

The Connection between Manufacturing and Energy Sector and its Impact on Indonesia's Economic Growth

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Abstract

This paper examines how Indonesia challenge the issue of energy availability to support Indonesian manufacturing. Considering the number of manufacturing industries in Indonesia, the country requires a significant amount of energy. The total energy supply owned by Indonesia cannot fulfill the demand of manufacturing because several other supporting sectors require energy supplies as well. This study uses qualitative and secondary data taken from various literatures relevant to this topic. In addition, the author also uses the theory of economic diplomacy to analyze the problem of energy availability for manufacturing with the aim of Indonesia's economic growth.

Keywords

Manufacturing, Energy Sector, Indonesia's Economic Growth, Trade, and Investment.

1. Introduction

Indonesia is a diverse archipelago nation with the largest economy in Southeast Asia. Indonesia has experienced rapid growth since emerging from the Asian financial crisis in the late 1990s. Indonesia already has the world's 10th largest economy by purchasing power parity (World Bank 2021b). Indonesia has made major progress in poverty reduction since 1999, with the poverty rate declined by more than half to 9.78 % in 2020 (Embassy of the Republic of Indonesia in London n.d.). Indonesia has recently qualified for middle to upper-income status by providing constant economic (World Bank 2021b).

The economic planning in Indonesia is based on a 20-year development plan that runs from 2005 to 2025. It is divided into National Medium Term Development Plan (RPJMN) 5-year medium-term plans, each with its own set of development priorities (Embassy of the Republic of Indonesia in London n.d.). The spread of COVID-19 has made renewed Indonesia a partnership with World Bank Group for the period of 2021-2025. The Framework would be aimed to assist Indonesia in its recovery from the pandemic to sustained economic growth and significant reductions in poverty. The existence of this Country Cooperation Framework (CFP) with the assistance of the World Bank Group can assist Indonesia in achieving its ambition to become a high-income class (World Bank 2021a). This is evidenced by an increase in Indonesia's economic growth between 4.5% and 5.5% this year, following a 2.1% contraction in 2020 due to the COVID-19 pandemic (Tani 2018).

The manufacturing sector has an important role in economic activity, especially in Indonesia (GlobalData 2021). Based on the 2016 International Yearbook of Industrial Statistics, Indonesia is included in the top ten largest manufacturing industrial countries in the world, surpassing the UK, Russia, and Canada. So that the manufacturing industry needs Indonesia to be able to encourage the country's economic growth, employment, increase exports and increase investment (Pratiwi and Aida 2017).

In 2020, it is known that there are 30,381 manufacturing companies in Indonesia (BPS-Statistics 2020). The manufacturing sector in Indonesia is in dire need of fuel derived from oil and gas commodities (Prastiyo 2020). With increased activity in the manufacturing industry, an increase in the energy supply is needed to balance the needs of the manufacturing industry. With a wide range of potential benefits, the energy supply can help the manufacturing industry develop and significantly contributes to state revenues. However, Indonesia's current energy supply is

insufficient to meet the energy needs of various other sectors that also required energy supplies, such as infrastructure and transportation (Teka 2012).

Based on these issues, this paper seeks to fill in the gap by addressing how Indonesia can tackle the issue of energy availability to support Indonesian manufacturing. Using economic diplomacy theory, this study seeks to determine the presence of energy in the Indonesian manufacturing sector that contribute to Indonesia's economic growth.

1.1 Objectives

The purpose of this paper is to provide input to the Indonesian government in carrying out its policies to maintain the country's economic growth. In addition, this article also aims to provide knowledge for researchers who focus on the energy and manufacturing sectors in Indonesia.

2. Literature Review

Economic diplomacy is a process that involves negotiations about activities such as trade and services, manufacturing, and investment in other countries (Rashid 2005). Economic diplomacy is related to state and public interests or a broader variety of social actors and interests (Lee and Hocking 2018). Diplomacy is more private than its policies during the dialogue and implementation process. Indeed, economic diplomacy consists of a variety of economic activities, including trade, labor, investment, and capital markets, foreign aid, and industrial cooperation. As a result, economic diplomacy wields significant power and is an impressive player in international diplomacy (Heijmans 2011). Economic diplomacy as a tool to advance economic growth, political and strategic goals in the manufacturing industry. Economic diplomacy has a significant role of the Indonesian government in the manufacturing industry (Wayne 2019)

