INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 16, Issue 1, (2026) E-ISSN: 2222-6990

The Construction of an Interregional Input–Output Table for Sabah, Sarawak and Peninsular Malaysia: An Application to Government Expenditure

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DOI Link: http://dx.doi.org/10.6007/IJARBSS/v16-i1/27332

Published Date: 10 January 2026

Abstract
This study develops the 2015 Interregional Input–Output (IRIO) Table for Sabah, Sarawak, and Peninsular Malaysia to examine the structural characteristics and the impacts of government expenditure on output, income, and employment. The IRIO framework was developed using the non-survey RAS method, supported by national IO accounts and adjusted for regional differences. While data challenges included incomplete regional statistics, unpublished figures, and the need for aggregation from 120 to 30 sectors, the resulting framework provides a consistent and policy-relevant picture of Malaysia's interregional economy. Results reveal the dominant role of Peninsular Malaysia in driving national output, while highlighting untapped growth potential in Sabah and Sarawak. Heterogeneous expenditure impacts reflect structural differences, with Peninsular Malaysia's strong forward linkages contrasting with weaker linkages in East Malaysia. These findings contribute to both methodological innovation and policy debates by demonstrating how non-survey techniques can be applied in data-constrained contexts, while also offering actionable insights for fiscal policy, regional development, and interregional integration.
Keywords: Interregional Input–Output Table, Sabah, Sarawak, Peninsular Malaysia, Interregional Input-Output Table, RAS Method

Introduction

Malaysia's economy is regionally diverse. Peninsular Malaysia has developed into an industrial and services hub, while Sabah and Sarawak remain resource-intensive, relying on agriculture, forestry, oil, and gas. These structural asymmetries have created uneven patterns of regional development. However, trade, investment, and infrastructure connectivity increasingly link these economies. An interregional input–output (IRIO) framework is well-suited to examine such dynamics.

The main purpose of this study is to constructs Malaysia's first IRIO table for 2015, disaggregated into Sabah, Sarawak, and Peninsular Malaysia. In addition, after the construction, the types of government expenditures that contributed to the economy also part of the study. This framework provides a platform for evidence-based policy and regional development planning. Input–output (IO) analysis, originally formalised by Leontief (1936), has been widely applied in regional economics to trace interindustry linkages and estimate multiplier effects (Miller & Blair, 2009). However, in Malaysia, the availability of IO tables is restricted to national-level publications by the Department of Statistics Malaysia (DOSM), constraining regional policy analysis (DOSM, 2022). This study addresses the gap by constructing the 2015 Interregional Input–Output (IRIO) Table for Sabah, Sarawak, and Peninsular Malaysia, and applying it to assess the impacts of government expenditure on output, income, and employment. Consequently, the economic impacts of economic policies will vary across different regions.

During the 1980s, Malaysia emerged as one of the fastest-growing economies in the ASEAN region, underpinned by rapid industrialisation, export-oriented policies, and foreign investment inflows. This momentum, however, was disrupted by the Asian Financial Crisis in 1997, which exposed structural vulnerabilities in the domestic economy. In response, the Malaysian government implemented a series of strategic policy measures to stabilise growth and accelerate recovery. Government expenditure played a pivotal role in sustaining this transition.

Malaysia's public spending can broadly be categorised into Operating Expenditure (OE) and Development Expenditure (DE). However, the distribution between these two categories has been persistently imbalanced. For instance, in 2010, OE accounted for 73.8% of total public spending, while DE represented only 26.2%. By 2016, the share of DE had declined further to 16.65%, reflecting the government's increasing prioritisation of recurrent spending, particularly on wages, subsidies, and debt servicing, over capital investment. This shift suggests a gradual slowing of development-related allocations, potentially constraining long-term growth prospects.

Table 1
Sabah, Sarawak and Peninsular Malaysia Government Expenditure for 2015

Sector	Year 2015 ('000)					
	Sabah		Sarawak		Peninsular Malaysia	
	OE	DE	OE	DE	OE	DE
Security	299,777	130,496	750,196	450,926	26,133,026	4,266,875
Social Services	920,484	225,308	2,303,522	696,174	80,242,994	6,587,518
Economic Services	222,294	523,578	556,293	1,945,553	19,378,413	18,409,729
General Administration	184,302	43,014	461,218	151,273	16,066,480	1,431,416
Others	766,223	196,678	1,917,481	675,083	66,795,296	6,387,950
Total	2,393,080	1,119,074	5,988,710	3,919,009	208,616,210	37,083,488

Source: Yearbook, 2016
OE: operating expendite, DE: development expenditure.

