

Apple Inc. and Global Supply Chain Transformation: A Study of Production Network Expansion to Southeast Asia

Ines Widy Rosandy¹, Listia Fariyanti², Fifi Agus Lina³

Uin Sunan Ampel Surabaya

10030124097@uinsa.ac.id

May 28, 2026

June 29, 2026

Abstrak

This study examines the transformation of Apple Inc.'s global supply chain within the evolving landscape of the contemporary international political economy, with particular attention to the diversification of its production network toward Southeast Asia and India. The study is motivated by the increasing complexity of global production systems resulting from intensifying geopolitical tensions between the United States and China, trade and technology competition, supply chain disruptions during the COVID-19 pandemic, and growing pressures on multinational corporations to strengthen production resilience, flexibility, and risk management. Against this background, the study aims to analyze the nature of Apple's global supply chain transformation and identify the key economic, geopolitical, and strategic factors driving the geographical diversification of its production activities. Employing a qualitative descriptive-analytical approach, the research draws upon a literature review and analysis of secondary sources concerning global value chains (GVCs), supply chain resilience, de-risking strategies, geopolitical risk, and the international production structure of Apple Inc. The findings indicate that Apple has gradually reduced its excessive dependence on China by adopting a China Plus One strategy, particularly through the expansion of manufacturing activities and supplier networks in Vietnam and India. Nevertheless, China continues to function as a critical and deeply embedded hub within Apple's global production ecosystem due to its extensive manufacturing capabilities, mature supplier networks, skilled labor base, and integrated industrial infrastructure. Rather than representing a complete relocation or decoupling from China, Apple's supply chain transformation reflects a gradual process of geographical diversification that has produced a more distributed, flexible, and adaptive multipolar production structure. The study argues that this transformation cannot be understood solely through the conventional logic of cost efficiency and comparative advantage, but must also be examined through the interconnected dynamics of geopolitics, economic security, technological competition, supply chain resilience, and corporate risk mitigation. By highlighting the interaction between corporate strategy and shifts in the international political economy, this study contributes to the literature on global value chains and de-risking by demonstrating how multinational corporations strategically reorganize global production networks in response to geopolitical uncertainty while simultaneously maintaining established production hubs that remain essential to global manufacturing efficiency.

Keywords: Apple Inc., global supply chain, china plus one, southeast asia, multipolar production

Introduction

In the context of contemporary global political economy dynamics, economic globalization has increasingly deepened the integration of international production systems. Multinational corporations play a central role in shaping cross-border production networks through the development of complex and fragmented global supply chains (Kano et al., 2020). In this system, the production process of goods is no longer concentrated in a single country but is distributed across multiple locations based on considerations of cost efficiency, technological access, labor availability, and political and economic stability. One of the key actors in this dynamic is Apple Inc. As a global technology company, Apple maintains a highly integrated international production structure with a historically strong dependence on China as its primary manufacturing hub (Sun, 2016). However, in recent years, significant changes have occurred in Apple's supply chain strategy, marked by increasing involvement of Southeast Asian countries such as Vietnam, as well as India, in its global production network. This phenomenon reflects a major transformation in global production configuration, shifting away from a single dominant manufacturing base.

These changes cannot be separated from various driving factors, particularly global geopolitical dynamics such as rising tensions between the United States and China, corporate de-risking policies, and the need to reduce vulnerabilities in global supply chains that were exposed during crises such as the COVID-19 pandemic (Bu, 2024). In addition, economic factors such as labor costs, investment incentives, and industrial policies in host countries have also contributed to these shifts. Therefore, the study of Apple's production network expansion to Southeast Asia is important to understand how multinational corporations adapt to changes in the global political economy structure. Based on this background, this article aims to analyze the transformation of Apple Inc.'s global supply chain through the expansion of its production network to Southeast Asia, as well as the factors influencing this change. The scope of the study is focused on Apple's production diversification strategy within the context of contemporary global political economy, without providing detailed analysis of technical production aspects at the country level. The research questions addressed in this article are: (1) how is the transformation of Apple Inc.'s global supply chain manifested in the context of its production network expansion to Southeast Asia? and (2) what factors drive these changes?

