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Getting The Focus Right: Achieving the Targeted Compensation of Employees' Composition in Post-Mid-Term Review of the Twelfth Malaysia Plan

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ABSTRACT

The successful implementation of eleven Malaysia Plans in charting and navigating economic growth has seen the transformation of Malaysia from an agricultural economy to an industrialised one and subsequently into a services-based economy. However, despite the developmental progress, Malaysia's growth quality was highly debatable due to the lower implications of growth on the compensation of employees (COE) generation. In line with the mid-term review of the Twelfth Malaysia Plan (12MP), this study was structured to reassess the sectoral capacity towards supporting the achievement of 40% targeted COE composition. Applying the reassessment models developed based on the input-output modelling technique yields positive outcomes, with 19 sectors central to COE target achievement identified. The sectors were grounded based on three areas of potential that are capable of guiding policy decisions to improve the COE composition: (i) sectors that have achieved the 40% targeted COE composition with strong backward (BW) and forward (FW) linkages; (ii) sectors that have achieved the 40% targeted COE composition with strong BW or FW linkage; and (iii) sectors over 30% achieved COE composition with strong BW or FW linkage, or both.

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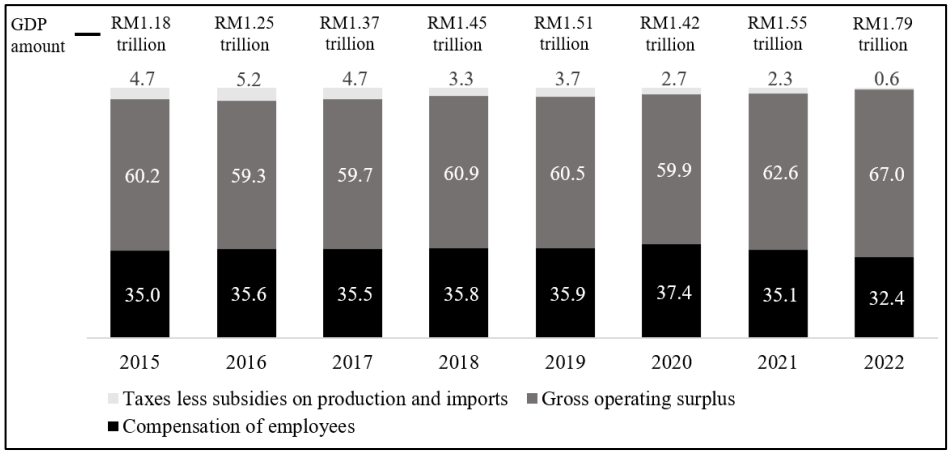
INTRODUCTION

Sixty-six years of development since the independence from the colonial master in 1957 have evidenced the successful implementation of eleven Malaysia Plans in charting and navigating Malaysia's economic growth. The success enabled Malaysia to transform from an agricultural economy to an industrialised one and subsequently into a services-based economy. From the policy perspective, the diversification approach in growth planning contributed significantly to the transformation outcomes, in addition to the impacts of key policy areas such as entrepreneurship, technology, investment, finance, and institutions (Briones and Felipe, 2013; Hill and Gochoco-Bautista, 2013).

However, despite the positive outcomes, Malaysia's growth quality was highly debatable due to the sluggish income growth[1] (see, for example, DOSM, 2023). Evident from the Department of Statistics Malaysia (DOSM) showed that the national income share hovered at rates lower than 38% between 2015-2022, implying that 1 *Ringgit* growth in the gross domestic product (GDP) contributed less than 38 cents to the compensation of employees (COE) (DOSM, 2023). The situation implies that capital owners enjoyed most of the growth benefits, with an average of 60% of the GDP recorded as the gross operating surplus (OS). Figure 1 provides an outlook for the COE and OS compositions in GDP between 2015-2022.



Notes: Computed based on current prices GDP for 2015-2022. GDP amounts in 2021 and 2022 are based on the estimated and preliminary values, respectively.

Source: DOSM (2023)

Figure 1 COE and OS compositions in GDP, 2015-2022 (percentage, %)

Marginal improvements in COE composition of less than 0.5% annually were recorded between 2015 and 2019, making the compositions comparably lower than the major Asian economies. For instance, the percentages for Japan, Singapore, South Korea and Taiwan were estimated between 42.8% and 52.7% in 2020 (DOSM, 2023). Although a slightly substantial improvement of 1.5% was registered in 2020, the overall sluggish growth proved detrimental, with Malaysia failing to achieve the projected COE share of 40% of the total GDP by the end period of the Eleventh Malaysia Plan (11MP) (EPU, 2015; 2021).

The 40% COE target extends into the 12MP but faces heightened challenges due to the changing local and global economic landscapes in the post-pandemic period. The growth results of the COE over the initial two years of the 12MP revealed a concerning trend, with growth rates of only 35.1% and 32.4%. These figures highlight a significant disparity between the achieved and targeted outcomes, which has expanded from a 4.9% difference in 2021 to a more substantial 7.6% gap in 2022. This widening gap is also notably larger compared to the end period of the 11MP, where the difference stood at a modest 2.9%.