Manufacturing is an important factor contributing to national prosperity and an essential driver of economic growth. In the face of disruptive innovation and government regulations, manufacturers should integrate technological advances, recognize economic risks, and manage complex global supply chains to increase productivity and maintain competitiveness (Oxford Economics n.d.). The factors that drive complexity in the manufacturing are classified as external and internal. The supply network and market aspects are examples of external factors. Many organizations, complex interactions, and decentralized networks are all part of the supply network. Large demand, commodity fluctuations, and buyer behavior are all aspects of the market. Internal factors including system and product aspects. Increased flexibility, complicated configurations, and machine breakdowns are all part of the system aspect. The product aspect includes more product models and options as well as a greater number of product constituent parts (Budiono, et. al. 2021). Industrial growth and population growth are affecting trends in consumer consumption pattern and demand for manufactured goods. The manufacturing sector has a significant impact on providing economic growth and employment for local communities (Australian Government n.d.).

There is literature that uses the theory of economic diplomacy by taking the example of the China. China has an active role in the global economy by being the main holder of foreign exchange reserves, the largest creditor country, the largest producer, the largest commodity exporter, and even the world's second-largest importer and recipient of foreign direct investment. With the rapid development, China has formed a global economic power that can form a policy orientation based on cooperation between countries. For example, China's economic diplomacy towards Arab countries is due to commercial interests. China is taking pragmatic steps in the face of the Arab uprisings by staying focused on its economic cooperation. China is the main provider that provides low-interest development loans to the Middle East and North Africa (MENA) countries. The loans China provides depend on the payment of resources, development projects, and materials used from China (Sun and Zoubir 2015).

3. Methods

The qualitative research methods are used in this paper. A qualitative method is a method for constructing a social reality based on in-depth case knowledge. Some situationally restricted cases and subjects are included in qualitative methods (Neuman 2013). The purpose of using this method is to provide an overview of various variations of phenomena, situations, problems, and others by focusing on the various data variables used (Kumar 2011). The research process is typically carried out by asking resource person questions, collecting specific data from participants, and analyzing data from specific themes to common themes (Creswell and Creswell 2013).

4. Data Collection

The authors rely on secondary data to collect information. The information is derived from government publications, reports, research, and other commercial sources (Kumar 2011). The authors conducted a qualitative data analysis to gain insight and knowledge on Indonesia's response as a country initiative to maintaining energy availability and improve economic growth. The secondary data will be analyzed and interpreted by the author to ensure energy availability in Indonesian manufacturing.

5. Results and Discussion

This paper will analyze Indonesia's role to explore energy availability in the manufacturing industry using economic diplomacy theory. According to Heijmans, authors will use four indicators of economic activities to analyze these issues such as trade, labor, investment, and industrial cooperation. Authors do not use economic activities that are deemed irrelevant to the topic of discussion taken. The manufacturing industry is usually the most supply of energy demand (Le et. al. 2012). The issue of energy availability in the manufacturing industry has an important role in Indonesia's movement.

The Indonesian Statistic Bureau (ISB) organized this survey containing basic information about each manufacturer, such as total assets, total revenue, total expenditures, details about the manufacturing process. The manufacturing sector in this study belongs to the International Standard Industrial Classification (ISIC) codes, which use five-digit industrial codes for various economic activities, while the ISB modified the firm-level data to reflect the reality of Indonesian manufacturing. The ISB made many changes to the manufacturing classification to accommodate the growing number of manufacturers, as shown in Table 1. (Setyawan 2020).

Table 1. Indonesia's Economic Activities Classification

ISIC	Sectors	ISIC	Sub-sectors
31	Food, Beverages and Tobacco	311	Basic Food
		312	Other Food
		313	Beverage
		314	Tobacco
32	Textile, Wearing Apparel and Leather	321	Textiles
		322	Wearing apparel
		323	Leather and leather products
		324	Footwear
33	Wood and Wood Products	331	Wood and wood and cork products
		332	Furniture and fixtures
34	Paper and Paper Products	341	Paper and paper products
		342	Printing and publishing
35	Chemicals, Petroleum, Coal, Rubber and Plastic Products	351	Industrial chemicals
		352	Other chemical products
		353	Petroleum refineries
		354	Miscellaneous products of petroleum and coal
		355	Rubber products
		356	Plastic products
36	Non-Metallic Mineral Products	361	Pottery, china and earthenware
		362	Glass and glass products
		363	Cement and lime
		364	Clay products
		369	Other non-metallic products
37	Basic Metal Industries	371	Iron and steel basic industries
		372	Non-ferrous metal basic industries
38	Fabricates Metal Products, Machinery and Equipment	381	Fabricated metal products
		382	Machinery
		383	Electrical goods and appliances
		384	Transport equipment