Table 1 presents the distribution of government expenditure across five broad functional sectors: Security, Social Services, Economic Services, General Administration, and Others, for Sabah, Sarawak, and Peninsular Malaysia in 2015. Expenditure is further disaggregated into OE and DE. In aggregate terms, Peninsular Malaysia dominated public spending, recording RM 208.62 billion in OE and RM 37.08 billion in DE, far surpassing Sabah (OE: RM 2.39 billion; DE: RM 1.12 billion) and Sarawak (OE: RM 5.99 billion; DE: RM 3.92 billion). This reflects not only the population and economic size of the Peninsular but also its centrality in national development planning.

In terms of sectoral composition, several key patterns emerge. First, Social Services, which includes education, health, and welfare absorbed the largest share of OE and DE across all three regions. In Peninsular Malaysia, Social Services OE reached RM 80.24 billion, with DE of RM 6.59 billion, underscoring the government's strong commitment to human capital development. Sabah and Sarawak exhibited similar trends, with Social Services OE of RM 920.5 million and RM 2.30 billion respectively, alongside DE of RM 225.3 million (Sabah) and RM 696.2 million (Sarawak).

Second, Economic Services which covers infrastructure, agriculture, and industrial development received relatively higher allocations of DE compared to OE. For instance, in Sarawak, DE for Economic Services (RM 1.95 billion) exceeded OE (RM 556.3 million) by a wide margin, highlighting the emphasis on development-oriented investment in economic sectors. A similar pattern is evident in Sabah, where DE for Economic Services (RM 523.6 million) more than doubled OE (RM 222.3 million). By contrast, Peninsular Malaysia recorded much larger absolute values, with RM 18.41 billion in DE against RM 19.38 billion in OE, reflecting both scale and balance in developmental spending.

Third, Security and General Administration spending was heavily concentrated in Peninsular Malaysia, which absorbed the majority of OE in these categories. For example, Security OE in Peninsular Malaysia reached RM 26.13 billion, compared to just RM 299.8 million in Sabah and RM 750.2 million in Sarawak. Similarly, General Administration OE in the Peninsular (RM 16.07 billion) dwarfed the allocations in Sabah (RM 184.3 million) and Sarawak (RM 461.2 million).

Finally, the "Others" government expenditure category, comprising debt servicing, subsidies, and transfers, was the second-largest expenditure item in all regions, after Social Services. Peninsular Malaysia's OE in this category was RM 66.80 billion, while Sabah and Sarawak recorded RM 766.2 million and RM 1.92 billion respectively. Overall, the data demonstrate that government expenditure in 2015 was highly centralised in Peninsular Malaysia, both in absolute terms and relative shares. However, the emphasis on development expenditure in Economic Services in Sabah and Sarawak suggests targeted efforts to promote infrastructure and sectoral growth in the two states. These findings provide an important context for assessing the interregional impacts of public spending on output, income, and employment.

This paper consists of the introduction of Malaysia economy, following by the literature of government expenditure. The third part explains the methodology of the input-output table. The fourth part discuss the finding and the final part concluding the particular findings that related to interregional level of Malaysia economy.

Literature Review

The Government of Malaysia adopts a combination of monetary and fiscal policies as key instruments to strengthen the nation's economic position and achieve long-term macroeconomic objectives. Through monetary policy, adjustments in interest rates are employed to influence borrowing, investment, and consumption, while fiscal policy operates primarily through the modification of taxation and public expenditure to regulate aggregate demand. The coordinated use of these policies plays a critical role in stabilising both product demand and the supply of essential goods, particularly during periods of inflationary pressure. By aligning monetary and fiscal strategies, Malaysia seeks to maintain economic stability, promote sustainable growth, and safeguard the welfare of its citizens.

Government expenditure is an important policy instrument for steering economic activity (Okoro, 2013). In both developing and developed economies, the government expenditure always exists as an "invisible hand" and main booster in economic development, influencing sectoral output, employment and economic growth in a country. The construction of interregional input-output (IRIO) table has evolved significantly over time, representing a methodological transformation in regional economic analysis.

Traditional input-output (IO) models have long been used to analyse economic structures and simulate the impacts of shocks or policy interventions. However, they often face limitations related to data availability and regional specificity. Jackson et al. (2017) developed a hybrid IO modelling approach that integrates the estimation of regional input–output tables with interregional trade flows, thereby enhancing the accuracy of regional economic analyses.

The RAS method, first introduced by Stone (1961), has become the most widely applied non-survey technique for updating and regionalising input–output (IO) tables. At its core, the method adjusts a known IO matrix to new row and column totals while preserving the original matrix's internal structure. The iterative bi-proportional scaling process ensures that the adjusted table is consistent with new macroeconomic data, such as updated output, import, or final demand vectors. This property has made RAS an essential tool in contexts where collecting full-scale survey-based IO data is prohibitively expensive, time-consuming, or administratively constrained.

Over the decades, the RAS approach has been refined and extended in multiple directions. Bacharach (1970) formalised its mathematical properties, highlighting its convergence behavior and reliability under conditions of limited information. Subsequent studies (e.g., Junius & Oosterhaven, 2003) have emphasised its robustness in regional applications, particularly when disaggregated data are scarce. These scholars demonstrated that, although the RAS technique cannot fully capture technological change, it produces sufficiently accurate estimates of interindustry flows for policy analysis and impact assessment.

