



EE463 GLOBALIZATION AND INTERNATIONAL DEVELOPMENT

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Transition to Electronic Manufacturing industries in Taiwan

GROUP #3

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Background

The objective of this paper is to discuss economic development in Taiwan and explain how a small, low-income country like Taiwan that positioned itself as an agricultural-based economy transitioned to an high-income country and industrial-based economy and became one of the world's largest producers of integrated circuits (ICs), and personal computer and information technology exporters. The time frame selected to analyze Taiwan's agricultural development, transition to an industrial-based economy, is 1949 to 2004.

Agriculture has been one of the primary development sectors in Taiwan for a very long time. Omandi (2019) claimed that Taiwan produces 6.9 million tons of crops annually, comprising rice, vegetables, and flowers. The annual rice yield alone was \$1.17 billion in 2013. Taiwan also has one of the most significant exports to China and other countries, with annual fruit exports worth 109.5 million. Furthermore, with 31.16% of arable land used for livestock, the value of livestock kept was \$4.8 billion, which is the most valuable in the agriculture sector.

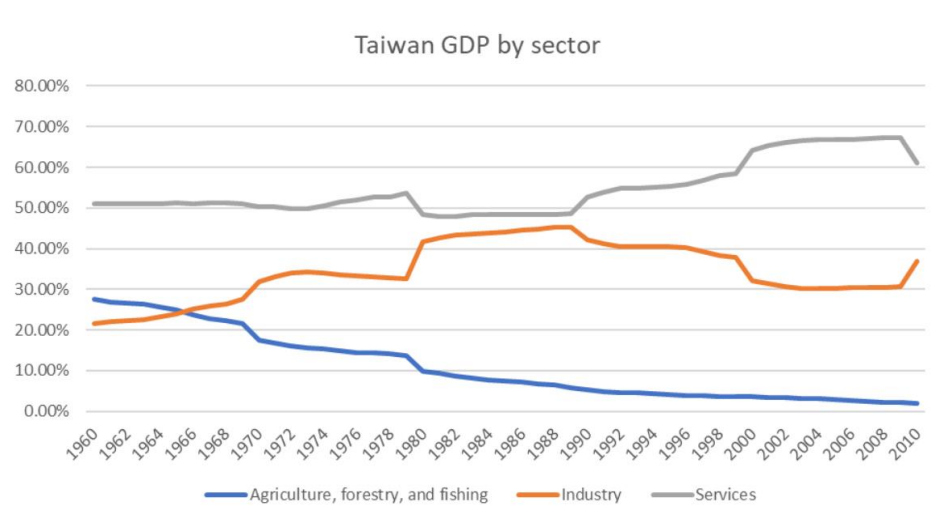


Figure 1: Taiwan's GDP by sector in percentages

Following WWII, Taiwan experienced significant inflation and food shortages. The government prioritized economic recovery, food production, and food production. Farmer subsidies, the 1949-1953 land reform program, and excellent rehabilitation and recovery programs all helped to solve the food production problem. Government funds were spent on irrigation and drainage repairs, fertilizer production, and farmer groups. As a result, agricultural output increased dramatically. Between 1951 and 1965, the United States gave Taiwan \$1.5

billion, one-third of which went to agriculture for infrastructure and human resources. In 1967, American exports to Taiwan totaled \$333 million, with agricultural products accounting for \$111 million of that total (Christensen, 1968).

Taiwan rapidly industrialized beginning in the early 1960s. As economic growth accelerated, industrial production surpassed agricultural production. The industrialization and export-led economy of Taiwan have reduced agriculture's GDP contribution. When technological advances opened up new profit opportunities, Taiwan focused its economic growth on manufactured goods. From 1960 to 1990, the agricultural sector's contribution to GDP fell from 30% to 6%. Farm household agricultural income fell from 49% to 22% between 1970 and 2004. Taiwanese farms had an average size of 1.2 hectares. Taiwan progressed from low to high income as agricultural revenue fell from 50% in 1970 to 20% in the 1990s. Taiwan's main crop, rice, fell in value as the country's wealth increased. Electronics is rapidly becoming a significant manufacturing and export industry. Taiwan is also a significant PC manufacturer. With a background rooted in agriculture and handicrafts, Taiwan's transition to industrialization was largely driven by a combination of internal and external factors, including government policies, foreign investment, and access to new technologies.

Key Factors that led to rapid industrialization

Taiwan's rapid industrialization was fueled by government policies, a skilled labor force, finances, a strategic location, and innovation and technology. Because of these factors, Taiwan's economy became one of the most dynamic in the world. Taiwanese government incentives for foreign investors, research and development, infrastructure, and education, according to Tai H. (2010) and Chen H. T. (2003), aided industrialization. These policies encouraged private and public investment in critical industries. Taiwan's education system prepared skilled workers for the country's thriving industrial sector. M. Harrison and L. Xu (2014), as well as M. C. Tsai (2001), stated that Taiwan's educational system produced skilled workers to serve the country's expanding industrial sector. Technical and vocational schools, as well as engineering universities, were established by the government. As a result, Taiwan has a large number of skilled workers to meet the needs of the growing industrial sector.