		385	Measuring and controlling goods
39	Other Manufacturing Industries	390	Other manufacturing industries

The manufacturing industry is known to have contributed the most to Indonesia's 7.07% economic growth in the second quarter of 2021, with a 6.91% increase. The manufacturing industry grew 3.68% in the third quarter of 2021 and contributed 0.75% to the national economy's growth. The manufacturing sector is set to become a key driver of the national economy, with a GDP contribution of more than 20% expected by 2024 (Ministry of Investment n.d.). As a result, this paper employs economic diplomacy to examine the government's role in ensuring energy availability in the manufacturing sector.

5.1 Trade

Indonesia's manufacturing sector has significantly grown. Manufacturing share to total Indonesia's economy in 1983 was the lowest at 13.43 % compared to the service sector at 39.27 % and agriculture sector at 24.1 %, it took time for the manufacturing sector to surpass the share of other sectors and become the backbone of Indonesia's economic growth. The manufacturing sector achieved a higher share over the agriculture sector in 1991 at 20.96% (Le et. al. 2012).

An increase in manufacturing production will have an impact on the energy demand is steadily increasing. According to the United States, Energy Information Administration (EIA), the global economic recovery from the global economic recession of 2008–2009 begins (U.S. Energy Information Administration n.d.). Both country's energy demand has increased dramatically as a percentage of overall global energy consumption, amounting to around 21% in 2008. The industrial sector has consistently been the highest consumer of energy among key manufacturing sectors such as transportation, residential, and commercial. Due to the worldwide economic downturn in 2009, the industrial sector saw a considerable fall in energy consumption, resulting in major reductions in manufacturing output demand. National economic growth rates, as well as industrial energy consumption, return to a steady increase over time (Le et. al. 2012).

China is a major contributor to the East Asian region's economic growth. In the last decade, it has been the developing world's largest source of revenue. With the large flows, China's stock of inward FDI relative to its size (as measured by GDP) is still not very high by East Asian standards (Lipsey and Sjöholm 2011). China has made a significant commitment to ensuring energy availability by investing in each export country such as Indonesia. If China's energy supply can be maintained, the same can be said for the country's political stability. Maintaining the political context that China is attempting to preserve is a critical measure to take because it could harm China's international trade. China has a good relationship with the Indonesian government on energy availability issues. Indonesia became the only country that managed to get through the financial crisis due to China's assistance in consuming energy owned by Indonesia (Badaruddin 2013).

5.2 Investment

Indonesia has attracted significant FDI (Foreign Direct Investment) inflows in a variety of sectors, particularly manufacturing, because a variety of factors, including abundant natural resources and low labor costs, assist the production process. Aside from that, several rules are primarily related to the import of intermediate goods, making Indonesia an appealing country (Le et. al. 2012). Foreign investment continues to dominate investment in Indonesia, although domestic investment has begun to persist behind foreign investment in recent years. Multinational Enterprises (MNEs) from different countries and cities broaden manufacturing to compete globally through investing in foreign. While there is production fragmentation, trade between countries occurs. As a result of the global fragmentation of production, the result may be processed in different locations (Veronica 2015).

The foreign direct investment measures both exports, as well as import of goods and services in the same, categorize of industry. Foreign investment is usually implemented in the trading partners which has the similar characteristic, such as industrialized countries. Business investment is important since it can bring a country to be part of the global economy. It can create a diversification product so that a country can compete in the global or international market. Furthermore, expansion companies can show the linkage of international producers (global supply chain) which make use of capital as a home country and abundant labor in a host country (Veronica 2015).

The electronics industry is one of the largest Indonesian foreign direct investments. In the 1970s, the Indonesian electronics industry started as part of the country's import substitution. The Indonesian government erected tariff and non-tariff barriers to the importation of finished radios and televisions. To meet domestic demand, foreign electronics firms were attracted to invest in Indonesia by joint ventures and technical cooperation of domestic partners. Export growth in Indonesia's electronics industry began in the early 1980s. The new investment policies supported inflows of export-oriented foreign direct investment from South Korea, Singapore, and Taiwan (Kadariusman and Nadvi 2013). The global electronics industry's related to imported goods of office and telecommunications equipment totaled approximately US\$ 1.9 trillion in 2017 (Raj-Reichert 2019).