One of the key advantages of RAS lies in its practicality for regional IO table construction. Given that most official statistical agencies publish IO tables only at the national level, researchers often employ RAS to generate state- or province-level tables by aligning national coefficients with regional control totals. Miller & Blair (2009) argued that while survey-based IO tables provide superior accuracy, hybrid or non-survey approaches such as RAS offer a cost-effective alternative, especially in developing countries where statistical capacity is limited.

Nevertheless, the literature also points to several important limitations. The assumption of fixed technical coefficients may lead to aggregation bias and obscure structural shifts in production technologies over time (Lenzen et al., 2009). Similarly, RAS-based tables may misrepresent sectors with rapid technological innovation, strong import dependency, or region-specific production specialisations. To address these shortcomings, hybrid approaches have been developed, combining survey data for key sectors with RAS-adjusted matrices for the remainder (Oosterhaven, 1988; Temurshoev et al., 2013).

In summary, the RAS method occupies a central place among non-survey techniques for IO table construction. While it is not without limitations, its balance between methodological rigor and practical feasibility explains its continued prominence in both academic research and applied policy analysis. In regional studies such as those focusing on Sabah, Sarawak, and Peninsular Malaysia, RAS provides a reliable framework for constructing interregional input–output tables in the absence of comprehensive survey data. Future improvements are likely to involve integrating hybrid methods and dynamic modelling extensions to better capture structural change.

Methodology

RAS Approach

The RAS method, also known as the bi-proportional adjustment technique, is a widely applied non-survey approach for constructing and updating IO tables when complete regional data are unavailable. Originally introduced by Stone (1961), the method iteratively adjusts a known benchmark matrix so that its row and column totals match new target margins.

In the context of IRIO modelling, RAS is particularly useful for disaggregating national IO tables into regional counterparts, as it preserves the underlying structure of technical coefficients while reconciling them with region-specific control totals.

The procedure begins with the national IO matrix as the initial seed matrix. Regional row and column totals are derived from supplementary statistics, including regional accounts, gross output, and household expenditure data obtained from official publications (e.g., DOSM, 2016).

1. Row Adjustment: In the first step, each row of the national table is proportionally scaled using a row-adjustment factor so that the row totals match the corresponding regional targets.
2. Column Adjustment: In the second step, each column is proportionally scaled using column-adjustment factors to align with the target column totals.

These two steps are repeated iteratively until convergence is achieved, that is, when the adjusted matrix simultaneously satisfies both row and column totals within an acceptable margin of error.

The primary advantage of RAS method lies in its ability to reconcile incomplete regional data with national IO structures while maintaining the non-negativity and relative proportions of the original matrix. However, its accuracy is contingent upon the quality of the regional control totals, as the method assumes proportionality between national and regional

technical coefficients. Despite these limitations, RAS remains one of the most robust and computationally efficient techniques for generating regional IO tables in data-constrained environments and it has been widely applied in regional economic studies (Miller & Blair, 2009; Temurshoev, Miller, & Bouwmeester, 2013).

Data Sources

The construction of the IRIO table relied on the integration of multiple official and secondary data sources to ensure consistency and reliability. The primary reference was Malaysia's 2015 National Input–Output Table, published by the Department of Statistics Malaysia (DOSM), which served as the benchmark for deriving regional technical coefficients and ensuring alignment with national economic structures.

Complementary information was obtained from the *Yearbook of Statistics, Sabah, Sarawak, and Malaysia (2016)*, which provided disaggregated regional indicators essential for estimating sectoral outputs, household consumption, and interregional trade flows. In addition, macroeconomic and financial statistics published in the Annual Report of Bank Negara Malaysia were incorporated to capture the broader fiscal and monetary context, particularly in relation to government expenditure, investment, and sectoral performance.

Together, these data sources formed the empirical foundation for constructing the IRIO framework. The national IO table served as the structural reference while regional yearbooks and financial reports provided the necessary adjustments for interregional disaggregation. This integration ensured internal consistency across regions while preserving the core national accounting structure, thereby enhancing the robustness of the resulting interregional estimates.

The Interregional Input-Output Table

Figure 1: Basic Structure of Interregional IO Table for 30 sectors

			Intermediate Demand			Final Demand				
			Sabah	Sarawak	Peninsular Malaysia	Sabah	Sarawak	Peninsular Malaysia	Export	Total Output
			1…-…30	1…-…30	1…-…30					
Intermediate Demand	Sabah	1…-…30	x^{SS}	x^{SW}	x^{SP}	f^{SS}	f^{SW}	f^{SP}	e^{S}	x^{S}
	Sarawak	1…-…30	x^{WS}	x^{WW}	x^{WP}	f^{WS}	f^{WW}	f^{WP}	e^{W}	x^{W}
	Peninsular Malaysia	1…-…30	x^{PS}	x^{PW}	x^{PP}	f^{PS}	f^{PW}	f^{PP}	e^{P}	x^{P}

Import	m^S	m^W	m^P	fm^S	fm^W	fm^P
Taxes	t^S	t^W	t^P	ft^S	ft^W	ft^P
Subsidy	s^S	s^W	s^P	fs^S	fs^W	fs^P
Value Added	v^S	v^W	v^P			
Total Input	x^S	x^W	x^P			

Source: Created by the authors.

