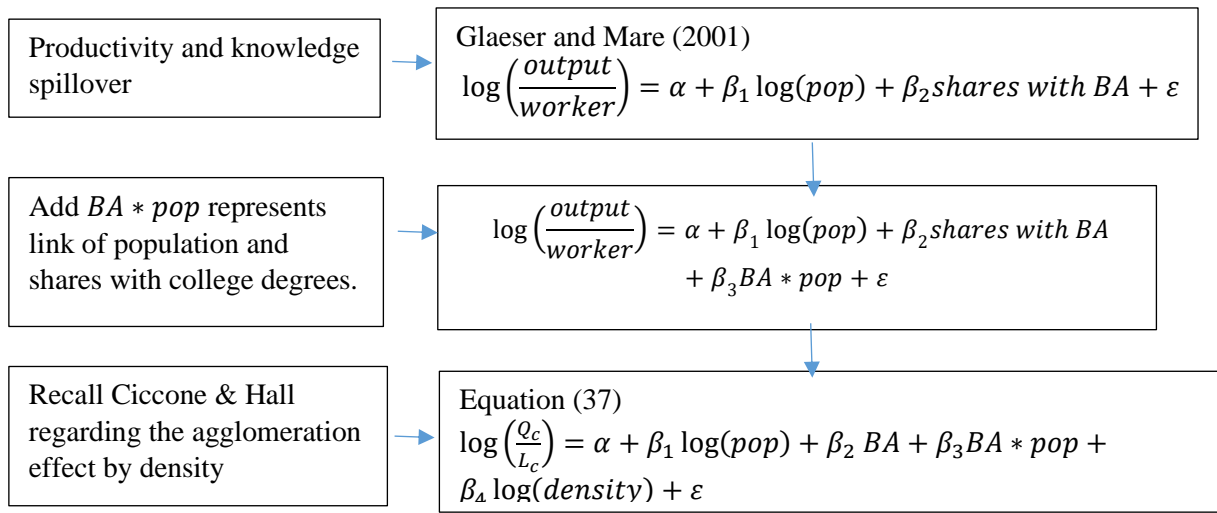


Figure 2.3 The equation (37) framework

Additionally, according to Taniguchi et al [150], education investments need to be more responsive to market demands and Indonesian labor productivity needs to catch up. As a result, a study of the Jakarta Metropolitan Area, which is a key location in Indonesia, might produce results and enhance the study of this subject. Notably, Jakarta serves as the economic hub for Java's economic corridor and as Indonesia's capital. The importance of Jakarta was then highlighted by Setyawan et al. [174] by highlighting the fact that it provides greater career prospects for people with better education levels, leading to commuters staying in their area. The activities of commuters influence how the local economy grows and the regional minimum wage [174]. The school zoning system in Jakarta that aims to establish educational equality only succeeds if there is spatial justice in Jakarta, according to Muhaimin et al. [152]. The capital-intensive industries in Indonesia are where Kuswardana et al. [153] found knowledge spillover from the inter-sectoral had a favorable impact on productivity. As

a result, we can identify the need for more research into the spatial association between the urban economy, labor market, and knowledge diffusion in the Jakarta Metropolitan Area. As a result, it would enhance analyses on this subject, particularly in developing nations.

Next, equations (32) and (37) were combined to examine the interplay between education, productivity, and city economic characteristics. In this equation, discover how the effect of educated people represent with bachelor degrees (BA) shares to improve the cities' productivity; hence, it is represented as an equation (38).

$$prod_c = \alpha_1 + \rho_0 W_c prod_c + \theta_0 W_c X_c + \beta_3 X_c + \varepsilon \quad (38)$$

where $prod_c$ refers to the c area's productivity that is proxied by divided GDP with the labor force. The X is a matrix of independent variables consist of density (D), the amount population in c region (Pop), the human development index (HI), education index (Edu) is showed the result of education development in c region, the amount of bachelor shares in the population (BA) and localization economic (LE) that proxy the industrial share sectors to GDP in c region. Next, $W_c prod_c$ is the the spatial lag of dependent variable (productivity) in city and $W_c X_c$ is the the spatial lag for productivity in city; ρ is a coefficient of spatial autoregressive of dependent variables; θ is a coefficient of spatial lag of independent variables; c is a c region; β is a vector of the parameters of independent variables and ε is a vector of error. Those data are provided by BPS in the level of kabupaten/kota in Jakarta Metropolitan Area. Meantime, the amount of bachelor shares in the population (BA) is generate from the Sakernas microdata. This model could discover how the impact of educated individuals symbolize bachelor degrees shares (BA) to boost the productivity of urban.

Subsequently, to obtain more information about wage premiums and human capital externalities, the approach of Combes et al. [24] and Lee, et al. [30]. In aim to reach the essential outcomes in this study, labor productivity was added to equation (3) as an additional regressor to assess the impact on wages:

$$w_c = \alpha_1 + \rho_0 W_c w_c + \theta_0 W_c X_c + \beta_3 X_c + \varepsilon \quad (39)$$

where w_c refers to the minimum wage in c area. The X is a matrix of independent variables consist of prod, D, Pop, HI, Edu, BA and LE in c region. Meantime, $W_c w_c$ is

the spatial lag of wage in city and $W_c X_c$ is the spatial lag for productivity in city; ρ is a coefficient of spatial autoregressive of dependent variables; θ is a coefficient of spatial lag of independent variables; c is a c region; β is a vector of the parameters of independent variables and ε is a vector of error.

Moreover, regional productivity and wages have been the focus of attention, but local characteristics also influence employment decisions and company location. One hypothesis is that the connection between productivity and area size reflects a tendency of more skilled people to locate in big cities. However, even in the more skilled places, controlling for area-level skills can only explain a quarter of the measured agglomeration effect. If unobserved skills were explaining the correlation, then we would expect sustainable growth would occur.

In addition, the logarithm of workers' monthly wages as the dependent variable will be regressed on independent variables such as workforce characteristics, labor, location effect, localization economies, and urban productivity [109]. Thus, presumably in cities, due to the uniqueness of the labor market formation and functioning, there is a higher concentration of qualified workers. This situation, in turn, can lead to low wages for skilled workers. This relationship with cross-sectional data is presented in equation (40).

$$w_{ct} = \mu_c + \mu_t + \theta \log prod_{ct} + \beta_t X_{ct} + \gamma Z_{ct} + \delta M_{ct} + \text{industry shares} + u_{ct} \quad (40)$$

Where w_{ct} is the log wage of city c , in year t ; μ_c , and μ_t are again, city-, and time-specific fixed effects. Furthermore, Wheaton and Lewis [18] and combine with the Micerian variables that use by Addario and Patacchini [20] is the base of X_{ct} variable. Thus, X_{ct} is an individual characteristic, including educational attainment indicators (no school and high), a worker experience, formal sectors occupation, and a marital status. For Z_{ct} represents a city-time-varying characteristics, including population, density, the unemployment rate, and an urbanization rate; M_{ct} is consisting of combinations of city human capital and employment, and u_{ct} is a residual.

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hypothesis is that the connection between productivity and area size reflects a tendency of more skilled people to locate in big cities. However, even in the more skilled places, controlling for area-level skills can only explain a quarter of the measured agglomeration effect. If unobserved skills were explaining the correlation, then we would expect sustainable growth would occur.

Furthermore, Glaeser [19] proved that productivity and economic growth in a region have positive relation with the share of high educated in the society and the density. Hence, based on Dapena, et al. [109] and Glaeser [19] the productivity is depending on human capital. Further, this high human capital—measurement by education level—has high impact on wage and create the density. Thus, there is a causality between them, but the density also followed by negative externality such as poverty and inequality. Follow several studies the side effect of city is sprawl area and attract the unskilled worker [32,147,148]. This side effect occurs an inequality in the city and poverty caused they lose in competitive labor market. Another effect of agglomeration is the sprawl area.

The dependent variable (Y) was depended on delta of total population dense from small to dense city or symbolized by Urb. This variable was chosen as a proxy of increasing urban development or urbanization. Higher population or city size is considered as the impact on urbanization or rapid urban development. The independent variables (X) in this model represented three types of driving forces, namely demographic, socio-economic, and infrastructural aspects. In this model, density is selected as proxy of demographic driving forces. For socio-economic driving forces, this analysis employed four independent variables, namely a literacy rate, average of earning, entropy index, and Theil index. The Y and X variables used in the spatial autoregressive model are described in Table 2.2. Entropy and Theil variables were collected from entropy and theil index analysis and GDP data was used. Entropy index is an index for measuring diversity of regional income per GDP. In the context of the region, the general equation of entropy value calculation is as the following equation (41) (Shannon, 1949 in [93]).

$$S = - \sum_{i=1}^n \sum_{j=1}^n P_i \ln P_i \quad (41)$$

Where: S – entropy value (diversity of regional economic structures;

P_i – GDP ratio sector i to total GDP of the region;

i – economic sector;

n – number of sectors.

Whereas the entropy index value is obtained by dividing the value of entropy (S) with a maximum entropy value (S_{max}), as the following equation (40).

$$Entropy\ index = \frac{S}{S_{max}} \quad (42)$$

S_{max} obtained by the formula $S_{max} = \ln n$ (where n is the number of all sectors). Entropy index values ranging from 0-1. If the value of entropy index is 1, it means that all the economic sectors are developed, and vice versa.

Theil index is an index for measuring regional disparity using GDP/income per capita. According Wibisono [149], Theil index has several advantages: (1) it is not sensitive to the scale of the area and is not affected by extreme values; (2) Theil index independent of the number of areas so that it can be used as a comparison disparity of different regional systems; (3) Theil index can be decomposed into between-region inequality and within-region inequality. Excess Theil index compared to other indices are able to make comparisons for a certain time and provide in detail in the sub-units of a smaller geographical [150], which is used as a share of total population-weighted in the measurement. Lower Theil index value shows lower disparities between regions, and vice versa, the higher Theil index value indicates a higher degree of disparity. The main characteristics of Theil index is the ability to distinguish between-region inequality and within-region inequality [150]. Theil index formula is as the following equation (43) (Theil, 1967 in (158)):

$$I_{Theil} = \sum \left(\frac{y_j}{Y} \right) \cdot \log \left[\left(\frac{y_j}{Y} \right) / \left(\frac{x_j}{X} \right) \right] \quad (43)$$

Total disparity calculated by theil index can be decomposed into inter-regional disparity (between-regions inequality) and disparities in the region (within regions inequality) with the following equations (44, 45).

$$I = I_0 + \sum_{g=1}^n Y_g I_g, \quad \text{where } I_0 = \sum_{g=1}^n Y_g \log \left(\frac{Y_g}{X_g} \right) \quad (44)$$

$$Y_g = \sum_{i \in S_g} y_i \quad X_g = \sum_{i \in S_g} x_i \quad \text{and} \quad I_g = \sum_{i \in S_g} \frac{y_i}{Y_g} \log \left(\frac{y_i/Y_g}{x_i/X_g} \right) \quad (45)$$

Table 2.2 – The dependent (Y) and independent variables (Xn)

Variable	Code	Definition
Urban (Y)	Urb	City size based on the population
Density	D	Population density
Bachelor share	BA_share	Bachelor share in the city
Entropy	E	Entropy index
Theil	T	Theil index

In addition, acknowledge that wage has impact other variables thereby verify improving poverty, inequality, industry sector, knowledge spillover and individual characteristics also prominent part. Next stage is deliberated the linked of urban with socio-economy situations. The purpose is relating urbanization, knowledge spillover, diversity, and disparities within regions. The Theil and entropy index are applied as indicators of inequality that occur when labor density is high, or a city is densely populated. Hence, entropy and Theil index added as indicator to knowing the disparity that experiencing in labor density or urban area. Therefore, the equation demonstrating this relationship is as follows:

$$Urb_c = \alpha_1 + W_c \beta_1 D_c + W_c \beta_2 BA_c + W_c \beta_3 T_c + W_c \beta_4 E_c + \varepsilon \quad (46)$$

Following, the tie between labor incentives, labor force characteristics, and poverty levels is assessed. Including poverty levels in the analysis helps identify the impact of wage levels on economic well-being and the consequence of individual worker characteristics on wage levels. The critical point is that wages influence other variables, thereby confirming improvements in the situation regarding poverty, inequality, the industrial sector, knowledge flows, and personal development. The novelty of the author's approach lies in the attempt to determine how the education level of urban residents affects the efficiency of urbanization, considering the urbanization channels and the effect of knowledge flow. A model using spatial autocorrelation was then built to determine how population urbanization affects economic growth:

$$\ln W_{ct} = \eta_0 + \eta_1 Urb_{ct} + \eta_2 Pop_{ct} + \eta_3 Pov_{ct} + \eta_4 Indus_{ct} + \eta_5 Knowledge_{ct} + \eta_6 Prod_{ct} + \eta_7 Z_{ct} + \eta_8 Y_{ct} + \varepsilon_{ct} \quad (47)$$

where W_{ct} – the wage minimum;

Urb_{ct} – the population urbanization level;

Pop_{ct} – population in city;

Pov_{ct} – urban poverty rate;

$Indus_{ct}$ – the industrial structure level, which is represented by the proportion of industry output value in GDP;

$Knowledge_{ct}$ – the innovation level by share of high education in city;

$Prod_{ct}$ – the productivity of the city proxy by output per worker as consequences of the high wage;

Z – the unemployment rate in city;

Y – the regional economic performance, which is measured by the GDP per capita of each region;

c and t – region and year, respectively;

ε – the error term.

