UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Implemented by

Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

TOOL 2

MANUFACTURING TRADE

EQuIP

Enhancing the Quality of Industrial Policies

Disclaimer

This publication was created by UNIDO in collaboration with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the financial support of the German Federal Ministry of Economic Cooperation and Development (BMZ). Its content is the sole responsibility of UNIDO and does not necessarily reflect the views of GIZ or BMZ.

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Acknowledgements

The new Enhancing the Quality of Industrial Policies (EQuIP) Toolkit was prepared by a team of experts from UNIDO's Directorate of Technical Cooperation and Sustainable Industrial Development (TCS) under the overall guidance of Ciyong Zou, Deputy to the Director-General of UNIDO and Managing Director of TCS, and under the direct management of Cristiano Pasini, Director of the Division of Capacity Development, Statistics, and Industrial Policy Advice (CPS).

The UNIDO EQuIP team was created by CPS's Capacity Development and Industrial Policy Advice Unit (CDA). The core group was made up of Anders Isaksson (Chief of CDA), Fernando Santiago, Christoph Hammer, Franz Brugger, Smeeta Fokeer and Frank Hartwich. The individual tools were drafted in collaboration with external experts.

The present tool was drafted by Neil Foster-McGregor (Asian Development Bank) and Anders Isaksson. Christoph Hammer provided valuable feedback.

The revision of EQuIP received generous support from the German Development Cooperation (GIZ). We are particularly grateful to Rainer Engels and Steffen Felix of GIZ's sector project for sustainable economic development for their exceptional contributions. Additional feedback was provided by UNIDO colleagues from various Divisions and by participants of expert group meetings held at UNIDO HQ in Vienna.

The tools have undergone rigorous testing and fine-tuning through a series of expert group meetings and training workshops in – inter alia – Mauritius, The Gambia, Jamaica, Jordan and Mongolia. Niki Rodousakis (UNIDO) provided editorial support and Silvia Druml designed the layout.

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Enhancing the Quality of Industrial Policies (EQuIP) – Tool 2	
Name of tool	**Manufacturing Trade**
Objective	There is ample evidence showing that development and trade are closely related. This tool aims to shed light on the structure of a country's industrial exports and dependency on foreign inputs to production in view of global competitiveness and further economic development.
Key questions	• What role does the country's industrial sector play in the global (or regional) arena? • To what extent is a country able to export products from a given sector? How does that country's export performance in different sectors compare to that of its main competitors and role models? And how has the country's capacity to export changed over time in individual sectors? • How rapidly has the country's export structure progressed towards higher-technology activities or products relative to its comparators? • To what extent does the country rely on imported intermediate goods? From which countries/ regions are these intermediate goods imported from? Has the structure of imports changed over time? • Have the country's imports and exports been able to reach distant markets or has it instead intensified its trade relations with markets that are geographically closer?
Performance indicators	• Share of exports in GDP • Share of imports in GDP • Export composition (by sub-sector, product use, technology) • Import composition (by sub-sector, product use, technology) • Export composition (by region, income of partner) • Import composition (by region, income of partner) • Number of products exported • Change in the number of products exported (gains and losses) • Number of products exported with Revealed Comparative Advantage • Change in the number of products exported with Revealed Comparative Advantage (gain and losses) • Trade balance

1 Introduction

After the end of the Second World War, many developing countries adopted an import substitution industrialization (ISI) strategy, with the intention of building up domestic industrial capabilities behind tariff barriers. Their policies went far beyond tariff barriers, however, and included quantitative restrictions (e.g. import quotas and licenses), overvalued and multiple exchange rates, foreign exchange controls, and a large degree of government intervention. At the same time, a smaller group of countries, most notably the East Asian Tigers (i.e. Singapore, Hong Kong (Special Administrative Region, China), the Republic of Korea, Taiwan (Province of China), adopted a more export-oriented approach to development. While this did not necessarily mean that the economy was free of trade restrictions (as well as foreign direct investment (FDI)), these economies were more open to trade.

In the face of debt crises and instability in the late 1970s and early 1980s, import substitution was rejected by many countries. The reasons put forward for this policy change are varied. While many economies that had adopted an import substitution industrialization (ISI) strategy faced a series of crises, some scholars argue that the reasons for these crises were unrelated to ISI given that the countries' productivity record was often relatively good (e.g. Rodrik, 1999). Other arguments put forward for the change in policy and the wave of liberalization that occurred in the 1980s and 1990s are attributable to the fact that outward-oriented economies (e.g. Taiwan (Province of China)), the Republic of Korea) performed better than inward-oriented ones and that the evidence was in favour of a positive relationship between trade openness and economic growth (Krueger, 1997).