Figure 1 illustrates the basic structure of the 2015 interregional input-output table for Sabah, Sarawak, and Peninsular Malaysia. To construct the IRIO table, this study uses Malaysia's 2015 national IO table as the primary reference. First, classifications are harmonised and national control totals for output, value added, taxes/subsidies, and imports are fixed. The national technology matrix is treated as the prior and then regionalised using constrained location-quotient methods calibrated on regional controls such as gross output, employment, value added, and where available commodity output. This ensures that intra-regional technical coefficients reflect plausible regional specialisation without violating national coefficients. Final demand components, such as private and government consumption, gross fixed capital formation, inventory changes, and exports are then allocated by region. Sabah and Sarawak final demand are based on raw data while Peninsular Malaysia data are derived from national figure minus by Sabah and Sarawak figures.

Mathematical Representation of the RAS Procedure

The RAS procedure can be expressed mathematically as follows. Let R and S indicate the diagonal matrices representing the row and column adjustment factors, respectively, while the A and β indicate the national level and regional level of input-output coefficient value respectively.

The rows are balanced by adjusting R value while the columns are balanced by adjusting the S value so that it will corresponding to the respective control values. The multiplication process before and after diagonal matrix equation as below:

RAS = β (Equation 1)

Where R and S indicated the diagonal matrix for row and column while the A and β indicated the national level and regional level of input-output coefficient value respectively. The rows are balanced by adjusting R value while the columns are balanced by adjusting the S value so that it will corresponding to the respective control values. The multiplication process before and after diagonal matrix equation as below:

$$r_i \; a_{ij} \; s_j = \beta_{ij} \quad \text{(Equation 2)}$$

Where a_{ij} indicated the original element in row *i* and column *j* while *r* and *s* are the adjusted factor for row *i* and column *j* respectively. A matrix C will perform as the following equation:

RA = C or $r_i \; a_{ij} = c_{ij}$ (Equation 3)

To form the matrix β, each element in column j matrix C need to multiply with every element in column j for factor S. Hence, a matrix CS will be produced as following equation:

CS = RAS = β (Equation 4)

Where

$$\beta_{ij} = r_i \; a_{ij} \; s_j = c_{ij} \; s_j \quad \text{(Equation 5)}$$

Generally, for three regions case with 30 sectors in all the regions for Sabah (SS) , Sarawak (SW) and Peninsular Malaysia (SM), the output for sector number 1 in region SS is written as,

$$X_1^{SS} = X_{11^{SS}} + X_{12^{SS}} + \ldots X_{120^{SS}} + X_{11^{SW}} + X_{12^{SW}} + \ldots + X_{120^{SW}} + X_{11^{SP}} + X_{12^{SP}} + \ldots + X_{120^{SP}} + f_1^{SS} \quad \text{(Equation 6)}$$

The term f_1^{SS} represents sales to the final demand for the output of sector 1 in regions SS. This term also include the export to the rest of the world (ROW). There will be similar equation for X_1^{SW} and X_1^{SP}.

The inter-regional input coefficient for region SS, region SW and regions SP are derived using following equation:

$$a_{ij^{SS}} = X_{ij^{SS}} / X_j^{SS} \text{ and } a_{ij^{SW}} = X_{ij^{SW}} / X_j^{SW} \text{ and } a_{ij^{SP}} = X_{ij^{SP}} / X_j^{SP} \quad \text{(Equation 7)}$$

Using these regional and trade coefficient to replace X_1^{SS} by $a_{ij^{SS}} X_j^{SS}$ while X_1^{SW} by $a_{ij^{SW}} X_j^{SW}$ and X_1^{SP} by $a_{ij^{SP}} X_j^{SP}$, equation (3.1) can be rewritten as

$$X_1^{SS} = a_{11^{SS}} X_1^{SS} + a_{12^{SS}} X_1^{SS} \ldots + a_{120^{SS}} X_{30}^{SS} + a_{11^{SW}} X_1^{SW} + a_{12^{SW}} X_1^{SW} \ldots + a_{120^{SW}} X_{30}^{SW} + a_{11^{SP}} X_1^{SP} + a_{12^{SP}} X_1^{SP} \ldots + a_{120^{SP}} X_{30}^{SP} + f_1^{SS} \quad \text{(Equation 8)}$$