Furthermore, the primary goal of our research is to identify the impact of urban workforce educational levels on the efficiency of urbanization. Thus, after studying the functioning channels of population urbanization, the innovation recognizes that the effect of urban labor educational levels on urbanization as knowledge spillover is tested [151]. Moreover, the impact of various variables on sustainable growth.

After identifying the growth effect of population urbanization, then verify the effect of the urban labor education level on urbanization effectiveness, assuming that economic growth is a result of urbanization. Hence, in the last stage, it considers how increasing the education level of workers affects the economic development of urbanized areas. After comprehending the impact of urbanization on population growth, the consequence of the educational level of the urban workforce on the efficiency of urbanization was then examined (assuming that economic growth is a result of urbanization). In implementing this condition, the educational level of the urban workforce was added to the equation as a variable. When labor force education

level is entered as a moderator, it allows the model to be normalized, and the overall effect of labor force education level can be expressed as follows:

$$\ln Y_{ct} = \eta_0 + \eta_1 Urb_{ct} + \eta_2 UrbEdu_{ct} + \eta_3 Urb * UrbEdu_{ct} + \varepsilon_{ct} \quad (48)$$

where Y is the productivity;

Urb – the urban rate;

UrbEdu – the high education level in the city;

Urb*UrbEdu – the level of urban labor education can affect the urban effectiveness.

For all the explanation above, it can be concluded in several stages of analysis of the effectiveness labor market in urban areas to ensuring the national economic. On the first stage is identifying the connection between productivity in urban and human capital level, agglomeration, and structure economy. Then, on the second stage is considered the agglomeration and educated people in region level with spatial regression for understanding the connected within regions. The next stage is discovering the relation between the motivation of labor (wage premium) and labor. At this stage we considered localization economies, productivity, population, labor structure, and labor's characteristics (the difference here the labor characteristic is generated to region level). Adding the poverty rate to show the existing high wage led to a good path or not. The fourth stage is considered the linked of urban with socio-economy aspects. Thus, in this stage is adding the Theil and entropy index and educated people describe urbanization, knowledge spillover, diversity, and disparities within regions. The last stage is present the element of the urban labor high educational level (Urb*Edu) as effect modification occurs when the relationship between two variables urban and high education people.

2.3 Statistic data of labor market in Indonesia

The labor market is an essential indicator of the achievement of both individual firms and national economies and employee remunerations, namely, salaries and compensation levels. Hence, for understanding the labor market should be observe from two sides, the demand and the supply. Notwithstanding, data from demand side

are harder to collect than supply side. Thus, the characteristic of demand side of labor market being important the concern of economists. Naturally, labor market information considers components of the labor force and population; the employment structure, quality, and quantity; the labor underutilization length; and the poverty rate among workers, among others (ILO and World Bank, 2016). Starting with international organization called ILO, which has indicator measurement called KILM (Key Indicator Labor Market). This measurement contains 17 pointers that catch essential characters of the global labor markets with varying degrees of detail and spatial level. Further, those indicators contain the goal of MDGs scheme.

Based on table 2.3, it can be considered there was a sharp decrease in the level of detail when moving to the province or municipal level. Majority this lack caused by the insufficient fund to collect the data. For instance, data of unemployment based on education level in province already unavailable and definitely the data of municipal level also unavailable. Hence, the municipal level majority depends on data of province or national level. Therefore, majority municipal level research in Indonesia using the qualitative method and survey data and rarely to use statistic data.

Moreover, the available data allows us to discover from supply side or from household side. Regrettably, the demand side or firms side totally so difficult to discover and unavailable in any level. Therefore, it is tremendously tough to discover both sides based on the statistical data. Basically, there is no information about the condition of the movement workers within the region. Also, there is limitation and difference range of the data period from statistic data in municipal level. For instance, the unemployment rate in Jakarta has period 2005-2019, on the other hand the same data in Bandung has period only 2009-2017. Further, other region could be worse or probably not up-to-date data. At the same time, the complex nature of the indicators calculated by the state statistical agencies can form the basis or foundation for analyzing the labor market.

Table 2.3 – Synchronize Data from international to municipal level

ILO (international level)	BPS (national level)	BPS (province level)	BPS (municipal level)
KILM 1. Labor force participation rate is an indicator of the country's working-age population quota that involves actively in the labor market, either by looking for work or by working; it indicates the relevant size of the available labor supply to occupy in the goods and services production.	Labor force participation rate	Available	Available
KILM 2. The employment-to-population ratio is described as a country's working-age population part that is hired (the youth employment-to-population ratio is youth population part – typically represented as individuals aged 15–24 – that is hired).	Employment to Population Ratio-EPR	Available	Available
KILM 3. Status in employment. Status indicators in labor identify among the two main classes of the hired: (1) employees (also acknowledged as wage and salaried workers) and (2) the self-employed. The self-employed are more disaggregated into (a) employers, (b) own-account workers, (c) members of producers' cooperatives, and (d) contributing family workers.	Status in employment	Available	Available only in few municipals or cities
KILM 4. Employment by sector. This point is specific to labor into three large sectors – agriculture, industry, and services – and reveals respectively as total employment percentage.	Employment by sector	Available only in several province	Available only in few municipals or cities
KILM 5. Employment by occupation	Employment by occupation	Employment by occupation	Available only in few municipals or cities

Continuation of the table 2.3			
KILM 6. Part-time workers. The pointer on part-time workers concentrates on personalities whose total working hours are less than “full time”, as total employment portion.	Part-time workers	Unavailable	Unavailable
KILM 7. Hours of work have two determinations: the hours a hired person works by week and the mean yearly real hours hired by an individual.	Hours of work	Available only in several province	Available only in few municipals or cities
KILM 8. Employment in the informal economy. Employment in the informal economy is commonly identified as necessitating the absence of legal status, inadequate working situations, shortage of society in social security systems, higher frequency of work-related ailments and accidents, and restricted association freedom.	Employment in the informal economy	Available only in several province	Available only in few municipals or cities
Continuation of the table 2.3			
KILM 9. The unemployment rate shows us the labor force portion that is possible to work, actively seeing for a job, and does not have an occupation.	Unemployment	Available	Available only in several municipals or cities
KILM 10. Youth unemployment is an urgent policy issue for numerous nations at all growing degrees. The indicator goal is the phrase “youth” includes individuals aged 15–24, whereas “adults” are described as personal aged 25 and above, in spite of state variants in age descriptions that do happen.	Unemployment based on education	Unavailable	Unavailable
KILM 11. Long-term unemployment	Unemployment based on youth age group	Unavailable	Unavailable
KILM 12. Time-related underemployment reflects productive capacity underutilization of the labor force.	Underemployment	Unavailable	Unavailable

Continuation of the table 2.3			
KILM 13. Persons outside the labor force. The inactivity standard is determined as the population percentage that is neither seeking working nor work (not including in labor force).	Persons outside the labor force	Unavailable	Unavailable
KILM 14. Educational attainment and illiteracy. Report on educational attainment levels is recently the best possible labor force skill levels index.	Educational attainment and illiteracy	Available only in several province	Unavailable
KILM 15. Wages and compensation costs. Salaries express an indicator of the state and inclination of workers' purchasing power and a resemblance of their living standard.	Wages and compensation costs	Available only in several province	Unavailable
KILM 16. Labor productivity. Labor productivity is determined as output per labor input.			
KILM 17. Poverty, income distribution, and the working poor. Poverty can occur when somebody is powerless to create adequate revenue from their work to sustain the minimum living standard.			

Moreover, Indonesia has a statistic institution called BPS or Statistic Indonesia. For labor market indicator, this institution has a special survey for labor market, namely National Labor Force Survey (Sakernas). Sakernas was invented to gather data that can represent the common labor circumstance during enumeration times. Certainly, to receive information on the quantity of employment, the unemployment and a person who has stopped/moved on to work and its growth at the district/city, provincial and national levels. This survey performed in the whole region of Indonesia with a specimen of 100,000 households, spread across 10,000 census blocks in all provinces, in both urban and rural regions. Each semester, the specimen quantity is 5,000 census blocks. Meanwhile, the Annual Sakernas census block specimen quantity is 20,000, of which 5,000 census blocks are examined in Sakernas next semester, and 15,000 census blocks are an additional Sakernas sample. A supplementary part of 15,000 census blocks was appointed to collect data assessments at the city/district level. Households' diplomatic troops, households living in both special block census, and specific households in the common census block are not selected in the individual. From each house, the chosen handled information about the common situation of each household member, which contains the name, relationship to head of household, gender, and age. Principally family members aged ten years and up will be questioned about education, marital status, employment, unemployment, and work experience.

The most significant substantive drawback is the development of methods without considering the specifics of urban and regional development of a particular kind. These features may present in an implicit form, but it must be admitted that the development of methodological support for labor market analysis, taking spatial specificities into account, has not actually started. And this is a rather serious omission, since the trends and prospects for the labor market development, as the most mobile and fast-growing market, will be largely determined by the peculiarities of the development of different types of cities and different types of territories.

Another substantive fragility is the analysis of developments in the labor market separately, without any link with firm side and other markets that configuration the municipal's or city's economy. Meanwhile, the labor market is an essential element of

the circulation of goods, education, health, income and other services that appears at each level of organizational layout. An imbalance in one of the links can lead to inequality in the labor market, as can inequality in the structure of labor supply and demand.

In addition, despite many data recommendations affecting various aspects of labor market development, the state of scientific and methodological support in this area has lagged the requirements of practice, such as the poverty line of the labor and their productivity level or how the training or education their productivity. The current stage of development of the labor market requires complex approaching that allow not only to identify certain trends in the value of research, but also to know more detail about the labor in individual level and in particular region. This certain data could create the effective and efficiency policy and support management decision-making processes both in the implementation of province agendas for integrated regional development and in the priority territorial development areas (urban).

Recognize the driving capabilities transforming accelerated urban augmentation in several areas in Indonesia (in this research is Jakarta and Surabaya metropolitan), and some variables are included in this study. The change minimum wage of the city (W) is a dependent variable (Y). The data of wage collected from Municipality Minimum Wages collected from governor regulation regarding the minimum wage. This variable was taken as a basis for employment centered in the metropolitan [6,19]. Another variable is the city level that uses the city population portion at the end of the year in every region for representation. This variable is representative of developing metropolitan augmentation since the accelerated development of built-up or metropolitan significantly. Theoretically, some variables were acknowledged as having ties with metropolitan augmentation, for instance, population growth [14,20,152,153], industrial structure [43,88], productivity, poverty and human capital [15,19,20,109].

The independent variables such as person characteristic in this form expressed three driving forces types: demographic, structural change, and economic factors. This study selected population growth as proxy of demographic driving capabilities.

Meanwhile, structural change driving parts represent by industrial structure. Finally, a variable for poverty or inequality, productivity and human capital were chosen as the economic factors proxy. All data statistics prepared by the Statistic Indonesia (BPS) with period 2017-2019, particularly the SAKERNAS datasets. In addition, SAKERNAS datasets is to understanding how the characteristic of individual can ensuring the sustainable growth. Moreover, the SAKERNAS also can provided the data more details in the individual level. Therefore, we can understand the characteristic of people who live in urban area, particularly in Jakarta and Surabaya Metropolitan.

CONCLUSIONS ON CHAPTER 2

The methods of spatial regression analysis are used in this study with applying both microdata and macrodata that collected from BPS with period 2017-2019 to get an idea of the urban labor market in Indonesia. The microdata consists of individual characteristics of the labor force, i.e., education, work experience, marital status, employment and macro data included GDP, productivity, minimum wage, population density, poverty, etc.) Additionally, the microdata is available in SAKERNAS datasets to understanding how the characteristic of individual can ensuring the sustainable growth. Meanwhile, the wage data collected from BPS about regional GDP, while Municipality Minimum Wages collected from governor regulation regarding the minimum wage. Therefore, the data collection could picture labor market condition comprehensively.

Using equation that developed by Glaser to identify the relationship between productivity and human capital quality, thus, the impact of educated people with a bachelor's degree (BA) to urban productivity is considered. Then, following a reliance was constructed by Combes et al. [24] and Lee et al. (2017) to obtain meticulously about wage premiums and human capital. Hence, workers' monthly wages as a dependent variable will be regressing related to independent variables such as labor force characteristics, total labor, location effect, localization economies, and urban productivity (Dapena et al., 2017). The critical point is that wages affect other

variables, thereby confirming the improvement of poverty, inequality, the industrial sector, knowledge flow and personal development. The indicators of entropy (E) and the Theil index (T) are used as an inequality indicator, which is observed with a high labor density or a densely populated city. Next, to determine how the education level of urban residents affects the effectiveness of urbanization, considering the urbanization and the effect of knowledge flow and economic growth. Then, it verify the impact of education to productivity. Therefore, the methodological principles for role of labor market on productivity in urban area and assessing the significance of wage in urban to labor market, productivity and other impacts such as knowledge spillover, poverty and inequality were formulated.

Chapter 3. URBANIZATION AND LOCAL LABOR IN INDONESIA

3.1 City, productivity and premium wage ensure sustainable growth: Jakarta and Surabaya

Why globalization and new technology could be increasing the demand of cities? These global shifts have radically increased the returns to being smart. Hundreds of studies have shown could be a big increase in the wage premium enjoyed by workers who have more years of schooling/higher test since 1970. Moreover, human beings are a social species, and they get smart by being around other smart people. People learn things by being in cities, and as the returns to learning increase, therefore it makes the demand for cities. Another reason is the world becomes far more complicated. As ideas have grown in complexity, it becomes easier for people to get lost in interpretation. Hence, a better educated and wealthier world also creates higher-end pleasures. Further, another piece of evidence comes from the location of the industry. If tech made cities irrelevant, then our expectation of seeing tech-intensive industries located far away from urban cities. Unfortunately, it does not happen. Several studies affirmed that skill and tech-intensive sectors are more assuring to establish in the region core than the other industries [7,24,26,30,32,109,124,156,157].

