Measuring Structural Power in Global Value Chains: Evidence from Malaysian Manufacturing

Miao Zhang[a]
Xiamen University

Rui Yang[b]
Xiamen University

Rajah Rasiah[c]
University of Malaya

Mingzhang Jiang[d]
Xiamen University

Abstract: The global value chain (GVC), as the most important feature and driving force of globalisation has profoundly shaped state–market relations, as well as the international political economy. This paper uses Malaysia as a case study to demonstrate a country's embedding structural power in GVC. Deploying the OECD's *Inter-Country Input-Output Table* from 1995 to 2018, two indicators were constructed, namely power of value added (PV) and interaction of value added (IV), to measure Malaysia's structural power in GVC. The results indicate that Malaysia's PV in GVCs has declined over the years. A combination of high GVC participation but low GVC position indicates that Malaysia's export sector remains stuck in low value-added activities despite being highly integrated into global production networks. Also examined is the value-added interaction between Malaysia and major economic powers, such as the US, China and Japan. In so doing, we provide an evolutionary explanation of Malaysia's location in the international political economic system where economic and political power are increasingly intertwined.

Keywords: Global value chain, trade in value added, structural power, Malaysia
JEL classification: L60, L63, O14, N45, N65

[a] Center for Southeast Asian Studies, Xiamen University, Xiamen 361005, Fujian, China. Email: miaozhang@xmu.edu.cn (Corresponding author)
[b] Center for Southeast Asian Studies, Xiamen University, Xiamen 361005, Fujian, China. Email: clara@stu.xmu.edu.cn
[c] Asia-Europe Institute, Universiti Malaya, 50603 Kuala Lumpur, Malaysia. Email: rajah@um.edu.my
[d] School of Economics, Xiamen University, Xiamen 361005, Fujian, China. Email: 2097392512@qq.com
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1. Introduction

The creation, flow and distribution of value added have become an integral part of a country's structural power, shaping state–market relations as well as international political economy. Strange (1994) defined structural power as the power that shapes and determines the structures of global political economy. It is constituted by four primary structures, namely security, production, finance and knowledge. Global value chain, characterised by production, trade and investment, has become an important arena for nurturing structural power that shape and form relationships within and between states. It becomes more influential in shaping the post-hegemonic international order than absolute and coercive "relational power" after the Cold War ends (Keohane, 1984). Meanwhile, the structural power evolves. Both individual powers and a group of powers generate innovative change in the structure of global or regional governance to give greater legitimacy to the renewed structures, which inevitably requires the conceptualisation of structural power to mirror the social interactions. This conceptualisation of structural power shall show how the structures of particular actors are shaped (Duggan et al., 2022).

Following the 2007–2008 international financial crisis, there has been a resurgence of anti-globalisation sentiments and trade protectionism making the securitisation of economic issues increasingly prominent (Buzan, 1998; Taureck, 2006). External factors such as the US–China trade tensions and the Covid-19 pandemic have accelerated the overall restructuring of global supply chains and expedited the trends of regionalisation and localisation of value chains (Wang & Sun, 2021). Existing GVC works in economics have focused primarily on the value-added shares recorded globally in particular commodity chains, and the drivers of these chains (Gereffi et al., 2005). Since Gereffi et al. (2005) published arguably their earliest work discussing changes on power relations within value chains, many have used it loosely to refer to theoretical constructs and the measurement of the variables used. Although power and control are arguably the most contentious concepts used in that literature, most economists tend to externalise the powers enjoyed by states. However, market and state are mutually embedded (Polanyi, 1944). As Strange (1994) provided a broad-based rationale on how states and markets interact, it is still a broad-based sketch that does not elaborate much on how to measure power and the way power evolves against international capital flows, production and trade. Therefore, this paper takes global value chain as an approach to measure production-related structural power.

The strategic competition between China and the United States provides a good backdrop to examine structural power (George et al., 2021; Pang & He, 2021). Southeast Asia has become one of the focal points of strategic competition between the two countries. Recently, the United States attempted to lead the restructuring of the Asia-Pacific regional value chain through the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) platform; later, it sought to strengthen control over the Southeast Asian supply chain system under the banner of Indo-Pacific Economic Framework for Prosperity (IPEF) to counter China's growing economic and geopolitical influence (Gomez et al., 2020). Therefore, analysing the structural power of the Southeast Asian countries against China and the United States holds practical

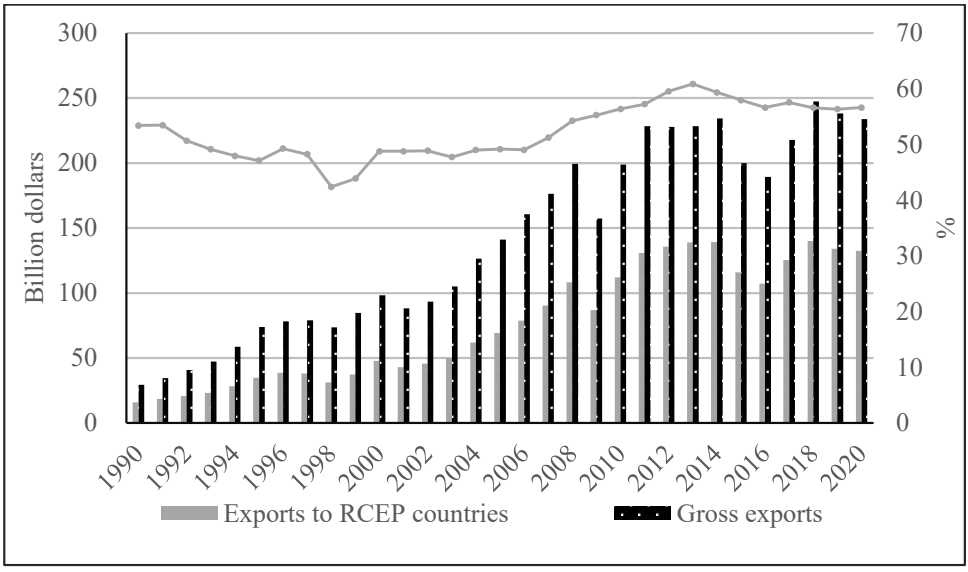

Figure 1. Malaysia's exports to RCEP countries and to the world (1990–2020)
Source: *IMF Direction of Trade Statistics* (*2021*).

significance for safeguarding the security and stability of regional industrial and supply chains.

Among the 10 countries in Southeast Asia, Malaysia appears to be an important case to study a country's structural power. With its economy deeply integrated into the regional production network, Malaysia ranked third among ASEAN countries in total foreign trade in 2020. From 1990 to 2019, the country experienced an annual average nominal growth rate in exports of 6.9% per annum to reach USD237.8 billion in 2019, which accounted for 65.2% of its national GDP. With Malaysia's exports to the Regional Comprehensive Economic Partnership (RCEP) countries accounting for 57% of its total exports in 2021 (Figure 1), this paper aims to examine Malaysia's position in RCEP and interactions with the member states in the global value chain at the national and sectoral level, respectively. Sectoral examination is necessary, as policy efforts to enhance a country's position in the global value chain ultimately need to be implemented in specific industries and sectors, just as optimising and upgrading industrial structures require precise sector-based policy formulas. Also, while the use of value-added chains captured in GVCs are more meaningful in denoting structural power than complexity of exports, that measure alone is not a robust construct to capture control but is arguably the best available for now. Therefore, this paper will first analyse Malaysia's structural value chain position with interactions at the national level. It will then assess Malaysia's participation in the global value chain in key industries and its interactions with major countries.

The rest of the paper is structured as follows. Following the introduction, Section 2 reviews relevant literature, providing theoretical foundation for the concept of a country's structural power in global value chains. Section 3 introduces the methodology for

estimation. Section 4 presents empirical results of Malaysia at the national and sectoral levels, respectively. The last section presents the conclusion and policy implications.

2. Theoretical Underpinning: Structural Power in Global Value Chains

The concept of the value chain in industrial economics can be traced back to the ideas first put forth by Adam Smith in 1774 in his early theory of specialisation and labour division. Over time, scholars like Hirschman (1958), Gereffi (1994), and Rasiah (1995, 2003) expanded and enriched the concept, forming an economic research path based on the international division of labour and factor endowment theory. Initially centred on the micro-level analysis of multinational corporations, the study of value chains has also become a focus in the fields of business management and corporate strategy (Porter, 1985).

The essence of the global value chain is an organisational form that combines production processes with geographical space and social systems. Within the global value chain, the creation, flow and distribution of value added not only reflect traditional economic factors such as labour costs, trade relationships and resource endowments but also encompass information related to political manoeuvring and power dynamics, which are non-conventional economic elements. From an inter-national political economy (IPE) perspective, the concept of the global value chain draws inspiration from Wallerstein's (1974) early seminal work on World System Theory in general, and the concept of the "commodity chain" in particular. That literature considers the value chain as production processes that lead to the creation of final goods, and the production network whose structure and distributive mechanisms of value added constitute a country's structural power in global political economy (Gereffi et al., 2005).