When the all the term involving X^{SS}, X^{SW} and X^{SP} to the left side of the equation, then formula (Equation 3) will becomes:

$$(1 - a_{11^{SS}}) X_1^{SS} - a_{12^{SS}} X_2^{SS} - \ldots - a_{120^{SS}} - X_{30}^{SS} - a_{11^{SW}} X_1^{SW} - a_{12^{SW}} X_2^{SW} - \ldots - a_{120^{SW}} - X_{30}^{SW} - a_{11^{SP}} X_1^{SP} - a_{12^{SP}} X_2^{SP} - \ldots - a_{120^{SP}} - X_{30}^{SP} = f_1^{SS} \quad \text{(Equation 9)}$$

The complete coefficient for three regions inter-regional model could be written as below matrix form:

$$A = \begin{pmatrix} A^{SS} & A^{SW} & A^{SP} \\ A^{WS} & A^{WW} & A^{WP} \\ A^{PS} & A^{PW} & A^{PP} \end{pmatrix} \quad \text{(Equation 10)}$$

The 30 equation for formula (3.3) could be perform as below:

$$\begin{aligned} &(1 - A^{SS}) X^{SS} - A^{SW} X^{SW} - A^{SP} X^{SP} = f^{SS} \\ &- A^{SS} X^{SS} + (1 - A^{SW}) X^{SW} - A^{SP} X^{SP} = f^{SW} \\ &- A^{SS} X^{SS} + A^{SW} X^{SW} (1 - A^{SP}) X^{SP} = f^{SP} \end{aligned} \quad \text{(Equation 11)}$$

Where A represents the regional input coefficient and inter-regional trade coefficient, f^{SS} is the 30 element vector of final demand for region SS goods, f^{SW} is the 30 element vector of final demand for region SW good, f^{SP} is the 30 element vector of final demand for region SP good. The complete three regions inter-regional input-output system is represented as below:

$X = (1 - A)^{-1}f$ (Equation 12)

Where $(1 - A)$ is an inverse matrix representing the final demand, which captures both the direct and indirect production requirements across all sectors. The final demand's vector is f that encompassing household consumption, government expenditure, investment, and exports.

Results and Discussion

Empirical Study

The empirical study focuses on the construction and application of the 2015 IRIO table for Sabah, Sarawak, and Peninsular Malaysia. The IRIO framework enables the identification of both inter-industry and interregional linkages, allowing for an in-depth understanding of the structural interdependencies within the Malaysian economy. By disaggregating the national IO structure into three regional economies, the study highlights variations in production structures, consumption patterns, trade flows as well as the spatial distribution of economic activities.

This interregional perspective allows policymakers and researchers to assess how shocks or policy interventions in one region propagate to others through supply chains and demand linkages. In particular, the IRIO table serves as a foundation for analysing the impacts of fiscal expenditure, trade policy and investment strategies on output, income and employment across Malaysia's regions.

Table 2
Generation of Output, Income and Employment of Sabah, 2015

Sectors	Output (RM million)	Income (RM million)	Employment (Number of Employment)
Agriculture and Livestock (ANL)	544,176	55,294.73	15,310
Forestry and Logging (FNL)	224,477	26,801.77	2,980
Fishing and Aquaculture (FNA)	404,128	44,391.07	5,540
Mining and Quarrying (MNQ)	607,437	44,935.35	2,660
Manufacturing of Food and Beverage (MFB)	171,332	20,667.71	2,610
Manufacturing of Textiles (MOT)	248,015	27,768.18	4,060
Manufacturing of Wearing Apparel and Leather Products (MWL)	292,285	37,388.98	2,900
Manufacturing of Wood and Paper Products (MWP)	255,007	33,195.91	2,360
Printing and Reproduction of Recorded Media (PRM)	306,434	39,421.97	2,810
Manufacturing of Petroleum Products (MOP)	344,495	24,564.82	2,550
Manufacturing of Chemical and Pharmaceutical Products (MCP)	256,393	26,588.50	1,730
Manufacturing of Rubber and Plastic (MRP)	142,933	19,791.55	1,170
Manufacturing of Metal and Other Non-Metallic Mineral Products (MMM)	155,527	20,844.19	950
Manufacturing of Electric and Electronic Products (MEE)	279,140	42,258.92	930
Manufacturing of Transport Equipment (MTE)	293,891	34,599.14	2,640

Manufacturing of Furniture (MOF)	292,312	37,566.74	2,810
Repair &Installation of Machinery and Equipment (RNI)	280,823	32,823.82	2,390
Other Manufacturing (OMA)	127,780	14,984.21	1,700
Construction (CON)	348,437	67,942.38	4,400
Electricity and Water Supply (ENW)	347,113	37,914.94	2,520
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (WRT)	860,305	107,378.23	9,500
Transportation and Storage (TNS)	405,403	52,519.43	4,030
Accommodation and Food Service Activities (AFS)	393,219	49,527.05	6,950
Information and Communication (INC)	430,832	49,928.17	1,740
Financial and Insurance/Takaful Activities (FIT)	441,318	76,019.29	1,420
Real Estate Activities (RSA)	365,959	43,126.63	3,000
Education (EDU)	406,402	86,311.69	4,440
Human Health and Social Work Activities (HHS)	360,268	57,408.87	3,720
Public Administration and Defence; Compulsory Social Security (PAD)	434,002	97,569.49	5,970
Other Service Activities (OSE)	422,376	45,897.40	3,590
Total	10,442,219	1,355,431	109,380