In addition, metropolitans can grow both more overpopulated and pleasure while they shift more congested and crowded. Notably, urban productivity defines the payments that firms will compensate employees and based on the city size. The notion that gathering firms collectively in an urban area addresses them more productive is the primary thought in urban economics or the urban scale agglomeration economies advantages [7,157,158]. Hence, city size rises, and incomes rise globally, although not fundamentally more than prices. Therefore, what is happen in cities would be impact of national economy and society.

Plausibly that the city size is making firms and people more productive [8,158,162,173]. Agglomeration economics primarily diminishing transport costs for goods, for people, and for ideas. Firms and goods are assumed to be more effective due to the lighter entree to input or users. It saves the transport cost if users and supplies

reside nearby. Meanwhile, firms and people are more productive if they employ company services, and those aids accommodate in person, such as accountants or lawyers. Otherwise, a great labor density could make firms more productive by suiting the labor that completely suits their necessities [8,52,124,156]. A relevant theory is that the city market size creates it simpler for people and firms to specialize. Specialization drives to more prominent productivity, or in other words, and agglomeration economies act by pursuing the ideas movement. Assumed that entrepreneurs and directors get more beneficial notions by receiving in urban so that they will be more productive. Some of that productivity may well turn into higher wages for their workers. Certainly, proper urban management can produce economic possibilities, productivity accumulations, and increasing earnings required to maintain the frequently middle-income countries' substantial portion, particularly Indonesia.

Java Island as the center economic of Indonesia has six provinces, namely, Jakarta, West Java, Banten, Yogyakarta, Central Java, and East java. Admits these provinces Jakarta is the capital city of Indonesia. Undoubtedly, this province become metropolitan area. All the benefit agglomeration scale experienced by Jakarta as capital city of Indonesia. Unfortunately, the disadvantages also followed such as traffic, flood, inequality and etc. Similarly, Surabaya as the second biggest city in Indonesia also enjoying the benefit of agglomeration, while this benefit also brings mass population in Surabaya. As a result, Surabaya is experiencing the slump area, poverty, inequality distribution of education and healthcare. Moreover, those cities are linking with other regions that boosting their economy activities and labor mobility.

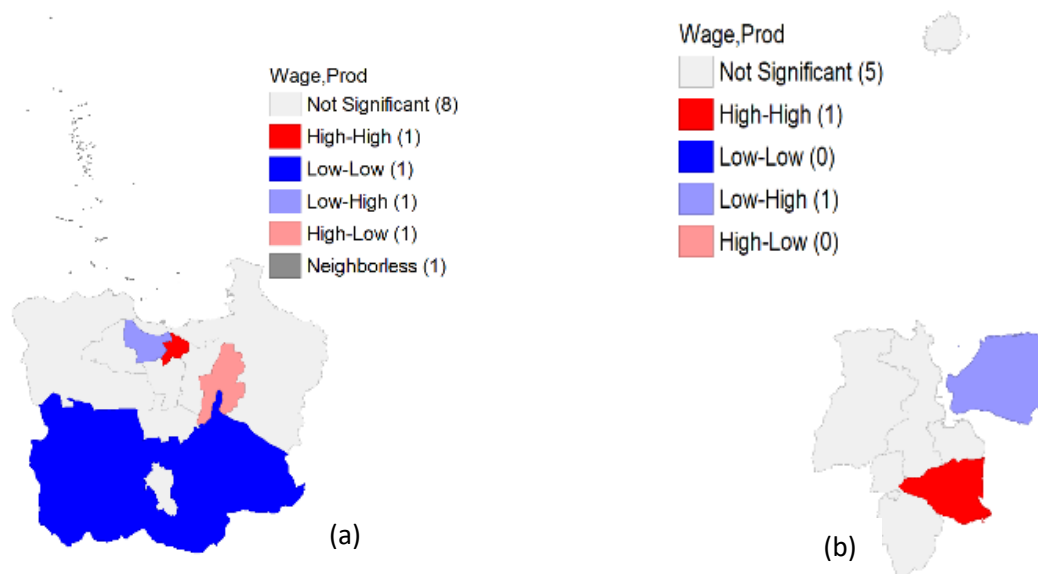


Figure 3.1 Cluster Map of Jakarta (a) and Surabaya (b)

In the figure 3.1 is the LISA Cluster Map presents important places of spatial autocorrelation kind by color coded. This map represents $p < .100$ and 999 combinations with several judgments such as spatial clusters (High-high and low-low) and spatial outliers (High-low and low-high). The spatial map clusters refer to the cluster core. The cluster is classed as such while the location value (low or high) is more related to its contiguous (as reviewed by the weighted mean neighboring values, the spatial lag) than the case following spatial randomness. Hence, figure 3.1 presented the spatial correlation in Jakarta and Surabaya metropolitan.

From this figure Jakarta has two spatial cluster the high-high productivity and low-low productivity. It can be interpreted as admits Central Jakarta and West Jakarta are the core of Jakarta metropolitan, while Bekasi city and Bogor municipality are the low productivity. Remarkably, Central Jakarta is the central of administration and service and trade sector. As the result of agglomeration West Jakarta has the high productivity also compared the other areas in Jakarta metropolitan. This is reinforced by the proximity of West Jakarta with the Soekarno-Hatta international airport.

Moreover, Surabaya has abnormal spatial or spatial outlier models. The outliers indicated that spatial objects are notably various from their spatial contiguous. Unavoidably, the Surabaya metropolitan low object is the Bangkalan region. This region be discovered as the developing area even though its near with Surabaya city

and has a bridge to connecting each other. Another outlier is Sidoarjo with high productivity due to this area surrounding by high productivity areas.

The implementation of the methodology made it possible to characterize the labor market states of Jakarta and Surabaya. According to the calculated data obtained at the first stage (Table 3.1), it can be concluded that productivity strongly intertwines with the localization economy. At the same time, acting as a proxy of the share of industry in the regional economy, the localization economy has a negative relationship with labor productivity. Presumably, those areas are shifting to another sector, or the industrial sector is not the backbone of the new era of industry. Nowadays, those metropolitans are trying to manifest the smart city scheme; hence, the trade and services sector has more impact than the industrial sector.

Due to the need to avoid bias in OLS estimates and the low deviation value obtained when applying the Akaike criterion and the Bayesian information criterion, within the framework of the author's approach, an SAR model with a spatial autoregressive lag was applied. The SAR model estimates obtained by the maximum likelihood method for all three spatial matrices are shown in Table 3.1. This approach allows for analysis and comparison in terms of population density, human development index, and localization economy for the Jakarta and Surabaya regions considered within the spatial approach.

Table 3.1 – Calculation of regression parameters for labor productivity in relation to population density, human development index, and localization savings.

Labor productivity (Prod)	Region			
	Jakarta		Surabaya	
	OLS Panel	SAR	OLS Panel	SAR
Labor Market Density (D)	-8.44e-06	7.12e-06***	.0000585	-.0003667**
Human Dev. Index (HI)	.0139854	.0026335	.0556225**	.0884214***
Localization Economic (LE)	-.022661***	-.0139416***	.0128967***	-.0243671***
Rho		.5584768***		.4352758**
AIC		-63.66124		-109.4175
BIC		-52.01631		-104.1949

Furthermore, the connection between population density and productivity is significant at 1%, with a positive correlation in Jakarta, and Surabaya has a significant at 5% in negative correlation. The difference in these indicators is due to the fact that not only Surabaya is an industrial center, but also, for example, such industrial cities as Malang, Pasuruan, Gresik, and Kediri. Meanwhile, Surabaya depends on more than just industry but also agriculture, like East Coast Surabaya. However, the community there does agriculture or fishing with traditional methods [164]. Another reason is that most of the economic activities are moving outside of Surabaya, while Jakarta is the core economic activity, and people don't have other options. Hence, if the area gets dense and the land becomes pricey, firms would move to another place that is costless. Notably, this result with the variable of localization economy in Surabaya's situation is evidence that firms could be relocated in a not dense area.

Further, the human development index in the Jakarta metropolis has a negligible effect on productivity, while in the Surabaya metropolis, the degree of this influence is significantly higher. It should be noted that Jakarta has a large population concentration and density, so companies are confident in staff turnover. In Surabaya, the situation is reversed; people have more options for where to live and work, so the Human Development Index plays a more significant role in this city.

Next, the result of the Glaeser and Reseenger's equation to discover the existence about productivity and human externalities. The purpose of this equation is to discover how the effect of educated people represent with bachelor degrees (BA) shares to improve the cities' productivity. Hence, the result of equation 33 (see table 3.2), it showed that population in Jakarta not intertwined with productivity, otherwise in Surabaya that population spatially nudge the productivity in that city. Next, if we considering the education, particularly bachelor degree, is negatively to improving the productivity in both metropolitans. Why this result could be appeared? Hypothetically, the high-education in Indonesia couldn't facilitating the skill that demanded in labor market. Another reason is massively less educated than bachelor degree that dominated in labor market. Meanwhile, if concern output of population in bachelor degree has

positively to boosting the productivity. Additionally, density does not have significantly to influence the productivity in those metropolitans.

Next, the result of Glaeser and Reseenger's equation is to discover the existence of productivity and human externalities. The purpose of this equation is to discover the effect of educated people with bachelor's degrees (BA) shares to improve the cities' productivity. Hence, the result of equation 33 (see table 3.2) showed that the population in Jakarta is not intertwined with productivity; otherwise, in Surabaya, that population spatially nudges the productivity in that city.

As follows from Table 3.2, the indicator of the share of the population with a bachelor's degree is significant, but the influence of this indicator is inversely proportional. Why could this result appear? Hypothetically, the high education in Indonesia couldn't be facilitating the skills that are demanded in the labor market. Recently, negative trends have emerged in the development of higher education, which has worsened during the pandemic. Alternative forms of education have become more attractive, such as investment courses, programming courses, etc., which are provided by institutions that do not have the status of an educational organization. Another reason is that they are massively less educated than bachelor degrees, which dominate the labor market.

Moreover, the $BA*Pop$ indicator, which means the product of the logarithm of the region's population and the share of the population with a bachelor's degree, is positively correlated with productivity. Thus, having a bachelor's degree can improve productivity. Consequently, the result of this phase was a change in views on the relationship between productivity and higher education, in particular, evidence that higher education has an inverse effect on productivity. Additionally, density does not have a significant influence on the productivity in those metropolitans. In ASEAN level, hiring a young worker with high education level more valuable than the older worker to improving the productivity of the firm [40]. Yet, from table 3.2 showed that amount of bachelor degree above are significant but they have negative effect. Recently, the higher education has negative sight and its exacerbate with the pandemic situation. Nowadays, mostly society looking another alternative such as investment

course, programing course, etc. that can get it for informal institution. Therefore, Ministry of Education, Culture, Research, and Technology create a master plan, namely “Kampus Merdeka”. This master plan is integrated between university and the firm, so the graduated students not only have theoretical skills but also practical skills. Furthermore, the term BA*Pop applies to the log outcome of population area and share with university degrees [32] has positive impact on productivity. Therefore, the product of the bachelor degree in population can support the productivity. This result related with several studies such as Cortright [27], Glaeser and Maré [6], Glaeser and Resseger [32], Duranton and Puga [13], and others.

Table 3.2 – Calculation of regression parameters for labor productivity in relation to population size, share of the population with a bachelor's degree, share of bachelors in the total population and population density

Labor Productivity (Prod)	Region			
	Jakarta		Surabaya	
	OLS Panel	SAR	OLS Panel	SEM
Population (Pop)	-.3556575***	-.252884***	.3316617	-.3715194
Portion of the population with a bachelor's degree (BA)	2.84e-06	-8.96e-07***	4.41e-06	-8.36e-06***
Portion of bachelors * Population (BA*Pop)	-1.7e4-06	2.82e-07***	-1.70e-06	4.44e-06***
Population Density (D)	.3975679**	.1786538**	.4114832	.0002219*
Rho/Lamda		.7062306***		.9455134***
AIC		-64.84033		-86.7681
BIC		-53.19539		-82.59001

The data presented in Table 3.3 demonstrates how regional characteristics, the human development index, density, and indicators of the education level influence productivity. In Jakarta, increasing population density directly affects productivity growth, supporting the theory of agglomeration economies. Contrastingly, in Surabaya, congestion or poor spatial planning are hampering productivity growth. Notably, the share of the population with a bachelor's degree has little effect on productivity growth in both cities. This suggests that a higher share of highly educated people may not directly translate into higher productivity in cities. In addition, the aggregate education

level has a significant negative impact on labor productivity in Jakarta. One possible explanation is that the education system may need to sufficiently equip graduates with the skills needed by the labor market. Meanwhile, the aggregate education level in Surabaya has a positive effect on labor productivity.

