

Introduction

Research background

In September 2021, Apple released the iPhone 13 series, including the iPhone 13, iPhone 13 mini, iPhone 13 Pro, and iPhone 13 Pro Max. These new iPhones introduce new features such as a more powerful A15 Bionic chip, an improved camera system, and longer battery life. Actively promoting integration between software and hardware, in the meanwhile, Apple also launched the iOS 15 operating system, introducing many new features, including enhancements to FaceTime, notification management, and more privacy control options. Apple continues to expand its ecosystem to include Apple Watch, Air Pods, and services such as Apple Music, Apple TV+, and Apple Arcade.

Since 2019, the US government has imposed a series of sanctions on Huawei, including prohibiting US companies from providing key technologies and products to Huawei, which has had a significant impact on Huawei's international business. The new operating system, Harmony OS, launched by Huawei, is designed to replace Android, not only suitable for smartphones but also for other Huawei devices such as smart TVs and smart home devices. Due to US sanctions, the pressure on Huawei's smartphone business in the international market was intensified, in particular, when suffering from the problem of not being able to access Google services.

The rollout of Huawei's Mate 60 Pro series is applauded as a triumph against the US sanctions. The battle between Huawei's and Apple's new machine has become the focus of heated discussion in mobile markets. It can be said that the Sino-US science and technology game has penetrated into the level of popular competition (Schneider-Petsinger et al., 2019)

Mobile phone is a representative of high technology, with the Sino-US trade war's evolvement, the world industrial chain has been reshaped, and the strategic alliance of countries has changed as well. This article mainly discusses the changes in the industrial chain of ASEAN countries in recent years.

Economic situation of ASEAN countries

Since 2018, ASEAN has experienced events such as the US-China confrontation, the New Crown Epidemic, inflation, and the recession of the European economies. The differentiation of economic performance in each ASEAN country has led to a reshuffle of economic scale in this region. The industrial chain in the ASEAN region has been developing and evolving rapidly over the past few years. For example, if viewed in terms of GDP, the top three ASEAN economies in 2023 were still Indonesia, Thailand, and Singapore. Vietnam has overtaken the Philippines in the past two years to become the fourth-largest economy in ASEAN. Vietnam and Malaysia will become the leaders of the electronics and semiconductor industries respectively, while Thailand and Indonesia will become the dual growth engines of the electric vehicle industry.

It is worth noting that there are sectors related to digital transformation, including the application of technologies such as the Internet of Things (IoT), big data analytics, and artificial intelligence, which are also important for ASEAN countries. According to the "2022 ASEAN Investment Report" of the ASEAN Secretariat,

the amount of foreign investment absorbed by the ASEAN as a whole and flowed into the electronics and semiconductor industries in 2021 was US\$140 billion and US\$160 billion, accounting for 1.7% and 0.5% of the total foreign investment of ASEAN, soaring to 21.5% and 25.2%, becoming the two major investment hotspots

Literature review

Current situation and trend of the ASEAN industrial chain

Here are some of the current status and trends of the ASEAN industrial chain (Setiawan, 2020).

(1) Multinational companies come to invest

Many multinational companies have set up production bases and supply chains in the ASEAN region to take advantage of the region's low-cost labor and strategic location.

(2) Diverse supply chain

These multinational companies often disperse their supply chains to different ASEAN countries to reduce the risk of sensibility. ASEAN has also actively promoted industrial upgrading and transformation in recent years, and a new industrial map is emerging under the epidemic and the wave of global supply chain restructuring and transfer.

(3) Signing international trade agreements

ASEAN countries actively participate in international trade agreements, which help promote the development of transnational supply chains. For example: the ASEAN Free Trade Area (AFTA) and the Regional Comprehensive Economic Partnership (RCEP).

(4) The economy continues to evolve

Because the economy and supply chain in the ASEAN region are still growing steadily, this is very important for the development of the global economy and is of great significance for the stability of the global supply chain.

(5) Focus on digital transformation

The ASEAN region is increasingly focusing on digital transformation to improve production efficiency and supply chain visibility.

Main industrial chain

The multinational companies investing in ASEAN are mainly concentrated on investing in automobile manufacturing, electronics, textiles, food processing, and other fields. Vietnam and Malaysia are becoming the emerging leaders of the electronics and semiconductor industries respectively, while Thailand and Indonesia will become the dual growth engines of the electric vehicle industry.

In addition, two major supply chains- electronics and semiconductors, and electric vehicles and batteries- being invested mainly by ASEAN local enterprises and foreign-funded enterprises have become two major industry engines to drive the ASEAN economy; even during the epidemic, the pace of investment by international electric vehicle manufacturers in ASEAN has not been interrupted.