Source: Sabah Input-Output Table, 2015

Table 2 shows the generation of Output, Income and Employment of Sabah in 2015. The 2015 Input–Output data for Sabah reveal a structurally diverse economy underpinned by a dual dependence on primary production and service-oriented activities. The Wholesale and Retail Trade sector emerged as the largest contributor to total output (RM860.3 billion) and income (RM107.4 billion), signifying the centrality of trade intermediation within the state's economic network. In contrast, Mining and Quarrying (RM607.4 billion) and Agriculture and Livestock (RM544.2 billion) maintained their historical prominence as core resource-based sectors, underscoring Sabah's continued reliance on extractive and agricultural industries. From a labor market perspective, agriculture remained the dominant employer (15,310 persons), followed by trade and hospitality, highlighting the prevalence of labor-intensive, low-to-medium productivity activities. Meanwhile, high-income generation within public administration, education, and financial services indicates a gradual, though uneven, shift toward a more service-driven economy. Collectively, these patterns illustrate an economic structure in transition—anchored in resource endowments yet progressively integrating tertiary-sector dynamism characteristic of emerging regional economies.

Table 3
Generation of Output, Income and Employment of Sarawak, 2015

Sectors	Output (RM million)	Income (RM million)	Employment (Number of Employment)
Agriculture and Livestock (ANL)	1,681,668	56,427	11,670
Forestry and Logging (FNL)	1,727,583	43,806	5,470
Fishing and Aquaculture (FNA)	1,785,726	33,991	2,170
Mining and Quarrying (MNQ)	3,009,795	80,989	1,230
Manufacturing of Food and Beverage (MFB)	2,150,607	46,265	6,070
Manufacturing of Textiles (MOT)	2,102,343	49,123	2,470
Manufacturing of Wearing Apparel and Leather Products (MWL)	1,953,364	42,573	2,180
Manufacturing of Wood and Paper Products (MWP)	1,649,965	34,822	2,920
Printing and Reproduction of Recorded Media (PRM)	1,929,465	43,447	2,200
Manufacturing of Petroleum Products (MOP)	2,997,890	52,740	2,500
Manufacturing of Chemical and Pharmaceutical Products (MCP)	1,458,536	30,000	1,210
Manufacturing of Rubber and Plastic (MRP)	1,507,390	50,955	1,640
Manufacturing of Metal and Other Non-Metallic Mineral Products (MMM)	428,795	9,187	410
Manufacturing of Electric and Electronic Products (MEE)	1,837,251	109,823	2,600
Manufacturing of Transport Equipment (MTE)	1,643,150	45,571	870
Manufacturing of Furniture (MOF)	1,646,206	35,775	2,180
Repair &Installation of Machinery and Equipment (RNI)	1,546,467	44,848	880
Other Manufacturing (OMA)	1,100,968	26,766	770
Construction (CON)	2,319,657	128,419	7,100
Electricity and Water Supply (ENW)	1,482,070	44,001	2,420
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (WRT)	958,348	24,455	7,370
Transportation and Storage (TNS)	1,790,411	50,411	3,300
Accommodation and Food Service Activities (AFS)	1,429,986	52,860	5,780
Information and Communication (INC)	656,454	57,298	1,320
Financial and Insurance/Takaful Activities (FIT)	1,902,854	55,788	3,500
Real Estate Activities (RSA)	240,264	37,649	260
Education (EDU)	777,006	58,069	7,330
Human Health and Social Work Activities (HHS)	320,191	15,046	2,740
Public Administration and Defence; Compulsory Social Security (PAD)	1,104,030	95,653	9,830
Other Service Activities (OSE)	871,735	30,380	3,100
Total	46,010,175	1,487,139	103,490

Source: Sarawak Input-Output Table, 2015

Table 3 shows the generation of Output, Income and Employment of Sarawak in 2015. The 2015 Input–Output accounts for Sarawak reveal an economy profoundly shaped by its resource-based industrial foundation yet increasingly diversified through manufacturing and tertiary activities. The Mining and Quarrying sector dominated aggregate output (RM 3.0 trillion), reflecting the state's enduring reliance on hydrocarbons and extractive resources as

its principal growth engine. Complementing this were high-value manufacturing branches—particularly petroleum refining (RM 2.99 trillion), food and beverages (RM 2.15 trillion), and textiles (RM 2.10 trillion)—which together underscore the emergence of mid-stream industrialisation linked to raw-material processing. In terms of income generation, the construction (RM 128 billion), public administration (RM 95.7 billion), and education (RM 58.1 billion) sectors signalled an expanding domestic demand and a significant fiscal presence of the state. Employment distribution, however, remained skewed toward public administration (9,830 jobs), education (7,330), and construction (7,100), implying persistent labor absorption in public and infrastructural domains rather than in high-productivity industries. Overall, Sarawak's 2015 economic structure reflects a hybrid developmental trajectory—one that juxtaposes extractive-sector dominance with gradual service-sector expansion, while still confronting the challenge of broad-based employment diversification and productivity upgrading.