Table 3.3 — Assessing the impact of regional indicators of population density, human development index, localization savings and indicators of educational level on labor productivity

Labor Productivity (Prod)	Region			
	Jakarta		Surabaya	
	OLS Panel	SDM	OLS Panel	SDM
Population Density (D)	.0133198	.0172218***	.0091625	-.1444082**
Human Dev. Index (HI)	36.62872*	1.248812	31.81554*	-15.94742
Localization Economic (LE)	-1.828916	7.022661	.7336024	1.255684
Proportion of population with bachelor's degree (BA)	-.0009769*	.0000947	.000539**	4.53e-06
Education level in the city (Edu)	-30.89623*	-15.86097**	-2057.04	1437.508*
Population (Pop)	-.000026	-.000138***	5.49e-07	.0003666*
W*Prod		.0780616		.7142882***
W*D		.0214587		.5949159**
W* HI		9.033807		-103.2819*
W*LE		38.02419		79.42564**
W*BA		-.0007852		.0003528
W*Edu		-7.971307		3952.814
W* Pop		.000015		.0000578
AIC		223.9561		70.77387
BIC		248.9096		82.26362

The analysis results shown in Table 3.4 presented how the level of education affects the wages of urban residents. The idea that a higher concentration of highly educated people directly translates into higher productivity and wages in cities does not hold. Moreover, the aggregate education level, as portrayed in the data, has a negative impact on labor productivity in Jakarta. This indicates a critical mismatch between the skills acquired through education and the demands of the labor market.

Table 3.4 – Assessing the impact of population density indicators, human development index, localization savings and education indicators on wage levels

Wage	Region			
	Jakarta		Surabaya	
	OLS Panel	SAR	OLS Panel	SAR
Labor Productivity (Prod)	600.687**	2985.858**	3654.571***	11731.92***
Population Density (D)	-3.070007	22.41312	-37.18628	350.9745
Human Dev. Index (HI)	9907.245	27651.75	148938.9*	-70842.63
Localization Economic (LE)	5058.771	-35922.01	27218.81***	86902.41***
Proportion of population with bachelor's degree (BA)	-1.483128	-.1378938	3.106039	-.476473
Education level in the city (UrbEdu)	51645.4*	143519.6***	-9667758*	6180701
Population (Pop)	.15527*	-.0230034	-.3261987	-1.193324
Rho/Lamda		.4382992		.4610745**
AIC		692.7199		355.2764
BIC		707.692		363.6326

It should be noted that the presence of education in Jakarta has practically no effect on the wage premium. Considering the information in Table 3.5, remarkably, according to the OLS model, education in Jakarta has little or no impact on the wage premium, while education in Surabaya has a significant impact on a worker's wage. However, testing this hypothesis using the SDM model gives ambiguous results that require further research. Statistics show that Jakarta has a significantly higher educated population than Surabaya. Therefore, in Jakarta, there is high competition among educated workers in this region, and work experience plays a more critical role, while in Surabaya, the situation is different: here, great experience does not guarantee the promotion of an employee. Thus, having an education does not guarantee a high salary in Jakarta. The opposite situation is observed in Surabaya, where education may be the primary requirement when hiring an employee.

Table 3.5 – Calculation of regression parameters for wages, population size, density, and individual characteristics in relation to wage levels

Wage level (Wage)	Region			
	Jakarta		Surabaya	
	OLS Panel	SAR	OLS Panel	SAR
Labor Productivity (Prod)	110320.8***	754240.4	14512.89	3240034***
Being married (Married)	1160.499**	855.6222**	296.1252	2339.254***
Work experience (Experience)	913.850*	136.8779**	522.1244	-1197.59***
Occupation (Formal)	-2032.492**	-.984.6881***	-2666.879	207.021
High education (Highedu)	-8.520259	-549.0782	6264.096*	-5010.573**
Without education (Noedu)	-656.7589	-571.7225*	-962.8729	-2446.287***
Population Density (D)	20.06905	1.314333	-518.6941***	5660.86*
Population (Population)	64259.4***	146684.4	-13.4306	537975.9
Unemployment rate (U_rate)	10683.64	-25264.23	-146584.4*	6.440669***
Urbanization level (Urbanrate)	-9649.406	-22767.68**	7308404	-488760.2***
Human development index (HI)	26828.38	-13006.71**	-179150.5***	656328.2
Work force (Labor)	-699047.9**	-466183.6	-6.409541 **	220114***
Urban education level (UrbEdu)	.0017836	0.0393532***	-6.081608	1.2811***
Industrial sector share (industry_share)	2336.889	9275.645	18568.95	88017.23**
Rho		.7532794***		.1471721***
AIC		857.9534		430.803
BIC		877.9161		438.1146

As Table 3.5 shows, the size of the urban wage premium in Jakarta and Surabaya depends on the level of urbanization, population size, educational level, productivity, and unemployment rate. The disappointing fact is that the city's wage premium is inversely proportional to the number of people with a bachelor's degree. This result reflects the actual situation in Indonesia, where higher education does not guarantee

high salaries or decent jobs. For example, a starting teacher with a master's degree will earn a minimum wage similar to that of factory workers with only a high school diploma. Another reason is age restrictions for some positions, which create a barrier to higher education and entry into the labor market. Moreover, the demographic dividend and the pandemic are aggravating this situation. Another reason is the maximum age for certain job position, thus create a barrier for upper education to entering the labor market. The situation exacerbates with the demographic bonus and pandemic. Hence, the manifest of “Kampus Merdeka” should be accelerated and continued.

Several studies claimed that city blessed by positive of productivity and economic growth. Meantime, this area also surrounding by well-educated society and might be create sustainable growth. On the other hands, city or dense area also followed by negative externality such as poverty and inequality. Follow several studies the side effect of city is sprawl area and attract the unskilled worker [32,147,148]. This side effect occurs an inequality in the city and poverty caused they lose in competitive labor market.

As shown in Table 3.6, city size has a positive and significant correlation with density and the Theil index. In other words, regional inequality within the Jakarta metropolitan area is becoming increasingly widespread and is accompanied by significant changes in the size of urban districts. In contrast, the Theil index in Surabaya is negatively correlated, meaning an increase in city size can lead to a decrease in inequality in that metropolis. In addition, there are still many accommodation and employment opportunities in Surabaya, and this trend will continue to a greater extent than in Jakarta. Also, when studying the situation in Jakarta, a negative correlation was found between the entropy index and the size of the city; therefore, the growth of the city is accompanied by a low level of income inequality due to the significant financial cycle in Jakarta.

Meanwhile, in Surabaya, the correlation is positive, meaning that increasing city size causes increasing income inequality. A small financial cycle and a higher concentration of the sector are observed in only a few regions, such as Surabaya and

Sidoarjo. Thus, city size in Indonesia tends to mean high density without guaranteeing a large number of people with a good education or bachelor's degree. The main reason for this is due to the fact that cities provide society with education obtained outside of educational institutions, which is in demand in the labor market.

Table 3.6 – Calculation of regression parameters for urbanization, knowledge flows and inequality in relation to city size

Urban size (Urb)	Region			
	Jakarta		Surabaya	
	OLS Panel	SAR	OLS Panel	SAR
Population Density (D)	-.828741***	1.83538***	.0712381	8.268661***
Portion of the population with a bachelor's degree (BA)	1.133286***	-.4539062	.6569584	.0053635
Entropy (E)	-7.409663**	-929.3814***	2.893176	11.7979**
Theil index (T)	-.0760569	6.309245***	-11.69733	-.1026248
Rho		-.4405094***		.426069***
AIC		176.1143		-116.1378
BIC		186.0956		-109.8707

Table 3.7 presents that the wage premium in Jakarta is positively and significantly correlated with the level of urbanization, productivity, and GDP per capita. Meanwhile, it is necessary to note the heterogeneous nature of the obtained regression results, which are in intervals close to the zero value. Therefore, raising the minimum wage may reduce urban unemployment, while poverty rates and the level of industrial structure are not significantly correlated with wages. On the other hand, wages in Surabaya have a significant negative correlation with the level of urbanization. This means that as urban density increases and labor costs increase, businesses have an alternative option for locating their company. In fact, wage in Surabaya has a positive and significant effect on the population, which mean wage is an attractive thing for job seekers. Oppositely to Jakarta, wages in Surabaya play a significant positive role for the population; that is, wages are an attractive factor for job seekers. Unlike Jakarta, the wage premium in Surabaya determines the decline in

poverty in the region. Moreover, dense industrial localization corresponds to higher wages, and agglomeration in Surabaya is indirectly more effective in reducing poverty.

Table 3.7 – Calculation of regression parameters for the wage premium, knowledge flow and poverty in relation to the wage level

Wage (W)	Region			
	Jakarta		Surabaya	
	OLS Panel	SAR	OLS Panel	SEM
Urban rate (Urban)	-.0022944	.0153317***	-.341238***	-.2296014***
Population (Pop)	9.90e-08**	-1.06e-07**	1.3717***	.961154***
Poverty (Pov)	-1.03e-06**	-1.26e-07	-.6083649***	.4526165***
Industry (Indus)	-.0004031	-.0012451	.0003603	.0050842***
Portion of the population with a bachelor's degree (Knowledge)	4.73e-08	-5.03e-08**	-2.11e-07	-1.71e-07
Productivity (Prod)	.0008674***	.000242**	.4121816**	.1598438
Unemployment rate (Z)	0101685	-.0108621**	.0168413	.0322304*
GDP/capita (Y)	-.0014328**	.0001792**	.0000307**	.0019727***
Rho/Lamda		.8962948***		.7785847***
AIC		-260.9654		-67.70266
BIC		-245.9933		-60.391

Table 3.8 shows how education, specifically higher education, affects productivity in metropolitan areas. Based on the calculations, it can be argued that higher education, such as a bachelor's degree, does not guarantee increased productivity in Jakarta. Whereas in Surabaya, education plays a more significant role in increasing the productivity of the city. At the same time, it is necessary to note the heterogeneous nature of the regression results obtained, which is explained by the specific nature of statistical fluctuations and the heterogeneity of data for regions with different economic structures and different characteristics of urbanization processes. Hypothetically, the reason for this phenomenon is that the Jakarta metropolis has a higher quality workforce than the Surabaya metropolis. Another reason is that the high competition in Jakarta leads to a flow of knowledge and the creation of a demand for a workforce that has not only education but also practical skills. Whereas in Surabaya, good education is equated with high professional skills. The reason for this is Indonesia's high population and low levels of education and competitiveness. Thus, a

dense population means a vast supply of labor in Indonesia, but limited demand for personnel and less competitiveness can lead to large-scale unemployment. In this regard, it should be noted that the OLS model shows results that are adequate for statistical fluctuations.

Table 3.8 – Estimated values of productivity and knowledge flows in cities in relation to the productivity indicator

Productivity (Y)	Region			
	Jakarta		Surabaya	
	OLS Panel	SEM	OLS Panel	SAR
Urbanization (Urb)	-1.23e-06***	-2.50e-07***	6.82e-07	-9.64e-07***
Education level in Urban (UrbEdu)	1.47e-07***	-1.45e-08	9.71e-08	-1.71e-07**
Urb*UrbEdu	-1.81e-06***	-2.57e-09	1.77e-06	4.48e-07
Rho/Lamda		.4860039		300917
AIC		-192.4778		-114.9525
BIC		-185.8235		-110.7745

3.2 Prognosis for development of labor market in largest cities of Indonesia

The most likely scenarios for the development of the labor markets of Jakarta and Surabaya and recommendations for improving their regulation are substantiated. The implementation of the inertial scenario means the continuation of the identified trends in the labor market. The situation will remain where the high level of higher education of the population in both megacities has little effect on increasing productivity, and at the same time, higher education does not guarantee high wages. However, for Jakarta, this trend will continue in relation to the overall level of education. There will continue to be a mismatch between the skills acquired through education and the demands of the labor market in Jakarta. That being said, a positive correlation between aggregate educational attainment and productivity in Surabaya would highlight the city's ability to utilize its educated workforce effectively. The trend will continue that high wages in Jakarta have no impact on poverty levels. Meanwhile, in Surabaya, the city's wage bonus will help reduce poverty levels. The current growth rate of the urban population and youth will be maintained.

The main external factor that could lead to the implementation of a pessimistic scenario for the development of the labor market in Jakarta and Surabaya, accompanied by an increase in existing imbalances, is uncontrolled and poorly taken into account migration to cities from rural areas. This problem is more acute in Jakarta, where the gap between actual and desired levels of education and skills is more significant. Moreover, since external migration in Indonesia is small, it will not be able to become a channel for the “extraction” of excess labor from the country’s economy. In the long term, the influence of this factor can be weakened only by consistently implementing a program to improve human capital and infrastructure in rural areas, which should be developed by the Ministry of Rural Affairs, Development of Disadvantaged Regions, and Resettlement of the Republic of Indonesia. However, at the moment, the implementation of this task is hampered not only by limited funds but also by the lack of an adequate system of state registration of population movements.

An optimistic scenario for the analyzed labor markets can be realized when, on the one hand, the features of the urban economies of Jakarta and Surabaya are considered. On the other hand, the shortcomings of the existing practice of state regulation of labor markets are overcome. In the structure of Jakarta’s GRP, over $\frac{3}{4}$ is occupied by services; in Surabaya, the share of industry and services is approximately equal, just over 44% (Table 3.9)

Table 3.9 – GRP structure of Jakarta and Surabaya, %

	Agriculture	Manufacturing industry	Other industries	Services
Jakarta	0,1	12,3	11,7	75,9
Surabaya	11,1	30,6	13,8	44,5

At the same time, Jakarta concentrates more than 100 universities, including the country's most prominent universities (Surabaya in comparison - more than 20 universities), the majority of the 47 research centers of the Indonesian Institute of Sciences (Lembaga Ilmu Pengetahuan Indonesia), the predominant share of research and development (R&D) expenditures, and a highly educated workforce. An “innovative technological leap” scenario can be considered an optimistic scenario for Jakarta. Efforts to improve the quality of human capital should lead to increased

innovation activity in the region. For Surabaya, whose economy is characterized by a high role of industry, the scenario of modernization of the traditional industrial sector should be considered as an optimistic scenario. The need for high-quality training of a significant number of workers in mass professions makes it critically important to have a high throughput of vocational education institutions to bridge the gap and ensure unity of requirements for the training of workers in private and public organizations.