Some international political economy scholars use regional approaches to analyse interaction patterns among various actors at the international level, as well as the institutional arrangements and power structures within regional production networks. Despite the significant achievements of mainstream international economics and international relations scholars in studying the global value chain, the restructuring of value chain structures involves the reshaping of international production networks and international trade patterns. This makes the global value chain not just a pure economic, business or international relations topic, but one that is multifaceted and interdisciplinary that involves the international and domestic, and political, social and economic dimensions.

The normative discourse on the connection between politics and economics can be traced back to Polanyi (1944), who introduced the concepts of "embeddedness" and "power relations" in the economy within general social structures. Unlike Polanyi, Cox (1987) focused his research on production, starting from power relations in production and discussing how power relations in societies are impacted by politics. He argued that production can generate the capacity to exercise power, while power determines the way production is organised. Cox understands transformations and transitions in society, states and world order through the lenses of dialectical relationship between material foundations, institutions and ideas. This idea of economics as the base, politics as the superstructure, and their dynamic interactions is an abstraction from Marxist economics

(Marx, 1848), though, the social and production relations meant remains a social construct that has eluded many scholars trying to measure it.[2]

As the international division of labour deepens the creation, flow and distribution of value added in the global value chain, (which generates complex and profound effects at both domestic and international levels, the international production system evolves into a global value chain with firms in countries interacting as buyers and sellers generating in the process value added, leading to a binary interaction in production and exchange, which also means that a country's economic decisions or production adjustments will inevitably affect production and distribution in other countries in the same value chain. When the former adjusts its behaviour, it influences the latter, placing the former in a relatively advantageous position. This asymmetric advantage endows the former with corresponding power. In the context of increasing the internationalisation of production, this power becomes an important component of a country's influence (Mahutga, 2014).

The concept of "structural power" was initially introduced by Strange (1994) who defined structural power as the power that shapes and determines the structures of global political economy, forming the basic framework for relationships within states, between states, people and corporations. Structural power consists of four primary structures (security, production, finance and knowledge) and four secondary structures (transport, trade, energy and welfare). Because structural power exists within four distinct yet interconnected structures, it is more influential in shaping the post-hegemonic international order than absolute and coercive "relational power" (Keohane, 1984). Therefore, the global value chain is characterised by production and trade, that has become an important arena for nurturing structural power. Nevertheless, as with Marxist constructs, many concepts are literally impossible to measure, including the use of values for the different actors. Yet, these concepts are important in understanding how value added is shaped.

Production and trade among countries in global value chains and the resulting structural power deeply influence international production relations and the international division of labour. This power structure or international order also affects a country's production behaviour and national interests. While nations, as producers and consumers in the global value chain, are constrained by their position and relative strength in the world order, it does not mean that countries (governments) are passive recipients without autonomy in this process (Miliband, 1969; Nye & Keohane, 1971; Poulantzas, 1973). In this regard, Miliband (1969) emphasised that states are instruments of capital while Poulantzas (1973) argued that states can only play developmental roles to assist all interest groups if they enjoy autonomy over interest groups (see Rasiah et al., 2017). Such an argument has been taken on by Evans (1995), Evans et al. (1985), Jessop (1994) and Skocpol (1995). However, the national capacity characterised by the achievement of national goals and the effectiveness of policy implementation are influenced by both domestic and international factors (Weiss & Hobson, 1995).

[2] However, it has to be noted that Cox did not comprehend Marx's (1848) argument on the productive circuit fully to capture the three circuits of capital in how the three circuits of currency, commodity and productive and repeat of these circuits achieve unity (see also Rasiah, 1995).

Nationalist scholars in international political economy start from the perspective of domestic structures and analyse the constraints of ruling coalitions and policy networks on a country's foreign economic policy (Katzenstein, 1978, 2009; Risse-Kappen, 1995). The remarkable economic expansion recorded by the East Asian countries provides convincing empirical evidence of developmental states in coordinating domestic political-business relationships through the deployment of successful policy tools (Amsden, 1989, 1991; Johnson, 1982; Wade, 1990). However, when analysing the impact of international actors on national capacity and policy behaviour, international political economy scholars have tended to overlook the study of national autonomy. Considering this, this paper will briefly explore the proactive role that governments play in responding to the economic challenges transmitted from the global value chain, which is why this paper seeks to measure and examine Malaysia's structural power in the global value chain. As noted earlier, the measure used is based purely on the relative structural value-added share enjoyed by the country in the global value chain.

3. Measuring Malaysia's Position in Global Value Chains

The international division of labour can be examined at the inter-industry, intra-industry and intra-product levels. Intermediate goods trade has become a major component of contemporary international trade. The traditional method of measuring a country's trade scale using total value of trade no longer accurately reflects the multilateral value contributions and the country of origin of final consumption in exports. Therefore, with the development of methods and databases for measuring global value chains, a new approach focusing on trade in value added is gradually becoming a new path for international trade calculation (Stehrer, 2012).

3.1 Index: Power of Value Added (PV) and Interaction of Value Added (IV)

Following the Leontief decomposition (see Appendix), transnational input-output tables are derived where data of trade in value added is available and used to systematically examine global value chains. In this section, two indicators were constructed to measure a country's structural power in a production network. One is power of value added (PV), which measures a country's position in a trade network. The other is interaction of value added (IV), which measures the degree of interdependence between a country and other member of the network.

Power of value added (PV) tracks a country's value-added contribution and absorption to the total exports of other countries in the network, measuring the importance of that country within its trade network. For example, in RCEP trade network, if a country (such as Malaysia) has a high proportion of value-added con-tribution to the exports of other member countries, it indicates that Malaysia has a value-added export advantage within the network. In other words, other countries in the trade network require or depend on Malaysia to provide value added to their exports. Conversely, if Malaysia has a high proportion of value-added absorption from other member countries' exports, it suggests that Malaysia has a value-added input advantage within the network. In this case, Malaysia serves as a demand market for the exports of other countries in

the trade network. Based on the different roles of the country under analysis (referred to as country (i) as both a value-added input and output country, the total value of production (PV) can be decomposed into two parts, where:

A. Power of value added outward (PVO)

$$PVO_i = \sum_{i \neq j} \frac{T_v^{ij}}{E_j} \tag{1}$$

B. Power of value added inward (PVI)

$$PVI_i = \sum_{i \neq j} \frac{T_v^{ji}}{E_j} \tag{2}$$

PVO_i represents the proportion that the sum of value-added output of country i to exports of all other countries in the network, or the degree to which the exports of all other countries contain the value added of country i. T_v^{ij} represents the added value of country i contained in the exports of country j. E_j represents the total exports of country j. PVI_i represents the proportion that the sum of value added absorbed by country i from all other countries' exports. T_v^{ji} represents the added value from country j in the exports of country i. Further, averaging PVO_i and PVI_i, we get the formula $PV_i = (PVO_i + PVI_i)/2$ to reflect the power of value added for country i as a whole.

Interaction of value added (IV) tracks a country's value-added input from and value-added output to member countries in the trade network as a proportion of that country's total value-added input from and value-added output to the world, measuring the country's value-added interactions with network member countries. Based on the different roles of country i in industry r as both a value-added input and output, IV can be decomposed into the following two parts and be calculated as $IV_{ijr} = (IVO_{ijr} + IVI_{ijr})/2$ where:

A. Interaction of value added outward (IVO)

$$IVO_{ijr} = \frac{T_{vr}^{ij}}{T_{vr}^{iw}} \tag{3}$$

B. Interaction of value added inward (IVI)

$$IVI_{ijr} = \frac{T_{vr'}^{ji}}{T_{vr'}^{wi}} \tag{4}$$

IVO_{ijr} represents the value-added output of industry r in country i to country j as a share of the total value-added output of industry r in country i. T_{vr}^{ij} represents the added value provided by country i's industry r in the total exports of country j. T_{vr}^{iw} represents the added value provided by country i's industry r in the total world exports (including exports of country i). IVI_{ijr} represents country j's value-added output

to industry r in country i as a share world's total value-added output to industry r in country i. $T_{vr'}^{ji}$, indicates the added value provided by country j in exports of country i's industry r. $T_{vr'}^{wi}$, indicates the added value provided by the world in exports of country i's industry r.

In addition, revealed comparative advantage (RCA) is also used to measure the global competitiveness of a country's products or industries (Balassa, 1965). The calculation of the traditional RCA index does not exclude foreign sources in the added value of export products, and thus cannot accurately reflect the international competitiveness of a country's products or industries. In this paper, we revise the traditional RCA index, replacing total exports with domestic added value included in exports. The amended net revealed comparative advantage (NRCA) expression for industry r in country i is as follows:

$$NRCA_i^r = \frac{DVA_i^r / (\sum_{r=1}^{G} DVA_i^r)}{(\sum_{i=1}^{N} DVA_i^r) / (\sum_{r=1}^{G} \sum_{i=1}^{N} DVA_i^r)} \tag{5}$$

where DVA_i^r is the domestic added value included in exports of country i's industry r. $\sum_{r=1}^{G} DVA_i^r$ sums the domestic value added in exports of all industries in country i. $\sum_{i=1}^{N} DVA_i^r$ sums the domestic value added in exports of all countries' industry r. $\sum_{r=1}^{G} \sum_{i=1}^{N} DVA_i^r$ sums domestic value added in exports of all countries' gross industries.