Theoretical arguments in favour of trade openness have existed for centuries as exemplified by the work of Adam Smith and David Ricardo, among others. These arguments highlight the output and welfare-improving effects of countries that specialize in their comparative advantage, i.e. advantages that are driven by differences in productivity or factor endowments. The benefits are static in nature, however, enabling countries to increase their level of income and welfare, but do not affect long-run growth rates. Further static benefits associated with openness to international trade include the possibility of more fully exploiting economies of scale, i.e. a (potentially) larger market size due to trade allows firms to reduce their costs, thus encouraging industries to reorganize to more fully exploit economies of scale (e.g. Dornbusch, 1992). Additional efficiency benefits associated with openness to trade include the reduction of X-inefficiency[1] and rent-seeking, with openness providing a stimulus for firms to reduce resources invested in unproductive activities in search of economic rents[2] (Little et al., 1970; Bhagwati, 1978).

Despite the above arguments highlighting the production and welfare benefits of international trade, we must keep in mind that there are distributional consequences of trade openness that might lead to unequal gains from trade, both within and across countries, potentially leaving some groups worse off. Moreover, there might be trade-offs for developing countries between specializing in line with their comparative advantage (in low-technology goods) and aiming to develop a comparative advantage in sectors and products that may offer opportunities for productivity growth (in high-technology goods), highlighting the dynamic nature of comparative advantage (Redding, 1999).

[1] The concept of X-inefficiency refers to a situation in which a firm's average costs of production are higher than necessary, possibly due to a lack of competition on domestic markets.

[2] For example, due to firms and industries lobbying for protection of their sectors from foreign competition.

By considering the various channels through which trade openness may impact economic development and industrialization, and thinking beyond the static traditional benefits associated with comparative advantage, arguments arise on both the export and import side that support the potential for dynamic gains from trade that can increase growth rates in the long term. One important aspect on the export side relates to learning and productivity improvements associated with exporting. Existing empirical (e.g. Wagner 2007, 2012) and theoretical (e.g. Melitz, 2003) contributions, however, highlight the significance of self-selection into exporting at the firm-level rather than learning from exporting, with more productive firms being able to afford the fixed costs of exporting and benefiting from such activity, suggesting that instead, causality runs from productivity to exporting. Nonetheless, evidence of learning by exporting has been identified in some cases, especially in studies on developing countries (e.g. Foster-McGregor et al., 2014). Moreover, while self-selection into exporting may be the norm at the micro-level, there may well be effects of openness at both the meso- and macro level. By opening competition to domestic firms, trade liberalization may result in the exit of weak (i.e. low productivity) firms, potentially leading to a reallocation of resources from poorly performing towards higher productivity firms, increasing the level of sectoral and aggregate productivity and potentially leading to dynamic gains from these more productive and innovative firms. In addition to more traditional arguments that emphasise the importance of movements of resources across sectors throughout the course of development (i.e. structural change), they also highlight the significance of structural change *within* sectors, which improves the allocation of resources within sectors, potentially encouraging innovation and productivity growth.

A more general benefit of an open trade regime is exposure to foreign competition. While the import substitution industrialization (ISI) strategy adopted in the post-war period has often been criticized for its approach of picking winners, with many arguing that governments do not have the necessary information or skills to adequately make such an assessment, a strategy of promoting production and exports from certain sectors and firms has been adopted by countries that follow an export-oriented approach (e.g. the Republic of Korea and sectors such as shipbuilding and steel, with production frequently organised in large conglomerates called *chaebols*). It is argued that such an approach is not about picking winners, but instead about weeding out losers, with exposure to foreign competition through exporting being a means of identifying firms and sectors that are able to compete globally (Studwell, 2014).

The effects of productivity and learning that are associated with exporting are often linked to the diffusion of knowledge and technology, the production of which is often highly concentrated within a relatively small set of developed countries. Exposure to foreign firms and markets through exporting is therefore considered an important means for generating productivity and learning gains. Such exposure and learning may be even more important in the context of global value chains (GVCs), within which the relationship between suppliers and lead firms can be an important means of learning, both through the direct diffusion of technology as well as through knowledge sharing to meet international standards. Similar arguments can be made at the more aggregated level about successfully exporting to richer markets, where quality requirements (formalized in standards and certifications) may be more stringent than in other markets. Exporting to such markets may therefore be associated with more rapid learning and a greater diffusion of knowledge and technology, although the benefits of such technological diffusion may well depend on the receiving economy’s level of absorptive capacity, such as human capital levels (e.g. Falvey et al., 2004, 2007).

