Annex 3. Pathways for Diversifying Exports and Enhancing Comparative Advantages[90]

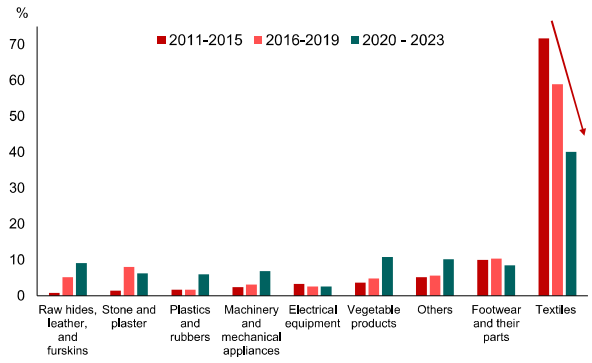
Initially reliant on traditional industries such as garments and textiles, Cambodia has gradually diversified its export sector and integrated deeper into global value chains (GVCs) over the past decade. A dynamic global trade network provides opportunities for Cambodia to engage more in GVCs. However, the country also faces challenges, such as intensifying competition, that complicate its efforts to climb up the ladders of GVCs. Cambodia needs to identify its comparative advantages and implement clearer strategies to fully utilize the opportunities while overcoming the challenges. Given this context, this Selected Issue focuses on two questions: (i) How have Cambodia's exports and GVC participation evolved over the past decade? and (ii) What sectors and products should the government prioritize to enhance its comparative advantages and diversify Cambodia's exports?

Cambodia's Export Performance

1. Cambodia has started diversifying its export goods as well as trading partners over the past decade.

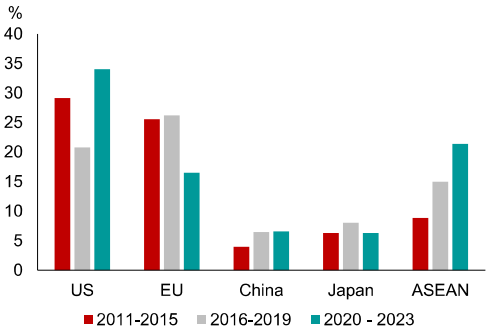
- First, although textiles continue to be an export mainstay for Cambodia, its shares of total exports have declined from about 70 percent in 2011 to 40 percent in 2023. Cambodia also witnessed the emergence of significant non-garment exports in 2023 (Figure A3.1). In particular, industries such as machinery appliances, raw leather, furniture, plastics, and rubbers have gained prominence. The decrease in the share of textile exports over the past decade signals a move toward greater export diversification and underscores the country's proactive approach toward embracing new opportunities in the global trade network.
- Second, Cambodia's key export markets include the U.S. (36.5 percent of total exports, as of 2023) and the E.U. (15 percent), ASEAN countries (20.9 percent), China (6.5 percent), and Japan (6 percent). Notably, Asia and the U.S. remain important trading partners for Cambodia (Figure A3.2), underscoring the importance of regional and trans-Pacific trade linkages. Any shifts in the trade linkages among these key partners, especially the US and China, will have substantial impact on Cambodia's export momentum in the years ahead.

Figure A3.1. Cambodia's Export Shares by Manufacturing Sector



Source: Global Trade Atlas (GTA), AMRO staff calculations

Figure A3.2. Cambodia's Key Export Destinations



Source: GTA, AMRO staff calculations

Cambodia's GVC Participation

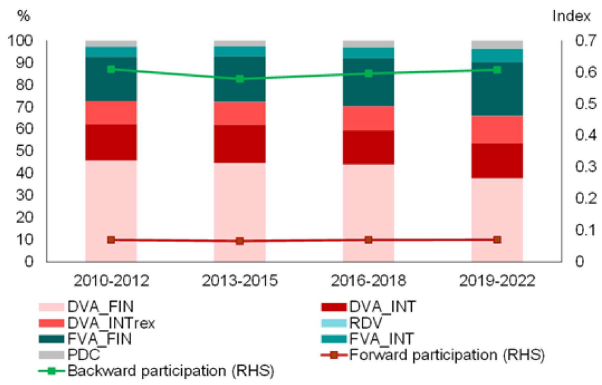
[90] Prepared by Trung Thanh Vu, Associate Economist

2. Decomposing Cambodia's export data can provide insights into the country's strategy to diversify its exports and enhance its comparative advantages. Data used for the analyses include Asian Development Bank Multi-Regional Input-Output (ADB MRIO) data from 2010 to 2022, which covers both manufacturing and service exports, and Global Trade Analysis (GTA) mirror data, focusing on HS6 codes on manufacturing exports. The methodological framework is based on the decomposition of gross exports into various components, including domestic value added (DVA) and foreign value added (FVA) using the ADB MRIO introduced by Wang, Wei, and Zhu (2018, see Appendix A3.1). Additionally, this Selected Issue employs a theory of economic complexity proposed by Hausman et al. (2013) to estimate several derived indicators—including Revealed Comparative Advantage (RCA), Diversity, Ubiquity, and Opportunity Gain—using the GTA data (See Appendix A3.2).