3.2 Data Selection

This paper uses the OECD-TiVA (Trade in Value Added) database based on the ICIO (Inter-Country Input-Output) Table. Compared to value added in trade, which examines the domestic value-added scale and its share in exports from the production side, trade in value added traces the source of value in final consumption goods, measuring the portion of domestic value consumed abroad. This approach helps avoid the problem of measuring the value of domestic exports that is re-imported, making it a more accurate reflection of a country's participation in international division of labour (Stehrer, 2012). The TiVA database, using ISIC Rev.4, provides value-added origin data for 66 economies (including RCEP member countries) from 1995 to 2018, making it suitable for examining Malaysia's participation in the global value chain within the RCEP framework.[3]

From Malaysia's export structure perspective, goods and merchandise trade are its most significant export contents. Over the past 30 years, the share of goods and merchandise exports in total has consistently been over 80%, accounting for 82.8%

[3] Although the Regional Comprehensive Economic Partnership (RCEP) officially came into effect in 2022, the analysis based on data from 1995 to 2018 in this paper remains relevant and valid. Even before the signing of the RCEP, the RCEP countries were already major trading partners of Malaysia. While the RCEP's official implementation occurred after the data period analysed in this paper, the inclusion of data from 1995 to 2018 allows for a comprehensive understanding of the historical trade relationship between Malaysia and the RCEP countries, providing possible insights into the potential impacts and implications of agreement on Malaysia's trade dynamics.

of total exports in 2019. Within Malaysia's goods and merchandise exports, industrial manufactured products have an absolute advantage, accounting for 70.1% of goods and merchandise exports in 2019.[4] Considering that most of Malaysia's total exports are industrial manufactured products, this paper uses net revealed comparative advantage (NRCA) to select Malaysia's advantageous manufacturing industries for in-depth analysis and examines the domestic value added and value-added exports in each sector.

4. Empirical Tests

Sources of structural power in the global value chain primarily stem from two key factors: technology and market. Technology has emerged as the fundamental driving force behind economic and social transformations. Nations possessing advanced technology often dominate substantial segments of the international market and safeguard their technological advantage through the establishment of barriers, effectively monopolising their technological prowess. Notably, technological evolution exhibits path dependence, allowing early developers to leverage significant first-mover advantages, creating a self-reinforcing cycle that hinders latecomers in their catch-up efforts. This structural power derived from technology is expressed by IVO which finds parallels with the concept of forward linkages in GVC.

Meanwhile, market control and demand generate significant power. Major importing countries wield substantial influence through their consumer markets, granting them considerable purchasing power. When foreign companies or products seek entry into these markets, the importing country can exert structural power over others by implementing import restrictions, such as tariffs or non-tariff barriers, which impact the source of imports and reshape the international market structure. Market power also encompasses the purchasing power of dominant firms within the supply chain, enabling them to impose specific technological standards or asymmetric product agreements on suppliers through their significant purchasing volume. This places suppliers in a dependent and subordinate position. This structural power stemming from the market is expressed by IVI which aligns with the concept of backward linkages in the GVC.

Hence, technology and market are interdependent and mutually reinforcing. Market size serves as the bedrock for consumption, fostering technological innovation, while technological capabilities provide production advantages that drive market expansion. This dynamic parallels the combined influence of IVI and IVO, which jointly shape the distribution and patterns of structural power within GVC. In this section, we calculate Malaysia's PV and IV respectively.

4.1 Malaysia's Power of Value Added in RCEP Network

First, we calculate PV of Malaysia from 1995 to 2018, examining the static characteristics and dynamic trends of value-added power in major countries in RCEP network.

[4] All values are calculated in current US dollars. Additionally, Malaysia's food and fuel exports also have a certain scale, accounting for 9.2% and 4.5% of its total merchandise exports in 2019, respectively.

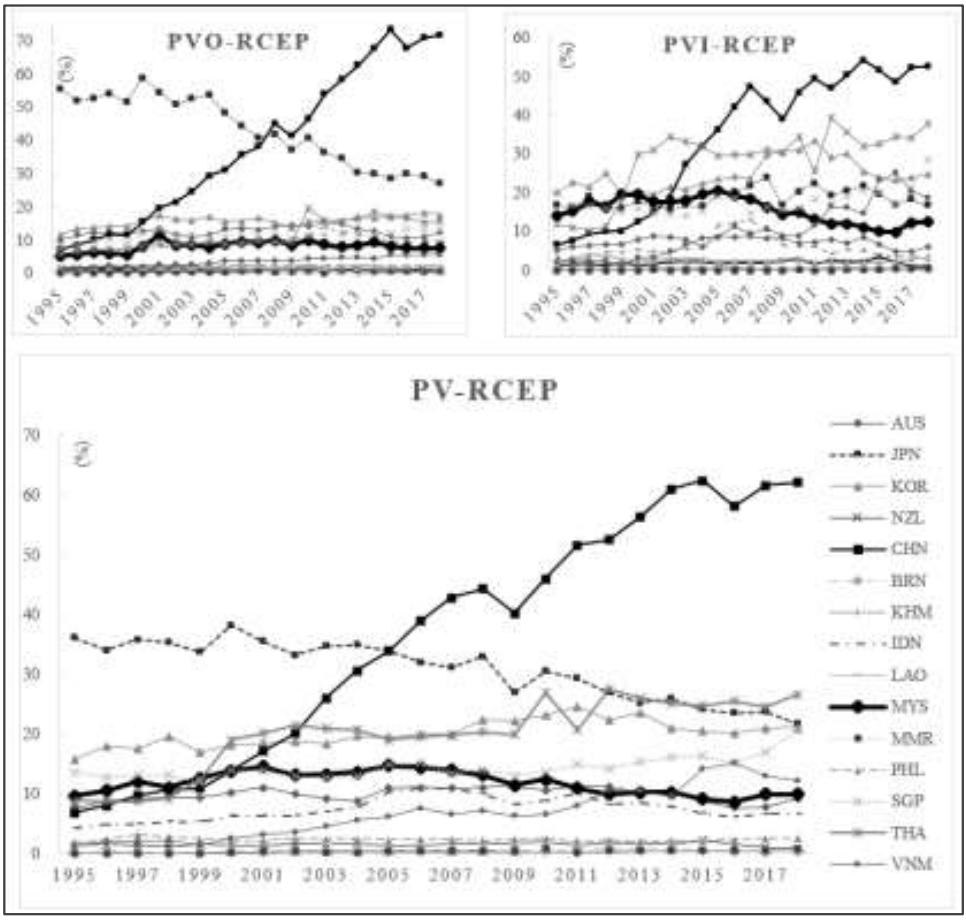

Figure 2. Power of value added (PV) for RCEP countries
Source: Calculated based on OECD-TiVA database (2021), the same below.

Overall, the PV index of RCEP members is hierarchical, whereas China occupies an absolute dominant position in value-added power and has been rising year after year and has become the leading actor since 2005. Japan, South Korea, Singapore, Thailand and Malaysia are at the second echelon. Brunei, the Philippines, Myanmar and Cambodia are in the third echelon with lower value-added power (Figure 2).

Overall, Malaysia's power of value added (PV) in RCEP network is at a medium level, showing a slow downward trend during the observation period. Decomposing PV, we find that the decrease in Malaysia's PV is mainly caused by the gradual decline of PVI, indicating that Malaysia's power as a value-added buyer has declined in RCEP network. However, PVI is higher than PVO, which suggests Malaysia is more like a value-added buyer rather than value-added seller in RCEP network. In addition, resilient domestic demand has enabled Malaysia's PVI to gradually recover after experiencing a low point in 2016 (9.78%), maintaining Malaysia's buyer power.

Further, based on the GVC participation index and GVC position index constructed by Koopman et al. (2010),[5] we analyse Malaysia's characteristics and causes of its value-added status by horizontal and longitudinal comparisons (Figures 3 and 4). Horizontally, Malaysia's GVC participation index is at a high level among RCEP member countries, while the GVC position index is at a low level and is negative for a long time, which shows that although Malaysia is highly integrated into global production network, its dependence on foreign added value is higher than domestic added value in exports, and its exports have long been locked in the production and assembly procedures with low added value, and has no advantage in high value-added procedures such as research and development. Longitudinally, 2014 was an important cut-off point, before which the GVC participation index showed a slow decline and after which it quickly rebounded. In contrast, the GVC position index has never been able to break through the negative value, but the upward trend in volatility indicates that Malaysia's industrial upgrade has been slightly effective. In summary, Malaysia is generally located in low value-added procedures in the international division of labour, and in the downstream of value chains, which also explains Malaysia's gradual decline of value-added position in RCEP network.