While the above highlights some of the benefits associated with an open trade regime, and specifically with exporting, there are also arguments against an open trade regime, which were used to promote and defend the ISI strategy. One important dimension of this argument in the case of exporting relates to specialization patterns. The concern is that developing countries with relatively few capabilities may become specialized in low-quality production. This was traditionally associated with natural resources and agricultural products, but has more recently been linked with low-tech manufacturing and low value-added stages of production in GVCs. There is concern that such specialization patterns may be associated with low productivity growth, with many of these activities considered to have limited possibilities for productivity improvements, as well as income inelastic demand, terms of trade decline and export instability. While the evidence in favour of these arguments is often mixed (depending on the time period considered and with evidence of country heterogeneity; see Kellard and Wohar, 2006), these arguments suggest that a country's specialization pattern is an important consideration when discussing the benefits or drawbacks of trade openness for development and industrialization prospects. This conclusion is reinforced in recent literature in econophysics on the complexity of production and exports (Hidalgo and Hausmann, 2009). This literature also suggests that the structure of production and exports (which in turn are a function of unobserved capabilities) is strongly related to growth performance.

Turning to the import-side, one of the major advantages associated with importing is gaining access to goods that are not available domestically. While this may have welfare effects for consumption (Broda and Weinstein, 2006), larger gains are often anticipated from the import of capital and intermediate goods that are often not available domestically or that are of a higher quality. There is substantial empirical evidence indicating that the import of capital goods is associated with increased economic growth (e.g. Lee, 1995). Similarly, evidence suggests that trade liberalization (i.e. moving towards increased trade openness) can be a source of new intermediate inputs (e.g. Goldberg et al., 2009), which can improve firm performance. Indeed, the importance of importing intermediate and capital goods, combined with its estimated effects on growth outcomes, has led some to suggest that the major reason for exporting is to obtain the foreign currency needed to import (Krugman, 1996).[3]

In relation to the arguments raised above, the question of knowledge and technology diffusion arises. While there is evidence that exporting can be a channel through which knowledge is diffused, importing could be considered a more natural channel for such exchanges, with knowledge and technology potentially embodied in physical goods as well as potentially being disembodied and derived from foreign contacts and suppliers. Beyond the direct flow of knowledge across borders, greater competition from foreign suppliers (i.e. through imports) may also be a stimulus for firms to adopt new products and processes. A significant evidence base exists which suggests that imports are indeed an important channel of knowledge spillovers that have a positive impact on productivity and output growth (a seminal study was published by Coe and Helpman, 1995).

In summary, the arguments in favour of a positive impact of openness to trade on economic performance remain convincing, albeit with heterogeneous effects across countries, depending on their factor endowments, capabilities, etc. Yet it is not only the level of openness—captured, for example, by a country's level of imports and exports—–that plays a relevant role and that captures an economy's performance in trade. One of the major arguments in favour of the ISI approach is the

[3] A similar argument relates to the so-called balance of payments constrained growth rate, which suggests that the growth rate of GDP in the long run can be approximated by the ratio of growth of real exports to the income elasticity of demand for imports, with exports again playing the role of generating foreign exchange (see Thirlwall, 1979).

concern that by specializing according to their comparative advantage, countries may end up specializing in the production and export of goods that do not provide opportunities for dynamic gains from trade, that are experiencing declining terms of trade and that are income inelastic. In earlier studies, the focus tended to be on the production and export of natural resources, products that are typically characterized by strong cycles of different periodicities (Erten and Ocampo, 2013). Similar arguments may also apply to certain low-tech manufactured goods and in the case of GVCs and for certain (i.e. low value-added) segments of the value chain. In other words, what matters is not simply exporting, but about *what* the country exports (Hausmann et al., 2007). Moreover, what the country exports can also be an important indicator of what it can export next, with the country's current export basket indicating its current capabilities and the constraints to what can be exported in the future. This issue is discussed in more detail in Tool 3 on diversification and upgrading.

While the discussion on import substitution and export orientation has focused on trade policies, a country's success or otherwise in international trade hinges on a broader set of factors. One such factor is the country's factor endowments which determine the range of goods the country can successfully export, but also includes factors that are external to firms, such as institutions, infrastructure and logistics that lower the costs of international trade and allow for a timely movement of goods across borders, as well as factors that are internal to the firm, such as capabilities and absorptive capacity.[4]

The purpose of this tool is to provide a set of indicators and diagnostics to identify a country's current level of integration into the global economy. The aim is to examine whether a country is meeting its potential in terms of international trade as well as to provide indirect evidence of the country's existing capabilities. In line with the above discussion, it is clear that these indicators must go beyond simple indices of exports and imports. The structure of both imports and exports is an important factor. On the export side, this relates to questions about the complexity of a country's exports, the characteristics of its export basket (e.g. natural resources, low-tech manufacturing, etc.) and importantly, the destination of the country's exports. On the import side, this covers questions about the structure of imports in terms of the use of imported goods (e.g. for intermediate use, capital goods, etc.).

[4] According to Cohen and Levinthal (1990), the "notion of absorptive capacity is that the organization needs prior related knowledge to assimilate and use new knowledge." (pp. 129).