Previous studies (Li, 2021) indicate that global supply chain transformation among multinational corporations is driven not only by economic efficiency considerations, such as production costs and market access, but also by increasing geopolitical risks, including trade wars, interstate tensions, and vulnerability to global disruptions such as pandemics. In this context, global value chain (GVC) studies (Franz et al., 2024) emphasize that multinational firms tend to diversify production locations to reduce dependence on a single country while enhancing flexibility and supply chain resilience. Furthermore, literature on de-risking strategies suggests that multinational corporations, including Apple Inc., have begun adopting diversification and multipolar approaches to managing global supply chains to reduce dependence on China as the primary manufacturing hub (Luo et al., 2024). However, studies specifically focusing on

Southeast Asia's role in Apple's production network expansion remain relatively limited. Therefore, this research is expected to contribute to the enrichment of literature on global supply chain transformation and the role of Southeast Asia in multinational production configurations. Overall, this article is structured into several main sections. The first section presents the introduction, providing an overview of the study. The second section discusses the literature review and theoretical framework. The third section explains the research methodology. The fourth section presents the results and discussion of Apple's supply chain transformation. Finally, the fifth section provides the conclusion, summarizing the main findings and implications of the study.

Methods

This study employs a qualitative research method with a descriptive-analytical approach. The qualitative approach is used to gain an in-depth understanding of social phenomena through the analysis of relevant data and literature (Ishtiaq, 2019). Meanwhile, the descriptive-analytical approach is used to describe and analyze the transformation of Apple Inc.'s global supply chain through the expansion of its production network into Southeast Asia within the context of changes in the global political economy. The type of data used in this study is secondary data obtained through library research. These data are sourced from academic journals, books, international organization reports, scholarly articles, and various publications related to global value chains (GVC), de-risking strategies, global geopolitical economy, and developments in Apple Inc.'s global supply chain. Data collection techniques are carried out through documentation and literature review relevant to the research topic (Sugiyono, 2020). Next, the data are analyzed using a qualitative descriptive analysis technique by identifying the relationship between global geopolitical dynamics, multinational corporations' production diversification strategies, and changes in Apple Inc.'s production network configuration in Southeast Asia, particularly Vietnam and India. Through this method, the study is expected to provide a more comprehensive understanding of the transformation of global supply chains of multinational corporations from an international political economy perspective.

Result and Discussion

As one of the largest technology companies in the world, Apple Inc. has a highly complex and internationally integrated supply chain. In the development of the modern technology industry, China has long served as the main hub for Apple's assembly operations (Clarke, 2015). This position has been supported by China's large industrial capacity, advanced infrastructure, and abundant labor force available at relatively competitive costs. China's dominance in Apple's production network illustrates how global technology companies have become highly dependent on manufacturing concentration in a single industrial region with an integrated production ecosystem. This condition has made China the primary base for assembling various Apple products, particularly the iPhone. Apple's dependence on China is also reinforced by the presence of major manufacturing companies such as Foxconn, which serves as one of Apple's key partners in the assembly of electronic devices (Sandoval, 2016). Through an

industrial network concentrated across various economic zones in China, Foxconn can support Apple's operational efficiency at an international scale. In addition, China's electronics industry ecosystem enables Apple to gain easier access to component suppliers, logistics distribution, and an interconnected industrial network within a single production region. This situation demonstrates that the success of Apple's production system is determined not only by labor costs but also by the depth of the industrial ecosystem that supports fast and efficient production processes.

From a global value chain (GVC) perspective, Apple's industrial structure reflects a fragmented production pattern, in which processes ranging from design and component manufacturing to assembly and distribution are carried out across different countries according to their respective comparative advantages. However, China has remained the main hub for Apple's product assembly for more than two decades (Turner, 2014). From this perspective, China's dominance illustrates how modern industrial globalization tends to concentrate manufacturing in regions with high efficiency, large industrial capacity, and well-integrated supplier networks. This condition reflects the high level of dependence of multinational corporations on a single country within the international production system. However, such a highly centralized industrial structure also creates various risks for the sustainability of Apple's supply chain. Strong dependence on China makes the company vulnerable to industrial disruptions caused by geopolitical dynamics, international trade policies, and global crises such as the COVID-19 pandemic (Luo et al., 2024). This situation shows that the concentration of manufacturing activities in a single country can increase vulnerabilities to the operational stability of multinational corporations. Therefore, Apple has begun to consider strategies for diversifying its production network to enhance the company's flexibility and industrial resilience. This also marks the starting point of Apple's restructuring of its production network toward a more dispersed and adaptive manufacturing configuration in response to global geopolitical uncertainty.