The electronics industry has become one of the most globally fragmented production systems with extensive and complex global supply chains because of outsourcing and offshoring. Components and partially manufactured subassemblies must cross the borders several times before reaching their final market. Products are becoming more commodified and generic, and manufacturing is becoming more adaptive and competitive (Raj-Reichert 2019). The electronics sector will be a shift from a hierarchy to more modular chains. Indonesian firms participating in such ties must adhere to the process and product specifications established by the global value chain lead firms. Lead firms supply complex designs and product samples, as well as materials, components, and parts for their Indonesian suppliers to use (Kadariusman and Nadvi 2013).

Pusaka Elektrindo is an example of Indonesian foreign direct investment. In the cases of Pusaka Elektrindo, a traditional hierarchy of a Japanese electronics joint venture foreign direct investment subsidiary was demonstrated. The Japanese lead firms (the most well-known global electronics manufacturers) have direct control in these relationships, providing capital, production technology, as well as running management and operation to provide their business model and management style (Raj-Reichert 2019).

Pusaka Elektrindo was a designated center for producing specific consumer electronics (in this case, refrigerators) for domestic and export markets. Pusaka Elektrindo concentrated on the mass production of small refrigerators for the domestic and international market while importing large refrigerators produced by the Japanese lead firm's Thai affiliate. The Japanese lead company oversaw Pusaka Elektrindo's export activities. The Japanese lead firm established product and process specifications for Pusaka Elektrindo to follow to achieve comparable technical requirements (such as quality, safety, reliability, and durability) globally. Pusaka Elektrindo was required to integrate the Japanese lead firm's production system and management, as well as product development management (Raj-Reichert 2019).

5.3 Industrial Cooperation

Indonesia is one of the largest countries in the world that has an important role in the Southeast Asia region, especially in the manufacturing industry sector. This industry has contributed 20.27% in improving Indonesia's economic growth. Based on Manufacturing Value Added (MVA) data in 2019, Indonesia occupies the top position in the Southeast Asia region at 4.5% (Karawang New Industry City 2019). In the last five years, the interest from the manufacturing sector has increased at an average rate rate of 5%. Besides the increase in manufacturing output, energy consumption increased by 3 to 4 percent per year over the previous five years. Indeed, the rate of increase in energy consumption is slightly lower than the rate of increase in interest. The manufacturing sector's energy efficiency has improved over time (Setyawan 2020).

According to the 2013 Competitive Industrial Performance (CIP) index report by the United Nations Industrial Development Organization (UNIDO), Indonesian industry is ranked 38th. The CIP index is a market index which assesses a country's capacity to produce and export manufactured goods competitively. The CIP index is composed of eight subindicators organized along three aspects of industrial competitiveness, one of which is the level of technological deepening and upgrading in the countries. The contribution of high-tech manufacturers among Indonesian manufacturers is the lowest. As a result, this technological aspect has an impact on both the level of energy consumption and the level of energy efficiency (Vivadinar et. al 2016).

Indonesia and the United States had been maintained for a long time. The establishment of formal diplomatic ties between Indonesia and the United States was commemorated by the inauguration of embassies in both nations. The organization of the Indonesia-US Energy Policy Dialog (EPD) II in Jakarta on October 20-21, 2008, marked the beginning of cooperation between Indonesia and the United States in the energy sector. The meeting included a

discussion of the cooperation plan for developing renewable technology, the development of geothermal technology through the International Partnership for Geothermal Technology (IPGT), information exchange about investment policy, and capacity building. Meanwhile, the EPD III, held in Washington D.C. from June 28 to 30, 2010, addressed national energy policy, energy source development, and utilization, capacity building research and development, unconventional gas, methane to market, and human resource development. The U.S. Trade and Development Agency (USTDA) provided significant support for Indonesia-U.S. energy cooperation by granting US\$ 1.6 million to fund the development of geothermal plans 370 MW in Halmahera and 300 MW in West Java (Embassy of the Republic of Indonesia in Washington D.C. the United States of America n.d.).

5.4 Labor

The labor force is an indicator of the number of qualified workers which is one factor that can increase a firm's output. A performance firm will produce outside of its host countries only if that placement offers a higher level of the labor force, as well as lower wages, if possible, to promote a higher level of output (Baskoro et. al. 2019).