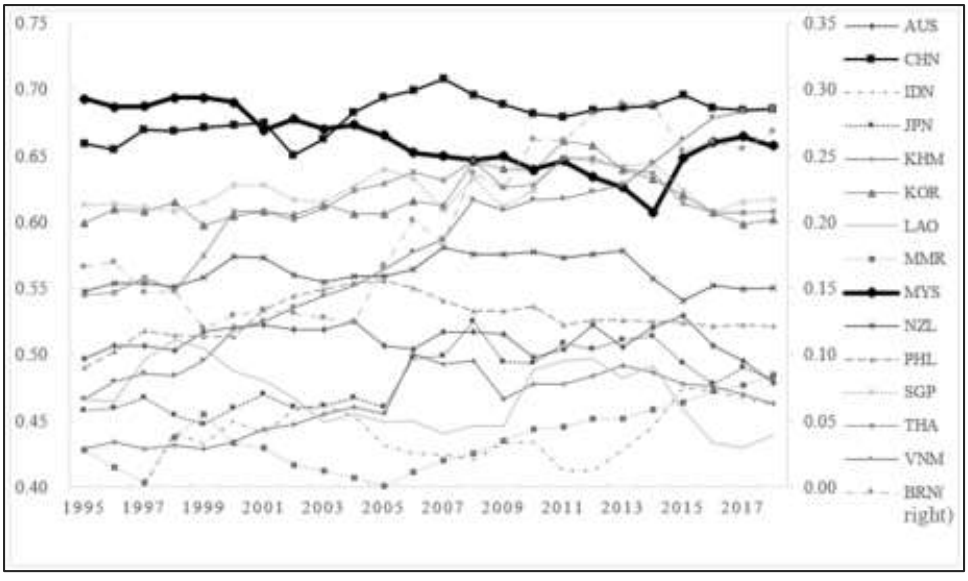

Figure 3. GVC participation index of RCEP countries (1995–2018)

[5] $GVC\ Position = \ln\left(1 + \frac{IV_{ir}}{E_{ir}}\right) - \ln\left(1 + \frac{FV_{ir}}{E_{ir}}\right)$, $GVC\ participation = \frac{IV_{ir}}{E_{ir}} + \frac{FV_{ir}}{E_{ir}}$ where: IV_{ir} represents the indirect value-added exports of country i in industry r, i.e., the domestic value added included in country i's exports of intermediate goods in industry r; FV_{ir} represents the foreign value added in country i's exports of final products in industry r; E_{ir} is the total exports of industry r in country i. See Koopman et al., 2010.

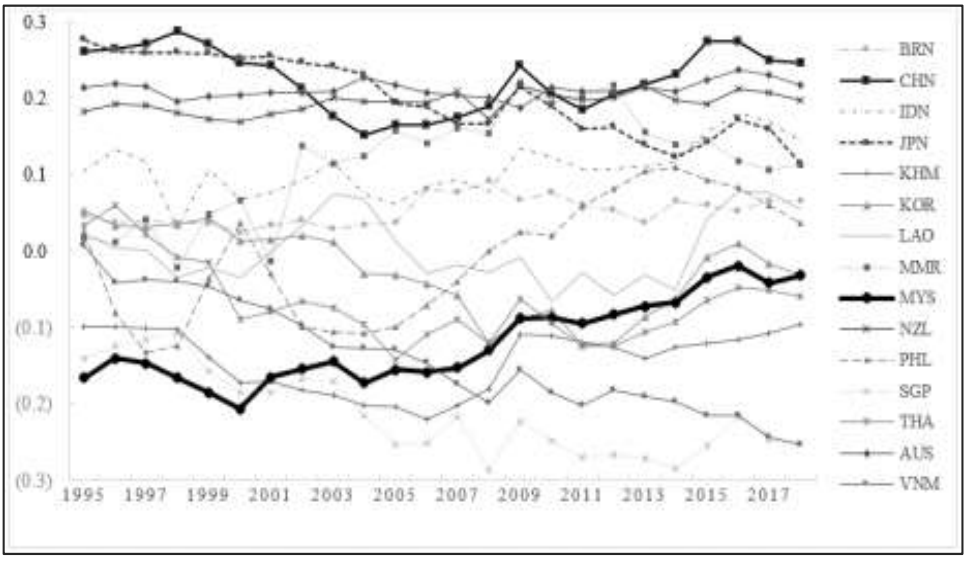

Figure 4. GVC position index of RCEP countries (1995–2018)

4.2 Malaysia's Value-added Interactions with Major Countries

Based on Malaysia's top 10 export partners from 2010 to 2020, we select its top 7 trading countries, namely, China, Japan, South Korea, Thailand, Singapore, Indonesia and the United States, to analyse interactions of value added at the national level, industry/sector level. Except for the United States, the remaining six countries are all RCEP members.

4.2.1 IV at Country Level

The IV index (Figure 5) suggests that, although starting from a relatively lower position, China has exhibited steady growth, making it Malaysia's largest value-added trading partner in 2007 after surpassing the United States and Japan. Since then, China has consistently maintained its lead, while the gap with the United States and Japan has widen. The value-added interactions between the United States and Japan with Malaysia have shown a continuous decline, with China and Singapore surpassing them in 2007 and 2014, respectively. Decomposing IV index, it is evident that Malaysia's value-added interaction with the United States is primarily driven by US exports to Malaysia, while Malaysia's value-added exports to the United States remain at relatively low level. However, the relative advantage of the United States as a value-added seller has gradually weakened due to the increasingly close value-added interactions between China and Malaysia. The decline in the value-added exports of the United States and Japan, once the top value-added exporters to Malaysia, contrasts sharply with China's continuously strengthening value-added export capabilities, highlighting China's growing influence as both a value-added input and output partner for Malaysia.

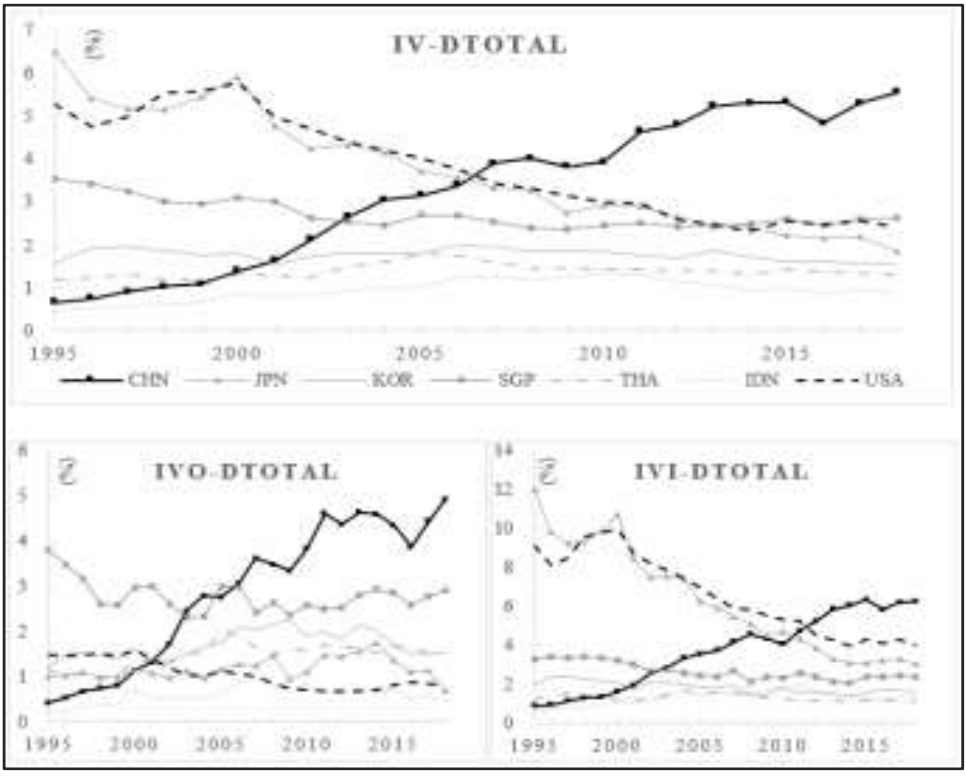

Figure 5. Value-added interactions between Malaysia and seven major trading partners

4.2.2 IV at Industry/sector Levels

Using OECD-TiVA data, we calculate and sort out the proportion of value added provided by industrial sectors in Malaysia to world's exports from 1995 to 2018 (Table 2). We find that manufacturing (D10T33) has obvious advantages when it comes to value-added exports. Meanwhile, combining with NRCA index to screening various sectors of manufacturing, we find that five sectors, i.e., food, beverages and tobacco (D10T12), wood and cork products (D16), coke and refined petroleum products (D19), rubber and plastic products (D22), and computer, electronics and optical products (D26), showed sustained and stable comparative advantages. Combining the results in Table 1 and Table 2, it is found that Malaysia's exports of D16 sector have a comparative advantage, but its proportion of external value added to the added value of Malaysia's entire industries is less than 1% for many years (Table 2), indicating that most products in D16 are exported in the form of primary products without local processing. The D22 sector, shows similar pattern as D16 sector, owns limited local value-added capacity. Excluding the two sectors, this section focuses on the value-added interactions between Malaysia and the seven major countries in D10T12, D19 and D26 sectors. Among them, D19 and D26 are strategic industrial sectors set out in the National Industrial Policy (2006–2020) and the 12th Malaysia Plan (2021–2025).