3. Our analysis indicates that Cambodia gains a modest share of domestic value-added in its exports. Its DVA accounted for nearly 65 percent of its exports, of which DVA in final products (DVA_FIN) accounted for a major portion (Figure A3.3). That said, within the DVA category, there has been a slight increase in the share of DVA in intermediate goods (that are exported to a counterpart country (DVA_INT) and re-exported to third countries (DVA_INTrex), This suggests that, as a whole, Cambodia mainly exports products with minimal processing and low domestic value-added. However, early signs have emerged in certain sectors indicating that the country is slowly beginning to move up the ladder of the GVC.

- Cambodia's backward participation linkage[91] has not shown significant improvements over the past decade (Figure A3.3), reflecting a reliance on foreign inputs and the limited capacity of industrial activities in the country. The high reliance on foreign inputs also underscores the importance of enhancing local sourcing capabilities and bolstering supporting industries in Cambodia.
- Meanwhile, Cambodia's involvement in forward participation linkage[92] within the GVC has been modest, with a large share of FVA in final exports (FVA_FIN) (Figure A3.3). A large share of FVA_FIN indicates that Cambodia mainly engages in final assembly activities based on imported components and participates in cross-country production sharing at the low end of the GVC.

Figure A3.3. Decomposition of Cambodia's Exports by GVC Components



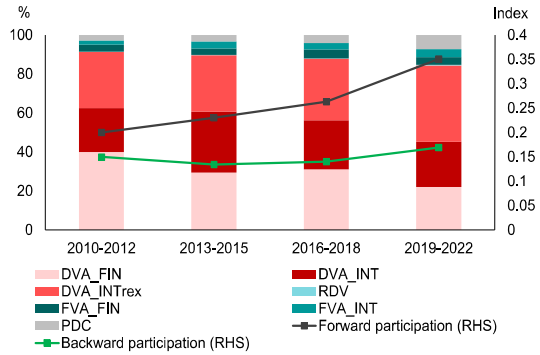
Source: ADB MRIO, AMRO staff calculations
Note: The figure includes all sectors including agriculture, manufacturing, and services. A higher forward participation rate indicates a stronger position in value-added activities. A higher backward participation rate indicates a country depends more on imported inputs for its production, suggesting a relatively weaker position in value-added activities.

[91] Backward participation linkage index is measured by the ADB using Borin and Mancini framework (2019) by origin-sector breakdown. The BPL is calculated using the foreign value added and pure double-counting components embedded in a country's exports. It captures the extent to which a country's production relies on foreign inputs.
[92] Forward participation linkage index is measured by the ADB using Borin and Mancini framework (2019) by origin-sector breakdown. The FPL is calculated using the domestic value added component that is re-exported to the third country or returned the home country. It captures the extent to which a country's exports are used as intermediate inputs by other countries in a production process.

4. A cross-sector comparison suggests that Cambodia has advanced its GVC linkages in agriculture, while its involvement in the manufacturing sector has predominantly centered on lower value-added activities.

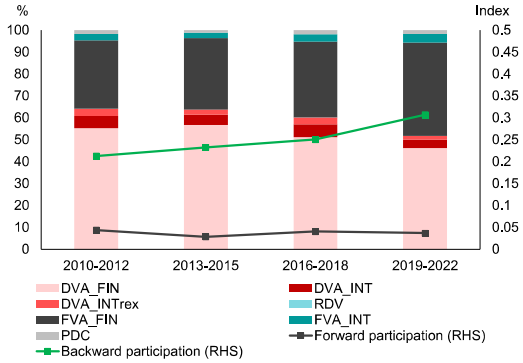
- In particular, Cambodia gains a large share of DVA in its exports of agriculture and services (Figure A3.4 and A3.7). The country's forward participation linkage is also higher than the backward participation linkage in the agriculture sector, indicating that it has engaged in higher value-added stages of production. Furthermore, a large share of DVA in intermediate products (DVA_INTrex and DVA_INT) implies that Cambodia is upgrading its agricultural industry by producing intermediate goods for other countries, especially when a growing number of agricultural products[93] are exported to third countries for final goods production.
- However, decomposing Cambodia's manufacturing exports reveals the opposite (Figure A3.5 and A3.6). Low and declining forward participation linkage and high and rising backward participation linkage suggest that the country remains dependent on imported inputs for its production processes. This implies a need to strengthen domestic production capabilities in the manufacturing sector while enhancing the complexity of its products. Moreover, some manufacturing industries such as textiles and garments that account for the biggest share of Cambodia's export profile need further attention and targeted interventions.