Moving towards the end of 2023, the mid-term review was tabled to assess the performance of selected outcomes, targets, strategies and initiatives, as well as identify the way forward to address the arising issues. Complementing this effort, this study reassessed the sectoral capacity that encompasses the sectoral ability and strength towards supporting the achievement of targeted COE composition in the post-mid-term review

[1] This paper views income growth from the national account perspective, with specific attention given to the COE component.

period. Precisely, two scopes of capacities were highlighted: (i) the sectoral capacity to generate COE and (ii) the sectoral capacity to promote COE growth in other sectors. Overall, the reassessment models were developed based on the input-output modelling technique.

This study offered two novelty aspects in terms of scientific knowledge and policy insights. First, the study developed customised models to address the two scopes of capacities based on the content and linkages measures. Second, the study provided evidence-based insights into the sectors central to achieving the 40% COE target by synthesising the modelling application outcomes. Despite the fact that the overall exercises were structured based on the academic viewpoint, outcomes from this study are highly applicable in guiding policy decisions.

The presentation of this study is structured into five sections. Section 2 discusses the literature gaps to justify our contribution to the literature. Section 3 explains the methodological approach. Section 4 presents the main findings, and section 5 provides the concluding remarks.

LITERATURE REVIEW

Reviewing existing literature brings attention to two research gaps. First, multiplier and conventional linkages measures were commonly employed in the context of sectoral capacity reassessment. However, these measures are not appropriate in some cases, as the multiplier only informs the sectoral potential, while the conventional linkages only view the interdependencies aspect from input and output perspectives. Second, existing studies concerning the 12MP mainly concentrated on the plan content, with most focusing on topics under the Sustainable Development Goals (SDGs) scope. Hence, this study provided empirical contributions to the existing literature by effectively addressing the specified gaps.

In Malaysia, extensive literature has utilised multiplier and conventional linkages measures as the primary economic tools for assessing various aspects of development (for example, Akhir et al., 2018; Saari et al., 2015; Yen et al., 2015). For instance, Akhir et al. (2018) employed the multiplier measure to examine the economic contribution of the batik industry, while Yen et al. (2015) utilised a similar approach to assess the income and employment effects of the higher education sector. On the other hand, Saari et al. (2015) adopted the linkages measure to determine the sources of income growth and inequality across ethnic groups. A few other notable studies employing the measures include Hassan et al. (2017), Latiff et al. (2020) and Utit et al. (2021; 2022).

Although the studies have significantly contributed to the body of knowledge, several areas demand further methodological improvement. One pertinent area based on the current time setting includes the models' extension for assessing the achievements of the multidimensional targets of the 12MP (see, for example, KRI, 2008; Lenzen, 2003). For instance, to evaluate the achievement of the GDP growth target, measures such as content analysis must be utilised instead of the multiplier since the former informs the achieved growth, while the latter only apprise the growth potential. In addition, the linkages measure also needs to be extended accordingly. For example, evaluating the achievement of COE targets must be based on COE linkages instead of focusing only on the conventional, production-centric linkages.

The study conducted by Alejandro Cardenete and Sancho (2006) emphasised the need for model extensions, particularly for COE linkages. This is because the productive sector not only generates output but also distributes income among primary factors as a result of production. Echoing this outcome, Leung and Secrieru (2012), through their study on the real-financial linkages in the Canadian economy, also stressed the importance of the extension requirement to facilitate understanding of the interaction between macroeconomic and financial conditions during the 2007-2008 financial crisis. Beyond economic studies, the traditional work on linkages has also been extended to include environmental and natural resource parameters (Lenzen, 2003).

In relation to the existing 12MP studies, none was found to focus on topics related to the mid-term review. Recent studies showed that most of literature have focused on SDG issues, aligning with the global movement to promote a long-term approach to addressing global challenges (for example, Abdullah et al., 2022; Aun, 2021; Ito et al., 2022: Nalathambi et al., 2023). Taking Abdullah et al. (2022) as an example, the study delved into the prospective impacts of the 12MP on urban and regional development. Meanwhile, the studies by Aun (2021) and Ito et al. (2022) were primarily concerned with inequality. Pivoting their study to the educational perspective, Nalathambi et al. (2023) researched the efforts of Technical and Vocational

Education and Training (TVET) institutions, in particular, the Polytechnic, in supporting the move towards the SDGs under the 12MP.

Building upon the gaps, this study was structured to offer empirical contributions to the literature by addressing them. The following section outlined the methodological approach to achieve the study's objective.

METHODOLOGICAL APPROACH

The input-output modelling technique was utilised as the primary approach in this study due to its wide application for policy analysis. Such a perspective is vital, especially for a study that reassessed the sectoral capacity to generate COE and promote COE growth in other sectors. The two scopes of capacities can be viewed holistically in the input-output model, starting with the interdependencies perspective, as given in Equation (1).

$$\begin{gathered}\mathbf{x} = \mathbf{Zi} + (\mathbf{c} + \mathbf{s} + \mathbf{g} + \mathbf{e}) \\ \mathbf{x} = \mathbf{Zi} + \mathbf{f}\end{gathered} \tag{1}$$

where **x** is total output, **Z** denotes the intra- and intersectoral transactions in acquiring domestically produced intermediate inputs, **i** is a column vector of sector *n*, and **f** is the final demand vector, which consists of private consumption (**c**), investment (**s**), government consumption (**g**) and export (**e**). As a result, Equation (1) states that total output equals the sum of intermediate inputs plus final demand.