The shift in Apple Inc.'s supply chain strategy did not occur abruptly, but rather as a response to major changes in an increasingly unstable international political economy. In the early era of globalization, multinational corporations were more oriented toward production cost efficiency. However, in recent years, this orientation has shifted toward industrial resilience and de-risking strategies. This transition reflects a broader change in production globalization, from a model of hyper-globalization that emphasizes efficiency to a form of strategic globalization that prioritizes economic security (Aiyar et al., 2023) and the stability of the international industrial system. One of the main factors driving this shift is the increasing economic tension between the United States and China. The rivalry between the two countries is not limited to trade relations, but also extends to technology, semiconductors, and economic security (Baldwin & Freeman, 2022). In this situation, global firms face higher uncertainty regarding the sustainability of manufacturing networks that are overly dependent on a single country. China, which was previously regarded as the world's manufacturing hub, has increasingly been perceived as a "strategic risk" within international production configurations. This condition has encouraged

multinational corporations to diversify their manufacturing locations to reduce vulnerability to political and economic disruptions at the international level.

In addition to geopolitical dynamics, the COVID-19 pandemic also became an important turning point in the restructuring of international production systems. The pandemic revealed how fragile industrial networks are when they are overly concentrated in a single region (Ivanov, 2022). Factory shutdowns, mobility restrictions, and distribution disruptions caused many companies to experience production delays and shortages of electronic components. In this context, Apple faced various manufacturing challenges due to lockdown policies in several industrial regions in China, which had long served as the company's primary assembly base. This situation demonstrates that manufacturing concentration in a single country can increase risks to the operational continuity of the global technology industry. As a result, companies have begun to prioritize supply chain resilience as a main concern rather than merely focusing on production cost efficiency. In addition to geopolitical and pandemic-related factors, economic considerations have also influenced the transformation of Apple's production network. Rising labor costs in China in recent years have prompted the company to seek alternative, more competitive production locations. Countries in Southeast Asia such as Vietnam, as well as India, offer relatively lower production costs, abundant labor supply, and various investment incentives aimed at attracting multinational corporations (Bolwijn, 2023). From a global value chain (GVC) perspective, manufacturing diversification is understood as a strategy to enhance flexibility and ensure production continuity when disruptions occur in a particular region. This condition has made Asia one of the key regions in the restructuring of the global technology industry.

Apple's manufacturing reconfiguration is also closely related to the emergence of de-risking strategies and the China Plus One approach adopted by various multinational corporations (Iida, 2015). This strategy aims to reduce dependence on China by expanding production networks to other countries without completely abandoning China as the main manufacturing base. In this context, Apple has begun to build a more multipolar production configuration to enhance flexibility, efficiency, and industrial resilience in the face of global economic and geopolitical uncertainty. This transformation shows that modern multinational corporations are no longer solely pursuing production efficiency but are also building manufacturing systems that are more adaptive to geopolitical risks and global industrial disruptions. Thus, Apple's supply chain transformation illustrates that a combination of geopolitical factors, global crises, and economic considerations increasingly drives changes in multinational production configurations in the contemporary era. This shift indicates that modern production systems are no longer solely oriented toward cost efficiency, but also toward flexibility, economic security, and long-term resilience in facing international uncertainty.

Apple Inc.'s global supply chain strategy has been reflected in the expansion of its production network to various countries in Asia, particularly Southeast Asia and India. This strategy is part of a manufacturing diversification effort aimed at reducing the company's dependence on China as its primary production hub (Ardanesworo, 2025). In recent years, Apple and its key suppliers have significantly increased production activities in countries such as Vietnam

and India, which are considered to have strong potential as alternative manufacturing bases. Vietnam is one of the countries that has experienced a significant increase in its involvement in Apple's global supply chain. The country is regarded as having several advantages, such as relatively competitive labor costs, political stability, continuously developing industrial infrastructure, and government policies that are highly supportive of foreign investment (Nguyen, 2023). These conditions have encouraged major Apple suppliers such as Foxconn, Luxshare, and Pegatron to expand their production facilities in Vietnam. Vietnam is not only involved in the production of electronic components but has also begun participating in the assembly of several Apple products such as AirPods, iPads, and MacBooks.

In addition to Vietnam, India has also become an important part of Apple's production diversification strategy. In recent years, Apple has increased iPhone production capacity in India through partnerships with manufacturing companies such as Foxconn and Wistron (Tripathy & Dastrala, 2023). The Indian government has also introduced various investment incentives through the Production Linked Incentive (PLI) policy to attract global technology companies to expand their manufacturing operations in the country. India's presence in Apple's supply chain indicates that the company is building a more geographically dispersed production configuration that is no longer fully concentrated in China. (Patrício et al., 2025) explain that Apple's expansion of its production network into Southeast Asia and India reflects a transformation in global production patterns among multinational corporations. Whereas global production systems were previously concentrated in a single manufacturing hub, companies are now developing more diversified and multipolar production models. This strategy is not only aimed at improving production efficiency but also at strengthening the resilience of global supply chains in the face of international economic uncertainty, geopolitical disruptions, and future global crises.

