**Enhancing International Trade Specialization through Free Trade Agreements: The Role of Logistics Integration in Global Value Chains**

**Abstract**

This study evaluates how Free Trade Agreements (FTAs) contribute to international trade specialization by enhancing logistics within global value chain (GVC) frameworks. As globalization intensifies and supply networks become increasingly complex, understanding the FTA-logistics nexus is critical for effective trade policy formulation. A systematic literature review method was employed, analyzing eight peer-reviewed studies published between 2010 and 2025. For doing the review, a table has been prepared listing the sources and findings for better flow of information. In the future, the focus will be on exploring longitudinal case studies for validating findings in a systematic way.

The findings highlight that logistics infrastructure functions as a catalyst, amplifying the benefits of FTAs beyond traditional tariff reductions by facilitating deeper GVC integration and reducing non-tariff barriers. The study reveals that transport development significantly contributes to trade growth, with deep trade agreements increasing domestic intermediaries by 0.48% per policy provision. Key enablers include supply environment capabilities, infrastructure quality, and absorptive capacity, while organizational control costs and geographic distance remain significant barriers. The study recommends integrated infrastructure investments, coordinated policy frameworks, workforce training initiatives, and the establishment of regional logistics hubs to enhance FTA-driven specialization.

**Keywords:** *Global Value Chain, Logistics, Free Trade Agreement, International Trade*

# Introduction

## 1.1 Background of the topic

International trade specialization has improved in the present era of globalization as nations are focusing more on specific segments of production where they can have comparative benefits. Free Trade Agreements have been viewed as a significant tool to transform trade patterns internationally through a reduction in tariff charges and the introduction of economic mergers across national boundaries. An essential element that determines the ability of a nation to perform excellently in trade specialization at the international level is the logistics performance (Ajewumi et al., 2024). Global value chain model has shaped the manner in which nations are participating in trade because it has shifted the conventional model whereby countries depended on exporting the finished products, but they have gone into a specific stage in production (Masters & Finaret, 2024). An efficient logistics system enables countries to fit in the value change by ensuring delivery is on time, quality standards are maintained across borders, and transaction cost is minimized. This study aims to investigate the role played by Free Trade Agreements in specializing in international trade.

## 1.2 Aim and Objectives

The main focus of the study is to evaluate how Free Trade Agreements have contribution towards international trade specialization by improving logistics within the Global value chain.

Objectives are as follows-

* To examine the role of logistics performance in enabling trade specialisation under various Free Trade Agreements.
* To evaluate how FTAs impact the integration of countries into specific segments of global value chains, and the advantages related to logistics.
* To identify main barriers and logistical enablers that have an influence on the extent of trade specialization in nations participating in an FTA.

## 1.3 Rationale

This research will address a gap in understanding how the infrastructure of logistics mediates the relationship between trade specialisation and FTAs. The existing literature mainly examines state creation effects of FTAs, and limited attention is given to the dimension of logistics and a catalyst for specialisation patterns (Fanjanirina, 2023). As the Global supply chain is becoming time-sensitive and complex, logistic performance has become a major competitive advantage. Hence, it is important to understand this relationship for policymakers who design FTAs and countries that are looking forward to maximizing that integration with Global supply chains by informing decisions that are strategic regarding specialization strategies and infrastructure investment.

## 1.4 Research Methodology

This study will employ a systematic literature review method by analyzing peer-reviewed papers for synthesizing current information. Eight peer-reviewed papers, along with other sources, will be considered for this study. The findings will help policymakers in designing trade agreements and provide infrastructure investment guidance for improving GVC integration.

## 1.5 Synopsis of chapters

The first chapter of this study offers an introduction to the topic along with stating the aim and objectives. The second chapter is literature review offering a general idea related to the topic along with identifying a gap in the literature. The third chapter provides information related to the method that is applied in this study. The fourth chapter includes the findings from the peer-reviewed papers. In the fifth chapter, analysis and discussion on the findings are offered, and in the last chapter, conclusion and recommendations for improvement are provided.