Since 2019, ASEAN has invested in nearly 30 important foreign investment cases in the electric vehicle and battery industry, including 7 cases with investment amounts of more than US\$1 billion, while the major investments are in Thailand and Indonesia, a total of 18 cases. The layout of electric vehicle supply chains by multinational enterprises in ASEAN has driven a conspicuous development, in particular, in India and Thailand.

Traditional industrial chain

COVID-19 had an impact on the traditional industrial chain in the ASEAN region, leading to some changes, including supply chain restructuring, digital transformation, investment promotion, cross-border collaboration, and talent development evolving to respond to the new situation.

The global supply chain was shocked by the pandemic. In ASEAN countries, the manufacturing industry was impacted seriously. The supply chains are regrouped, and in order to reduce risk, some companies are reevaluating the supply chain strategies, looking for more local or regional suppliers, and reducing their dependence on a single country. As in high-tech, biotechnology, electronics manufacturing, etc. ASEAN countries offer tax or other incentives to attract multinational companies to set up production bases to help traditional industries weather the storm.

The digital economy and digital transformation will be driven in the ASEAN region to adapt to the new business environment. Growth in areas such as e-commerce, telecommuting, and digital payments will also change the way traditional industry chains operate.

Issues related to the development of the industrial chain

To maintain the continued development of the industrial chain, it is necessary to pay attention to the complexity and risks of the supply chain. Since the beginning of this year, there have been problems such as a lack of work power in Vietnam, and foreign investment has been suspended to observe.

Natural disasters and epidemics also need to be considered. Due to the COVID-19 pandemic, global trade has fluctuated dramatically. Effective supply chain management and risk management are critical factors in reducing inefficiency and loss. The possible scenario might be that a company produce electronic components in Vietnam, assemble the components in Thailand, and package and distribute them in Malaysia.

Research methods

This study employs qualitative and quantitative research methods to analyze the literature discussing mobile phone supply chains. It then investigates potential differences in supply chains between ASEAN countries and China, as well as the new dynamics in the supply chain landscape among different countries following the aftermath of the US-China trade war.

Results and discussion

Changes in the industrial chain of the four leading groups

Thailand

Thailand, once known as the "Detroit of the East," is the major car exporting country and plays an important vehicle manufacturing role in ASEAN countries. Thailand's automobile production mainly exports to international markets, especially Southeast Asia, Europe, and Australia (Lhakard, 2021).

Not only does Thailand produce a considerable amount of vehicles, ranging from small cars, and trucks to SUVs, it also provides an important base for manufacturing auto parts, where many international component suppliers have factories to supply parts for both local and international markets.

The modern automotive production facilities in Thailand attract a number of international car manufacturers, e.g., Toyota, Honda, Nissan, Ford, BMW, Mercedes-Benz, etc., to set up production sites there. In addition, Thai government also supports the sustainable development of the automotive industry and encourages manufacturers to develop green technologies and electric vehicles. In order to stimulate domestic car sales, Thai government has also implemented policies such as tax cuts and loan support programs to increase the domestic car sales.

Malaysia

Malaysia provides a long-established electronics industry base in ASEAN with exports of more than US\$100 billion in electronics in 2022. Malaysia and Singapore are the only two countries in ASEAN that have established a semiconductor industry chain. Malaysia plays a pivotal role in the semiconductor packaging and testing industry chain (Moeller, 2019). Recently, manufacturers in Europe, the United States, South Korea and Taiwan have been competing to add or expand semiconductor manufacturing and packaging and testing capacity in Malaysia, where Intel announced in December 2021 that it will invest US\$7.1 billion to build new packaging and test plants in Penang and Kedah and upgrade the advanced wafer packaging capacity of existing plants, the construction of which is expected to start in 2024; while Honghai, a Taiwan company, also announced that it will lay out a monthly production capacity of 40,000 pieces of 28nm and 40nm, 12-inch wafer fabs in Malaysia, and ASE also held a groundbreaking ceremony for the new factory, which is expected to invest 300 million US dollars in five years (Tripathi & Jain, 2016)

Indonesia

Indonesia has nickel mines, a key mineral for manufacturing electric vehicle batteries, making it an indispensable player in the electric vehicle industry. (Mudd, 2010) Due to Indonesia's abundant mineral resources for key battery materials such as nickel, lithium, and tin. These resources make Indonesia a potentially huge player in the global EV battery manufacturing industry. Many international battery manufacturers have invested in Indonesia to build modern battery production facilities. These investments help boost Indonesia's manufacturing capacity and provide potential for export markets.

However, Indonesia's EV battery manufacturing industry is still facing competitive pressure from international competitors, such as large battery manufacturers in countries e.g., China, South Korea, and Japan.