The China Plus One strategy adopted by Apple reflects a fundamental shift in how multinational corporations manage their global supply chains. Instead of maintaining a high level of dependence on a single primary manufacturing country, in this case China, Apple has begun expanding its production base to other countries such as Vietnam and India. This approach is not only economic but also strategic, responding to increasing geopolitical risks, trade tensions, and supply chain vulnerabilities that have emerged in recent years. In this context, Apple's production configuration has shifted toward a more distributed or multipolar production model. Manufacturing processes are no longer concentrated in a single country but are spread across multiple locations that serve different functions within the global value chain. Nevertheless, China remains a crucial hub in Apple's production ecosystem due to its more advanced industrial infrastructure and highly integrated supplier network compared to other countries. For many years, China's dominance in Apple's supply chain has been driven by structural advantages such as abundant labor supply, production efficiency, and a deeply interconnected manufacturing ecosystem (Sun, 2016). However, excessive dependence on a single country creates strategic risks for the company, particularly in the context of trade wars, restrictions on technology exports, and global logistical disruptions such as those experienced during the COVID-19 pandemic.

In response to these conditions, Apple has expanded its production base into Southeast Asia and India as part of its global supply chain diversification strategy (Franz et al., 2024). Countries such as Vietnam, Thailand, and Malaysia have become part of this diversification strategy due to their combination of competitive labor costs, political stability, and attractive investment policies. Vietnam stands out as a key example, where Apple's partners such as Foxconn, Luxshare, and Pegatron have expanded their production facilities, including the assembly of higher-value products such as AirPods, iPads, and MacBook components. Beyond economic factors, geopolitical dynamics have also reinforced this shift. Southeast Asian countries generally occupy a more flexible position within the United States–China rivalry, providing multinational corporations with greater room to maintain long-term production stability (Bu, 2024). From a de-risking strategy perspective, the dispersion of manufacturing activities across multiple countries is understood as an effort to build a production system that is more adaptive to global uncertainty.

However, this diversification process does not mean that China's role has diminished significantly. China's industrial capacity, depth of supplier networks, and scale of production still make it a central actor in Apple's supply chain. Therefore, the China Plus One strategy is better understood as a form of risk redistribution rather than a complete relocation of production. Within this structure, Southeast Asia and India act as reinforcing nodes, while China remains the central hub. The China Plus One strategy demonstrates a shift in multinational corporations' orientation from a production model focused solely on efficiency toward an approach that emphasizes flexibility, resilience, and risk mitigation. This shift results in a multipolar production configuration that makes Apple's supply chain increasingly dispersed, adaptive, and resilient in the face of geopolitical and economic uncertainty.

Conclusion

This study shows that the transformation of Apple Inc.'s global supply chain represents a structural change in the production configuration of multinational corporations in the contemporary global political economy. These findings answer the research questions, namely that (1) Apple's supply chain has shifted from a China-centered system toward a more distributed configuration through the China Plus One strategy, and (2) a combination of geopolitical factors, the COVID-19 pandemic, and economic efficiency considerations drive this change. Empirically, Apple's expansion into Vietnam and India demonstrates that Southeast Asia now plays an important role in global production networks. Nevertheless, China continues to maintain a dominant position in Apple's manufacturing ecosystem, meaning that the transformation should be understood more as risk redistribution rather than a full relocation of production. Theoretically, these findings reinforce the global value chain and de-risking strategy literature, which explains the shift in multinational corporations' orientation from pure efficiency toward resilience and flexibility in production systems. Practically, this study indicates that global geopolitical dynamics significantly influence the location decisions of global technology firms. The main limitation of this study lies in its reliance on secondary data from literature-based

sources, without incorporating primary empirical analysis or direct interviews with industry actors. Therefore, future research is recommended to adopt a more in-depth empirical approach better to examine the internal dynamics of Apple's supply chain. Thus, this study concludes that the China Plus One strategy reflects a paradigm shift in global supply chain management toward a more diversified, adaptive, and resilient production system in facing international political and economic uncertainty.