# 2. Literature Review

## 2.1 Free Trade Agreements and International Trade Specialization

Free Trade Agreements reshaped international trade patterns by forming preferential access that allows countries to create specialized comparative advantages within traditional blocs at the regional level. According to Zainovic (2022) FTAs enhance trade specialization as regional trade agreements increase intra-industry trade among member countries. Also, FTAs generate positive effects on trade flows that are bilateral over the period (Esmatzada et al., 2019). This shows that preferential trade arrangements formulate advantages that extend beyond static factor endowment, allowing countries to specialise in production stages that are specific where they can achieve economies of scale. However, Baena-Rojas & Herrero-Olarte, (2020) argued that FTAs may result in trade diversion rather than specialisation as preferential arrangements can redirect trade from global suppliers that are efficient to regional partners that are less efficient. Despite this issue, the point that well-designed FTAs promote specialization by expanding excess in the market and allowing countries to make use of their competitive advantage is overlooked. Hence, FTAs in the modern era serve as catalysts for the specialisation of trade.

## 2.2 Logistics Performance and Global Value Chain Integration

Logistics performance acts as an important determinant of the ability of a country to integrate into Global value chains and achieve economic specialization. According to Nasser & Ouerghi, (2024) superior logistics capabilities allow deeper GVC participation as improvements in logistics performance increase participation in GVC. Also, logistics infrastructure quality coordinates directly with the position of a country in high-value segments of global production networks (Chilcott et al., 2020). Port delays can be reduced by 70% in emerging economies that have digitized supply chain in comparison to developed countries (World Bank, 2023). This finding shows that efficient logistics systems help in reducing transaction costs, reducing delay and improving reliability, which allows countries to specialise in quality development production activities that generate returns that are value-added. As per the World Bank, (2023), 60% of international trade time is consumed by logistics processes, requiring 44 days for moving containers between the ports. However, Tien et al. (2019) stated that improvement in logistics may facilitate low-value assembly activities without promoting upgrading. Efficiency in logistics alone cannot guarantee progression to higher value-added specialisation. This perspective overlooks the role of logistics as a generator of complex coordination required for production networks that are sophisticated. Hence, superior logistics performance remains an improvement for achieving sustainable advantages in the value chain at the global level.

## 2.3 The Nexus of Trade Policy, Logistics, and Economic Specialization

The interconnection between trade liberalization policies and logistics improvement formulates synergistic effects that create opportunities for countries to develop competitive advantage in the international market. As stated by Gnangnon, (2019), the nexus creates multiplicative benefits as countries experience implementation and logistics improvement to achieve better export diversification in comparison to those with only trade liberalization. According to Franco-Bedoya & Frohm, (2020) logistic-enhanced FTAs increase participation in goods trade that are intermediate. This synergy takes place because straight liberalization formulas provide opportunities to get market access while logistics improvement provides the capacity to exploit these opportunities efficiently, allowing countries to specialise in multi-stage production processes, which are complex and require seamless cross-border coordination. However, Murphree & Anderson, (2018) stated that this may result in dependency on foreign logistics providers and constraints on domestic capacity building, as over-dependence on external logistics solutions can suppress long-term competitiveness. This factor overlooks the evidence that strategic integration of trade policies and logistic development form sustainable bases for economic specialisation.

## 2.4 Theoretical Underpinning

The study is based on the Global Value Chain Theory and New Trade Theory because they are complementary approaches used to comprehend the trend in modern trade specialization. Baccini et al. (2018) stated that the New Trade Theory motivates the view on specialization and intraindustry trade in preferential trading arrangements through the increasing returns to scale and product differentiation, not only with regard to the conventional comparative advantage found in factor endowments. This theory explains how the FTAs create opportunities for the countries getting specialized in product and production at various stages. The theory of global value chains provides the analytical link of the role of the performance of logistics in enabling nations to participate in some components of the production network at the international stage (Benito et al., 2019). The two theories elaborate on the ways in which FTAs and advancements in logistics aid in the fragmentation of the production process that lets countries specialise in value-added activities where they can attain a competitive edge in the market.

The literature determines that FTAs contribute to trade specialization by preferential access, whereas logistics performance facilitates the integration of global value chains. However, an interconnection between trade policy and logistics on specialization patterns has not been sufficiently studied. The review demonstrates the necessity of an integrated examination of these closely linked aspects of modern international trade dynamics. Even though research on FTAs and logistics performance has been done separately, a combined study and their effect on trade specialization patterns is limited. In the existing literature, there is a lack of comprehensive analysis of how capabilities related to logistics mediate the relationship between FTA participation and integration of the countries into specific global value chain segments, forming an empirical and theoretical research gap.