2 Relevance for the industrial policymaking process

This tool primarily aims to evaluate a country's performance and its industry in terms of its global trade integration. Performance in this sense is a broad term covering a country's level of global integration and the structure of its trade. The tool thereby determines the country's global competitiveness and that of its various sub-sectors on the basis of the composition or structure of its exports. On the import side, the tool provides information about the structure and geographical sources of different types of imports, which can be used to identify areas where the country and its sub-sectors lack productive capabilities, based, for example, on the composition of its import structure. The approach adopted to assess a country's performance entails a comparison with relevant comparator countries, either through a pre-selection of comparator countries or through indicators such as revealed comparative advantage (RCA), which are constructed relative to a specific benchmark (usually world shares). By focussing on diagnostics, the tool takes a first step towards defining *policy areas* that need attention. For example, if a country with comparable fundamental characteristics or endowments can export a higher share of its products to rich world markets, it may indicate untapped opportunities for laggard countries. Certain policies may be necessary to capitalize on these opportunities. The tool does not address the underlying causes of poor performance, but additional indicators can be used (e.g. on infrastructure or logistics performance) and/or an initial input to policy engagement with the private sector provided (e.g. is failure to meet standards and certifications a cause of the country's relatively poor export performance?).[5]

In addition to a cross-country comparison, the tool also examines data over time, allowing for an assessment of changes in the country's composition of exports and imports. While this approach is also adopted in Tool 3 (diversification and upgrading), primarily to capture upgrading, it contributes value when considering trade openness more generally. This approach allows for an examination of the changing dependence on imports to meet capital and intermediate good requirements, as well as of the changing structure of exports with respect to products (increased or reduced dependence on low-tech manufacturing, for example[6]) and countries (a shift towards or away from rich world markets). These dynamics have the potential to inform policymakers about whether their country's development in trade performance has been positive and to identify areas of concern.

A third policy-relevant angle relates to policy evaluation. Since we use time series data, past policy interventions cannot be directly connected to the development of trade performance. For example, one would expect that past trade liberalization has a positive impact on import and export levels, but have heterogeneous effects on the structure of trade (depending on the country's factor endowments, for example). A finding that exports did not respond to liberalization may indicate the presence of certain bottlenecks that require policy intervention, while a change in the country's export structure towards low-tech manufacturing and agricultural goods may suggest that certain policy interventions are necessary to allow for a gradual upgrading of production capabilities (see Tool 3).

While the indicators developed in this tool do not always directly link to policy interventions, they can serve as a useful guide for identifying policy areas and capabilities that are lacking in the case country. These capabilities are often likely to relate to endowments, particularly human and physical capital.

[5] They are partly discussed in Tool 8.

[6] Note that this discussion on the structure of trade is related but differs to the topic covered in Tool 3, namely diversification. A change in the structure or composition of exports can, in principle, be associated with higher, lower or unchanged levels of diversification.

In other cases, institutional and infrastructural factors are likely to represent major constraints. These examples highlight the importance of the comparator countries used in the analysis. The use of comparators with similar endowments allows ruling out of endowments as the major constraint. Likewise, comparator countries with similar access to the sea and logistics capabilities rules out the possibility of logistics being the case country's major constraint.

3 Methodology and Indicators

This section presents a guide for calculating a selection of indicators on international trade performance. It addresses questions such as: Which indicators can be used to measure the country's integration in the global economy on both the import and export side? Which indicators can be used to capture the structure or composition of trade? Which data are needed, and where can the relevant data to answer these questions be found? How does the data need to be manipulated? What does the diagnostic process look like, and which analytical steps must be taken?

The first step is identifying the indicators of export and import ratios to capture the country's intensity of trade. It is important to understand the shortcomings of these ratios and distinguish relevant comparator countries to provide meaning to these indicators. At the same time, basic indicators of the composition of exports and imports are introduced. The focus then moves beyond the simple value of trade flows to consider the country's specialization patterns using the concept of RCA.

To illustrate how the methodology presented in this tool can be applied, the methodological discussion is followed by concrete examples using data from various countries.

Selecting comparator countries for benchmarking

The choice of suitable benchmarking countries very much depends on the indicator being considered. As already mentioned, the values of export and import ratios are strongly (and negatively) correlated with indicators of country size, such as level of GDP and population size. This is because larger countries do not need to specialize to the same extent as smaller countries and are therefore not as reliant on trade to achieve consumption gains. As such, comparator countries with similar GDP levels and/or population size should be selected. At the same time, several other factors are known to have an impact on a country's level of trade – on both exports and imports. These include geographical factors such as whether countries are island economies, whether they are landlocked as well as their distance from major markets. These factors can therefore also be considered when choosing comparator countries.