Basically, urban economics does not assert that metropolitans offer a free lunch, simply that cities frequently perform firms more productive. The readiness to reward higher salaries is a hint of that productivity improvement [159–161]. Moreover, acknowledging that direct measure of firm productivity is also typically higher in dense urban areas. Frequently question whether high firm productivity or labor salary implies the agglomeration economies existence. Possibly more productive firms and workers choose to live in cities. Conceivable cities have other advantages like path to harbors, coal mines and airports that drag industries and people and create them productive.

Based on table 3.1, we can consider that density affects productivity but depends on the region. Regionally, density in Jakarta positively impacts productivity, while Surabaya does not have the same response. In other words, the more density Jakarta metropolitan push more productivity in this area although the negative externality following. In the meantime, the Surabaya density creates less productivity; the other options area around Surabaya could explain this phenomenon. Hence, the unstable result of density could be showed urban diseconomies, such as congestion, which offset agglomeration economics. For Jakarta, they can handle it, while Surabaya is still struggling with it. Unfortunately, Jakarta unguaranteed the high productivity they have can improve the quality of the human resources. It showed by the insignificantly between the human index and the productivity.

Meanwhile, Surabaya metropolitan cares about it, so their relationship is a positive connection. For both metropolitans, localization economies represented by the industry sector showed that it was negative. This result signaled that metropolitans are processing the transformation structure, not laying on the industrial sector. Therefore, preparing high-quality human resources is needed.

In addition, considered high education in both metropolitans is insignificantly improving productivity, while spatially it has a negative relation in productivity. Recall Figure 1.11, we could understand the negative nexus here due to a few contributions of university graduation. In addition, the result of education in Jakarta insignificantly with premium wage, contrarily, education in Surabaya has significantly with the wage (Table 3.5). This situation indicates abundantly well-educated in Jakarta than in Surabaya. Hence, educated labor has highly competition in each other in Jakarta. Further, job experience more considerate in those areas, although in Surabaya has negative association. In other words, Surabaya could not facilitate a person who has high experience. Hypothetically, education degree in Indonesia is unguaranteed to get the high salary in Jakarta. Oppositely, Surabaya has another perspective about it and education degree can be main requirement to select the employee. Therefore, the education institution should be more integrated with firms or institutions, hence education institute can produce highly labor supply. Therefore, if we look up more details in table 3.5, we can realize that spatially productivity greatly influences wage standards in Surabaya, while Jakarta does not.

Moreover, based on table 3.6, we understand that financial distribution in Jakarta and Surabaya is definitely different. It interpreted that the more Jakarta growing up could reduce the disparity income, while in Surabaya, it could not be like that due to uneven regions. Therefore, to raise financial equality, the government should have strategies for being equal with Surabaya, so the financial disparity can also reduce and improve economic growth and reduce unemployment.

After the income inequality reducing, another wave can raise the wage rate. Unavoidably, increasing the minimum wage rate could reduce poverty (see Table 3.7). From this result also we can predict that wage is a magnet to attracting people to migrate to high-wage places. But, if we consider the result between Jakarta and Surabaya is attractive, in Jakarta, people tend to leave Jakarta. In contrast, in Surabaya, people move in to get a high salary. Hypothetically, this phenomenon also supports the cost-living that is so expensive in Jakarta, while in Surabaya relative to the average level.

Theoretically, education is a significant investment and could make us get a high salary also. Meantime, based on several results (see table 3.2, 3.5-3.7), education negatively relates to productivity, wage, and urban size. This result showed us that high education in Indonesia has a problem and many mismatches.

Aftermath controlling the population, it is necessary to improve the quality of the community. Thus, the second target is to enhance high-quality education. Furthermore, Wijayanti [40] asserted that hiring decision an employee with a high education level is beneficial in emphasizing firm productivity. This target has several steps starting with upgrading the quality of teaching and learning. Hence, the authorization action in revitalizing enhances the students' ability to adapt and respond to the education system. Nonetheless, in accomplishing these goals, knowledge is needed that sounded by all participants in the digital industrial ecosystem [165]. The new era also demanded the new skills, hence reform the curriculum by providing reinforcement that focuses on STEM and literacy at all levels is needed. Therefore, curriculum and minimum wage reform are essential matters.

The curriculum reform could prepare society to enter the labor market or creating job vacancies [165]. Meanwhile, the minimum wage reform could create an equality based on their education and skilled. Due to the minimum wage in Indonesia only take the side of blue-collar workers. For instance, the teacher salary with a contract is lower than blue-collar workers¹⁹. Inevitably, the Indonesia labor market powered by the uneducated or unskilled (see Figure 1.11).

Inevitably, the minimum wage standard is crucial because it can boost productivity and reduce poverty (see table 3.7). Therefore, the minimum wage policy needs to be considered carefully. Hence if too high, it could contribute to the high unemployment rate (see table 3.7). However, this must be balanced with the workforce quality so that employers do not need to flee Indonesia. The existence of quality education can encourage prospective workers to be prepared the labor market and

¹⁹ URL: <https://www.wowkeren.com/berita/tampil/00284646.html> (Date of access: 10.02.2022)

URL: <https://www.cnnindonesia.com/nasional/20191124172231-20-451047/pidato-nadiem-igi-sindir-gaji-guru-kalah-dari-buruh-bangunan>; <https://www.merdeka.com/uang/upah-buruh-lulusan-s1-haruskah-sama-dengan-lulusan-sma.html> (Date of access: 22.12.2021)

reduce a transition time from the learning step to the world of work. Significantly, Jakarta is not leaning on the industry sector anymore, while in Surabaya, this sector still has a positive impact (see table 3.7). Therefore, the sectorial wage should be not deleted from minimum wage rate.

In 2014-2019, this is the era of President Joko Widodo (Jokowi) and his popular program is Nawacita. Nawacita has nine priority programs to improving Indonesia's development. The fifth point is to enhance the productivity of society. In the next five years (2019-2024), Jokowi underlined in his five visions for Indonesia's development that the second priority in Indonesia is to improve human resource (HR) development. Hence, this priority has already been applied in Indonesia's long-term national plan (2005-2025).

Meanwhile, as we know that minimum wage is an instrument to reduce the poverty and inequality. This statement is in line with the result of equation 47 on table 3.7, particularly in Surabaya, due to, based on PP 78/2015, minimum wages based on Decent Living Needs (Kebutuhan Hidup Layak - KHL). Henceforth, in 2020, Indonesia created new law called omnibus law on Job Creation or Act Number 11 of 2020 on Job Creation (Undang-undang nomor 11 tahun 2020 tentang Cipta Kerja or UU 11/2020). In PP 36/2021, minimum wage is determined based on economic and labor conditions. Unfortunately, this labor conditions are the average of the household member, not considered the qualification of the labor. Therefore, the minimum wage cannot guarantee the high education or high skill could have the high salary in Indonesia.

3.3 Indonesia's labor policy

The labor markets of Jakarta and Surabaya are expected to continue with high levels of education but not necessarily high wages. In Jakarta, there will be a mismatch between education and labor market demands, while Surabaya's educated workforce can effectively utilize its resources. High wages in Jakarta will not impact poverty levels, while wage bonuses in Surabaya can help reduce poverty. The main external factor that could lead to a pessimistic scenario is uncontrolled migration from rural

areas, particularly in Jakarta. To mitigate this, the Ministry of Rural Affairs, Development of Disadvantaged Regions, and Resettlement of the Republic of Indonesia should develop a program to improve human capital and infrastructure in rural areas. An optimistic scenario for the labor markets can be achieved by considering the urban economies of Jakarta and Surabaya and overcoming shortcomings in state regulation. Jakarta's high concentration of universities and highly educated workforce could lead to an "innovative technological leap" scenario, while Surabaya's modernization of the traditional industrial sector could be an optimistic scenario. In other words, improving HR (human resource) quality is a fundamental problem that is facing Indonesia. As a result of the vast population in Indonesia, but less-educated and low competitiveness. Therefore, an immense population means tremendous labor supply available in Indonesia, but limited labor demand and less competitiveness could create fascinating unemployment.

The role of the state in regulating the Indonesian labor market is crucial due to the fact that the country is implementing a statist model of modernization. An analysis of the current practice of state regulation of the labor market showed that the tasks of increasing its efficiency at the national level are considered the most important. Thus, one of the goals of the Indonesian national development plan is to increase competitiveness and productivity. In line with point fifth of the vision and direction of Indonesia's long-term development (Pembangunan Jangka Panjang – PJP), 2005-2025 was focused on HR development. A reason for these steps is in 2002, the gross participation education for elementary school reached 105.99%, junior high school by 79.81%, senior high school by 48%, and the literacy rate for 15 years above reached 89.51%. It was a good achievement; unfortunately, Indonesia experienced low human development. At that moment, Indonesia's human development index (HDI) ranked in 112 of 175 countries globally. Meanwhile, 59% of this market is dominated by workers who graduated elementary school on the labor market side. Furthermore, this condition is exacerbated by the low technology achievement index (Indeks Pencapaian Teknologi – IPT) of only 0.21. Another challenge is the imbalance of citizen mobility in Indonesia

that centralizes Java Island, mainly urban areas. Hence, the long-term development plan's primary purpose is to raise the labor's quality and competitiveness.

Based on the middle-term development plan (Rancangan Pembangunan Jangka Menengah Nasional – RPJMN) 2015-2019, the absorbent primary way to improve Indonesia's competitive labor market as a goal in RPJPN 2005-2025 is to try to manage the education system. The first step is to create equality in the education system. For instance, they improve education access and equality of good quality and cheap education services, particularly for poor people.

Moreover, the RPJMN 2020-2024 also focusing on population control and strengthening population governance. This strategy aims to improve the life quality of Indonesians. Hence, to achieve that goal, in 2014, Indonesia created the Grand Design of Population Development (Grand Design Pembangunan Kependudukan – GDPK). This design includes controlling the amount, structure, growth, and mobility of the population and integrating population administration. Hence, this design also supports mapping the labor market quality (Figure 3.2).

Accordingly, the policy direction and strategies nationally can be identified as following Figure 3.3. The first goal is to improve the quality of human resources. Thus, the government has two targets to reach this goal: population control and high-quality education – those targets are a shield and baby steps for facing the transformation economic and bonus demographic. As we know, the abundant population could be a good idea or not. The large population can be interpreted as a plentiful potential labor supply, but AI or robots could replace them, and the vast society could be abundant unemployed. Hence, integrating and synchronizing population control policies in realizing balanced population growth, such as Keluarga Berencana (KB), is essential.

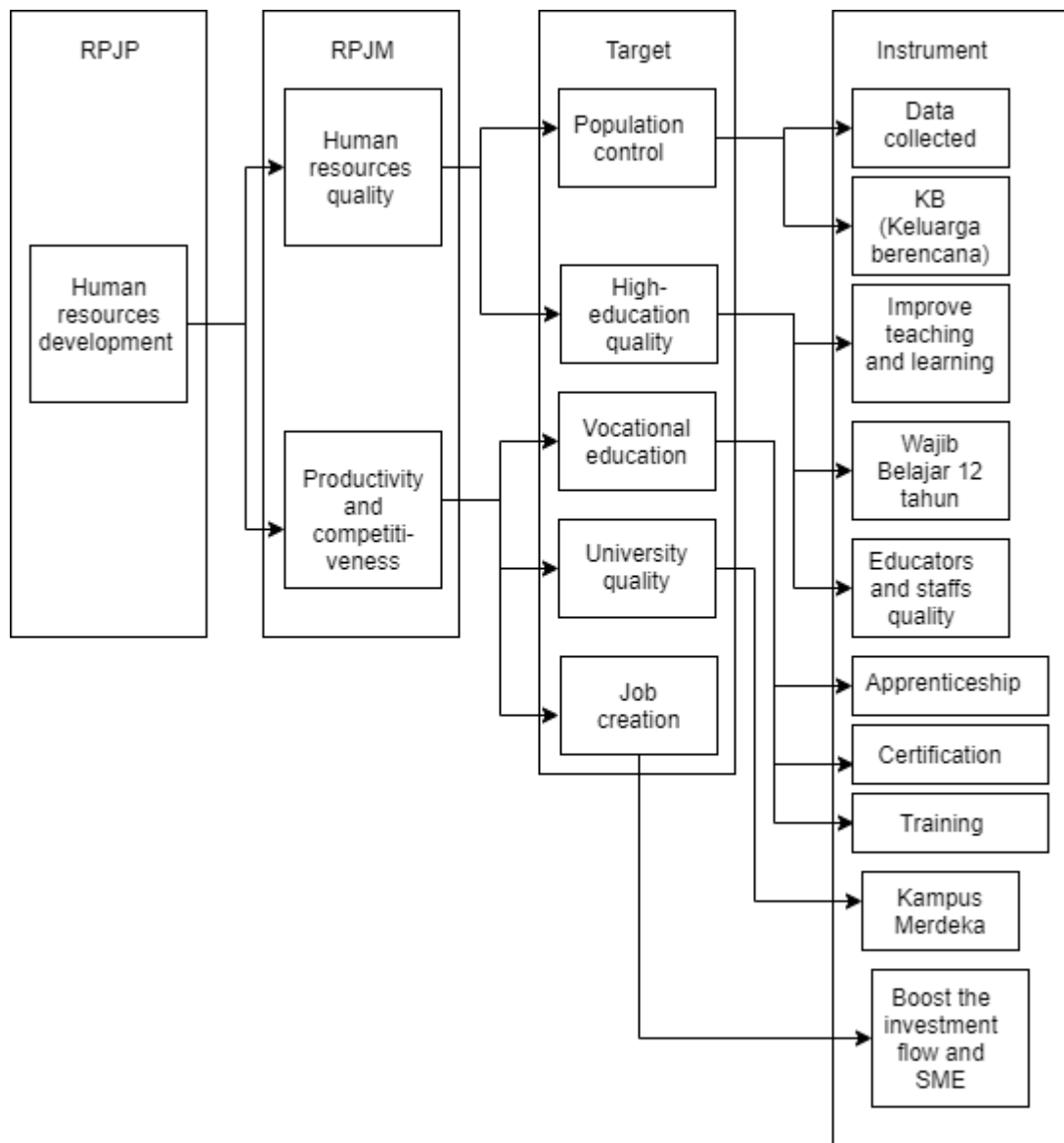


Figure 3.2 Synchronize of targets and instruments
on RPJPN 2005-2025 and RPJMN 2020-2024

Another way to control the population is by the identity card. Indonesia has electronic identity card called e-KTP (electronic Kartu Tanda Penduduk). This ID card prevents double ID cards and ID card falsification, so it creates accurate population data to support development programs and realize an accurate population database. Meantime, this card also requires a family card or Kartu Keluarga (KK). For KK, we can discover how many family members are in one household. Hence, improving the integration of population registration could improving the accessibility and quality of complete, accurate, and up-to-date essential statistics for development planning and implementation, including (1) rendering reliable essential statistics from cross-sectoral

data; and (2) optimal utilization of essential statistics for advancement and public services within central and regional government.