Figure A3.4. Agriculture
(23.8% of total exports in 2019-2022)



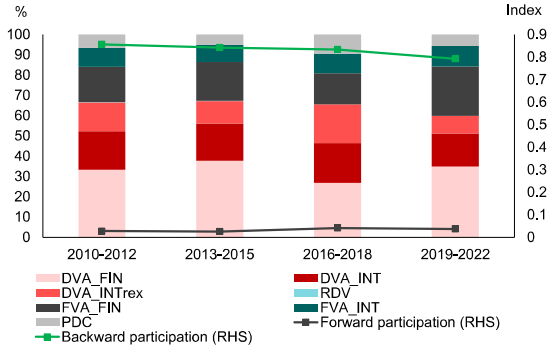
Source: ADB MRIO, AMRO staff calculations

Figure A3.5. Light Manufacturing
(44% of total exports in 2019-2022)



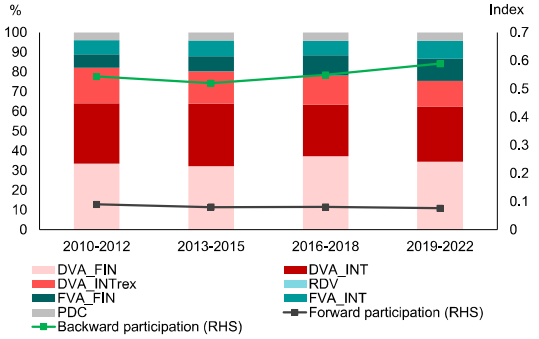
Source: ADB MRIO, AMRO staff calculations
Note: Light manufacturing sector includes textiles, food, wood, paper, rubber, plastic, and other non-metallic mineral.

Figure A3.6. Heavy Manufacturing
(2.4% of total exports in 2019-2022)



Source: ADB MRIO, AMRO staff calculations
Note: Heavy manufacturing sector includes chemical, chemical products, refined petroleum, metals, machinery, electrical optical equipment, and transport equipment.

Figure A3.7. Services
(29.8% of total exports in 2019-2022)



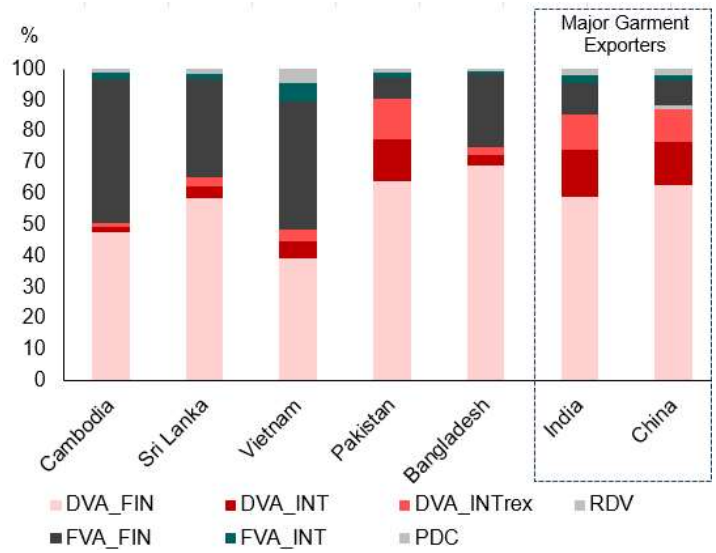
Source: ADB MRIO, AMRO staff calculations
Note: Services includes trade services, hotels and restaurants, transport services, telecommunications, real estate activities, and other services.

[93] Cambodia has been exporting a variety of agricultural products such as rice, cassava, cashew nuts, and peppers. Processing these products rather than exporting raw materials has created value addition. For example, cashew can be processed into products such as cashew butter, cashew milk, and roasted cashews. Cassava can be processed into starch, flour, and biofuel.