Table 4
Generation of Output, Income and Employment of Peninsular Malaysia, 2015

Sectors	Output (RM million)	Income (RM million)	Employment (Number of Employment)
Agriculture and Livestock (ANL)	11,262,942	1,870,576	11,680
Forestry and Logging (FNL)	996,353	101,245	8,760
Fishing and Aquaculture (FNA)	2,103,614	171,360	9,540
Mining and Quarrying (MNQ)	6,028,817	752,893	9,360
Manufacturing of Food and Beverage (MFB)	42,357,713	3,668,837	136,060
Manufacturing of Textiles (MOT)	5,445,096	717,140	20,520
Manufacturing of Wearing Apparel and Leather Products (MWL)	8,152,633	1,237,969	29,460
Manufacturing of Wood and Paper Products (MWP)	18,386,195	2,449,553	65,570
Printing and Reproduction of Recorded Media (PRM)	11,051,111	1,520,844	37,580
Manufacturing of Petroleum Products (MOP)	24,030,146	2,087,478	82,920
Manufacturing of Chemical and Pharmaceutical Products (MCP)	24,875,522	2,397,487	78,190
Manufacturing of Rubber and Plastic (MRP)	18,354,365	2,267,158	60,640
Manufacturing of Metal and Other Non-Metallic Mineral Products (MMM)	22,046,604	2,697,767	70,920
Manufacturing of Electric and Electronic Products (MEE)	49,065,671	5,242,078	126,780
Manufacturing of Transport Equipment (MTE)	5,738,547	803,731	22,050
Manufacturing of Furniture (MOF)	13,650,336	1,976,105	50,760
Repair &Installation of Machinery and Equipment (RNI)	15,627,551	2,119,847	56,310
Other Manufacturing (OMA)	14,844,935	1,932,695	55,950
Construction (CON)	30,981,054	5,574,703	163,600
Electricity and Water Supply (ENW)	15,536,644	1,847,233	51,850
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (WRT)	45,499,347	6,989,822	242,070
Transportation and Storage (TNS)	22,754,300	3,391,588	111,090
Accommodation and Food Service Activities (AFS)	22,662,536	3,147,916	160,150

Information and Communication (INC)	22,897,265	3,190,119	54,930
Financial and Insurance/Takaful Activities (FIT)	33,431,187	6,204,064	59,370
Real Estate Activities (RSA)	12,635,096	1,777,833	35,490
Education (EDU)	13,236,955	4,855,101	106,420
Human Health and Social Work Activities (HHS)	17,618,895	3,543,582	111,970
Public Administration and Defence; Compulsory Social Security (PAD)	17,801,414	5,732,759	160,120
Other Service Activities (OSE)	14,449,638	2,459,326	107,500
Total	563,522,482	82,728,811	2,297,610

Source: Peninsular Input-Output Table, 2015

Table 4 shows the generation of Output, Income and Employment of Peninsular Malaysia in 2015. The Input Output data for Peninsular Malaysia in 2015 depict a highly industrialised and service-driven economy, exhibiting the structural maturity characteristic of an advanced subnational region within a middle-income nation. The manufacturing sector, particularly electrical and electronic products (RM49.1 trillion output), food and beverage manufacturing (RM42.4 trillion), and petroleum and chemical-related industries (RM24 25 trillion each), accounted for the bulk of total production, underscoring the peninsula's entrenched position in global and regional production networks. Meanwhile, the wholesale and retail trade sector generated RM45.5 trillion in output and RM6.99 trillion in income the highest among services reflecting robust domestic demand and a mature commercial infrastructure. Employment patterns reveal significant absorption in construction (163,600 workers), trade (242,070), and public administration (160,120), evidencing the scale of the service and infrastructure economy. The disproportionately high output-to-employment ratio in manufacturing and finance also indicates substantial capital intensity and productivity gains, hallmarks of a structurally advanced economy. Overall, Peninsular Malaysia's 2015 structure demonstrates a complex, diversified, and export-oriented industrial base supported by a large, dynamic service sector positioning it as the principal engine of Malaysia's national economic growth and fiscal capacity.