Access to capital, both domestically and from abroad, aided Taiwan's industrialization. Taiwanese entrepreneurs were able to secure loans from banks willing to invest in the country's growing economy after the government implemented policies encouraging foreign investment (Lim, T. C., 1993 and Wu, Y. S., & Wu, R. I., 2008). Taiwan is close to some of the biggest markets in Asia, which makes it an attractive place for foreign investors who want to take

advantage of the region's growing consumer markets. Also, the country's closeness to Japan and South Korea made it possible to share technology and work together with established industries (Chen, W. Y., & Tsai, J. F., 2005 and Chen, S. Y., 2015).

An emphasis on innovation and technology has fueled Taiwan's industrialization. Significant investments in infrastructure development, including highways, ports, and airports aided in the improvement of transportation and logistics, making it easier to move goods in and out of the country (Tung, C. H., & Lin, C. H., 2012; Lee, K. J., & Chen, C. H., 2011). Apart from that, Liu, C. C., & Chen, W. T. (2015) and Sun, C. H. (2012) asserted that entrepreneurs in this country were quick to adopt new technologies and adapt them to local markets after the government established research and development institutes to support innovation and technology transfer. Despite Taiwan's successful transition from agriculture to industrialization and economic development, the industrial sector faced challenges of dual infrastructure that made the domestic sector unable to compete with foreign-owned enterprises for Taiwan.

Key Issues and Challenges

(i) The dual structure

Taiwan's dual structure dilemma is the coexistence of a modern, high-tech industry and a traditional, low-tech sector. According to a 2017 International Journal of Business and Social Science study, Taiwan's dual structure industrialization challenge was caused by historical and cultural factors. Taiwan's industrialization began with low-tech industries such as textiles and electronics, which provided jobs and income. As Taiwan's economy matured, high-tech businesses took over, requiring qualified workers and cutting-edge technology. The traditional sector lagged behind and was unable to compete with the new sector.

The primary cause of this discrepancy was the fact that manufacturing techniques for making a few of each product for a local market are vastly different from those for making thousands of the same product for export. There were two more possible explanations. As a developing economy such as Taiwan was forced to adopt technologies from developed countries, it was frequently subject to export restrictions imposed by multinational corporations. Companies serving the domestic demand sector that relied on new technology found it difficult to expand internationally as a result. Businesses seeking to enter the domestic market needed to establish distribution channels. As a result, many export-focused businesses faced significant fixed costs. This situation resulted in a widening income gap between high- and low-skilled

workers, uneven regional development, and an overreliance on the high-tech sector for economic growth.

(ii) The relocation of foreign-based firms from Taiwan.

When discussing Taiwan's industrialization, the term "relocation of foreign-based firms" is used to describe the departure of foreign-owned businesses from Taiwan. This issue has become a major concern for Taiwan's industrial sector, according to a research paper published in 2019 by the Taiwan Institute of Economic Research. This paper suggested that the trend of foreign companies relocating from Taiwan to other countries has been ongoing for several years and has accelerated as a result of factors such as rising labor costs and a shift in global manufacturing to Southeast Asia.

Since foreign-based firms contribute to job creation and economic growth in Taiwan, their relocation can have a significant impact on the economy. The loss of these companies may result in fewer job opportunities and slower economic growth. On the other hand, this could be a great chance for Taiwan to get more investment from abroad and spur innovation at home. Foreign-based firms are relocating from Taiwan for a variety of reasons. Rising wages in Taiwan are a major contributor. As the economy has grown, so have wages, increasing the cost of doing business in Taiwan for foreign firms. As a result, many multinational corporations have relocated operations to countries like Vietnam and Indonesia, where labor costs are significantly lower.

The migration of global manufacturing to Southeast Asia is another factor driving foreign-based companies to leave Taiwan. Due to their lower labor costs and more welcoming business environments, these nations have become increasingly popular among international corporations. Foreign companies' ongoing trend of leaving Taiwan has been a major economic drag for the island nation for years.

Government/State Strategies, Policies, and Legislation

(i) The dual structure

The difference between big and small businesses has been a problem in this nation for a long time. Two of the many strategies the government of Taiwan has implemented to deal with this problem are as follows:

First is the support for Research and Development (R&D) in Industry. Taiwan's government has been pushing for industrial innovation and R&D as a means of leveling the

playing field between large and small businesses. The government launched the "5+2 Innovative Industries Plan" in 2018 with the goals of fostering innovation in the "Asian Silicon Valley" and "smart living," as well as developing innovative industries in the following five areas: green energy, smart machinery, biomedicine, national defense, and the circular economy.

By putting this plan into action, the government hopes that the industrial ecosystem will become more diverse and innovative, making it easier for small and medium-sized businesses (SMBs) to grow and compete with larger businesses. The authorities had also increased its investment in R&D with the hope of boosting the invention of new technologies and the spread of academic research into commercial applications.