5. Compared to its peers, Cambodia focuses more on exports of final products and relies more on foreign countries' inputs for manufacturing exports.

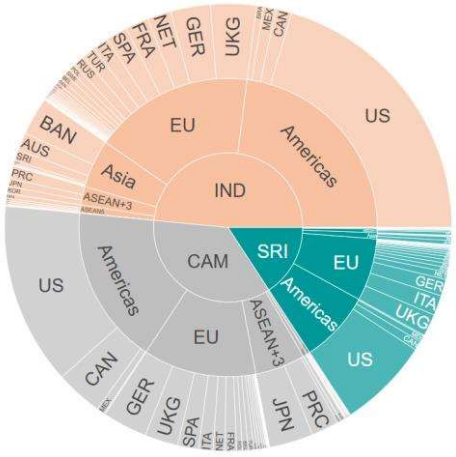
- Garment and textile exports provide a good example of Cambodia's comparative position in the GVC. The DVA accounts for about 50 percent of Cambodia's garment exports, primarily in DVA in final products. However, its peers exhibit a higher share of DVA in their exports (Figure A3.8).[94] Notably, countries such as India and Pakistan stand out for the significant share of DVA in their intermediate products (DVA_INT and DVA_INTrex), suggesting their elevated positioning within the garment and textile GVC.
- Sources of FVA play a crucial role in understanding the interconnectedness between Cambodia and other countries in the GVC. FVA components stem from diverse and often geographically dispersed sources (Figure A3.9), highlighting the intricate interconnectedness within the GVC. Moreover, this connectedness not only underscores the complexity of the modern global trade network but also renders participating countries highly susceptible to disruptions from negative shocks. Given Cambodia's high share of FVA in its exports, it is even more vulnerable and less reactive to such disruptions. Therefore, this emphasizes the importance of enhancing Cambodia's own manufacturing capacities.

Figure A3.8. Decomposition of Garment Export by Country
(2019-2022)



Source: ADB MRIO, AMRO staff calculations
Note: Countries are ranked based on their global share of garment exports in terms of domestic value added as of 2022.

Figure A3.9. Distribution of FVA Sourcing Countries for Selected Garment Exporters
(As of 2022)



Source: ADB MRIO, AMRO staff calculations
Note: The core of the pie chart indicates selected garment exporters, including India, Sri Lanka, and Cambodia (referred to as IND, SRI, and CAM, respectively). The outskirts of the chart include the corresponding FVA sourcing countries for these garment exporters.

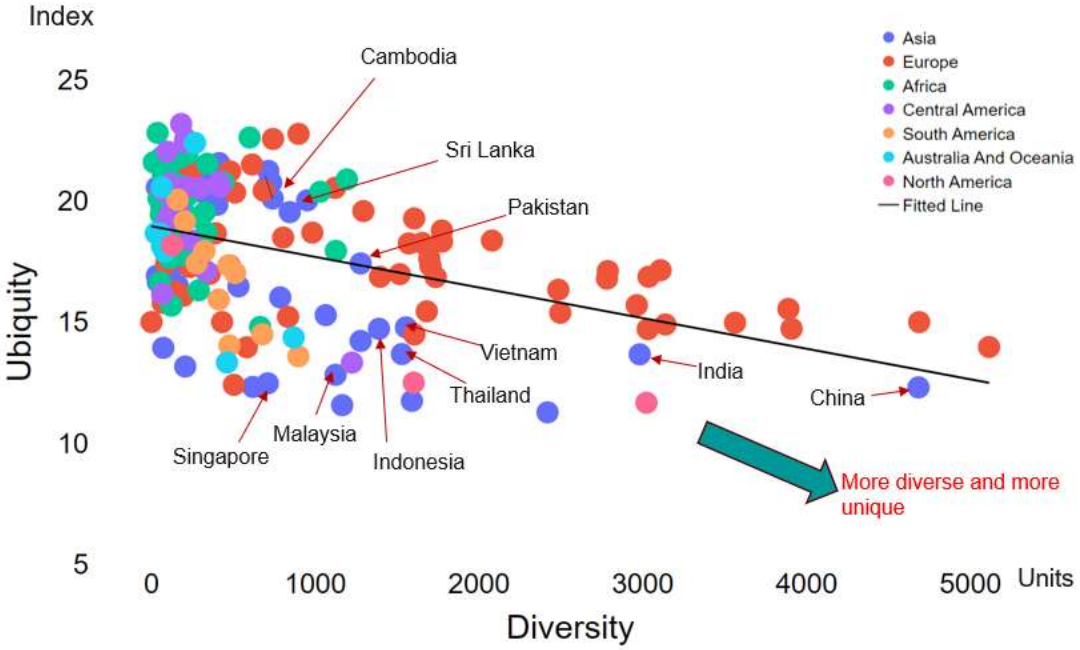
Export Diversification: Quo Vadis?