The model presents intermediate inputs as endogenous variables, whereas final demands are treated as exogenous variables. Equation (1) can be modified as follows to create a standard Leontief input-output model:

$$\begin{gathered}\mathbf{x} = \mathbf{Ax} + (\mathbf{c} + \mathbf{s} + \mathbf{g} + \mathbf{e}) \\ \mathbf{x} = \mathbf{Ax} + \mathbf{f}\end{gathered} \tag{2}$$

where **A** is the input-output coefficient matrix, which depicts the amount of input a sector buys from other sectors per unit of output. By adopting an *n*-sector economy with an intersectoral transaction matrix (**Z**) and sectoral total output vector (**x**), the input-output coefficient matrix can be expanded as follows:

$$\mathbf{A} = \mathbf{Z}\hat{\mathbf{x}}^{-\mathbf{1}} \tag{3}$$

where $\hat{\mathbf{x}}$ is the diagonalised matrix of **x** reflecting the intermediate purchase between sectors. Equation (2) can be represented as follows:

$$\mathbf{x} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{f} \tag{4}$$

where **I** is the identity matrix and $(\mathbf{I} - \mathbf{A})^{-1}$ is the Leontief inverse or multiplier matrix. The elements in this matrix reflect the total output impacts for any sector *j* to meet each unit of final demand.

3.1 COE Content in Value-Added

The measure for COE content in value-added was developed in the first part of the reassessment procedure to reassess the sectoral capacity in generating COE. In this case, the content not only measures the creation of COE per *Ringgit* of value-added but also tracks the changes in COE composition in GDP. Value-added was utilised to represent GDP in this model as the indicator accounted for 99% of Malaysia's GDP, while taxes less subsidies on production and imports only constituted about 1%.

The modelling approach for the COE content in value-added, **w** is as follows:

$$\mathbf{w} = \mathbf{uv}^{-\mathbf{1}} \tag{5}$$

where **u** denotes the COE amount and **v** is the sectoral value-added. Therefore, Equation (5) gives the measure for COE content in value-added.

3.2 COE Linkages Measures

Following the first part of the reassessment procedure, the COE linkages measures were developed to inform the sectoral capacity to promote COE growth in other sectors. Methodologically, the conventional linkages measures, which focus only on input and output perspectives, were extended for COE in this study to achieve the underlined objective. The measures were modelled using the normalised index to inform the backward (BW) and forward (FW) COE linkages. Precisely, BW linkage measures a sector's COE integration level with sectors that serve as its input supplier. In contrast, FW linkage measures the level of COE integration with sectors that act as output buyers.

BW is derived from the Leontief inverse matrix, while the FW is estimated from the Ghosh inverse matrix (see, for example, Lenzen, 2003). The derivation process, which was extended from Equation (4), can be explained through the following equations.

$$\boldsymbol{BW_i} = \left(\boldsymbol{(1/n)\sum_i l_{ij}} \Big/ \boldsymbol{(1/n^2)\sum_i \sum_j l_{ij}} \right) \text{ for backward COE linkage} \quad (6)$$

$$\boldsymbol{FW_i} = \left(\boldsymbol{(1/n)\sum_j b_{ij}} \Big/ \boldsymbol{(1/n^2)\sum_i \sum_j b_{ij}} \right) \text{ for forward COE linkage} \quad (7)$$

where l_{ij} indicates the element of the Leontief inverse matrix and b_{ij} represents the element of the Ghosh inverse matrix.

Overall, the outcomes from the COE linkages measures can fall into one of the four potential degrees of linkages.

- If BW <1 and FW <1 – the sector's capacity to generate COE is independent of other sectors.
- If BW ≥1 and FW <1 – the sector's capacity to generate COE depends on its input suppliers but less on its output buyers.
- If BW <1 and FW ≥1 – the sector's capacity to generate COE depends on its output buyers but less on its input suppliers.
- If BW ≥1 and FW ≥1 – the sector's capacity to generate COE depends on input suppliers and output buyers.

The sectors are considered to have robust COE linkages if the index for BW and FW equals or is higher than 1.

3.3 Data Sources and Classifications

This study used two primary datasets, including the national account statistics and the national input-output tables, which were sourced directly from DOSM (2023; 2022). DOSM compiled both datasets based on the international statistical standard for the national accounts, referred to as the System of National Accounts 2008 (2008 SNA).

Concerning the national account statistics, the dataset was obtained from the publication "Gross Domestic Product (GDP) by Income Approach" for 2015-2022 to provide the statistical background of COE compositions in GDP and guide the sectoral grouping for modelling and analysis. The dataset covered five broad sectors (with further segregation into several sub-sectors), including agriculture (three sub-sectors), mining and quarrying, manufacturing (seven sub-sectors), construction, and services (four sub-sectors). The second dataset, the input-output tables, were obtained from the DOSM's e-Statistik platform for two base years, 2019 and 2020, to enable sectoral capacities comparison. Each table comprised 124 sectors, classified according to the 2008 Malaysia Standard Industrial Classification (MSIC). Table 1 gives the list of sectors available for analysis.