In the case of indicators of export (and import) composition, countries' GDP level and population size are likely to be less relevant than other factors. One relevant variable is a measure of development or income level, such as GDP per capita. An additional important set of factors relates to endowments, and particularly to natural resources. When considering comparator countries in terms of indicators of diversification, income per capita is likely to be an important factor, with evidence suggesting that a country's level of diversification correlates strongly with GDP per capita.

3.1 Measuring trade integration – trade intensity measures

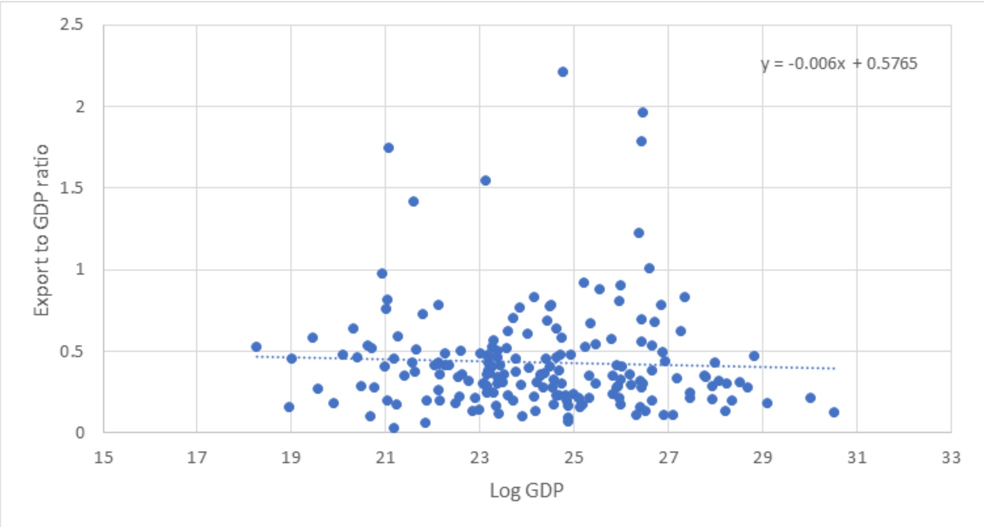
A useful starting point to determine the country's degree of global integration is to consider its export to GDP ratio[7], which is often used as an indicator of the country's overall openness.[8] This indicator can provide a general picture of the extent of a country's integration in the global economy, with change across time capturing increases or declines in trade integration. While the changes over time are

[7] An alternative used in earlier versions of EQuIP was the ratio of exports to population, capturing the value of exports per person and used as an indicator of the country's capacity to export.

[8] A common alternative is the ratio of total trade (i.e. exports plus imports) to GDP.

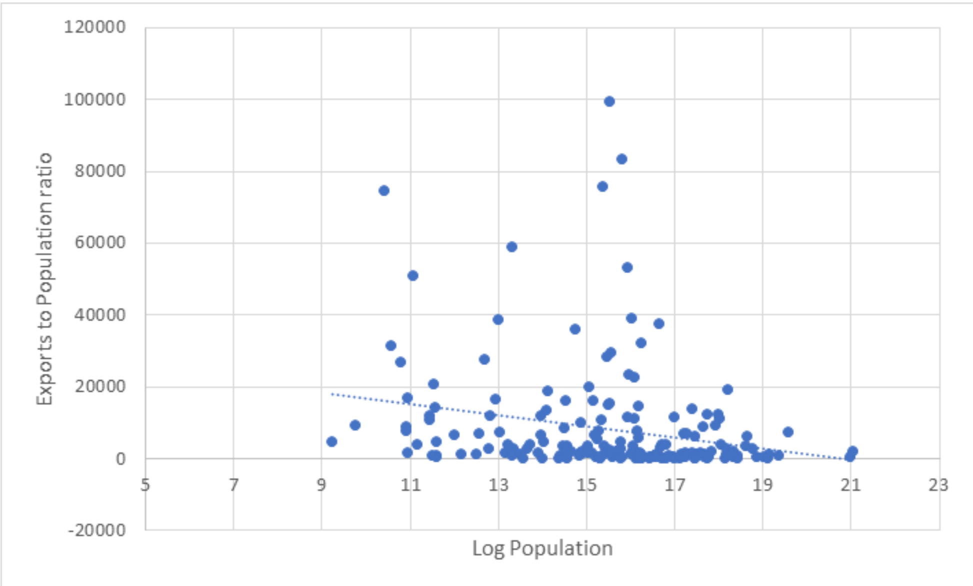
conceptually straightforward to interpret—with a growth in export ratio reflecting increased global integration—information on the ratio of exports to GDP (or population) must be interpreted carefully. This is because these ratios tend to be driven to a large extent by country size, with larger countries (in terms of GDP or population) tending to report a lower ratio of export to GDP, an outcome which in turn is driven by the more diversified structure of larger economies, leaving them less reliant on international trade. Export to GDP ratio (or another similar trade ratio) should not be used to compare levels of export capacity. This is demonstrated in **Figure 1** for GDP and **Figure 2** for population, both of which report data for 2015.