6. An analysis using metrics on diversity and ubiquity[95] provides insights into Cambodia's current position relative to other countries and suggests pathways to upgrade its standing. Figure A3.10 illustrates a cross-country comparison of the diversity

[94] These peers are selected based on the global share of their garment exports as of 2022 using ADB MRIO data. Cambodia's garment exports have the same global share as that of Sri Lanka, albeit lower than those of Bangladesh, Pakistan, and Vietnam. China and India are two major garment exporters, accounting for more than 50 percent of global garment exports.
[95] Diversity is a measure of how many types of products a country is able to make. Ubiquity is a measure of how many countries are able to effectively make a product. See the definitions in more details in Appendix A3.2.

and ubiquity, in which each dot indicates an individual country's position.[96] Cambodia's exports are characterized by a lower degree of diversity compared to its peers. Moreover, the average ubiquity of Cambodian products exceeds what would be expected given its level of diversity (Figure A3.10). This suggests Cambodia primarily produces goods that are already produced by other countries. This also reaffirms that, although Cambodia has made efforts to diversify its exports, its exports have remained concentrated in certain sectors such as agricultural products and textiles, and centered on low-value-added activities. Despite this, Cambodia has various opportunities to improve its position. The shift in its export profile over the past decade suggests Cambodia has already started the initial stages of structural transformation by reallocating its economic activities and resources of the economy toward sectors other than textiles. Figure A3.10 also suggests various ways for Cambodia to upgrade its standing. It can increase its diversity and enhance its competitiveness by either focusing on new products (going to the right in Figure A3.10), or promoting its ubiquity by becoming involved in higher value-added segments in the same product cluster (going down in Figure A3.10), or improving both diversity and ubiquity (going southeast in Figure A3.10).

Figure A3.10. Cross-Country Comparison of Diversity and Ubiquity Measures



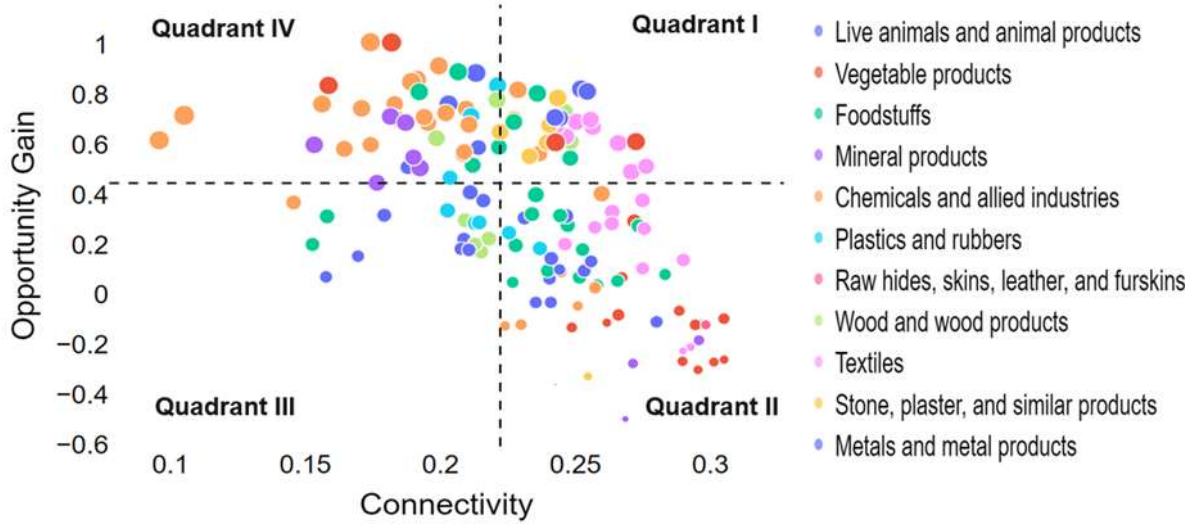
Source: GTA and AMRO staff estimates
Note: Data are as of December 2023, covering 180 countries and all HS6 code items.