Table 1. Industrial NRCA Index in Malaysia (1995–2018)

Industry/ Sector	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
D01T03	1.63	1.54	1.55	1.85	2.01	2.21	1.94	1.99	1.88	1.91	1.76	1.72	1.47	1.19	1.00	0.86	0.85	0.80	0.76	0.46	0.47	0.47	0.48	0.47
D05T09	1.54	1.48	1.50	1.62	1.46	1.61	1.60	1.44	1.74	1.62	1.49	1.42	1.35	1.37	1.18	1.11	1.11	1.10	1.18	1.37	1.47	1.28	1.17	1.14
D10T33	0.95	0.95	0.95	0.95	0.96	1.04	1.06	1.10	1.10	1.10	1.10	1.07	1.05	1.07	1.14	1.11	1.11	1.11	1.10	1.11	1.15	1.19	1.20	1.20
D35T39	0.55	0.53	0.57	0.55	0.59	0.42	0.40	0.40	0.32	0.33	0.32	0.31	0.37	0.34	0.35	0.41	0.31	0.29	0.25	0.21	0.16	0.17	0.17	0.17
D41T43	0.49	0.52	0.53	0.45	0.43	0.40	0.38	0.38	0.31	0.31	0.32	0.35	0.38	0.37	0.44	0.44	0.49	0.43	0.35	0.26	0.19	0.18	0.17	0.17
D45T98	0.95	0.96	0.95	0.93	0.92	0.73	0.73	0.71	0.64	0.66	0.68	0.73	0.79	0.76	0.77	0.82	0.82	0.83	0.81	0.78	0.73	0.74	0.74	0.74
D10T12	2.14	2.03	2.09	2.52	2.67	1.90	1.85	2.45	2.43	2.43	2.34	2.31	2.14	3.24	2.89	2.76	2.63	2.35	2.11	2.18	2.13	2.08	1.96	1.91
D13T15	0.37	0.36	0.36	0.38	0.40	0.43	0.46	0.45	0.43	0.47	0.45	0.48	0.47	0.43	0.41	0.42	0.38	0.37	0.37	0.39	0.37	0.39	0.41	0.40
D16	3.44	3.45	3.46	3.53	3.39	4.54	3.55	3.45	3.51	3.45	3.43	3.64	3.68	3.19	3.26	3.14	3.28	3.01	2.60	2.59	2.69	2.58	2.62	2.46
D17T18	1.04	1.09	1.16	1.27	1.29	1.54	1.60	1.60	1.63	1.67	1.68	1.80	1.78	1.65	1.58	1.54	1.42	1.24	1.05	1.00	0.84	0.84	0.88	0.83
D19	1.46	1.37	1.35	1.26	1.48	1.66	1.87	1.76	1.65	1.48	1.50	1.53	1.46	1.67	1.69	1.75	1.81	2.43	2.70	2.67	2.70	3.26	3.35	3.12
D20	0.84	0.87	0.87	0.98	0.99	1.25	1.22	1.37	1.34	1.47	1.38	1.42	1.29	1.09	1.07	1.08	1.17	1.06	0.98	1.03	1.19	1.22	1.23	1.23
D21	0.11	0.11	0.11	0.10	0.10	0.11	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.07	0.07	0.08	0.09	0.10	0.11	0.10	0.10	0.10	0.10
D22	2.08	2.05	2.17	2.27	2.00	2.18	2.20	1.95	2.01	1.97	2.01	1.99	1.91	1.80	1.94	1.95	2.20	2.18	1.99	1.85	1.97	1.94	1.97	1.95
D23	0.87	0.86	0.89	1.17	1.21	0.57	0.56	0.54	0.49	0.45	0.40	0.45	0.45	0.40	0.39	0.37	0.45	0.48	0.51	0.63	0.68	0.73	0.79	0.74
D24	0.34	0.35	0.38	0.41	0.42	0.46	0.45	0.43	0.43	0.39	0.35	0.37	0.32	0.28	0.31	0.32	0.31	0.33	0.48	0.49	0.64	0.75	0.65	0.67
D25	0.52	0.51	0.52	0.53	0.53	0.67	0.64	0.63	0.64	0.62	0.60	0.61	0.57	0.50	0.50	0.51	0.57	0.51	0.46	0.49	0.50	0.50	0.51	0.48
D26	1.93	2.02	1.91	1.62	1.57	1.77	2.09	2.14	2.21	2.15	2.14	1.93	2.36	2.28	2.71	2.57	2.58	2.78	2.82	2.83	3.01	3.14	3.08	3.16
D27	0.77	0.72	0.67	0.69	0.65	0.76	0.84	0.96	1.03	1.09	1.41	1.14	1.03	0.70	0.74	0.83	0.85	0.73	0.73	0.79	0.83	0.86	0.90	0.87
D28	0.30	0.31	0.33	0.30	0.32	0.43	0.43	0.42	0.43	0.42	0.42	0.46	0.39	0.26	0.35	0.32	0.29	0.27	0.26	0.26	0.35	0.36	0.37	0.35
D29	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03
D30	0.62	0.62	0.57	0.56	0.57	0.78	0.69	0.67	0.73	0.71	0.71	0.67	0.58	0.49	0.42	0.41	0.50	0.38	0.32	0.31	0.27	0.27	0.31	0.31
D31T33	0.82	0.83	0.82	0.93	0.84	0.93	1.05	0.98	0.94	0.96	0.88	0.96	0.84	0.76	0.72	0.79	0.68	0.56	0.53	0.53	0.56	0.55	0.58	0.56

Table 2. The proportion of value added provided by Malaysia's industries to world exports

Industry/ Sector	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
D01T03	9.6	9.6	9.5	9.6	9.4	9.0	9.3	9.8	9.7	9.5	9.4	9.1	9.1	9.3	9.6	9.0	8.7	8.1	7.5	6.9	6.9	6.9	6.8	6.5
D05T09	14.6	15.0	15.1	14.4	14.4	15.7	16.8	16.4	17.7	17.9	19.2	20.2	18.9	22.1	18.8	19.5	19.3	20.2	20.7	21.3	19.3	18.1	18.4	19.5
D10T33	32.7	32.0	31.9	31.4	31.8	34.9	35.2	34.8	34.4	34.3	32.8	32.2	32.4	30.2	32.0	31.8	31.0	30.9	31.2	31.8	32.1	32.3	32.5	32.4
D35T39	2.3	2.4	2.4	2.5	2.5	2.5	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.4	2.3	2.2	2.2	2.4	2.4	2.4	2.4
D41T43	0.3	0.3	0.3	0.6	0.7	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5
D45T98	40.5	40.7	40.8	41.4	41.2	37.4	36.0	36.4	35.4	35.5	35.8	35.7	36.9	35.6	37.0	37.1	38.2	38.1	37.9	37.5	38.9	39.8	39.4	38.7
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
D10T12	2.5	2.6	2.6	2.6	2.4	2.3	2.4	2.7	2.7	2.7	2.7	2.6	2.5	2.8	3.0	2.8	2.6	2.5	2.4	2.4	2.3	2.3	2.2	2.1
D13T15	1.0	0.9	0.9	1.0	1.0	1.0	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.6
D16	1.0	0.9	0.9	1.0	1.0	1.2	0.8	0.7	0.7	0.7	0.6	0.7	0.7	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
D17T18	1.4	1.3	1.3	1.4	1.5	1.7	1.7	1.6	1.6	1.6	1.4	1.5	1.4	1.2	1.3	1.2	1.0	0.9	0.8	0.8	0.7	0.7	0.7	0.7
D19	2.9	3.0	2.9	2.9	2.9	2.9	3.1	3.1	3.1	3.2	3.4	3.5	3.3	3.5	3.4	3.6	3.9	4.2	4.5	4.5	4.2	4.3	4.3	4.5
D20	3.0	3.0	3.0	2.9	2.8	3.1	3.1	3.3	3.3	3.4	3.3	3.3	3.3	3.1	3.2	3.3	3.8	3.8	3.7	3.9	3.9	3.9	3.9	4.0
D21	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
D22	1.5	1.4	1.5	1.4	1.4	1.4	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.5
D23	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5
D24	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.3	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.2	1.0	1.0	1.2	1.2	1.3	1.4	1.3	1.3
D25	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.1	1.0	1.3	1.3	1.2	1.3	1.4	1.4	1.4	1.4
D26	12.2	11.9	11.9	10.5	10.9	12.9	13.4	12.7	12.6	12.4	11.1	10.0	11.2	10.4	11.7	11.6	10.0	10.3	10.5	10.7	11.0	11.1	11.3	11.2
D27	1.0	0.8	0.8	1.0	1.0	1.1	1.2	1.3	1.3	1.4	1.6	1.4	1.3	1.0	0.9	1.1	1.1	0.9	0.9	1.0	1.1	1.0	1.1	1.1
D28	1.3	1.3	1.3	1.3	1.4	1.8	1.7	1.6	1.6	1.6	1.5	1.7	1.5	1.0	1.2	1.1	0.8	0.8	0.7	0.7	0.8	0.9	0.9	0.9
D29	0.3	0.3	0.3	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5
D30	0.5	0.5	0.5	0.6	0.6	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.4
D31T33	1.2	1.2	1.2	1.5	1.4	1.5	1.8	1.8	1.6	1.6	1.4	1.6	1.4	1.3	1.3	1.4	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0