Second method is to Strengthen SMEs Competitiveness. "SME Innovation and Entrepreneurship Development Plan" was released in 2016 to encourage and assist small and medium-sized enterprises (SMEs) in the areas of innovation and entrepreneurship. The plan's goals are to boost SMEs' management skills, expand their access to capital, and encourage their international expansion through a variety of measures like financial support, counseling services, and training programs. The Small and Medium Enterprise Credit Guarantee Fund was set up by the government to make it easier for lenders to take less risk and for SMEs to get more capital.

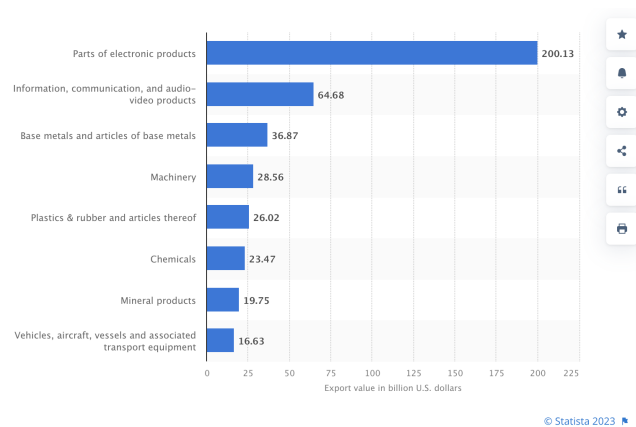


Figure 2: Taiwan industrial exports total value in USD billions



Figure 3: Taiwan industrial exports in USD billions during years 1970 to 2010.

(ii) The relocation of foreign-based firms from Taiwan.

Foreign enterprises have left Taiwan's manufacturing industry, causing it to suffer. To begin, the government's Promotion of Industry Upgrading and Transformation (PIUT) initiative seeks to modernize Taiwan's industry in order to attract and retain foreign firms. This strategy offers financial incentives to foreign firms that relocate to Taiwan in order to modernize and adopt cutting-edge industrial technologies.

The PIUT was first introduced in 2015 to address challenges in the manufacturing sector, such as foreign corporations leaving Taiwan. The strategy's primary objectives are green energy, biotechnology, and smart machinery. Taiwan provides financial incentives to foreign enterprises that invest in operations. There are tax breaks, R&D funds, and subsidies for cutting-edge manufacturing technology. The government pays for the education of future professionals in these fields.

Financial incentives from PIUT and business-university collaboration accelerate technological advancement. The government has established innovation and technology transfer hubs to foster business-university relationships. Taiwan's economic growth and foreign investment strategy are supported by PIUT. To retain foreign investors, Taiwan's economic climate should be improved and high-tech manufacturing should be expanded.

Second, Special Economic Pilot Zones should be established. Taiwan's Free Economic Pilot Zones (FEPZs) attract foreign investment and encourage foreign enterprises to relocate to Taiwan in order to upgrade and restructure their businesses. FEPZs offer investors tax breaks, streamlined regulatory processes, skilled labor, and financial backing. In 2014, Taiwan established the first FEPZ in Kaohsiung. The 2.13 square kilometers of the Kaohsiung FEPZ

will benefit green energy, intelligent machinery, biotechnology and pharmaceuticals, national defense and aerospace, high-value agriculture, and international healthcare.

In 2015, the government granted FEPZs to the counties of Pingtung and Hsinchu. Hsinchu FEPZ promotes technology, while Pingtung FEPZ promotes agriculture. Taoyuan County received a fourth FEPZ in 2016 to boost aviation. Among the six 2017 FEPZs were the Taoyuan Aerotropolis, the Port of Kaohsiung, and the Hsinchu Science Park. Increasing the number of FEPZs makes it easier for foreign firms to do business in Taiwan and encourages them to relocate there. These FEPZs are intended to spur economic growth and technological innovation in Taiwan.

Conclusion

According to the paper, Taiwan's successful shift to electronic manufacturing sheds light on the industry's growth and sustainability. It emphasizes the importance of government policy and assistance, technological breakthroughs, and a skilled workforce in this shift. To ensure the industry's long-term viability, the report emphasizes resolving issues such as ongoing innovation and job displacement.

Regarding the key findings, it demonstrates that several factors, including government policies and investments, technological advancements, and the development of a skilled workforce, contributed to Taiwan's successful transition to electronic manufacturing. The electronic manufacturing industry has significantly contributed to Taiwan's economic growth and provided numerous job opportunities for its citizens.

However, it has the need for continuous technological innovation and the potential for job displacement in traditional industries as highlights of some of the challenges faced during the transition. These challenges are critical for the long-term viability of Taiwan's electronic manufacturing industry.

The report discusses some of the lessons learned from Taiwan's experience. It emphasizes the importance and effectiveness of government support and investments in R&D, as well as the need for collaboration between industry and academic systems that support many laborer skills. According to the report, investing in human capital development and education is critical to retaining a skilled workforce in the electronic manufacturing industry.

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