7. The selection of strategic manufacturing sectors should be guided by multiple factors, including complexity, connectivity, and opportunity gain. We apply the methodology introduced by Hausman et al. (2013) to estimate industry-specific indices of opportunity gain, trade connectivity, and product complexity for Cambodia's export products, as presented in Figure A3.11, to gain insights into which strategic industries the country should focus on. The challenge comes from trade-offs among those factors. For Cambodia to export higher value-added products and benefit from higher opportunity gain, it may need to enter a more complex manufacturing industry in which it has little experience. Attracting foreign direct investment (FDI) and encouraging foreign technological transfers are one possible solution. However, it will typically take time to absorb new knowledge and technologies. Furthermore, attracting FDI does not necessarily lead to entrance into high-value-added sectors if Cambodia

[96] Diversity and ubiquity are a crucial factor influencing countries' competitiveness. The observed negative relationship between diversity and average ubiquity reaffirms that highly diversified economies often excel in producing goods with a larger RCA in less common products.

does not have a solid strategy and capacity to absorb technological transfers. In the long run, the continuation of FDI flows may not guaranteed if multinational enterprises seek more attractive locations other than Cambodia. Thus, one solution is to favor products for which Cambodia already has some requisite capabilities and connectivity so that it is easier for Cambodia to overcome this technological problem. The metric of product complexity, connectivity, and opportunity gains suggests two broad options for Cambodia, namely, "*Balanced Strategy*" and "*Big Jump Strategy*", which provide higher-than-average opportunity gains. First, the so-called "Balanced Strategy" focuses more on the exports of manufacturing sectors that have higher connectivity (Quadrant I in Figure A3.11). Second, in the "Big Jump Strategy", Cambodia can focus more on the manufacturing sectors that have higher complexity but less connectivity than those of "Balanced Strategy" (represented by a larger bubble size in Quadrant IV in Figure A3.11).

Figure A3.11. Opportunity Gain, Complexity, and Connectivity by Industry



Source: GTA, AMRO staff estimates
Note: Data are as of December 2023, covering 180 countries and all HS6 code items. Opportunity gain quantifies how a new product can open paths to more complex products. Connectivity indicates the closeness of connection in the trade network. The size of the bubble represents the product complexity (The larger the bubble, the higher complexity of the product). The vertical and horizontal lines represent the average of opportunity gain and density, respectively. Indices are calculated based on methodology introduced by Hausman, Hidalgo, and others in 2013.

8. Diversification will require support from the government and the attraction of more strategic and viable investments.

- Analysis using the metric of product complexity, connectivity, and opportunity gains in the previous paragraph suggests two strategies for Cambodia. First, the so-called "Balanced Strategy" can help Cambodia benefit from higher opportunity gains, and diversifying products will have higher trade connectivity but less complexity. More specifically, this strategy focuses on sectors in Quadrant I of Figure A3.11, such as food processing, agricultural products, garments, and textiles, while scaling up machinery appliances and metal products (Figure A3.12). Pursuing this strategy will require further allocating investments in developing Cambodia's SMEs and local sources, while gradually promoting industrial diversification.[97]
- Second, another more ambitious strategy, the so-called "Big Jump Strategy", focuses on products that have lower trade connectivity but high complexity. More specifically, this strategy focuses more on sectors in the Quadrant IV of Figure A3.11, such as heavy manufacturing including mechanical appliances, chemical industries, electrical equipment,

[97] The findings also align with the government's strategy, particularly the "Cambodia Garment, Footwear and Travel Goods (GFT) Sector Development Strategy 2022-2027" announced by the Royal Government of Cambodia in 2022. The GFT sector continues to be a part of the government's strategic vision to further develop Cambodia's export diversification and competitiveness.