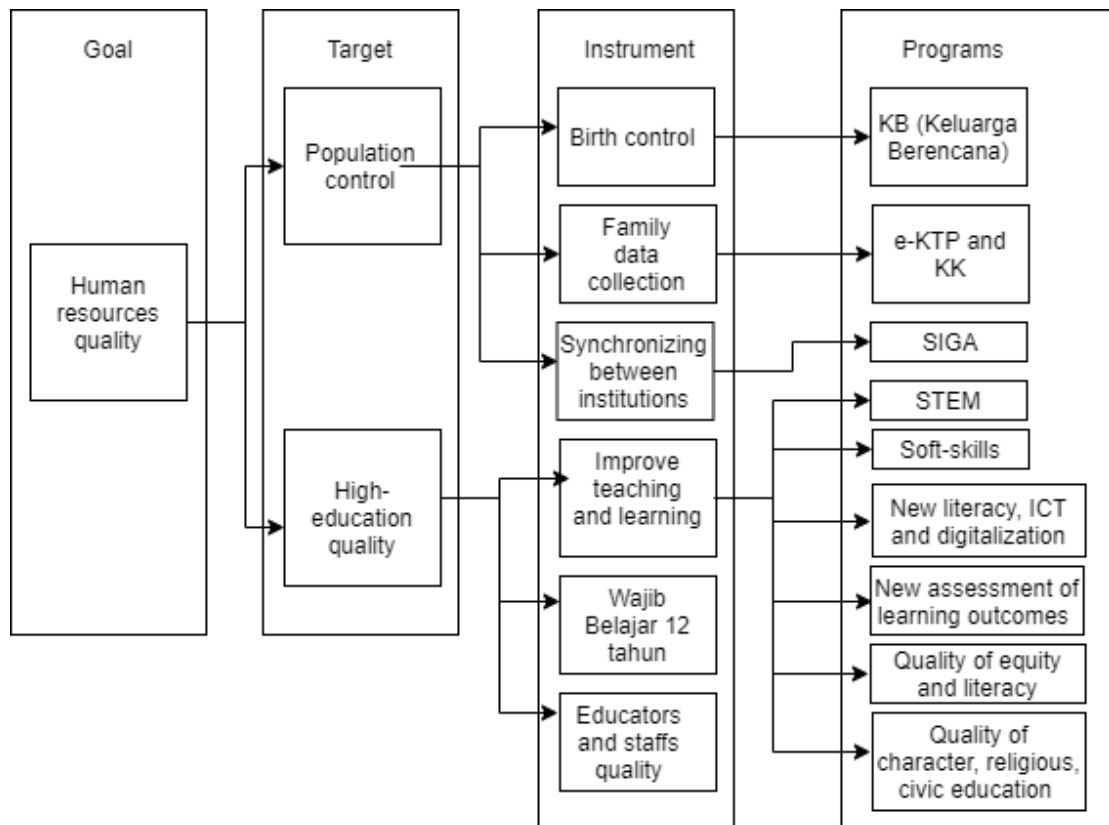


Figure 3.3 Synchronize of Goal and Programs on RPJPN 2005-2025 and RPJMN 2020-2024

Historically, Indonesia changed the curriculum ten times, although the new curriculum does not apply STEM, and few schools used it. Furthermore, the curriculum should be providing the soft-skill and character building. To achieve a high-quality education, the role of technology and digitalization is unavoidable. The obstacle to achieving this target in Indonesia is inequality in internet networks, computers, etc. Undoubtedly, many students in underdeveloped regions suffer due to distance learning models and online learning systems in the pandemic era. Meanwhile, Indonesia is still formulating the evaluation quality of student learning outputs after the government erased the national test or Ujian Nasional (UN) as a standard of graduating in all levels of schools.

As we recall the Figure 1.6, that composition of Indonesia labor market in 2019 almost 60% has education under the senior high school. Since 2016, wajib belajar 12

tahun (Wajar 12 tahun) or 12-years compulsory education implemented as a part of Program Indonesia Pintar (PIP). Unfortunately, this program is not optimal, although it is free. The boundaries are financing, facilities, awareness, and socialization. Financing problems include the low level of public participation in education financing and inappropriate subsidies. The facility problems are inadequate school facilities and teachers, and there are still children dropping out of school. A latent social problem is a low interest in children and a lack of parents' awareness of the importance of education for the future. Hereinafter, the socialization of the 12-year compulsory education program is less than the maximum. Hence, elevating fair entree to education services at all levels and stimulating the accomplishment of Wajar 12 Tahun is necessary, particularly with IR 4.0 and demographic dividend.

Aside from that, the quality of the educator and staff is necessary to improve. The increasing management, professionalism, quality, and equal placing of educators and education staff could boost educational excellence at all levels. The problem to achieve is unguaranteed of the teacher's welfare. Therefore, the government should be settled with this issue to reach their target.

The second goal of Indonesia's plan is improving competitiveness and productivity, via vocational education, university quality, and job creation. The aim of strengthening the vocational education is to produce get-ready worker that demanded by industry. Hence, vocational education and training are hand-shake with the industrial/private sector. Meanwhile, the apprenticeship is to engaging between employee and employer, a solution for facing the IR 4.0, and make ready student to enter the labor market with skills that industry needs. Thus, after Permenaker 36/2016 was issued, apprenticeship participants are required to obtain competency certification. The benefit is that the intern's ability is no doubt to encounter in the work world, when it comes to applying for jobs to many companies. Unfortunately, several industries take an advantage for this program as under-workers paid²⁰. This condition is exacerbated with limitation budget for certification that promised by government and many moral

²⁰ URL: https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo-jakarta/documents/publication/wcms_740537.pdf (Date of access: 10.10.2021)

hazards that happening. The government is also trying to combine access to vocational training by applying Pre-Employment Cards (Kartu Prakerja). This card function is temporary social aid with abilities improvement to accommodate fired employees and job seekers. Therefore, a synergy between government, vocational institute, and private sector is needed, particularly to reformulated the right competency-based that in line with the new era [165].

Based on Figure 1.11, we question whether the quality of graduate higher education is not good enough in the labor market? Based on tables 3.3 and 3.4, high education does not guarantee increased productivity and high salary. Therefore, the government is trying to strengthening the quality of higher education. This target has several programs, such as Tridharma University, PTN-BH, and Kampus Merdeka. Tridharma is the three pillars of higher education for the sake of the development of the university and the nation, consisting of education, research, and community dedication. Thus, prompting universities to concentrate on bringing out the Tridharma of higher education, a teaching university, a research university, or a vocational university to support high-quality human resources.

The governance is strengthening State Universities of Legal Entities (PTN-BH) that is more accountable and self-sufficient. The program is also improving the independence of universities, particularly to getting some funds sourced from the private sector, philanthropy, and public funds for the education and learning advancement in their establishments. The independence of managing their management is expected to elevating their competencies and qualifications. As a result, are excellent outcomes, facilitators, and amenities from the university.

As a result, government-initiated about Kampus Merdeka. The aim is to develop higher education as a producer of technological innovations and science and a center of excellence that focuses on the science field based on the potential of the regional area and enhancing the cooperation of research consortia between universities and institutions both domestic and abroad. The collaboration among universities, industries, and the government provides incentives for universities and industries to advance crucial research and improvement collaboration and facilitate the scientists'

movement within industries and universities. Another advantage is enhancing the research quality and use by strengthening the synergy among industries and universities. With Kampus Merdeka, the university should be improving the skills of tertiary education graduates by developing adaptive education plans and learning curriculum designs that are in harmony with industry and local development requirements. The enlarging certification and plans to stimulate work waiting periods and entrepreneurship training promote the young businesspeople's growth. Hence, the quality of tertiary education graduates improved, creating job vacancies, and reducing educated unemployment.

After creating high-quality workers, another problem is appearing, namely limitation of the job vacancy. Although the labor supply is already well maintained, if the labor demand is still limited, the result creates educated unemployment. Thus, to expand it, the government has an obligation to make a good investment climate that boosts the labor demand side. The renewing of the investment climate is expected to create new jobs in Indonesia, particularly in fields with labor-intensive. Another way to make a good atmosphere on the demand side is strengthening the SMEs to create new job vacancies. As we know, the SME or informal sector is the last resort after the formal sector rejects labor. Meantime, SMEs have an outstanding contribution to absorb the labor market.

As we mentioned above that Human resource (HR) development is a priority highlighted in Indonesia's Long-Term National Plan (2005-2025) and the Medium-Term Plan (Rancangan Pembangunan Jangka Menengah Nasional, RPJMN) 2015-2019. and 2020-2024. Then, the generalization and systematization of data on the implementation of the goals of the national plan are shown in Fig. 3.4. The identified second-tier goals - the provision of vocational education, quality university education, and the creation of new jobs - if achieved, could reduce labor market disproportionality. However, the mechanism for achieving these goals needs to be adjusted. The fundamental problems here, according to the author, are: firstly, the lack of a system of interaction between the Government, trade unions, educational institutions, private sector organizations, and industry associations of enterprises; secondly, insufficiently

effective interaction between critical ministries responsible for implementing state policy in the field of labor resources and education; thirdly: significant imbalances in the education system, incl. differentiation of the quality of educational services provided by public and private educational organizations, lack of a mechanism for transferring knowledge from universities to the vocational education sector, weak interest of teachers in improving the quality of work.

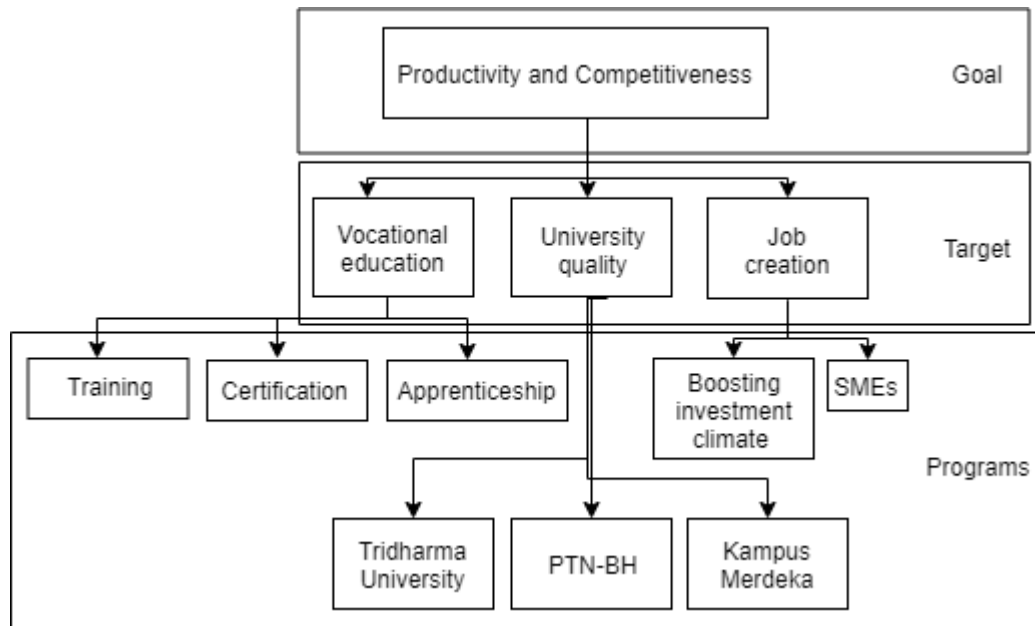


Figure 3.4 Synchronize of Goal and Programs of second goal on RPJMN 2020-2024

It should be emphasized that the Government is currently implementing a variety of initiatives aimed at achieving the national goal of increasing productivity and competitiveness. These initiatives were divided into two groups: state programs and changes in the institutional environment (Fig. 3.4). In the field of vocational education, and state programs became the primary means of achieving goals (vocational training in specialized regional centers, internships at an enterprise, resulting in a particular certificate; vocational training through special pre-employment cards (Kartu Prakerja program) In the field of higher education, the most essential government programs are the Kampus Merdeka program aimed at expanding practical skills, the Tri Dharma University program (science, teaching, social activities), aimed at improving the quality of work of university teachers and the PTN-BN initiative related to changing the legal norms of universities, expanding their economic and academic freedoms.