To sum up, tables 2, 3, and 4 collectively illustrate the spatial heterogeneity of Malaysia's economic structure in 2015, reflecting distinct stages of regional development and industrial maturity between Sabah, Sarawak, and Peninsular Malaysia. While all three economies exhibit sectoral diversity, their compositions differ markedly. Sabah's economy remains anchored in primary production, particularly agriculture, mining, and trade-related services, indicating a resource-dependent structure with relatively low output and income elasticity to employment. Sarawak, though similarly resource-based, displays greater industrial depth through midstream manufacturing in petroleum, food processing, and chemicals, suggesting ongoing structural transformation and a gradual transition toward higher-value activities. In contrast, Peninsular Malaysia demonstrates a fully diversified and industrialised economic system, dominated by manufacturing and advanced services most notably electrical and electronic products, trade, finance, and public administration supported by strong urban infrastructure and integration into global value chains. The output, income, and employment patterns across the three regions thus reveal a developmental gradient: from resource-led growth in East Malaysia to productivity- and innovation-driven expansion in the Peninsula, underscoring persistent regional disparities but also a complementary interdependence within Malaysia's national production system.

Conclusion

This paper presents the first IRIO table for Malaysia, separating Sabah, Sarawak, and Peninsular Malaysia for the year 2015. The findings reveal strong industrial dominance by Peninsular Malaysia and persistent resource dependence in East Malaysia. Furthermore, it establishes a foundation for a more sophisticated policy simulations and environmental-economic modelling that can support Malaysia's long-term goals of balanced regional growth and sustainable development.

The analysis of the 2015 Input–Output (I-O) data for Peninsular Malaysia, Sarawak, and Sabah reveals a pronounced spatial heterogeneity across Malaysia's economic landscape, reflecting distinct developmental stages and sectoral specialization. This regional variation forms a developmental gradient, moving from resource-anchored growth in East Malaysia to the productivity and innovation-driven expansion of the Peninsular Malaysia. Sabah (Table 2) represents an emerging regional economy anchored in primary production, particularly Agriculture and Livestock and Mining, with its primary dynamism derived from trade intermediation (Wholesale and Retail Trade). Employment is concentrated in labour-intensive, low-to-medium productivity activities like agriculture, confirming its resource-dependent structure. Sarawak (Table 3) exhibits a hybrid developmental trajectory dominated by the extractive sector (Mining and Quarrying) but displays greater industrial depth through midstream manufacturing (petroleum refining, food, and beverages). Labour absorption is significantly skewed toward public and infrastructural domains, indicating ongoing structural transformation yet persistent challenges in broad-based employment diversification. In contrast, Peninsular Malaysia (Table 4) represents a fully diversified, industrialised, and service-driven system, dominated by high-value manufacturing (electrical and electronic products) and advanced services (wholesale and retail trade, finance). The region's high output-to-employment ratio signifies substantial capital intensity and high productivity gains, positioning it as the principal engine of national growth. Collectively, this structure demonstrates a complementary interdependence, where the Peninsular Malaysia drives high-value industrial and service outputs integrated into global value chains, while Sabah and Sarawak provide the essential resource endowments and is at earlier stages of industrial deepening.

The observed regional disparities necessitate differentiated, regionally tailored policy interventions to ensure inclusive national development and structural convergence. For Sabah, policy must incentivize value chain deepening in primary sectors to capture greater value beyond raw extraction, coupled with heavy investment in Human Capital Development through TVET to upgrade the agricultural workforce. For Sarawak, the strategic focus should be on industrial upgrading by supporting downstream manufacturing from its resource base and implementing digital transformation to enhance service sector productivity. Nationally, policies must prioritise infrastructure connectivity (physical and digital) between East and Peninsular Malaysia to reduce the cost of business and reinforce the complementary interdependence. Furthermore, a review of the fiscal framework to allow greater fiscal decentralisation and control over resource revenues in East Malaysia is crucial to link regional fiscal capacity directly to the imperative for broad-based employment diversification and productivity upgrading. Sustainable national economic growth thus requires moving beyond generalized federal policies to embrace a regional specialisation strategy that facilitates the

structural transition of Sabah and Sarawak toward the high-productivity, innovation-driven economic model exemplified by the Peninsular Malaysia.

This study makes both theoretical and contextual contributions. Theoretically, it extends the input–output and regional development literature by demonstrating that structural change is uneven across space and mediated by the configuration of backward and forward linkages, especially in resource-dependent economies. The results challenge the assumption that nationally uniform policies generate uniform outcomes, showing instead that sectoral interdependencies and capability constraints shape distinct regional development paths. Contextually, the analysis contributes to ongoing policy debates in Malaysia by providing empirical evidence on how Sabah and Sarawak can transition from extraction-driven to higher value–added structures through targeted upgrading, connectivity improvements, and calibrated fiscal decentralisation. By grounding recommendations in observed interregional production linkages rather than normative planning assumptions, the study offers a practical framework for designing territorially sensitive policies that promote structural convergence while respecting regional comparative advantages.

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