Table 1 Sectoral grouping based on the national account and input-output tables

Broad Sectors		Sectors
Agriculture	1	Food crops and other agriculture
	2	Oil palm
	3	Poultry farming and livestock
	4	Forestry and logging*
	5	Fishing and aquaculture*
Mining and quarrying	6	Mining and quarrying*
Manufacturing	7	Food processing
	8	Spirits, wines and liquors
	9	Soft drinks, mineral waters and other bottled waters
	10	Tobacco products
	11	Textiles, wearing apparel and leather products*
	12	Wood products, furniture, paper products and printing*
	13	Coke and refined petroleum products
	14	Chemicals
	15	Pharmaceuticals, medicinal chemical and botanical products
	16	Rubber and plastic products
	17	Non-metallic mineral products
	18	Basic metal and fabricated metal products
	19	Machinery and equipment
	20	Electrical and electronics
	21	Medical devices
	22	Optical and scientific
	23	Transport equipment
	24	Other manufacturing and repair
Construction	25	Construction*
Services	26	Wholesale and retail trade
	27	Accommodation
	28	Food and beverage
	29	Transportation and storage
	30	Information and communication services
	31	Finance, insurance, real estate and business services
	32	Other services (including government services)*

Notes: (*) refers to the sectors that remained classified based on the national account sectoral grouping, while other national account sectors were further expanded to provide better insights into sectoral capacities. The broad sector's coverage under agriculture includes forestry and logging.

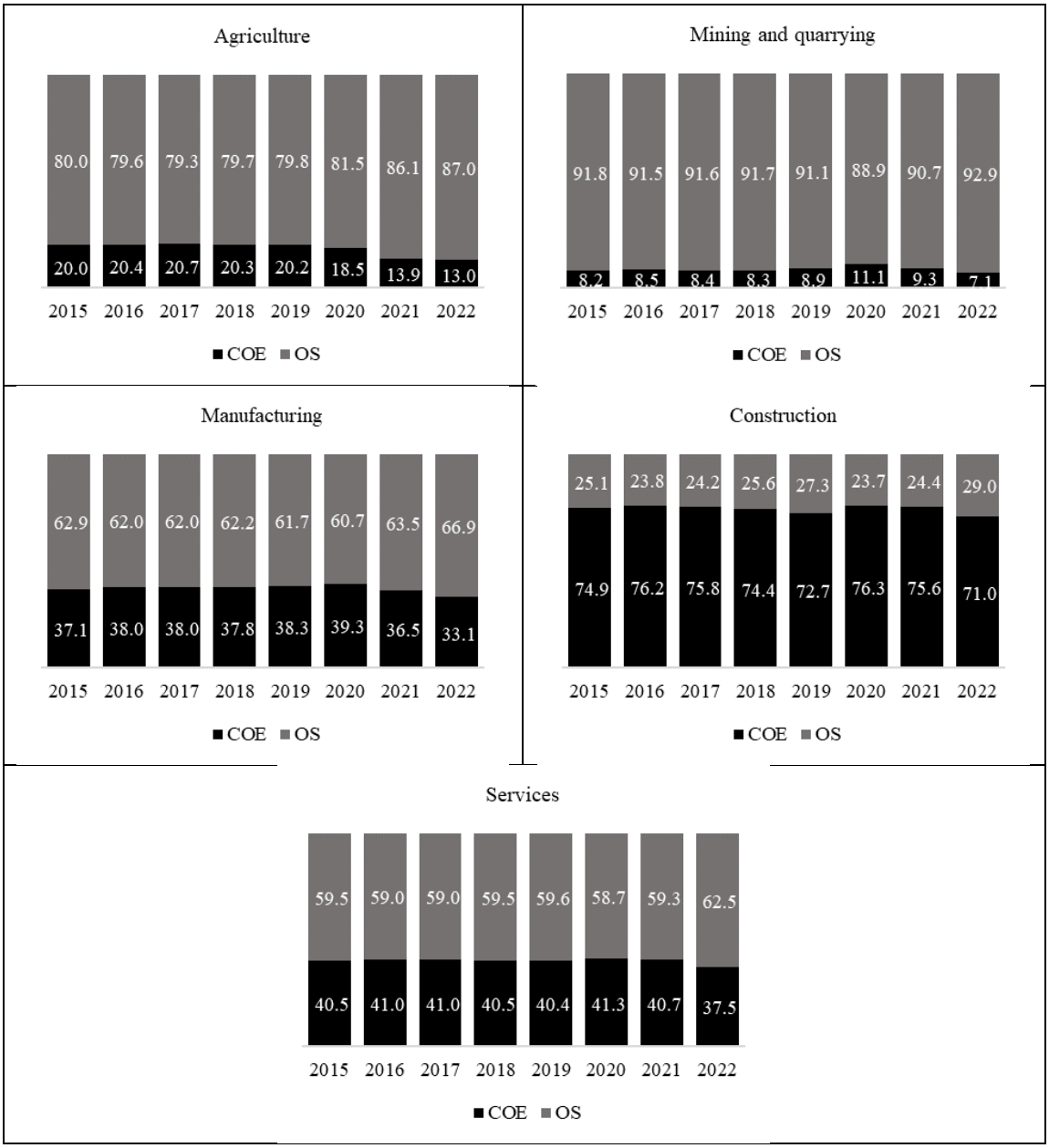
RESULTS AND DISCUSSIONS

Improving the COE composition is indeed a noble strategy towards elevating the living standard of the people. However, the effort was tainted by uncertainties due to changing economic landscapes and various structural issues. Moving into the second quarter of the 12MP, the target seems far beyond reach, as data in 2022 indicated that COE composition shrunk to 32.4%, the lowest since 2015. Therefore, complementing the mid-term review process, this study reassessed the sectoral capacity towards supporting the achievement of the targeted COE composition in the post-mid-term review period.