Additionally, Bambang Brodjonegoro, a former Menteri Perencanaan Pembangunan Nasional (PPN)/Kepala Bappenas, explained that Indonesia has three stages of labor reformation. First, 2016-2025 focuses on reformation labor rules towards reformation flexible labor market and transition policy from informal to formal labor. Another target in this period is to accelerate the 12-year compulsory education program, zero junior high schools (SMP) graduated, strengthen relevance education program and training, also expanded training with basic competence that supports transformation to industrial manufacture.

Second, 2026-2035, the primary targets are: 1) to continue the industrial transformation to the manufacturing industry; 2) increase agricultural productivity; 3) strengthen the competitiveness of the creative economy service sector; 4) expand the transition of workers from informal to formal; 5) strengthen institutions and expand access to training, education, apprenticeship, and competency-based entrepreneurship; 6) strengthen the relevance of the workforce graduate work related to innovation and information technology.

Third, 2036-2045, Indonesia targets the execution of informal employees (non-wage recipients) National Social Security System, the achievement of a formal workforce of 85%, the application of more flexible labor regulations by emphasizing the balance of protection of workers and employers, the expansion of the apprenticeship system, the close link between training systems and industry needs, as well as certification of skills across sectors and their application to the job market.

In regional level these plans also applied in their long-term and medium-term development plans. Surabaya and Jakarta long-term development plan also focusing in quality of human resources. Due to the human resource's quality is an important element in development process. Thus, quality of human resources related to quality of labor that fulfill the vacancy in labor market. If there is a gap between labor quality and industry demanded, so the unemployment and low productivity are unavoidable. In addition, Indonesia is undergoing a prompt urbanization proceed. Recently, majority of Indonesia's total population inhabits in urban areas. On the one hand, in middle-income country level demands to have significant urbanization and industrialization

development. On the other hand, this activity entails to go hand in hand with adequate job creation in the urban areas. Therefore, investment (domestic and foreign) requires to rise in existing or new cities. Hence, the Indonesian government must formulate an attractive investment climate to allure investment and create new jobs and boost human capital.

In details, Surabaya RPJPD (Rencana Pembangunan Jangka Panjang Daerah) pointed out in the seventh mission is to achieve similar entree to quality health, education, and social services for all levels of society, with the following development policy directions. This mission is to achieve of competitive advantage in the local economy that is competitive and supported by infrastructure and technology as well as quality human resources, in order to increase regional independence. Hence, human capital is a key point to reach the goal in RPJPD.

The very rapid development of Science and Technology (IPTEK) has influenced the structure of the global order. This structure will cause all nations in the world, including Indonesia, to follow and be involved in a global order, especially in the science and technology sphere. High quality human resources is one of the key factors in global competition. Competition in the increasingly competitive era of globalization requires human resources (HR) to continuously be able to develop themselves proactively (able to adapt and be responsive to technological changes). Thus, Surabaya development policies are prioritized to prepare quality human resources (intelligent, faithful, caring, physically and mentally healthy), have skills, and creativity and are highly competitive.

Table 3.10 – Stages of Surabaya policy direction regarding the seventh mission (2005-2019)

No	First stage (2005-2009)	Second stage (2010-2014)	Third stage (2015-2019)
1	Increasing the availability and equity of basic health facilities that are easily accessible to every level of society	Increasing the development of health infrastructure that is easily accessible to every level of society.	Ensure the fulfillment and equitable distribution of quality health infrastructure and are easily accessible by the community.

Continuation of the table 3.10			
2	Strive to provide the sufficient provision of health assistance for mothers and children through increased health promotion and community empowerment	Improve the sufficient provision of health assistance for mothers and children through increased health promotion and community empowerment.	Strengthen the sufficient provision of health assistance for mothers and children to reduce maternal mortality, infant mortality, and reduce the prevalence of undernourished and malnourished children under five.
3	Providing health financing through health service guarantees to improve the health status of the community	Increasing health financing through health care guarantees.	Improving affordability, equity, security and quality of public health insurance services.
4	Strive to provide safe, responsible and humane regional hospital health services.	Strive for the provision of safe, responsible and humane regional hospital health services.	Establish regional hospital resources that are professional, productive and highly committed in terms of providing quality hospital services.
5	Realizing quality education for the whole community	Improving quality education for the whole community.	Consolidating quality education for the entire community.
6	Provide educators at all education levels following competency standards.	Improving the quality and quantity of educators at all education levels following competency standards.	Strengthen the quality and quantity of teaching staff at all education levels following competency standards.
7	Provide general and vocational secondary education service facilities in the context of preparing a ready-made workforce	Realizing a creative, innovative and fun learning process by appropriating the environment as a education source.	Improving the quality of the creative, innovative and fun learning process by appropriating the environment as a education source.
		Increasing the quantity and quality of general and vocational secondary education services in the context of preparing a ready-to-use workforce.	Consolidating the quality and quantity of general and vocational secondary education services in the context of preparing a ready-to-use workforce.

Continuation of the table 3.10			
7.		Establish partnerships with business and industry referring to absorbing and fulfilling manpower from general and vocational secondary education.	Increasing and maintain partnerships with business and industry referring to absorbing and fulfilling manpower from general and vocational secondary education.
8	Increasing the role of the younger generation in various fields.	Increasing the potential and achievements of the young generation in various fields.	Strengthening youth and sports achievements directed at increasing the human resource's quality.
9	Increasing youth and sports achievements.	Improving youth and sports achievements through improving sports facilities and infrastructure.	

For details the Surabaya policy direction divided into 3 stages (Table 3.10). First step is 2005-2009 that focused on improving accessibility, financing healthcare system, establish the facilities, socialization about education and health and improving the youth generation role in any spheres. In the second stage, Surabaya planned on developing their healthcare infrastructure and financing for adequate the health services, boosting the education quality and role of youth generations. On the third stage, healthcare sector should be on equality distribution, improve and maintain the education quality with any parties, and strengthening the youth role.

On RPJMD Surabaya 2021-2026, in determining the Equitable Quality of Human Resources (HR) policies that are superior, dignified, and independent, Surabaya has 6 development strategies. The two of them are related to improving the quality of labor market and poverty alleviation with encouraging inclusive economic growth. Firstly, Equitable Quality of Human Resources (HR) who are Superior, Dignified and Independent. Social capital and superior quality of human resources are very important elements in achieving the goals of a region in facing the era of globalization and the era of taking off. Large social capital must be turned into an asset that is beneficial for regional development. Careful and wise action must be taken in

equipping and preparing social capital so that it truly becomes a productive and useful regional development asset and has quality for assistance in the proceed of developing the quality of human resources owned in the area. Social capital and human resources are an integral part of the social system and have high potential for sustainable community development. The higher the quality of social capital and the quality of human resources of an area, the higher the level of development progress of the area. On the other hand, the lower the quality of social capital and the human resources' quality in an area, the lower the regional development will be. Therefore, the Surabaya City government has made a strategy to improve and equalize the quality of competitive and dignified human resources (HR) which can be achieved through providing entrée to fundamental health and education services and other fundamental needs (Table 3.11).

The second is Encouraging Inclusive Economic Growth with Impact on Poverty and Unemployment Reduction. The creation of economic inclusivity is intended so that the economic conditions that occur in the city of Surabaya are not only a result of changes in macroeconomic conditions but are also built from the economic capacity of the community as a real sector, especially in strengthening MSMEs (Micro, Small and Medium Enterprises) which will then become pillars for alleviating poverty and unemployment.

Table 3.11 – Synchronize mission, agenda and program development of RPJMD Surabaya 2021-2026

Second Mission	Agenda	Sector	Explanation	Program
Building Human Resources (HR) with superior character, healthy physical and spiritual, productive, religious,	Surabaya lapangan kerja untuk rakyat	Labor	1.Open job vacancy to recovering economy post-pandemic 2.Creating 10,000 new entrepreneurs 3.Give an incentive and build invest system services with global standard 4.Free 10,000 expert working certifications	Job training and workforce productivity programme Job placement programme Supervision labor programme

Continuation of the table 3.11				
cultured in the frame diversity through increasing access and quality of service health, education, and other basic needs.			5. Create cooperation national-international for youth apprenticeships	
		SMEs	<ol style="list-style-type: none"> 1. Create 1,300,000 SME national-international 2. Revitalisation traditional market 3. Facilitate street vendors 4. Create centre of economic creative and digital economy 	<p>Empowerment program SMEs Development program MSE</p>
	Surabaya Generasi Cerdas	Education	<ol style="list-style-type: none"> 1. Strengthening free education for public elementary and junior high schools 2. Provide scholarship support for SMA/SMK students 3. Increase scholarships to study at home/abroad for underprivileged children, achievers, and athletes 4. Improving the welfare of private teachers and non-permanent teachers (Guru Tidak Tetap – GTT) 5. Increase teacher capacity 6. Increasing the Regional Education Operational Costs (Biaya Operasional Pendidikan Daerah –BOPDA) to improve the quality of schools and subsidies for private elementary and junior high schools 7. Equip all schools with sports facilities and high-speed internet 8. Providing free tutoring at the Rukun Warga (RW) halls 	<p>Education management program Curriculum development program Programs for educators and education personnel</p>

Strengthening micro, small and medium enterprises is the main basis for driving the economy in the city of Surabaya considering that the central government focuses

on developing a people-based economy by strengthening MSMEs so that MSMEs can focus more on increasing production capacity and quality. The integration of the micro, small and medium business sector needs to be carried out which includes the creation of new entrepreneurs, increasing community expertise, standardization, product marketing development and increasing access to capital.

Undoubtedly, in development is related to the quality of human resources (HR). The HR's quality is closely related to the quality of the workforce available to fill job opportunities. Improving HR's quality which is important, so that there is no gap between the quality of the workforce and what is needed by the business/industry world. Meanwhile, the Pentahelix synergy that is formed between the government, the business world, the community, and educational institutions can grow and develop Micro Business entrepreneurship to overcome poverty and unemployment. In addition, strengthening the workforce and creating an investment climate can encourage and develop added value from superior local commodities that are competitive and sustainable. High-quality human capital will be able to encourage the development of an on-line-based distribution and marketing system for local products that is integrated between producers, financial institutions and consumers, so that they can become a driving power for the local economy and MSMEs development and growth. In addition, this condition can encourage the development of the digital economy through business start-ups, creative industries and public awareness to invest. Hence, if this circumstance is sustained, the goal to reducing poverty could be true.

Alike Surabaya, the RPJMD Jakarta 2017-2022 prioritizes in improving human resources to obtain a qualified and competitive workforce in 2025. In the RPJPD Jakarta 2005-2025, it is proclaimed to create an investment climate that supports the creation of new jobs in Jakarta. In an effort to improve the investment climate, it is necessary to encourage a supportive environment, one of which is the minimum wage. The Jakarta provincial government believes that a minimum wage rising will make investors confident to invest, so that this will increase the productivity and quality of the required workforce.

Long- and medium-term national development plans are also being implemented at the level of Surabaya and Jakarta. The analysis showed that here, at the national level, significant attention is paid to human resources. In particular, in the medium-term development plan for Surabaya for the period 2021-2026, indicators of the quality of human life are noted, such as education and social security for all segments of society, as well as the creation of new jobs through the creation of a favorable investment climate. Jakarta's medium-term development plan for the period 2017-2022, like Surabaya's development plan, prioritizes improving human resources to create a skilled and competitive workforce by 2025, as well as creating an investment climate conducive to job creation [175]. To improve the investment climate, it is necessary to create favorable conditions, one of which, according to the author, is the minimum wage. This task is of fundamental importance since, in Indonesia, along with the national minimum wage, minimum wages are also established at the subnational level. According to Jakarta's long-term development plan (2005-2025), regional authorities are guided by the position that increasing the minimum wage will strengthen investor confidence and, accordingly, will lead to increased productivity and the quality of the workforce. The minimum wage is a tool for reducing poverty and inequality, while calculations have shown that higher education does not guarantee increased productivity and wages. To address this issue, the Jakarta and Surabaya governments could implement a project to take education levels into account when setting minimum wages and determining industry minimum wages.

Meanwhile, as we know that minimum wage is an instrument to reduce the poverty and inequality. This statement is in line with table 3.10, particularly in Surabaya. If we picture the minimum wage formula, we can understand why this policy can reduce the poverty (equation 47). Based on PP 78/2015, increase in minimum wages based on Decent Living Needs (Kebutuhan Hidup Layak - KHL) and taking into inflation and economic growth with the formula:

$$UM_{t+1} = UM_t + [UM_t \times (\pi + \% \Delta GDP_t)] \quad (47)$$

where UM_{t+1} is minimum wage will be set in next year (t+1);

UM_t – minimum wage in t year;

π – inflation from September last year to t year;

$\% \Delta GDP_t$ – GDP growth which is calculated from the growth of GDP covering the period of the third and fourth quarters of the previous year and the period of the first and second quarters of the current year.