Reference

- Aiyar, S., Ilyina, A., Chen, J., Kangur, A., Trevino, J., Ebeke, C., Gudmundsson, T., Soderberg, G., Schulze, T., Kunaratskul, T., Ruta, M., Garcia-Saltos, R., & Rodriguez, S. (2023). Geo-Economic Fragmentation and the Future of Multilateralism. In *Staff Discussion Notes* (Vol. 001). <https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2023/01/11/Geo-Economic-Fragmentation-and-the-Future-of-Multilateralism-527266>
- Ardanesworo, A. D. P. M. F. K. P. (2025). Apple-Inc-and-the-US-China-Tariff-War-Identifying-Assessing-and-Mitigating-Risks.pdf. *Jurnal Ekonomi, Manajemen, Akuntansi*.
- Baldwin, R., & Freeman, R. (2022). Risks and Global Supply Chains: What We Know and What We Need to Know. *Annual Review of Economics*, 14, 153–180. <https://doi.org/10.1146/annurev-economics-051420-113737>
- Bolwijn, J. X. Z. dan R. (2023). *Word Investment Report 2023 Investing in Sustainable Energy for All*. <https://doi.org/10.18356/9789210027847c010>
- Bu, Q. (2024). Can de-risking avert supply chain precarity in the face of China-U.S. geopolitical tensions. *International Cybersecurity Law Review*, 5(3), 413–442. <https://doi.org/10.1365/s43439-024-00125-1>
- Clarke, T. (2015). The Governance of Global Value Chains : Unresolved Human Rights , Environmental and Ethical Dilemmas in the Apple Supply Chain The Governance of Global Value Chains: Unresolved Human Rights , Environmental and Ethical Dilemmas in the Apple Supply. *Journal of Business Ethics*, JULY. <https://doi.org/10.1007/s10551-015-2781-3>
- Franz, S., Giroud, A., & Ivarsson, I. (2024). Multinationals' value chain configuration for product diversification in emerging markets: Western firms in China. *Multinational Business Review*, 32(1), 65–97. <https://doi.org/10.1108/MBR-07-2022-0093>
- Iida, K. (2015). Political Risks and Japanese Foreign Direct Investment in East Asia-A Case Study of “China-Plus-One.” *The Korean Journal of International Studies*, 13(2), 383. <https://doi.org/10.14731/kjis.2015.08.13.2.383>
- Ishtiaq, M. (2019). Book Review Creswell, J. W. (2014). Research Design: Qualitative, Quantitative and Mixed Methods Approaches (4th ed.). Thousand Oaks, CA: Sage. *English Language Teaching*, 12(5), 40. <https://doi.org/10.5539/elt.v12n5p40>
- Ivanov, D. (2022). Viable supply chain model: integrating agility, resilience and sustainability perspectives—lessons from and thinking beyond the COVID-

- 19 pandemic. *Annals of Operations Research*, 319(1), 1411–1431. <https://doi.org/10.1007/s10479-020-03640-6>
- Kano, L., Tsang, E. W. K., & Yeung, H. W. chung. (2020). Global value chains: A review of the multi-disciplinary literature. *Journal of International Business Studies*, 51(4), 577–622. <https://doi.org/10.1057/s41267-020-00304-2>
- Li, J. (2021). Journal of Contemporary Eastern Asia. *Journal of Contemporary Eastern Asia*, 20(1), 82–88. <https://doi.org/10.17477/jcea.2021.20.2.0>
- Luo, W., Kang, S., & Di, Q. (2024). Global Supply Chain Reallocation and Shift under Triple Crises: A U.S.-China Perspective. *Ekonomi (General Economics)*.
- Nguyen, T. (2023). Hidden Power in Global Supply Chains. *Harvard International Law Journal*, 64(1), 35–84.
- Patrício, L. D., Ferreira, J. J., & Gerschewski, S. (2025). A Network of Networks: Building Resilience in the Globalised Era. *Global Networks*, 25(3). <https://doi.org/10.1111/glob.70014>
- Sandoval, M. (2016). Foxconned Labour as the Dark Side of the Information Age: Working Conditions at Apple's Contract Manufacturers in China. *Studies in Critical Social Sciences*, 80(2), 350–395. https://doi.org/10.1163/9789004291393_012
- Sugiyono. (2020). *Metodologi Penelitian Kuantitatif, Kualitatif dan R & D*.
- Sun, Y. (2016). China's evolving role in Apple's global value chain. *Area Development and Policy*, 2, 1–22.
- Tripathy, A., & Dastrala, S. M. (2023). Make in India: So Far and Going Ahead. *SSRN Electronic Journal*, March. <https://doi.org/10.2139/ssrn.4384039>
- Turner, B. (2014). How the iPhone Widens the United States Trade Deficit with the People's Republic of China. *Asian Development Bank Institute*, 257, 75–75.