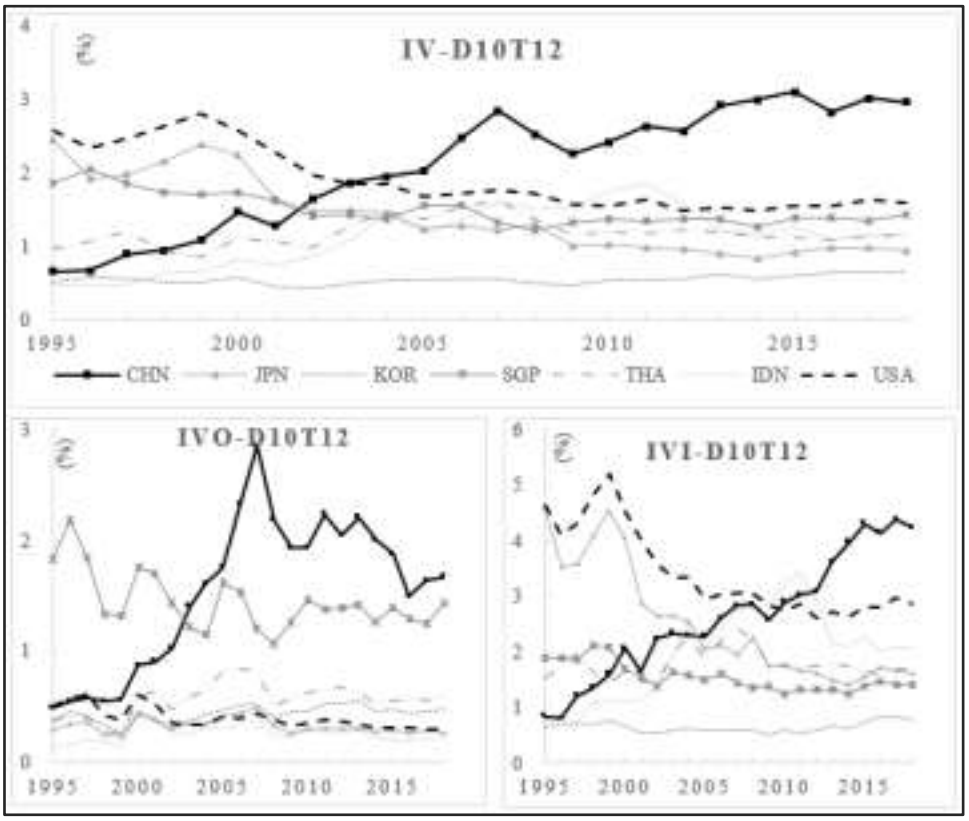

Figure 6. Value-added interactions between Malaysia and 7 countries in D10T12 sector

D10T12 Sector (Food, Beverages and Tobacco)

As shown in Figure 6, China, compared to other major countries, has obvious advantages for value-added interactions with Malaysia in D10T12 sector, and it has maintained its leading position after surpassing the US in 2003. The US lead between 1995 and 2003 was largely supported by US exports to Malaysia (see IVI), but has continued to decline since the Asian financial crisis. Singapore, an island neighbouring country, is limited by natural resources such as land and needs to import massive basic daily necessities such as beverages and food from Malaysia, so Singapore ranks as the second largest value-added buyer from Malaysia.

Based on the basic view of the trade gravity model, that is, economic scale and distance affect trade volume, two developing countries, Thailand and Indonesia, maintain close value-added interactions with Malaysia, of which Indonesia once (during 2010–2012) surpassed China and the US to become Malaysia's largest value exporter. According to UN Comtrade, the top two imported goods and merchandise from Indonesia were "Palm oil and its fractions" (HS1511) and "Coconut (copra), palm kernel or babassu oil and their fractions" (HS1513) from 2010 to 2012.

D19 Sector (Coke and Refined Petroleum Products)

In 2019, Malaysia was the second largest oil and gas producer in Southeast Asia and the fifth largest liquefied natural gas (LNG) exporter in the world. From 1995 to 2018, the comparative advantage and the proportion of added value in the exports of Malaysia's D19 sector continued to rise. dismantling IV-D19 (Figure 7), we can also find that D19's capacity of value-added output is higher than its input capacity (PVO>PVI), which reflects the fruits of industrial upgrading of D19 as the main source and pillar sector of national finance. In 2019, Petronas, an oil company wholly owned by the federal government, contributed 35% of fiscal revenue in the form of taxes, dividends and cash payments. Malaysia has always regarded the transformation and upgrading of oil and gas industry as key point of its national energy policy, and has committed to becoming an integrated and comprehensive petrochemical refining and storage hub in Southeast Asia. In October 2018, the government launched the Malaysian National Industry 4.0 Policy, focusing on petroleum and petrochemicals.

From the perspective of value-added interactions between countries, Singapore, a neighbour with scarce natural oil and gas resource, is the country interacting with Malaysia D19 sector most closely. According to UN Comtrade data, during the period of 1995 to 2018, Malaysia's imports and exports of "mineral fuels, mineral oils and their

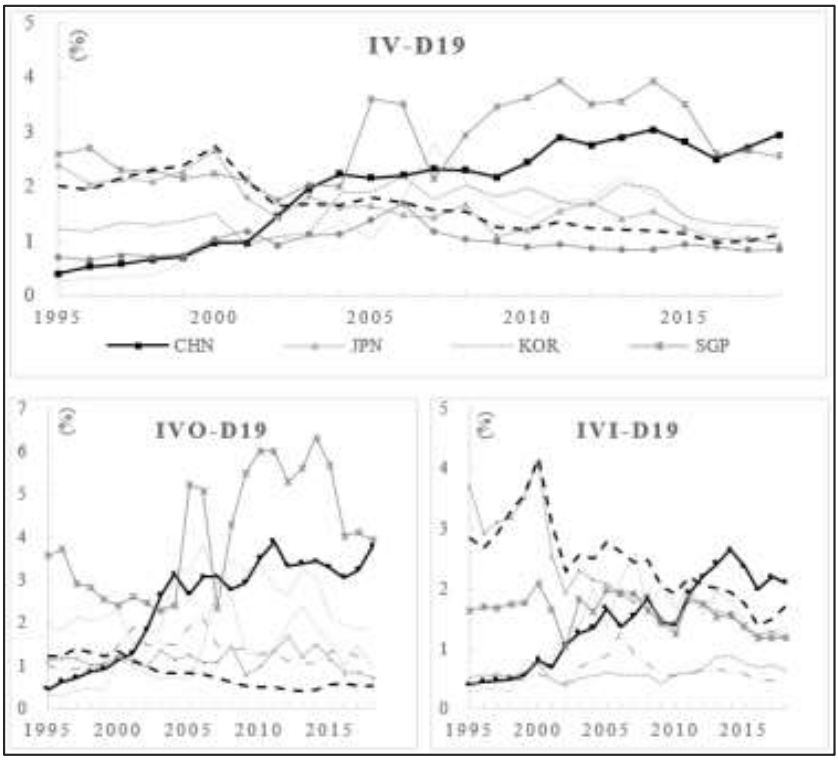

Figure 7. Value-added interactions between Malaysia and 7 countries in D19 sector

distilled products, bituminous substances, mineral waxes" (HS 27) accounted for 30.7% and 17.6% of Malaysia's total imports and exports to Singapore, respectively, of which the largest import and export goods was HS2710,[6] accounting for 93.8% and 75.9% of Malaysia's imports and exports to Singapore's HS 27 goods and merchandises. Through IVO and IVI indicators, we find that the value export of Malaysia D19 to Singapore (IVO-D19) is the main support of value-added interactions between the two countries, and the continuous improvement of Malaysia's value-added output capacity to Singapore, from the perspective of supply side, also reflects the increasing competitiveness of Malaysia's D19 sector.