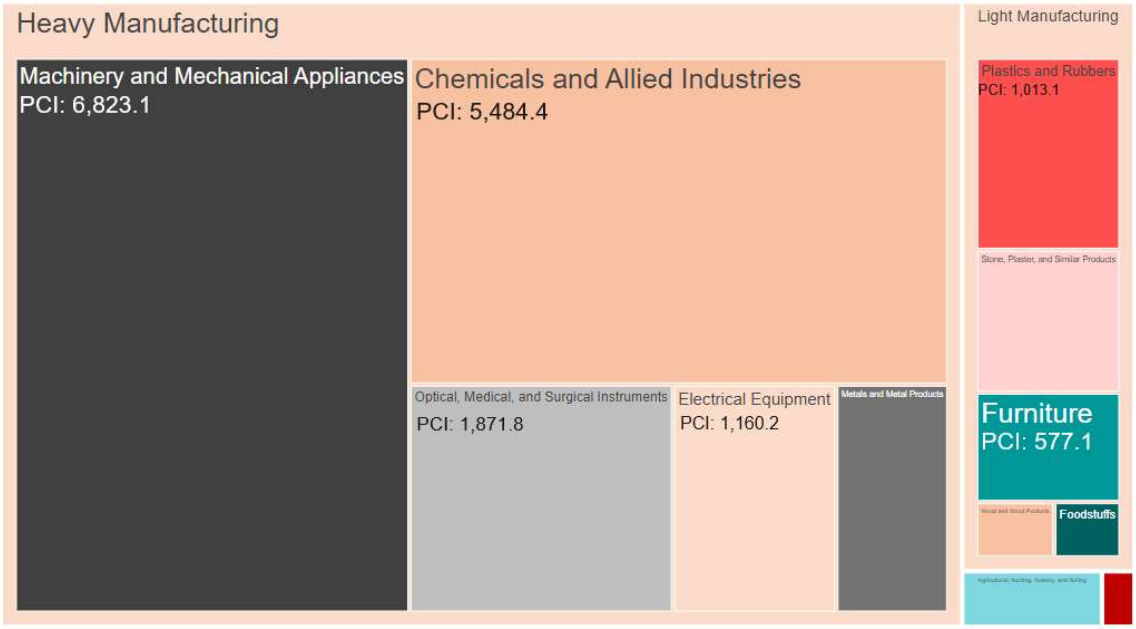
medical instruments, and metal products (Figure A3.13). Pursuing this strategy will require attracting more foreign investment in high-tech manufacturing and high-value-added industries, nurturing talent in human resources; and enabling relevant ecosystems.

- Between the two strategies, the "Balanced Strategy" would be more practical and suitable, as it can leverage Cambodia's existing comparative advantages. Furthermore, by focusing on gradual diversification, the "Balanced Strategy" allows Cambodia to diversify its export portfolio without abrupt shifts, making the transition less risky compared to the "Big Jump Strategy."
- In general, pursuing these two strategies will result in several benefits for Cambodia, including (i) higher economic growth thanks to strategic structural transformation, (ii) enhancing competitiveness thanks to the enhancement of product complexity and skillful labor, and (iii) attracting more quality FDI and integrating deeper into the GVC.
- However, there can be some adverse effects that the government should be mindful of, including (i) environmental and social consequences if the industrialization process is poorly managed, (ii) an over-reliance on foreign investors, and (iii) economic distortions in the short-term due to the ambitious nature of the strategies.

Figure A3.12. Strategic Products Proposed by the Balanced Strategy

Source: GTA, AMRO staff estimates
Note: Data are as of December 2023. Selected products are those located in the northeast area (Quadrant I) of Figure A3.11. Products are selected based on (i) their connectivity is larger than the average connectivity of all Cambodia's export products, and (ii) their opportunity gain is larger than the average opportunity gain of all Cambodia's export products. Products that have higher opportunity gains are often those having higher complexity. PCI refers to product complexity index. The size of each industry in the figure represents the product complexity index for that industry.

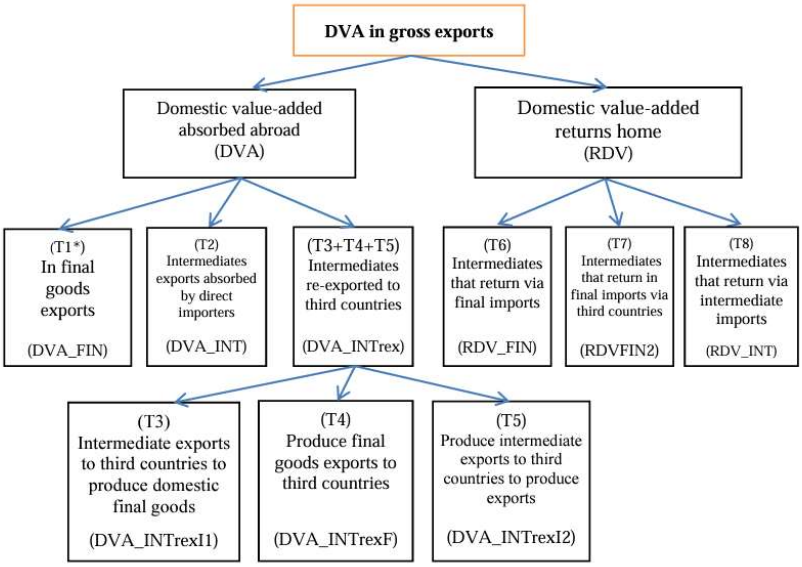
Figure A3.13. Strategic Products Proposed by the Big Jump Strategy