Figure 1: Plot of export to GDP ratio against the log of GDP



Data Source: World Development Indicators (World Bank)

Figure 2: Plot of export to population ratio against the log of GDP



Data Source: World Development Indicators (World Bank)

It is important to emphasize that a proper assessment of a country's integration into the global economy involves both the export and import dimension. Considering the import to GDP ratio can therefore be a valuable complementary indicator, despite the fact that the export and import to GDP ratios tend to be highly correlated. The export dimension—captured by the phrase "what you export matters"—and specifically a country's export structure provides a picture of its set of productive capabilities (Hausmann et al., 2007). Conversely, a country's import structure reveals the productive capabilities that in a sense are lacking in the country, which could be interpreted as areas that require upgrading. Another way of thinking about imports is that they can provide a country with high-quality imported intermediate and capital goods that support its own production activities. The lack of a global comparative advantage in particular products can be perceived as foreign dependence, with the relative technological sophistication of the country's import portfolio (especially the sophistication of imported intermediate products and capital goods) serving as an indicator of the sophistication of its productive capabilities (e.g. the Mexican imports within the Maquiladora Programme). This tool considers the import perspective to be complementary to the export perspective.

Indicator 1 – Export to GDP ratio

The export to GDP ratio is measured by the ratio of the value of exports (in current US$) to the value of GDP (also in current US$). Different definitions of exports can, however, be adopted when constructing this ratio. The World Development Indicators (World Bank), for example, includes both goods and services exports in its definition of export to GDP ratio. It is possible, however, to consider alternative definitions such as focussing on goods exports only or on manufacturing products only.

Strategic question:

- To what extent is the country integrated into the global economy?

Equation: Export to GDP ratio is measured as:

$$ExpRatio_{it} = \frac{Exp_{it}}{GDP_{it}}$$

Exp = value of exports in current US$

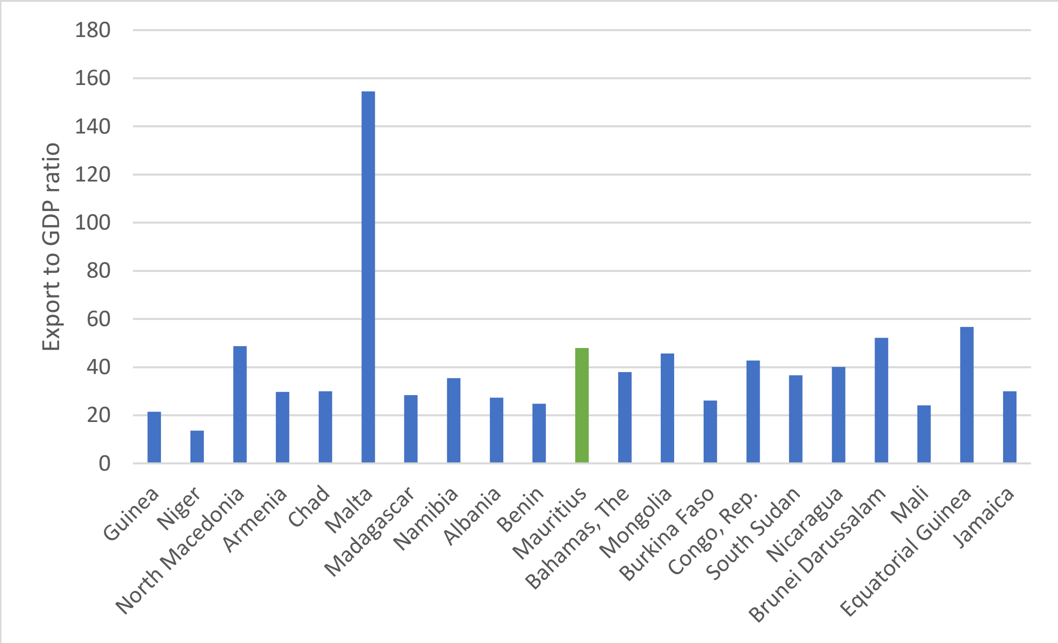
GDP = value of GDP in current US$

The subscripts i and t refer to countries and time periods, respectively.