Wages in Indonesia mostly are set by the market, with the government playing a minor role except for minimum wages, which are set by provincial governments but are not often effectively enforced (Figure 1 and Figure 2). Indonesia has seen a sustained era of high nominal and real wage growth. Before the Asian crisis of 1997, nominal salaries climbed at a rate of 15% per year on average, but real wages grew at 7%. This was the case manufacturing follows suit, with rates of 17 % and 8% of the population (Amiti and Cameron 2012). Unless the industry should be to rise sustainably and inclusively and provide decent job opportunities for further women and men, it must overcome some significant challenges (Raj-Reichert 2019).



Figure 1. The Relations between Energy, Factory, Employment and Economic Growth

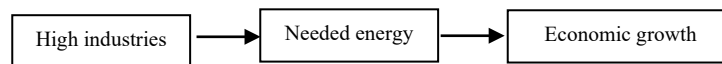


Figure 2. The Relations between Industries, Energy, and Economic Growth

The manufactures have a positive relationship with intra-industry trade among Indonesia and its trading partners. In the case of trade agreements among Indonesia and China in labor-intensive and resource-intensive industries, and associates in technology-intensive industries. This share of trade is projected to boost Indonesia's trade industry. Foreign companies, which are primarily export-oriented, are thought to be able to expand economies of scale and product varieties, allowing Indonesia to participate more fully in global networks. Foreign direct investments in particular industries that have a positive relationship with trade partners in the case of bilateral between Indonesia and Japan. Most of foreign direct investment is in labor-intensive and resource-intensive industries. Furthermore, foreign direct investment has a positive correlation with the technology-intensive industry. Trade connectivity between countries can be demonstrated through intra-industry trade. Industrial cooperation from other countries in Indonesia has the potential to increase energy demand in the country. It is critical to attract and enhance more multinational corporations in Indonesia to maximize their potential for transferring technology and management in Indonesia, particularly foreign direct investment in industries with a negative correlation. Foreign direct investment has the potential to increase the scale of its production, export capacity, and decent job opportunities.

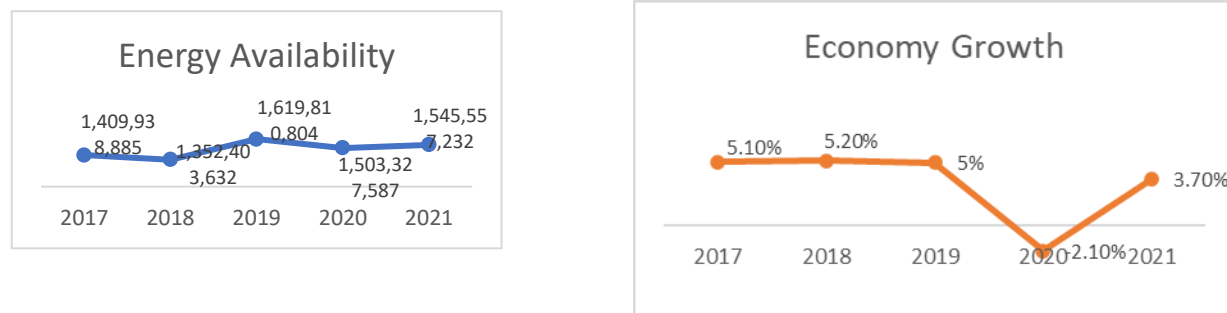


Figure 3. Energy Availability and Economic Growth in Indonesia from 2017 to 2021
Source: Data based on the author's analysis of energy availability and economic growth in Indonesia

Based on the Figure 3, the availability of energy has an impact on economic growth. In 2018, the availability of energy fell, and in 2019 it rose again. Indonesia's economic growth conditions in 2018-2019 were stable at 5%. A significant impact can be seen in 2020 where energy availability declines, economic growth also drops sharply. Indonesia's economic growth conditions increase again in 2021 in line with the increase in energy availability.

6. Conclusion

The manufacturing industry in Indonesia is needed from the existence of an energy supply. The adequate energy supply can help the manufacturing sector in fulfill its needs so that it can move well. Based on the theory, there are four points discussed among others, trade, investment, industrial cooperation, and labor. First, in the trade, there is a role of China as an income contributor in the Asian region that requires Indonesia's energy supply to fulfill its needs. Second, in the investment, Indonesian foreign investments can help in encouraging productivity, Indonesia can be further developed and have more advanced technology in manufacturing. Three, Indonesia cooperates with the United States in maintaining energy availability and developing technology and knowledge. Four, the existence of this manufacturing can also help Indonesia in providing even greater employment opportunities in the country. With the opportunity of employment, it can reduce the unemployment rate in the country. Finally, the reduced unemployment rate can also have an impact on the country of Indonesia because it will be able to have an impact on increasing economic growth.

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