# 3. Methodology

## 3.1 Justification for Choosing Systematic Literature Review

For conducting this study, the method that has been chosen is a systematic literature review because of the fragmented nature of existing knowledge on logistics, FTAs and trade specialisation (Hiebl, 2023). Considering the interdisciplinary scope spanning logistic management, international economics and trade policy, systematic methods ensure coverage of diverse scholarly perspectives while ensuring transparency in the synthesis of evidence and analytical rigor.

## 3.2 Search Strategy

A literature search has been conducted using various academic databases, including Google Scholar, Scopus and Web of Science.

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| The search strategy employed Boolean operators with the following keyword combinations:("Free Trade Agreement\*" OR "FTA\*") AND ("trade specialization" OR "comparative advantage") AND ("logistics" OR "supply chain") AND ("global value chain\*" OR "GVC\*") |

**Table 1: Search criteria**

(By learner)

The search is limited to publications between 2010-2025 in order to capture contemporary developments in the pattern of International Trade and logistics performance within the framework of FTA.

## 3.3 Selection Process

The process applied for selecting the sources includes a PRISMA flowchart through a systematic screening stage. The initial search of the database showed 800 sources. After eliminating duplicates and applying the eligibility criteria, 8 high-quality papers have been selected for final analysis.

## 3.4 Inclusion and Exclusion Criteria

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| **Inclusion Criteria** | **Exclusion Criteria** |
| Published 2010-2025 | Non-English publications |
| Peer-reviewed articles | Opinion pieces/editorials |
| Focus on FTAs and trade specialization | Studies without logistics dimension |
| English language | Conference abstracts only |
| Logistics/GVC emphasis | Purely theoretical models |

**Table 2: Inclusion and exclusion critetia**

(By learner)



**Figure 1: PRISMA Flowchart**

(by learner)

## 3.5 Data Extraction and Analysis

Selected studies were analyzed using thematic synthesis methodology. Key information extracted included research objectives, methodological approaches, main findings, and policy implications (Chigbu et al., 2023). Data was systematically organized using Excel spreadsheets to facilitate cross-study comparison and pattern identification across different FTA contexts and regional experiences.

## 3.6 Research Quality Appraisal

To maintain review credibility, each selected study underwent quality assessment focusing on peer-reviewed status, methodological clarity, and relevance to research objectives. Only studies demonstrating rigorous analytical frameworks and substantial contributions to the research questions were retained, ensuring reliable synthesis outcomes.

# 4. Findings

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| **Author(s)** | **Year of publication** | **Method** | **Findings** |
| Halaszovich, T. F., & Kinra, A | 2020 | Qualitative comparative analysis | National transportation systems significantly boost both trade and FDI in Asia. Advanced transport infrastructure helps overcome distance costs differently for trade (requiring international/port infrastructure) versus FDI (needing domestic/land-based infrastructure). This transportation gap partially explains South Asia's weaker FDI performance compared to East and Southeast Asian regions. |
| Mishrif, A., Antimiani, A., & Khan, A | 2024 | Quantitative research method, employing computable general equilibrium (CGE) modeling through the GTAP database, combined with secondary data analysis and scenario-based forecasting. | The study found that logistics and supply chain infrastructure significantly impact trade efficiency in developing countries. To enhance trading and commercial activities, developing nations must invest in logistics infrastructure development, provide workforce training, and implement flexible logistics policies. These improvements are essential for gaining competitive advantages in international trade. |
| Lai, K. H., Pang, Y., Wong, C. W., Lun, Y. V., & Ng, Y. E. | 2019 | Applied quantitative method - regression analysis | FTA formation creates business opportunities through reduced trade barriers. Transport logistics development mutually reinforces trade growth by reducing non-tariff barriers. The Association of Southeast Asian Nations (ASEAN) should invest in physical and soft infrastructure improvements. China's "One Belt One Road" initiative and AIIB provide crucial financial support for regional transport infrastructure development. |
| Laget, E., Osnago, A., Rocha, N., & Ruta, M | 2020 | quantitative econometric methodology | Deep trade agreements significantly boost global value chain (GVC) participation, with each additional policy area increasing domestic and foreign value-added intermediates by 0.48% and 0.38% respectively. The effect is stronger in higher value-added industries. Beyond-WTO provisions like competition policy and investment drive North-South trade integration most effectively. |
| Gereffi, G., Lim, H. C., & Lee, J | 2021 | Qualitative case study | Trade policies have unintended consequences amplified by global value chain complexity. Rather than simply disrupting GVCs, trade restrictions and agreements trigger adaptive firm strategies including supply chain reconfiguration, partner switching, and geographic relocation. Firms mediate policy effects through strategic responses that often produce counterintuitive upgrading outcomes. |
| Zhao, J., Pang, Y., & Gao, W | 2025 | Secondary data collection method using a gravity model with fixed effects | China's FTA strategy significantly enhances firms' global value chain embeddedness, particularly benefiting state-owned, central/western, manufacturing, and high-tech enterprises. The mechanism works through increased technological innovation, while internal control costs negatively moderate this relationship. |
| Harrison, J | 2023 | Secondary data collection method | GVC-oriented sustainability provisions in trade agreements show significant deficiencies despite theoretical potential. Three governance models emerge: third-party certification, domestic regulations, and bespoke FTA arrangements. All examined provisions from recent agreements have substantial effectiveness and legitimacy shortcomings. |
| Melo, J. D., & Twum, A | 2021 | Secondary data collection method  | African RECs' GVC participation increased but lags behind comparators, focusing on non-regional forward linkages. Only 0.5-3% of exports involve regional value chains versus ASEAN's 17.2%. Lower tariffs and better digital connectivity correlate with higher GVC participation. |