This section is structured into four parts. Subsection 4.1 provides an overview of the COE movement trend in Malaysia. Next, Subsections 4.2 and 4.3 present the sectoral capacities to generate and promote COE growth. Finally, Subsection 4.4 synthesises the preceding subsections' outcomes to provide evidence-based insights for sectors central to achieving the 40% COE target.

4.1 Overview of COE Movement Trend

At the national level, COE compositions in GDP between 2015-2020 showed a marginal increment trend before it shrank to the lowest in 2022 (see Figure 1). One might argue that the changes in COE compositions during the specified periods were influenced by factors relating to the pandemic and geopolitics, as well as the existing structural issues such as the prevalence of the low-cost production model and high dependence on low-skilled foreign workers (BNM, 2021). However, basing only on these insights to further strengthen the COE growth in the post-mid-term review of the 12MP will not contribute much towards achieving the target. A more imperative input lies in the sectoral COE trend. Figure 2 presents the overview of the COE movement trend at the sectoral level between 2015-2022.



Notes: Computed based on current prices GDP for 2015-2022. GDP amounts in 2021 and 2022 are based on the estimated and preliminary values, respectively. Taxes less subsidies on production and imports are excluded as the data are unavailable at the sectoral level.

Source: DOSM (2023)

Figure 2 Broad sectors' COE and OS compositions in GDP, 2015-2022 (percentage, %)

Three critical pieces of information are available in Figure 2. First, the construction and services sectors proved their capacity to produce COE beyond the targeted composition. Broad sectors data indicated that the construction sector achieved more than 70% of COE composition between 2015-2022, implying that 1 *Ringgit* growth in the construction GDP had contributed more than 70 cents to COE. Other than the above-average contribution, the sector's capacity was quite resilient to the impacts of the pandemic crisis based on the marginal changes in its COE compositions between 2019-2022. On the other hand, the services sector also proved its COE creation capacity with an annual contribution of more than 40%, except for 2022. The sector's capacity, however, demonstrated a more moderate strength in comparison to the construction sector, with its share of contribution fluctuating only between 37.5% and 41.3%.

Second, the manufacturing sector offers the key to achieving the targeted COE composition by the end period of the 12MP. A primary justification for this observation lies in the COE movement trend in this sector, which resembles the national average COE compositions in GDP between 2015-2022. For instance, the manufacturing sector also recorded an improvement in COE composition between 2019-2020 before it reduced to the lowest in 2022. From the policy perspective, this finding proved intriguing since the sector exerts a considerable influence on the national COE movement trend despite only contributing 23.5% to the total GDP, which is 34.3% lower than the construction and services sectors combined (DOSM, 2023).

Third, the agriculture and mining and quarrying sectors are incapable of supporting the targeted COE composition achievement in the remaining period of 12MP. During 2015-2022, the two sectors could only create an average of 18.4% and 8.7% of COE composition, respectively. The contributions were considerably low despite their significant value-added multiplier impacts (see, for example, KRI, 2018). This situation indicates greater returns to the capital owners as reflected by their contribution to OS. Based on Figure 2, the agriculture sector contributed more than 79% to OS, while the mining and quarrying sector created more than 89%.

A more detailed discussion at the sectoral level is given in the following subsections.

4.2 Sectoral Capacity to Generate COE

The reporting approach in the national account statistics separates GDP (income approach) into three major components–COE, OS and taxes less subsidies on production and imports, with the combined COE and OS figures giving the total amount of value-added created. Therefore, measuring the COE content in value-added would inform the sectoral capacity to generate COE. In this study, the sectoral capacity was assessed based on the COE content instead of the multiplier because the former provides the actual contribution of the concerned indicator, while the latter only indicates the potential impact. Table 2 presents the COE per *Ringgit* of value-added between 2019-2020.

Table 2 COE per *Ringgit* of value-added, 2019-2020

	Sectors	2019	2020	40% target	Trend
1	Food crops and other agriculture	9.24	8.92		Decrease
2	Oil palm	37.21	30.97		Decrease
3	Poultry farming and livestock	12.03	11.70		Decrease
4	Forestry and logging	9.10	9.07		Decrease
5	Fishing and aquaculture	6.46	6.92		Increase
6	Mining and quarrying	8.72	10.33		Increase
7	Food processing	33.76	32.14		Decrease
8	Spirits, wines and liquors	9.25	9.51		Increase
9	Soft drinks, mineral waters and other bottled waters	66.92	59.90	Achieved	Decrease
10	Tobacco products	5.72	5.30		Decrease
11	Textiles, wearing apparel and leather products	60.21	60.73	Achieved	Increase
12	Wood products, furniture, paper products and printing	67.88	71.77	Achieved	Increase
13	Coke and refined petroleum products	4.76	4.79		Increase
14	Chemicals	19.95	21.03		Increase
15	Pharmaceuticals, medicinal chemical and botanical products	37.60	26.17		Decrease
16	Rubber and plastic products	51.50	46.67	Achieved	Decrease
17	Non-metallic mineral products	42.98	49.93	Achieved	Increase
18	Basic metal and fabricated metal products	50.87	58.83	Achieved	Increase
19	Machinery and equipment	61.56	62.79	Achieved	Increase
20	Electrical and electronics	55.54	52.13	Achieved	Decrease
21	Medical devices	56.48	60.17	Achieved	Increase
22	Optical and scientific	59.07	58.68	Achieved	Decrease
23	Transport equipment	14.80	14.39		Decrease
24	Other manufacturing and repair	30.05	32.32		Increase
25	Construction	73.72	75.65	Achieved	Increase
26	Wholesale and retail trade	30.40	32.22		Increase
27	Accommodation	49.05	77.67	Achieved	Increase
28	Food and beverage	42.21	48.71	Achieved	Increase
29	Transportation and storage	38.72	41.00	Achieved	Increase
30	Information and communication services	26.18	25.73		Decrease
31	Finance, insurance, real estate and business services	31.03	31.35		Increase
32	Other services (including government services)	65.97	68.00	Achieved	Increase