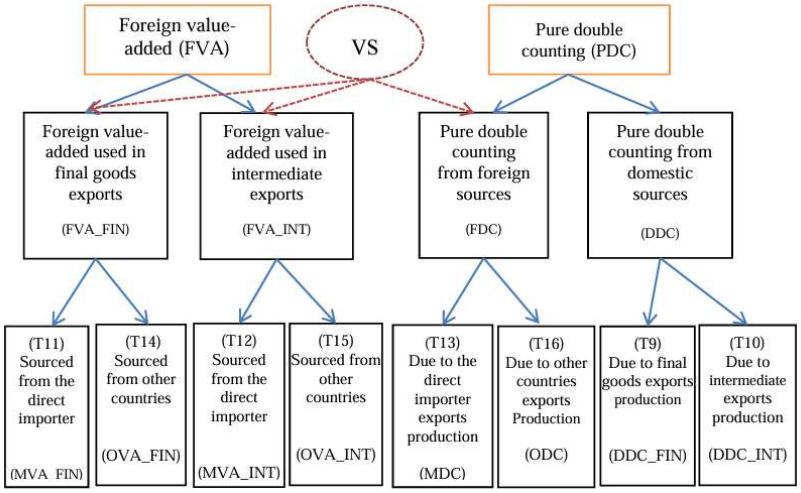


Source: GTA, AMRO staff estimates
Note: Data are as of December 2023. Selected products are those located in the northwest area (Quadrant IV) of Figure A3.11. Products are selected based on (i) their connectivity is smaller than the average connectivity of all Cambodia's export products, and (ii) their opportunity gain is larger than the average opportunity gain of all Cambodia's export products. Products that have higher opportunity gains are often those having higher complexity. PCI refers to product complexity index. The size of each industry in the figure represents the product complexity index for that industry.

Appendix A3.1: Export Decomposition

Wang, Wei, and Zhu (2018) used an accounting framework to decompose gross exports into several components including domestic value added, foreign value added embodied in final and intermediate exports, and pure double counting. The detailed components can be seen below. The charts are adapted from Wang, Wei, and Zhu (2018).





Appendix A3.2: Economic Complexity

The theoretical framework of economic complexity is based on "The Atlas of Economic Complexity" introduced by Hausman, Hidalgo, and others in 2013.

Revealed Comparative Advantage (RCA) is a measure of whether a country is a competitive exporter of a product. The RCA for country c and product p is measured as

$$\mathrm{RCA}_{cp} = \frac{X_{cp}/\Sigma_c X_{cp}}{\Sigma_p X_{cp}/\Sigma_c \Sigma_p X_{cp}}$$

The M_{cp} matrix is defined as

$$M_{cp} = \begin{cases} 1 & if \ \ RCA_{cp} \geq 1 \\ 0 & otherwise \end{cases}$$

Diversity refers to the number of products that a country exports. It is defined as

$$Diversity = k_{c,0} = \sum_p M_{cp}$$

Ubiquity refers to the number of countries that export a product. It is defined as

$$Ubiquity = k_{p,0} = \sum_c M_{cp}$$

The product Complexity Index corrects diversity and ubiquity and is defined as the eigenvector associated with the second-largest eigenvalue of an $\widetilde{M^P_{p,p'}}$matrix,

$$\tilde{M}^P_{p,p'} = \sum_c \frac{M_{cp} M_{cp'}}{k_{c,0} k_{p,0}}$$

$$k_{p,n} = \frac{1}{k_{p,0}} \sum_c M_{cp} \cdot k_{c,n-1}$$

The proximity matrix or Connectivity measures the easiness of moving from one product to another. The proximity matrix ($\phi_{p,p'}$) is defined as

$$\phi_{p,p'} = \frac{\sum_c M_{cp} M_{c'p}}{\max(k_{p,0}, k_{p',0})}$$

The opportunity gain (OG_{cp}) index quantifies how a new product can open paths to more complex products. It is calculated as

$$OG_{cp} = \left[\sum_{p'} \frac{\phi_{p,p'}}{\sum_{p''} \phi_{p'',p'}} (1 - M_{cp'}) PCI_{p'} \right]$$

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