Variables required	Data source	Notes
Export values (Exp)	Various sources including World Development Indicators (World Bank) and UN COMTRADE (2022) database via the WITS platform	The indicator can also be downloaded directly from World Development Indicators (World Bank). When considering manufacturing exports or some other sub-aggregate, export data from UN COMTRADE will be needed to aggregate to the appropriat level.
Gross domestic product (GDP)	Various sources including World Development Indicators (World Bank)	

Given the importance of considering (and potentially controlling for) differences in country size when using ratios such as the export to GDP ratio, one useful approach to benchmarking is to compare a country's export to GDP ratio with that of other countries of a similar size. This allows identifying where a country falls within this more limited distribution of countries. **Figure 3** presents Mauritius' export to GDP ratio[9] alongside that of 20 other countries (the ten countries that lie directly to the right of Mauritius in GDP distribution and those that lie directly to its left in GDP distribution). By controlling for level of GDP in this way, this approach allows for a more meaningful comparison of a country's general degree of trade openness. In our example, and if we disregard the case of Malta, Mauritius appears to have a relatively high level of openness. Indeed, among the 21 countries included in the figure, Mauritius ranks fifth in terms of openness, with an export to GDP ratio of 47.9 per cent.

Figure 3: Ratio of export to GDP in 2015 for Mauritius and similarly sized comparator countries



Data Source: World Development Indicators (World Bank)

While useful as an indicator of general trade openness, the approach illustrated in **Figure 3** highlights that country size is not the only driver of trade openness. The figure includes countries at various levels of development (e.g. Malta versus Chad), with different export structures (e.g. Equatorial Guinea versus The Bahamas) and different proximities to major markets (e.g. Madagascar versus Malta), for example. The usefulness of this general openness indicator on its own is therefore limited. Hence, it needs to be complemented with the indicators introduced below to provide further and more complete information.

While the previous discussion highlights the importance of selecting suitable comparator economies, data on export ratios can be used for benchmarking purposes. By comparing similar countries with one another, it can be assumed that they will show a similar level of performance (in this case, export performance in terms of export to GDP ratio). The extent of deviations from the best performer can be interpreted as the gap or distance from capacity (in this case, export capacity). **Table 1** reports the same information illustrated in **Figure 3**, but also includes information on relative export ratio, defined

[9] The data are from World Development Indicators (World Bank) are thus include both goods and services.

as the ratio of export to GDP for each country to that of the country with the highest ratio (in our case, Malta). The relative export ratio thus provides an indication of the extent to which a country's export to GDP ratio lies below that of the lead economy in the list of comparators. In our case, the results suggest that Mauritius' export to GDP ratio is around 31 per cent of Malta's. While this appears to be a relatively weak performance in comparison to the lead economy, Mauritius still performs better than most other comparators in terms of this general indicator of a country's overall integration into the global economy.

Table 1: Export to GDP ratio and relative export ratio in 2015

Country	Export to GDP ratio (%)	Relative export ratio (Malta = 100)
Guinea	21.50	13.90
Niger	13.62	8.81
N. Macedonia	48.74	31.52
Armenia	29.73	19.23
Chad	30.00	19.40
Malta	154.62	100.00
Madagascar	28.39	18.36
Namibia	35.37	22.88
Albania	27.27	17.64
Benin	24.72	15.99
Mauritius	47.86	30.96
Bahamas, The	37.92	24.52
Mongolia	45.65	29.52
Burkina Faso	26.11	16.89
Congo, Rep.	42.73	27.63
South Sudan	36.65	23.70
Nicaragua	40.08	25.92
Brunei Dar.	52.21	33.77
Mali	24.04	15.55
Equatorial Guinea	56.66	36.64
Jamaica	29.92	19.35

Data Source: World Development Indicators (World Bank)

Indicator 2 – Import to GDP ratio

Similar to the approach taken for exports, another useful starting point when considering global integration in the global economy in terms of imports is to consider import to GDP ratio.[10] This is defined analogously as the ratio of the value of imports (in current US$) to the value of GDP (also in current US$). As with the case of exports, different definitions of imports can be adopted when constructing this ratio, with the World Development Indicators (World Bank) including imports of both goods and services.

Strategic questions:

- To what extent is the country integrated into the global economy?
- To what extent is the country reliant on imported (intermediate) goods?

Equation: Import to GDP ratio is measured as:

$$ImpRatio_{it} = \frac{Imp_{it}}{GDP_{it}}$$

Imp = value of imports in current US$

GDP = value of GDP in current US$

The subscripts i and t refer to countries and time periods, respectively.