**Table 3: Findings from several sources**

(By the learner)

# 5. Analysis and Discussion

## 5.1 Analysis

**Logistics Infrastructure as a Catalyst for FTA-Driven Trade Specialization**

Logistics infrastructure development increases FTA benefits for trade specialisation. According to Lai et al. (2019) transport logistics development reduces NTBs for business partners while allowing trading firms to identify prospective customers and suppliers outside the FTA. This demonstrates the role of infrastructure in expanding specialisation opportunities beyond the boundaries at the regional level. The mutual reinforcement mechanism reveals that development in transportation is required not just to support trade flows within ASEAN but also to bridge the gap of ASEAN Free Trade Area (AFTA) agreement formation with increasing trade. This nexus is supported by evidence which shows that Preferential Trade Agreements (PTAs) increase domestic value-added intermediate by 0.48% and foreign value-added intermediate by 0.38% per policy area that is added (Laget et al., 2020). This analysis confirms that deep agreements provide support to countries for integrating industries with more value-added, especially in service sectors. For instance, the Maritime Silk Road initiative of China demonstrates strategic infrastructure investment with projects funded by AIIB in Laos and Indonesia with the aim of meeting ASEAN standards for transport infrastructure, and formulating pathways for improved regional trade specialisation (Lai et al., 2019).

**FTA-Enabled Global Value Chain Integration Through Logistics Optimization**

FTAs help in the global value chain (GVC) integration by optimizing logistics and not just tariff reduction. For instance, Oman-Singapore FTA guide Oman into participating in Global value chain to the Asian market, creating spillover effects between the chemicals, machines and motor vehicles industries (Mishrif et al., 2024). This shows how strategic FTA partnerships help in multi-sectoral GVC integration through logistic networks that are optimised. Also, the textile sector under the Oman-USA FTA demonstrates more output and rising domestic value added which is governed by yarn-forward rules of origin, presenting pathways dependent on logistics for better GVC partnership (Mishrif et al., 2024). Contemporary FTAs like the US–Mexico–Canada Agreement (USMCA) receive the value chain by implementing sustainable and wage standards, which make logistics performance important for compliance and influencing participation in the Global value chain beyond cost factors (Harrison, 2023).

**Logistical Enablers and Barriers in FTA-Participating Nations**

The study reveals logistical factors that determine the success of FTA in improving economies. Supply chain capabilities act as fundamental enablers where supply environment infrastructure and absorptive capabilities stimulate export-oriented or vertical FDI, infrastructure being the most important for differentiating countries in terms of attracting FDI (Halaszovich & Kinra, 2020). National transportation systems reveal the capacity to reduce expenses related to different dimensions of distance with rail services within the country and road infrastructure showing the importance of Foreign Direct Investment (FDI) while geographic distance remains negative (Halaszovich & Kinra, 2020). Also, the study from China confirms heterogeneous FTA impacts where Central and western regions, state enterprises, high-tech enterprises and manufacturing firms get more GVC-related benefits, which indicates variation in regional logistics infrastructure (Zhao et al., 2025). The analysis reveals that FTAs improve embeddedness by increasing levels of technological innovation, while the internal control costs are negatively moderated, demonstrating how organisational logistics capabilities define the effectiveness of FTA.