In addition to Singapore, IVO-D19 and IVI-D19 between China and Malaysia both showed a consistent growth trend, suggesting a balanced growth in China's input and output capacity of value added to Malaysia. The value-added interactions between USA–Malaysia, Japan–Malaysia in D19 sector have shown declining trend overall. The value-added output of the United States and Japan to Malaysia has an absolute advantage in the 1990s, but it has continued to decline since around 2005 with the increase of China's share. In addition, Indonesia, a large developing neighbour, also maintains relatively frequent value-added interactions with Malaysia in D19 sector, but IVI-D19 fluctuates greatly.

D26 Sector (Computer, Electronic and Optical Equipment)

The computer, electronic and optical equipment (D26) sector is one of Malaysia's main export sectors. In 2020, the electronics and electrical production sector had exports totalling MYR386.1 billion, accounting for 39.4% of total exports (MIDA, 2021), with semiconductors being the main export product. Malaysia is the seventh-largest semiconductor exporting country globally, with a strong presence in semiconductor testing and packaging, holding 13% of the global market share. Apart from packaging, Malaysia also has semiconductor wafer fabrication plants and several component production factories. According to UN Comtrade data, from 1995 to 2018, Malaysia contributed 7% of the global semiconductor (HS8541) export volume. In 2018, Malaysia's integrated circuit export share surpassed Japan and was on par with the United States.

As early as the 1970s, the Malaysian government actively implemented policies to attract foreign investments in the electronics and electrical industry, including semiconductors. After nearly 50 years of development, Malaysia has accumulated significant technological capabilities and scale, with a relatively complete semiconductor supply chain. It has become a hub for overseas semiconductor companies, including over 50 semiconductor industry giants from the United States, Germany, South Korea, Japan and others. These companies engage in vertical integration, covering design, manufacturing, packaging, testing and sales as integrated device manufactures (IDMs).

An open economy and favourable policies have deeply integrated Malaysia's semiconductor industry into the global value chain. When looking at the IV indicator

[6] Petroleum oils and oils from bituminous minerals, not crude; preparations n.e.c, containing by weight 70% or more of petroleum oils or oils from bituminous minerals; these being the basic constituents of the preparations; waste oils.

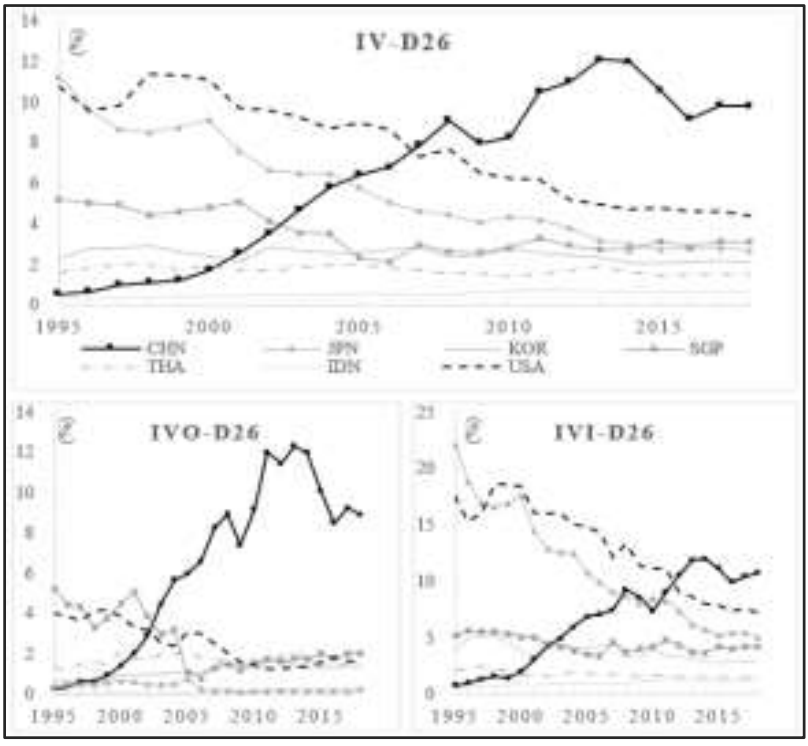

Figure 8. Value-added interactions between Malaysia and 7 countries in D26 sector

(Figure 8), the slow decline of the United States and Japan contrasts sharply with China's steady improvement. China has consistently led in terms of value-added interaction with Malaysia since surpassing Japan and the United States in 2004 and 2007, respectively. China and the United States' influence on Malaysia's D26 industry can be further confirmed through Malaysia's trade data for electronic and electrical goods. UN Comtrade data shows that in 2020, Malaysia's exports of semiconductors and integrated circuits to China reached $10.09 billion, more than twice the exports to the United States ($4.49 billion), with exports to China and the United States accounting for 17.7% and 7.9%, respectively, of Malaysia's total semiconductor exports.

IVO-D26 reveals that China holds an overwhelmingly dominant position as a value-added buyer for Malaysia. For instance, in semiconductor-related products, China's buyer power is reflected in its downstream position in Malaysia's semiconductor supply chain, primarily importing semiconductor components that have undergone testing and packaging in Malaysia. In contrast, the value-added interaction between the United States and Japan with Malaysia is primarily driven by their exports to Malaysia, indicating that these two countries are positioned upstream in Malaysia's semiconductor supply chain, exporting semiconductor wafers, key semiconductor production equipment/materials, optical components, and other items where they hold technological dominance to Malaysia.

4.3 Discussion

Based on the empirical findings above, we can draw three implications. Firstly, Malaysia's value-added power within the RCEP trade network has been consistently declining over the years. Its importance as an importer of value added is far greater than its significance as an exporter of value added. This suggests that Malaysia's domestic demand remains robust, but it also indicates a relative decline in Malaysia's capacity to provide value added compared to other countries. The coexistence of high GVC participation index and low GVC position index implies that while Malaysia is highly integrated into the global production network, its export trade has been primarily focused on lower value-added production stages, with a clear trend towards downstream participation in the global value chain. The international competitiveness of high-tech manufacturing sectors, represented by electronics and electrical appliances, has gradually declined during the observation period. Export trade, centred on primary processing intermediate products, still relies on importing countries for deep processing.

Technological progress has been proven to provide continuous endogenous motivation for industrialisation and economic development in developing countries (Romer, 1986; Schumpeter, 1939). Insufficient capacity for independent innovation has led to Malaysia's industry structure characterised by a focus on downstream activities and a neglect of upstream activities (Rasiah, 2011). In the 1970s, Malaysia prioritised the development of labour-intensive industries for national industrialisation. From the 1980s to the mid-1990s, the manufacturing sector experienced rapid growth driven by factors and investments. In the latter half of the 1990s, as international trade conditions worsened, and domestic production costs increased, Malaysia's economic growth slowed. The inability to achieve technological breakthroughs led Malaysia to shift towards developing services, such as finance, following a period of "deindustrialisation," which resulted in the hollowing out of the industrial sector. Malaysia, with its abundant natural resources, did not have a pressing need for technological upgrading in manufacturing. The manufacturing sector has long relied on technology transfers from multinational companies, with limited local spillover effects (Zhang & Yang, 2022). Additionally, factors such as the brain drain caused by affirmative action policies have hindered Malaysia from transitioning from factor- and investment-driven economic growth to innovation- and wealth-driven transformation (Lee, 2012), keeping it trapped in the middle-income trap and making it difficult to transition to a high-income country (Woo, 2009).

Secondly, trade in value added within RCEP network constitutes a significant part of Malaysia's participation in the global value chain, which provides empirical support for Malaysia's active engagement in RCEP. However, Malaysia's overall value-added power within the trade network of RCEP is relatively modest, and its power as an importer of value added has been declining over the years. This directly diminishes the country's importance within the RCEP network. It indicates that changes in Malaysia's economic policies or trade behaviours can have a diminishing impact on the value added generated by other countries in the network.

The continuous decline of Malaysia's value-added power within the RCEP network prompts us to reconsider the role of government in developing countries. Since its establishment in 1963, the Malaysian government has maintained sustained

economic growth by actively attracting foreign investments and signing various regional trade agreements to maintain an outward-oriented economy. It has played the role of promoter and overseer of the GVC through the use of industrial policies, trade policies and other tools (Horner & Alford, 2019). However, unless domestic institutional arrangements can provide incentives and safeguards for local innovation while maintaining economic openness, an outward-oriented economic policy does not necessarily enhance the core competitiveness of local enterprises. Instead, it may have negative impacts on national industries and infant industries (Nelson & Winter, 1985; North, 1991). Traditional analyses of developing countries have focused on domestic structures, emphasising the role of the government in coordinating domestic business relationships, formulating industrial policies, and other domestic variables, while neglecting the significance of "external forces" in a globalisation context (Johnson, 1982; Pempel, 2021). In the current trend of increasing globalisation, the examination of a country's economic development process must take external influences into account. In practice, governments need to stay adaptable, make precise development strategy adjustments, and choose policy tools at the national and sectoral levels based on the actual participation of local enterprises in the global value chain. Efforts to improve the position in the value chain should be specific to technological innovation, production transformation and upgrading within industries (Gereffi & Luo, 2014).