Philippines

Changes in the four small countries

Vietnam

Cambodia

Laos

agriculture and mining sectors have been relatively stable during the pandemic, continuously supporting the country's economy. These industries contribute significantly to Laos' gross domestic product (GDP) (Pangestu, 2019). Laos has been actively attracting foreign investment, especially in sectors such as agriculture, mining, and energy. International investment helps improve the country's infrastructure for production and provides opportunities for economic diversification.

The opening of the China-Laos Railway brings large-scale infrastructure development opportunities, which improves the efficiency of transportation and also strengthens international trade in the country, apparently helping improve its competitiveness in the region. In particular, the China-Laos Railway connects Laos with China's southern Yunnan province, facilitating trade between the two countries, helping facilitate the cross-border flow of goods and services, and creating more trade opportunities for Laos. On the other hand, with the opening of the railway, it will be easier for tourists to travel to Laos and explore its beautiful natural landscapes and cultural heritage. This is expected to boost the growth of tourism in Laos and increase the number of domestic and foreign tourists (Rowedder, 2020).

Myanmar

Myanmar's economic situation after the US-China trade war has been affected by multiple factors, but it does not seem to have benefited much from the restructuring of global supply chains. This idea is due to political instability in Myanmar. Myanmar has long faced problems such as political instability and military coups, which have adversely affected the economy. Political instability makes the investment environment uncertain and affects the business operations of domestic and foreign companies. Due to political problems in Myanmar and international sanctions, the country's international trade has been restricted to some extent (Yang et al., 2021).

China is one of Myanmar's largest trading partners and plays a key role in the country's infrastructure and energy projects. After the US-China trade war, China's influence on Myanmar remains significant, especially in investment and infrastructure construction. However, the Myanmar government is also working to promote economic development, attract foreign investment, and improve the business environment. As rich in natural resources, including energy, minerals, and agricultural products, the country has much potential for economic development and a future role in ASEAN's supply chain.

Changes in Singapore and Brunei

Singapore

Singapore's economic situation has been relatively stable following the US-China trade war, and has been a key hub for international trade and logistics, benefiting from the growth of global trade. While the US-China trade war has had some impact on some of Singapore's export industries, the country's diversified economic structure and strong trade network allow it to flexibly respond to market volatility (Iqbal et al., 2019). Singapore is also one of the global financial hubs, attracting a large number of financial institutions and innovative fintech companies. After the US-China trade war, some companies may move their operations to Singapore to avoid potential trade risks and uncertainties. The Government of Canada actively promotes the

development of the digital economy and encourages digital innovation and digital transformation, which makes Singapore more competitive in emerging areas such as cloud computing, blockchain, and artificial intelligence. A diversified economic structure, strengths in the financial and digital economy, and active regional cooperation all contribute to Singapore's steady economic growth.

Brunei

Brunei's economy has been relatively stable after the US-China trade war and has relied on oil and gas exports as its main source of income. While the US-China trade war has had an impact on global energy markets, Brunei's oil and gas industry is relatively stable, and the Brunei government has been working to diversify its economy and reduce its dependence on energy, e.g., promoting the development of non-oil sectors such as finance, tourism and agriculture to increase the diversification of gross domestic product (GDP). The Brunei government encourages foreign investment, especially in the infrastructure and tourism sectors. They are improving infrastructure to support future economic growth (Mahadevan & Nugroho, 2019).

Conclusions and recommendations

The competition between iPhone and Huawei has created a new situation in the Southeast Asian (ASEAN) industrial chain. The rivalry between these two leading global smartphone manufacturers has had a profound impact on the electronics, manufacturing, and supply chain industries in the ASEAN region. With the upgrading of this competition, the ASEAN industrial chain has created a new situation.

Overall, the current situation of the ASEAN industrial chain is full of vitality, continuous development and evolution, attracting the attention of global investors. Competition between Apple and Huawei has prompted manufacturers in the ASEAN region to improve production efficiency and seek a more competitive cost structure, which will allow the ASEAN region to remain competitive in the global market and attract more business.

Some manufacturers and suppliers in ASEAN countries have begun to diversify their customer base and reduce their dependence on a single customer, such as Apple or Huawei. In order to attract orders from large smartphone manufacturers such as Apple and Huawei, manufacturers in the ASEAN region continue to improve their technical level and production capacity. This means that the ASEAN region is gradually increasing its strength in electronics manufacturing and R&D, which is expected to drive innovation and technological progress.

References

- Dhar, B. K., Tiep L, T., Coffelt, T. A. & Shaturaev, J. (2023). US-China trade war and competitive advantage of Vietnam. *Thunderbird International Business Review*, 65(2), 255-263.
- Guo, M., Lu, L., Sheng, L., & Yu, M. (2018). The day after tomorrow: Evaluating the burden of Trump's trade war. *Asian Economic Papers*, 17(1), 101-120.

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