**Strategic Policy Integration: Aligning FTA Provisions with Logistics Development for Enhanced Specialization**

Strategic policy coordination is important for maximizing FTA benefits through the integration of Logistics and trade. Trade restrictions show how organizations deploy switching strategies, including market switching, production switching, and supplier switching, to deal with barriers while focusing on economic upgrades through enhanced capabilities from imported inputs to original design and equipment manufacturing (Gereffi, et al., 2021). This strategy shows how uncertainty is related to policy-driven logistics reconfiguration and capability development. For instance, African integration demonstrates policy alignment challenges where fragmentation of production requires borders that are seamless and the success depends on how the tariffs on imports of intermediates, digital connectivity, rules of origin and trade in services are coordinated (Melo & Twum, 2021). The strategic approach of the African Continental Free Trade Area (AfCFTA) to develop Regional Value Chains (RVCs) at continental and regional levels differs from the present low participation rates in comparison to ASEAN's 17.2% RVC participation (Melo & Twum, 2021). This shows that successful integration of logistics and FTA requires policy reforms that are coordinated and address multiple dimensions simultaneously, from investment in infrastructure to institutional development and regulatory harmonization.

## 5.2 Discussion

This study successfully addresses all three research objectives through a comprehensive literature review. The first objective is fulfilled through the analysis that logistics instructor increases FTA benefits with transport development, declining non-tariff barriers and allowing specialisation beyond regional boundaries, which is evidenced by deep PTAs increasing trade, which is valued added by 0.48% per policy provision. The objective is fulfilled as the findings reveal that FTAs allow integration of GVC so optimisation of logistics rather than only reduction of tariff, by doing strategic partnerships like Oman-Singapore, which creates multi-sectoral spillover effects and allows gateway functions for better market access. Objective 3 is full field through the identification of critical enablers, which include supply environment, quality of infrastructure and absorptive capabilities, while revealing obstacles such as organisational control costs and geographic distance that form competitive advantages. This demonstrates that successful FTA outcomes depend on strategic coordination of policy, which requires simultaneous reforms across regulatory harmonization, infrastructure investment and institutional development in order to increase integration benefits between trade and logistics.

# 6. Conclusion and Recommendation

## 6.1 Conclusion

The study shows that FTA improves international trade specialization through logistics improvement strategically within the framework of the global value chain. The study reveals that logistics infrastructure performs as a critical catalyst, increasing the benefits of FTA, which is beyond traditional tariff reductions by allowing deeper integration of GVC and reducing barriers that are non-tariff. The findings of the study demonstrate that successful trade specialization is possible through coordinated policy approaches that integrate development, institutional reforms and regulatory harmonization. Countries that achieve superior logistics performance under the framework of FTA formulate a sustainable competitive advantage in production segments that are of high-value, confirming the relationship between logistics optimization and liberalization of trade in promoting economic specialization patterns that are effective.

## 6.2 Recommendations

* They should focus on integrating infrastructure investment by combining Digital connectivity, transport and port facilities within the framework of the FTA to increase the benefits of specialization (Nasser & Ouerghi, 2024).
* They should formulate policy approaches that are coordinated in alignment with trade liberalization with harmonizing regulations, logistic reforms and institutional building of capacity at the same time.
* Concentrate on enhancing capability by providing training to the workforce, innovation and optimization of the supply chain for leveraging opportunities related to FTA ((Esmatzada et al., 2019).

## 6.3 Implications and Study Usefulness

The study is practically helpful to policymakers who formulate FTA models, trade negotiators who draft trade agreement guidelines with logistics provisions, government agencies with an eye on infrastructure investments, and companies wishing to take advantage of the FTA arrangements adding greater value to their global value chains.

## 6.4 Limitation of the Study

This research study has limitations such as methodological constraints of systematic literature reviews, limited to eight peer-reviewed studies, use of secondary sources of data, duration of time limitation, and nature of the study being qualitative can limit the quantification of relationships.

## 6.5 Future Research Scope

Studies in the future should be focused towards examining sector-specific logistics impacts, analyzing digital logistics integration effects, quantifying infrastructure investment levels and evaluating the influence of sustainability provisions on patterns of GVC participation within the growing FTA framework across various regions.

**Disclaimer (Artificial intelligence)**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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