Source: Estimated based on Equation (5)

The findings in Table 2 point to two critical policy areas that could support the achievement of the targeted COE composition in the remaining 12MP periods. Strengthening the growth promotion strategies in sectors which have achieved the 40% COE target would be the top priority area. Out of 32 sectors, 15 have proven their capacities with Accommodation; Construction; and Wood products, furniture, paper products and printing, leading to more than 70% COE creation. Separating the sectors into broad sectors level, ten were found to operate under the manufacturing segment, and the remaining five were under construction and services. These findings corroborated the observation on the COE movement trend, which further emphasised the roles of construction and services-based sectors towards COE generation and the influence of manufacturing on the national COE movement trend.

On top of strengthening the growth promotion strategies, four sectors were found to possess critical "push factors" towards achieving the targeted national COE composition. The factors include their capacity to generate COE and size of economic contribution (percentage contribution to GDP). The sectors include Oil palm; Food processing; Wholesale and retail trade; and Finance, insurance, real estate and business services. Although their contributions were relatively lower than the targeted 40% composition, currently standing between 30.9% and 32.3%, pairing the sectors with the proper growth promotion strategies may invigorate their contribution to COE. In terms of economic contributions, the sectors in total accounted for 34.2% of the GDP (DOSM, 2023). Therefore, leveraging the push factors may help realise the national policy target.

The detailed findings for COE per *Ringgit* of value-added are given in Appendix 1.

4.3 Sectoral Capacity to Promote COE Growth

This subsection provides the outcomes from the extended linkages modelling to complement the discussion for sectoral capacity to generate COE. Although the conventional linkages modelling approach was centred on input and output as the indicators of concern, this study extends the model for COE based on a simple justification. That is, a sector with strong BW and FW linkages (based on input and output indicators) does not necessarily possess the same capacity to produce spillover impacts in terms of COE. Similarly, relying only on COE content in value-added to chart path for achieving the specified COE composition target is insufficient as the sectoral capacity to generate COE may differ from its ability to promote the COE spillover. Table 3 gives the COE linkages matrix.

Table 3 COE linkages matrix, 2019-2020

Index		**Forward Linkages (FW)**	
		<1	**≥1**
Backward Linkages (BW)	**≥1**	**Panel A**: BW ≥1 and FW <1 1. Food processing[b] 2. Soft drinks, mineral waters and other bottled waters 3. Rubber and plastic products[b] 4. Machinery and equipment 5. Electrical and electronics[a] 6. Medical devices 7. Food and beverage[b]	**Panel B**: BW ≥1 and FW ≥1 1. Oil palm 2. Textiles, wearing apparel and leather products[a] 3. Wood products, furniture, paper products and printing 4. Pharmaceuticals, medicinal chemical, and botanical products 5. Non-metallic mineral products 6. Optical and scientific[a] 7. Other manufacturing and repair[a] 8. Construction 9. Wholesale and retail trade 10. Accommodation 11. Transportation and storage 12. Information and communication services 13. Finance, insurance, real estate and business services 14. Other services (including government services)
	<1	**Panel C**: BW <1 and FW <1 1. Food crops and other agriculture[b] 2. Poultry farming and livestock 3. Fishing and aquaculture 4. Mining and quarrying[b] 5. Spirits, wines and liquors 6. Tobacco products 7. Coke and refined petroleum products[b] 8. Chemicals 9. Transport equipment[b]	**Panel D**: BW <1 and FW ≥1 1. Forestry and logging 2. Basic metal and fabricated metal products[b]

Notes: ([a]) sectors moving up the value chain between periods of 2019-2020; ([b]) sectors with strengthening backward and forward COE linkages between periods of 2019-2020.

Source: Estimated based on Equations (6) and (7)

Considering the limited time frame for stimulating COE growth in all sectors between 2024-2025, the findings from Table 3 summarise the sectors critical for achieving the targeted COE composition. In short, the sectoral focus must revolve around sectors in Panels A, B and D due to their immense potential for stimulating COE spillover. For Panel A, the growth in the Food processing COE, for instance, will induce the COE growth in sectors that act as its input suppliers. Taking Forestry and logging from Panel D as an example, the growth of COE in this sector will also support the COE creation in sectors purchasing its output. Compared to sectors in Panels A and D, the growth of COE in sectors under Panel B would bring in the most spillover impacts due to the integration between the sectors with other sectors along their value and supply chains.