Hereinafter, in 2020, Indonesia published a new called the omnibus law on Job Creation or Act Number 11 of 2020 on Job Creation (Undang-undang nomor 11 tahun 2020 tentang Cipta Kerja or UU 11/2020). This act creates a new formula of minimum wage. In PP 36/2021, minimum wage is determined based on economic and labor conditions. By considering the upper and lower limits of the minimum wage, see formula (48):

$$UpL_t = (\overline{C \text{ per capita}_t} \times \overline{ART_t}) / \overline{\text{working } ART_t}$$

$$LoL_t = UpL_t \times 50\%$$

$$UM_{t+1} = UM_t + [Max(PE_t \text{ or } \pi_t) \times (UpL_t - UM_t \text{ or } UpL_t - LoL_t) \times UM_t], \quad (48)$$

where UpL_t – upper limit of minimum wage in t year;

$\overline{C \text{ per capita}_t}$ – average consumption per capita in t;

$\overline{ART_t}$ – average number of household members in t year;

$\overline{\text{working } ART_t}$ – average number of household members working in each household in t year;

LoL_t – lower limit of minimum wage in t year;

PE_t – economic growth in t year.

Based on those formulas of minimum wage in Indonesia, we can understand why high education does not guarantee increased productivity and high salary. Due to the minimum wage policy does not consider a proxy of education level. Moreover, based on the UU 11/2020 the sectoral minimum wage is abolished, hence the minimum wage in all sectors will be equal. On the other hands, this policy potentially create pro and contra between the employee and employer. For instance, the labor who enjoyed the high wage caused by sectoral minimum wage could be suffer after the elimination of this wage. On the other side, the employer could reduce their labor's wage and push

their input cost. Therefore, this new policy will be threatening the welfare of the existing community, particularly labor in urban area.

CONCLUSIONS ON CHAPTER 3

Jakarta's density and productivity indicators are positively correlated due to economic activity in Jakarta shifting outside the city pushed by the pricey land. In the meantime, Surabaya has a negative relation because the industrial center is not only Surabaya but also several nearby cities. The human development index in Jakarta is insignificant because it has an abundant labor supply, that a reason for companies' confidence in staff turnover. Contrarily, Surabaya's society has more options for where to live and work; hence this index plays a significant role.

Surabaya's wages play more positive role for attracting the job seekers than Jakarta, because the Jakarta's competitiveness is higher than Surabaya. Wage in Jakarta and Surabaya could reduce the poverty, but this indicator more effective in Surabaya than in Jakarta. Followed by the expansion of Jakarta's city size, regional inequality is becoming more widespread while income inequality decreased. On the other hand, increasing Surabaya's city size leads to reduced regional disparities but improved financial inequality.

In Jakarta, a bachelor's degree does not guarantee an increase in productivity and wages. Reservedly, education plays more role in increasing the city's productivity and wages in Surabaya. The main reason is that cities provide society with the education received outside educational institutions, which is demanded in the labor market. Therefore, the city size in Indonesia, as a rule, means a high density while not guaranteeing a large number of people with a good education or a bachelor's degree. Unavoidably, Indonesia's priority is to improve the human resources quality provided for in Indonesia's long-term national plan (2005-2025). This grand plan is a way to solve the possibility of densely populated or a vast labor supply in Indonesia, but limited labor demand and less competitiveness can lead to large-scale unemployment.

CONCLUSION

Currently, Indonesia is experiencing a period of structural transformation and rapid processes of industrialization and urbanization. All these processes are concentrated mainly on the island of Java, one of the most populous islands in the world, which has become an island of megacities, becoming the focus of both the positive and negative consequences of urban consolidation.

In countries with emerging markets that are amid a demographic transition, the relationships between density, productivity, wages, population dynamics, and educational levels that are characteristic of countries with developed market economies may still need to be confirmed. Situations were identified where an increase in the education level led to a decrease in wages and productivity; increasing wages did not always lead to a reduction in poverty; the urban wage premium level in Jakarta and Surabaya depends on the level of urbanization, population size, bachelor's degree availability, productivity, and unemployment rate.

Furthermore, the condition Indonesian labor market showed demographic transition that impact to labor market structure. As a result of this transition, Indonesia is blessing with demographic dividend. Meanwhile, in welcoming industry revolution and the imminent demographic bonus, the Indonesian labor market still dominated by undereducated workers. Hence, this circumstance create fortune or not, particularly in urban. Consequently, half of Indonesia's population inhabit in urban area. The labor situation also showed that more than half of labor force in urban area are employed, contrarily, in rural that only 30% of the labor force. Therefore, the existence of labor in urban areas is an essential matter, particularly to ensuring the sustainable economy.

Java as the populous island in Indonesia with more than half the inhabitant reside there. Furthermore, almost 30% live in 2 megacities, namely Jabodetabek and Gerbangkertosusila or well known as Jakarta and Surabaya metropolitan. Further, the ICT skill is dominated by Jakarta as the capital city of Indonesia, even though the university enrollment is moderate level. The anomaly of the situation in Indonesia is mainly that the province with high ICT skills has a low rate of university enrollment.

Another hypothesis about this situation is Indonesian labor market dominated by human resources with low education but skill in the ICT field.

As the main metropolitans in Indonesia, Jakarta and Surabaya metropolitan have a significant role in boosting economic activities and sustainable growth. Meanwhile, those metropolitans have several problems to solve, such as poverty and inequality. Based on several studies, cities always promised high productivity and high wage. As a result, the high education people move to cities and create the knowledge spillover. Slightly different from several studies, high education in Indonesia has a negative influence on productivity and wage. This circumstance provides by quickly swipe the labor, particularly with the dividend demographic that is experiencing by Indonesia.

Spatially the productivity in Jakarta has two spatial cluster the high-high productivity and low-low productivity, namely Central Jakarta and West Jakarta as the core of Jakarta metropolitan, while Bekasi city and Bogor municipality is the low productivity. Moreover, Surabaya has abnormal spatial or spatial outlier models. The outliers indicated that spatial objects are notably various from their spatial contiguous. Unavoidably, the Surabaya metropolitan low object is the Bangkalan region. This region be discovered as the developing area even though its near with Surabaya city and has a bridge to connecting each other. Another outlier is Sidoarjo with high productivity due to this area surrounding by high productivity areas.

We can conclude that productivity strongly intertwining with localization economy. Meanwhile as a proxy of industrial share in region localization economy has negative relation with productivity. This can be assumed that those areas are shifting to another sector not or industrial sector is not the backbone in the new era of industry. Nowadays, those metropolitans are trying to manifest the smart city scheme, hence trade and services sector give more impact than industrial sector.

Furthermore, the density with productivity is significant and positive relation in Jakarta and negative in Surabaya. The difference of this result due to Surabaya not only the central of industry, for instance, Malang, Pasuruan, Gresik and Kediri are cities that have highly industry also. Another reason is Surabaya has the agriculture part like east coast Surabaya and their still use traditional methods. Another reason is mostly of the

economic activities are relocating to outside of Surabaya, while Jakarta is the core economic activities and people do not have other options. Hence, if the area getting dense and the land become pricey, firms would move to another place that costless. Notably, this result with variable of localization economy the Surabaya's situation is evidence that firms could be relocated in not dense area.

Next, human index in Jakarta metropolitan is insignificantly impact the productivity in Jakarta metropolitan, oppositely with the Surabaya metropolitan that has high significance. Remarkably, Jakarta has abundant people and centralize on them, hence they can be swiping their labor easily. Contrarily, with Surabaya's condition that has several options for locating or working, so the human index has the big role on it.

Next, if we considering the education, particularly bachelor degree, is negatively to improving the productivity in both metropolitans. Hypothetically, the high-education in Indonesia couldn't facilitating the skill that demanded in labor market. Another reason is massively less educated than bachelor degree that dominated in labor market. Meanwhile, if concern output of population in bachelor degree has positively to boosting the productivity. Additionally, density doesn't have significantly to influence the productivity in those metropolitans.

Generally, urban premium in Jakarta and Surabaya is influenced by urban rate, population, bachelor degree, productivity, and unemployment rate. Urban wage in Jakarta and Surabaya has a negative intertwining, or the increasing of wage will reduce the number of poverty people and decreasing the unemployment rate. In other words, the premium wage lifts society's welfare. Hence, sectoral wage as a component in minimum wage policy should be maintained, not deleted.

The disappointing fact is that the city's wage premium is inversely proportional to the number of people with a bachelor's degree. This result reflects the actual situation in Indonesia, where higher education does not provide the skills required by the labor market and does not guarantee high wages or decent work. The unusual situation in Indonesia is that the labor market is dominated by personnel with a low level of education but with a high level of knowledge in the field of ICT.

The domination of high school graduation in the labor market, but as blue-collar workers, could be replaced by technology in the future. Thus, the strengthening the vocational or public school produce not only get-ready workers but also an insightful and creative worker. Meantime, the government should pay attention to realize the Wajar 12 Tahun inclusively.

A few university graduations in the labor market also create a question of their quality. Hence, the government is manifesting “Kampus Merdeka” as a preventive the educated unemployment. In case Kampus Merdeka runs well, this program should give the educators and students freedom to be more creative. Therefore, the government should be improving the educators' welfare and adding the research and development budget. Moreover, in the minimum wage policy, government should be considered the proxy of education level as the result of eliminated the sectoral minimum wage. Hence, with this proxy could improve the characteristics of Indonesia's labor market, particularly in urban area. Additionally, it could be attracting more labor that have high competitiveness, higher education and skills. Therefore, this labor could improve the local economy and the society welfare that can reduce poverty and inequality.

This study provides evidence of Indonesia's current labor market situation, particularly in Jakarta and Surabaya. Additionally, the data collection could picture labor market conditions individually and comprehensively. The practical value of this research is to clarify ideas about the specifics of the labor markets functioning in the demographic transition and assess the complex consequences of labor concentration in the largest cities. Moreover, urbanism is essential in ensuring sustainable development, such as reducing poverty and unemployment via premium wages. In the future, the education quality at any level should have a brawny form to adjust to labor market requirements hereafter; hence their education could be related to their wages and welfare. Therefore, the results obtained can be used by authorities at various levels can attempt to maximize serendipity, which has been identified and discovered in this study. Therefore, prospects for further development of the research topic are related to the following areas: the role of labor market density in ensuring sustainable development; studying the relationship between wages and education in developing

countries; assessing the knowledge flow in the labor market with high density; urban development to reduce poverty and inequality; regional minimum wage policy; raising the level of regional economic development and economy sustainability as a consequence of a dense labor market.

The state implementing the statist model of modernization is assigned a unique role in overcoming imbalances in the labor market and improving its regulation. The goals and tools for improving the quality of labor resources are included today in long-term and medium-term development plans at the national and regional levels and are embodied in a variety of government programs and institutional reforms. Interconnection of measures in the field of regulation of urbanization processes, income policy, and education policy; increasing the efficiency of coordination of government activities can create the preconditions for the implementation of optimistic scenarios for the development of the labor markets of Jakarta and Surabaya.

Key recommendations from the study are:

- Improving the population registration system as a monitoring and control tool in conditions of active migration from rural areas to the largest cities of the country. The updated accounting system should be built on the basis of combining the databases used to issue electronic cards for personal identification (Kartu Tanda Penduduk electronic ID card) and household characteristics (Kartu Keluarga family card).

- Ensuring more precise coordination of the goals and tools for the implementation of the long-term national plan (2005-2025) and the medium-term development plan of Indonesia (2020-2024) in the field of labor market regulation and the development of the country's labor force through closer interaction between the Ministry of Manpower and the Ministry Education and Culture, Ministry of Rural Affairs, Development of Disadvantaged Regions and Resettlement of the Republic of Indonesia.

- Improving income policy by changing the approach to the formation of the minimum wage at the national and sub-national levels. Taking into account the results illustrating the different impacts of changes in wages on the poverty level, each region of the country must assess the feasibility of maintaining the existing territorial

differentiation of the minimum wage in interregional and intraregional contexts. Raising the minimum wage is advisable in those regions where it has a significant impact on reducing poverty.

- Improving the quality of secondary vocational and higher education). For secondary vocational education, it is necessary to improve the Kartu Prakerja professional internship program. The selection of priority areas for internships should be carried out, considering the structure and development trends of regional labor markets and the specifics of the labor market's reaction to increasing the level of education of workers. For higher education within the framework of the Kampus Merdeka program, the procedure for training students outside the "mother" university requires clarification, namely, in what format, with the involvement of which companies and employers this training should take place, what competencies should be developed, how regional specifics should be taken into account. When implementing the principles of Tri Dharma University, it is recommended to shift the distribution of teaching time in favor of scientific research and develop new methods for monitoring the effectiveness of higher education employees. As part of expanding the academic and economic freedoms of state universities (granting the status of a legal entity to PTN-BHB), it is necessary to work out mechanisms for the participation of subnational authorities in their activities.

- Scientists from the country's leading universities, in collaboration with the Ministry of Human Resources and the Ministry of Education and Culture, will develop methodological recommendations for subnational authorities to improve employment policies in the most significant urban agglomerations. These recommendations should include such vital sections as improving the population registration system, increasing the efficiency of income policy, and improving the education system. It is possible to test the recommendations within the framework of an experimental site created in several regions

Prospects for further development of the research topic are related to the following areas: studying the relationship between wages and education in other countries with emerging markets; principles and approaches to differentiation of the

minimum wage at the subnational level; increasing the level of regional economic development and economic sustainability in a high-density economic space, increasing the efficiency of labor market regulation by subnational governments at the level of urban agglomerations.

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