Thirdly, structural power, characterised by value-added power and value-added interactions, can provide a new explanatory path for a country's foreign policy decision-making and implementation. The structural power inherent in the value chain is more influential than "relational power" in maintaining the international system post-hegemony and shaping international relations. Taking the example of China–Malaysia relation, over the past two decades, the value-added interaction between the two countries has shown a stable growth trend, with China maintaining an absolute leading position in Malaysia's manufacturing industry and the vast majority of sectoral levels. While China's starting point in value-added interaction with Malaysia was relatively low and lagged behind major developed countries such as the United States and Japan in the 1990s, it managed to catch up over the next ten years. The fluctuation in structural power between China and the United States in Malaysia's value-added interaction explains Malaysia's diplomatic strategy shifting from "lean" towards "balanced". This change is driven by considerations of national interests and power status. Practical implications from this study provide a foundational economic logic for Malaysia's foreign policy choices from the perspective of the global value chain.

As a developing country follower, China has broken away from its peripheral position in international division of labour, as evidenced in the production network of RCEP. China's development, coupled with the relative decline of Japan, has accelerated the decline of the previously dominant "flying geese model" with Japan at the forefront. Changes in the balance of power between countries and strategic interactions will have profound implications for the East Asian regional order. Malaysia's experience reflects the overall decline in the influence of Western powers led by the United States in Southeast Asia, echoing the general trend of the global value-added network shifting from "unipolarity" to "multipolarity" and the "eastward rise, western decline" of international economic and trade centres" (Pang & He, 2021).

5. Conclusions

In contemporary production relations, structural power characterised by value-added position and interdependence has become an important factor in the composition and nature of international relations. In this paper, we construct two indicators, namely power of value added (PV) and interaction of value added (IV), and use OECD-TiVA data from 1995 to 2018 to measure the structural power of Malaysia in the global value chain. The results offer three important recommendations.

Firstly, trade in value added facilitated by the RCEP network of countries constitutes the main content of Malaysia's participation in the global value chain. However, Malaysia's overall value-added position within the RCEP network is moderate and has been declining year by year, which to some extent reflects Malaysia's value-added dependence on other countries, making the country structurally vulnerable in the global value chain. The Malaysian government should focus on stimulating industrial upgrading to strengthen its control of the value chains. This can be achieved by increasing investments in education and training, human capital and R&D. In doing so, Malaysia should seize the opportunity to accelerate her firms' integration into the global supply chains, and upgrading its appropriation of value added among the RCEP countries to take advantage of disruptions caused by the COVID-19 pandemic, as well as the Russia-Ukraine conflicts.

Secondly, since the 1990s, China's structural power over Malaysia has continued to rise, which arrived at an absolute leading position in value-added interaction with Malaysia's manufacturing and other key sectors. Malaysia should strategise to transform its structural power over China into a form of influence, to promote social interaction processes with China and other RCEP countries through institution building, while constructing an international relations sphere beneficial to Malaysia that is secure and favourable for its peaceful development.

Thirdly, the fluctuation of structural power between China and the United States over Malaysia confirms the overall trend of the global value-added network shifting from unipolarity to multipolarity. In the current changing international order, the structural power inherent in the global value chain has profound implications for the restructuring of the international landscape and the direction of foreign relations between the RCEP countries. Traditional high politics, characterised by military and security issues, is no longer the sole defining variable in international relations. Instead, structural power characterised by dominance in value added and dependence plays an increasingly important role in determining competitiveness. Malaysia should grasp the mechanisms and patterns of evolution of the global value chain to strategically gain upgrading to enjoy stronger structural power in the value chains, though technological upgrading is the path to such an achievement. In this unprecedented era of change, Malaysia should seize the development opportunities emerging to strengthen the quality and resilience of its industrial value chain cooperation with the RCEP countries, construct a secure and stable regional value chain, and improve the autonomy, controllability, as well as the modernisation of its industrial chain.

While this article took a global value chain perspective to examine the role of structural power in international relations with a focus on Malaysia, future research can further explore the potential for integrating structural power theory into the study

of global value chains. It requires multidisciplinary endeavours to incorporate the GVC framework, research methods and analytical tools into the field of international political economy. While traditional economics has extensively studied international production, trade and investment, it is essential for researchers to meanwhile pay their attention to non-trade structures such as security, finance and knowledge networks that underpin structural power. Also, empirical research in this area can benefit from cross-validation using multiple sources and databases such as UNCTAD-Eora and ADB-MRIO. Last but not least, including discussion on FDI and its linkages to structural power can greatly deepen our understanding on this issue.

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Appendix

Leontief Decomposition and Value-added Traceability

Global traceability of the value added in a country's total exports requires Leontief decomposition of the inter-country input-output table. Transnational input-output tables are derived from basic input-output tables and cover international division of labour and cooperation at the national level or country-sector level, thus becoming a main tool for systematically examining global value chains (UNCTAD, 2013b). In the basic non-import competitive input-output table, X represents the total output matrix, which is equal to the sum of intermediate demand and final demand on line items, and equal to the sum of intermediate inputs (intermediate consumption) and initial input (value added) on column items. As shown in Table 3, in the simplified input-output table, y_{ij} represents the final product produced in country i and consumed in country j, which can be broken down to the industry or product level as needed.

Table 3. Simplified input-output table of two countries

Input / Output		Intermediate use		Final demand		Gross output
		Country i Industry	Country j Industry	Country i Industry	Country j Industry	
Country i	Industry	x_{ii}	x_{ij}	y_{ii}	y_{ij}	X_i
Country j	Industry	x_{ji}	x_{jj}	y_{ji}	y_{jj}	X_j
Value added		V_i	V_j			
Gross input		X_i	X_j			

Source: UNCTAD (2013a).

When analysing the input-output table mentioned above, the input-output coefficient matrix A is introduced, and AX represents intermediate demand. In other words, AX reflects the intermediate inputs required by different sectors or industries in the economy. The element a_{ij} is calculated as $a_{ij} = \frac{x_{ij}}{x_j}$, where: x_{ij} is the value of country i that is being consumed by country j's production, x_j is the total input of country j, a_{ij} reflects the intermediate goods from country i that needs to be input for one unit of total output in country j. Y is the final demand matrix; we can certify AX + Y = X in a line direction, and there is $X = (I - A)^{-1}Y$. Let $B = (I - A)^{-1}$, then X = BY, where B is the Leontief inverse matrix, also called as the fully required coefficient matrix; the element b_{ij} reflects the total output from country i required by country j to produce one unit of final product. In order to further reflect the value chain at the level of value added, we mark $\hat{V}$ as the value-added coefficient matrix, which represents the value added (initial input) ratio in total output, and $\hat{V}B$ is the value chain matrix (i.e., value-added share matrix), reflecting the value added obtained by country i participating in the production of per unit final product in country j.

We decompose the value added of national exports to obtain the inter-country value added network matrix T_V^{NN} (Table 4).[7] Line i represents the value-added output by country i, e.g. row 1 represents the value-added output by country 1 to itself (1) and other countries (2, …, N). Column j represents the value added of other countries included in exports of country j, such as column 1 represents the domestic value added and the value added of other countries contained in the exports of country 1, that is, the value-added contribution of the country 1 and other countries to the gross export value of country 1. Column j adds up to the total export of country j. When i = j, T_V^{ii} represents the domestic added value or domestic content in the export of country i. When i ≠ j, T_V^{ij} represents the added value that country i exports to country j, that is, the foreign added value or foreign content contained in the export of country j; and T_V^{ji} represents the added value exported by country j to country i, i.e., the added value absorbed by country i's exports from country j.

Table 4. Value added network for export decomposition

	Country 1	Country 2	Country 3	……	Country j	……	Country N
Country 1	T_V^{11}	T_V^{12}	T_V^{13}	……	T_V^{1j}	……	T_V^{1N}
Country 2	T_V^{11}	T_V^{22}	T_V^{23}	……	T_V^{2j}	……	T_V^{2N}
Country 3	T_V^{21}	T_V^{32}	T_V^{33}	……	T_V^{3j}	……	T_V^{3N}
……	……	……	……	……	……	……	……
Country i	T_V^{i1}	T_V^{i2}	T_V^{i3}	……	T_V^{ij}	……	T_V^{iN}
……	……	……	……	……	……	……	……
Country N	T_V^{n1}	T_V^{n2}	T_V^{n3}	……	T_V^{Nj}	……	T_V^{NN}

Source: UNCTAD (2013a).

[7] Let $\hat{V}$ represent the value-added coefficient matrix, and $\hat{V}B$ can be referred to as the value chain matrix or value-added share matrix. It reflects the value added that country i obtains from participating in the production of the final products of country j. When multiplied by the export matrix E, it yields T_V=$\hat{V}BE$. The ŶBE matrix, with dimensions NG×NG, is aggregated by country to create the N×N dimensional national value-added network connection matrix T_V^{NN}.