Sectors in Panel C, however, were less critical in terms of their capacities to promote COE growth in the economy, in addition to their marginal contribution to COE creation. As such, the sectors must be positioned under the long-term plan to allow policymakers to work towards carefully designed strategies that may improve the sectoral impacts in both areas (COE composition and linkages). The detailed COE linkages outcomes are given in Appendix 2.

4.4 Sectors Central to COE Target Achievement

The mapping of findings in Tables 2 and 3 separates the list of sectors central to achieving the 40% COE target based on three areas of potential (see Table 4). Each area considered two essential criteria–the COE content in value-added and sectoral capacity to promote COE growth via linkages. Sectors failing to meet any criteria are excluded from the list. Collectively, inputs in Table 4 were mainly structured to guide policy decisions, especially those concerning focused sectors for achieving the COE composition target in the post-mid-term review periods of 2024-2025.

Table 4 Sectors central to COE target achievement by areas of potential

Sectors		Areas of potential
1.	Textiles, wearing apparel and leather products	Sectors that have achieved the 40% targeted COE composition with strong BW and FW linkages.
2.	Wood products, furniture, paper products and printing	
3.	Non-metallic mineral products	
4.	Optical and scientific	
5.	Construction	
6.	Accommodation	
7.	Transportation and storage	
8.	Other services (including government services)	
1.	Soft drinks, mineral waters and other bottled waters	Sectors that have achieved the 40% targeted COE composition with strong BW or FW* linkage.
2.	Rubber and plastic products	
3.	Machinery and equipment	
4.	Electrical and electronics	
5.	Medical devices	
6.	Basic metal and fabricated metal*	
7.	Food and beverage	
1.	Food processing*	Sectors over 30% achieved COE composition with strong BW* or FW linkage, or both.
2.	Oil palm	
3.	Wholesale and retail trade	
4.	Finance, insurance, real estate and business services	

Table 4 revealed that 19 out of 32 sectors were determined as the leading sectors capable of supporting the national policy target to elevate people's living standards through COE composition improvement. These results align with the insights presented in Figure 2, which highlighted–(i) the strengths of the construction and services-based sectors in generating COE are beyond the targeted composition and (ii) the key role of the manufacturing sector towards achieving the targeted COE composition. Overall, more than half of the listed sectors in Table 4 are manufacturing-based.

Considering the context of the study that aims to reassess the sectoral capacity towards supporting the achievement of targeted COE composition, no specific strategies or initiatives are laid out. A primary justification for excluding such context lies mainly in the fact that sectoral COE contribution is determined by factors unique to others. For example, the Oil palm sector's contribution to COE is partly determined by issues such as the banning of palm oil imports by the European Union (for example, Purnomo et al., 2020; Rum et al., 2022). Nonetheless, the progressive wage model could provide an overarching push factor from a macro perspective to achieve the targeted COE composition, particularly in sectors with over 30% COE composition.

CONCLUSION

This study reassessed the sectoral capacity towards supporting the achievement of targeted COE composition in the post-mid-term review period. The reassessment procedures were performed by developing two measures based on the input-output modelling techniques–COE content in value-added and COE linkages, using input-output tables for 2019 and 2020.

An initial viewpoint based on the national account statistics indicated that Malaysia's growth quality was highly debatable due to the lower implications of growth on COE generation. Despite the issue being elevated as a national policy concern, the targeted improvement of COE composition to 40% seems far beyond reach, especially when Malaysia moves into the second quarter of the 12MP. Nevertheless, applying the reassessment models on 32 input-output sectors yields positive outcomes, with 19 sectors central to COE target achievement identified. Overall, the sectors were grounded based on three areas of potential that are capable of guiding policy decisions to improve the COE composition: (i) sectors that have achieved the 40% targeted COE composition with strong BW and FW linkages; (ii) sectors that have achieved the 40% targeted COE composition with strong BW or FW linkage; and (iii) sectors over 30% achieved COE composition with strong BW or FW linkage, or both. From a macro perspective, the progressive wage model could provide a major push factor towards improving the COE compositions, especially for sectors under the third area of potential.

Despite the novelty aspects offered, this study had two limitations. First, detailed policy directions regarding strategies or initiatives that could improve the sectoral COE composition were not provided due to unique issues surrounding the sectors. Second, only 32 sectors were covered in the reassessment procedures, following the sectoral mapping between national account statistics and input-output tables. Addressing these limitations should be among the key considerations in future studies.

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APPENDIX

Appendix 1 COE, value-added and COE per *Ringgit* of value-added, 2019-2020

	Sectors	2019			2020		
		(1)	(2)	(3)	(1)	(2)	(3)
1	Food crops and other agriculture	2.68	29.06	9.24	2.45	27.51	8.92
2	Oil palm	12.63	33.94	37.21	13.40	43.27	30.97
3	Poultry farming and livestock	1.96	16.31	12.03	1.94	16.57	11.70
4	Forestry and logging	0.53	5.82	9.10	0.43	4.79	9.07
5	Fishing and aquaculture	0.86	13.32	6.46	0.80	11.55	6.92
6	Mining and quarrying	11.03	126.54	8.72	9.56	92.58	10.33
7	Food processing	9.74	28.85	33.76	10.16	31.62	32.14
8	Spirits, wines and liquors	0.24	2.56	9.25	0.20	2.08	9.51
9	Soft drinks, mineral waters and other bottled waters	1.26	1.88	66.92	1.04	1.74	59.90
10	Tobacco products	0.21	3.67	5.72	0.16	3.01	5.30
11	Textiles, wearing apparel and leather products	3.58	5.95	60.21	3.17	5.22	60.73
12	Wood products, furniture, paper products and printing	14.53	21.40	67.88	13.98	19.48	71.77
13	Coke and refined petroleum products	2.07	43.56	4.76	1.86	38.80	4.79
14	Chemicals	6.40	32.09	19.95	5.82	27.68	21.03
15	Pharmaceuticals, medicinal chemical and botanical products	0.68	1.80	37.60	0.64	2.43	26.17
16	Rubber and plastic products	9.23	17.93	51.50	10.58	22.66	46.67
17	Non-metallic mineral products	5.42	12.61	42.98	5.08	10.18	49.93
18	Basic metal and fabricated metal products	12.84	25.24	50.87	12.79	21.74	58.83
19	Machinery and equipment	5.14	8.35	61.56	5.15	8.20	62.79
20	Electrical and electronics	38.37	69.08	55.54	38.42	73.70	52.13
21	Medical devices	0.74	1.32	56.48	0.71	1.19	60.17
22	Optical and scientific	2.64	4.48	59.07	2.53	4.31	58.68
23	Transport equipment	3.15	21.28	14.80	2.87	19.93	14.39
24	Other manufacturing and repair	2.89	9.60	30.05	2.73	8.46	32.32
25	Construction	50.92	69.08	73.72	41.74	55.18	75.65
26	Wholesale and retail trade	73.37	241.33	30.40	74.48	231.17	32.22
27	Accommodation	3.68	7.51	49.05	2.86	3.68	77.67
28	Food and beverage	18.98	44.98	42.21	17.47	35.88	48.71
29	Transportation and storage	18.75	48.43	38.72	14.97	36.52	41.00
30	Information and communication services	21.40	81.75	26.18	22.29	86.60	25.73
31	Finance, insurance, real estate and business services	73.05	235.43	31.03	70.37	224.48	31.35
32	Other services (including government services)	133.66	202.62	65.97	135.92	199.89	68.00

Notes: (1) COE, expressed in RM billion; (2) Value-added, expressed in RM billion; (3) COE per *Ringgit* of value-added.

Source: Estimated based on Equation (5)

Appendix 2 COE linkages, 2019-2020

	Sectors	2019		2020	
		BW	FW	BW	FW
1	Food crops and other agriculture[b]	0.5373	0.4996	0.5470	0.5635
2	Oil palm	1.4183	1.5971	1.4231	1.6155
3	Poultry farming and livestock	0.7381	0.4832	0.7582	0.4347
4	Forestry and logging	0.5142	1.3069	0.5202	1.2553
5	Fishing and aquaculture	0.3808	0.4426	0.3850	0.3420
6	Mining and quarrying[b]	0.4587	0.8364	0.4713	0.8394
7	Food processing[b]	1.0684	0.3967	1.1357	0.4083
8	Spirits, wines and liquors	0.4633	0.5347	0.4780	0.3001
9	Soft drinks, mineral waters and other bottled waters	1.0845	0.5950	1.1552	0.4802
10	Tobacco products	0.3912	0.3000	0.4465	0.2089
11	Textiles, wearing apparel and leather products[a]	1.2393	0.8899	1.3382	1.1045
12	Wood products, furniture, paper products and printing	1.3008	1.0764	1.3621	1.1286
13	Coke and refined petroleum products[b]	0.4405	0.8161	0.4525	0.8297
14	Chemicals	0.7694	0.7870	0.7694	0.6983
15	Pharmaceuticals, medicinal chemical and botanical products	1.0805	1.0478	1.0937	1.4508
16	Rubber and plastic products[b]	1.0231	0.8449	1.0761	0.8777
17	Non-metallic mineral products	1.0641	1.2455	1.0892	1.3136
18	Basic metal and fabricated metal products[b]	0.9886	1.0628	0.9977	1.1141
19	Machinery and equipment	1.0394	0.6776	1.0731	0.6637
20	Electrical and electronics[a]	0.9860	0.7987	1.0845	0.9145
21	Medical devices	1.1107	0.6562	1.1190	0.6119
22	Optical and scientific[a]	0.9963	0.8393	1.0819	1.3924
23	Transport equipment[b]	0.7880	0.7354	0.9108	0.8755
24	Other manufacturing and repair[a]	0.9982	0.9708	1.0289	1.0439
25	Construction	1.5691	1.1578	1.5880	1.1703
26	Wholesale and retail trade	1.1803	1.2345	1.2063	1.2627
27	Accommodation	1.6721	1.6342	1.7181	1.2627
28	Food and beverage[b]	1.3429	0.9253	1.3993	0.9953
29	Transportation and storage	1.1761	1.1079	1.1704	1.0576
30	Information and communication services	1.0986	1.0194	1.1000	1.0588
31	Finance, insurance, real estate and business services	1.1964	1.3828	1.1880	1.3544
32	Other services (including government services)	2.1133	1.8817	2.1154	1.8776

Notes: BW and FW refer to backward and forward linkages; ([a]) sectors moving up the value chain between periods of 2019-2020; ([b]) sectors with strengthening BW and FW COE linkages between periods of 2019-2020.

Source: Estimated based on Equations (6) and (7)