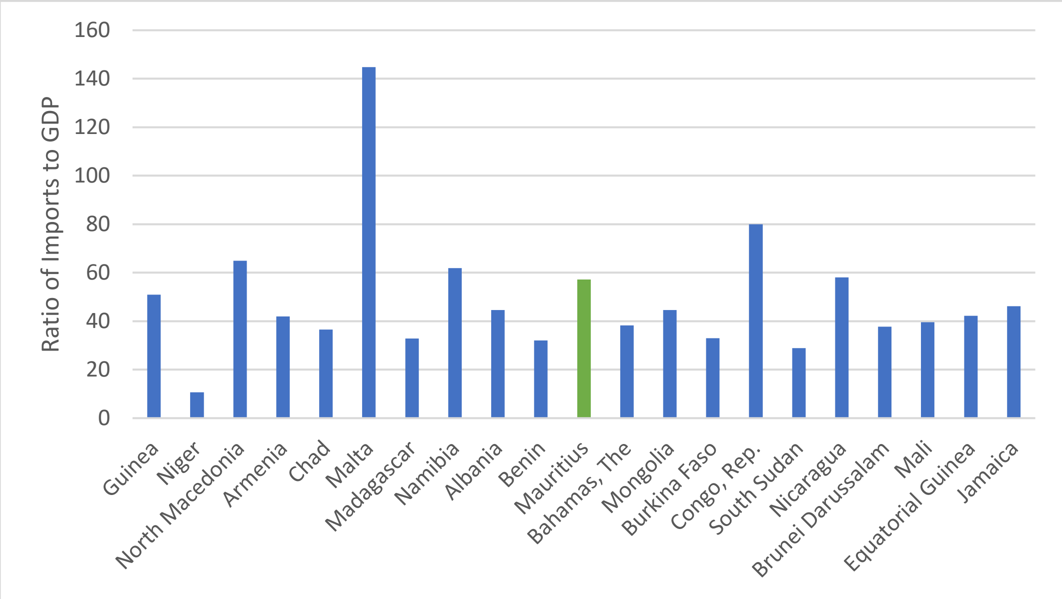
Variables required	Data source	Notes
Import values (Imp)	Various sources including World Development Indicators (World Bank) and UN COMTRADE (2022) database via the WITS platform	The indicator can also be downloaded directly from World Development Indicators (World Bank). When considering manufacturing imports or other sub-aggregates, import data from UN COMTRADE will be necessary to aggregate to the appropriat level.
Gross domestic product (GDP)	Various sources including World Development Indicators (World Bank)	

The import to GDP ratio faces the same interpretation challenges as the export to GDP ratio, with larger countries tending to have lower import to GDP or population ratios, reflecting the fact that larger countries can, to a greater extent, rely on their own intermediate goods, for example. Differences in size must therefore be considered when using the indicator import to GDP ratio. Comparing a country's import to GDP ratio with that of countries of a similar size is a useful approach for identifying where a country falls within this more limited distribution of countries. As in the case for exports, **Figure 4** presents information on Mauritius' import to GDP ratio alongside that of 20 other countries (the ten countries that lie directly to the right of Mauritius in GDP distribution and those that lie directly to its left in GDP distribution). By controlling for level of GDP in this way, this approach allows for a more meaningful comparison of a country's level of trade openness in terms of imports. In this example, and consistent with the results for exports, Mauritius can be considered as being relatively open to imports. The country's import to GDP ratio is 57 per cent, ranking Mauritius in the top six countries included in the figure (with Malta again being an extreme outlier). Other countries with a higher import share include the Republic of the Congo, Nicaragua, North Macedonia and

[10] Similar to when considering the export side, an alternative to look at ratios to GDP is to take the ratio of imports to population, capturing the value of imports per person.

Namibia. As highlighted above, one explanation for these differences in import ratio could be related to foreign import dependence, although such a reliance may also offer benefits through imports of high-quality intermediates and potentially through the diffusion of knowledge and technology. To gain a better understanding of the example under consideration, we must look beyond simple import ratios and examine the structure of imports.

Figure 4: Import to GDP ratio in 2015 for Mauritius and similarly sized comparator countries



Data Source: World Development Indicators, World Bank (2022)

Similar to the case of export to GDP ratio, a benchmarking exercise can be conducted for import to GDP ratio, although similar challenges arise when determining suitable comparator economies. **Table 2** presents the results of this benchmarking exercise, with Malta again achieving the best results in terms of integration in the global economy according to this measure. Mauritius' import to GDP ratio is 40 per cent of that of Malta, although this share is still higher than in most other comparator countries included in **Table 4**.

Table 2: Import to GDP ratio and relative import to GDP ratio in 2015

Country	Import to GDP ratio (%)	Relative import to GDP ratio (%)
Guinea	50.95	35.17
Niger	10.67	7.36
N. Macedonia	64.96	44.85
Armenia	41.96	28.97
Chad	36.56	25.24
Malta	144.85	100.00
Madagascar	32.83	22.66
Namibia	61.87	42.71
Albania	44.53	30.74
Benin	32.04	22.12
Mauritius	57.15	39.45
The Bahamas	38.26	26.41
Mongolia	44.64	30.82
Burkina Faso	32.98	22.77
Congo, Rep.	79.97	55.20
South Sudan	28.90	19.95
Nicaragua	58.11	40.12
Brunei Dar.	37.68	26.01
Mali	39.60	27.34
Equatorial Guinea	42.22	29.15
Jamaica	46.20	31.89

Data Source: World Development Indicators, World Bank (2022)

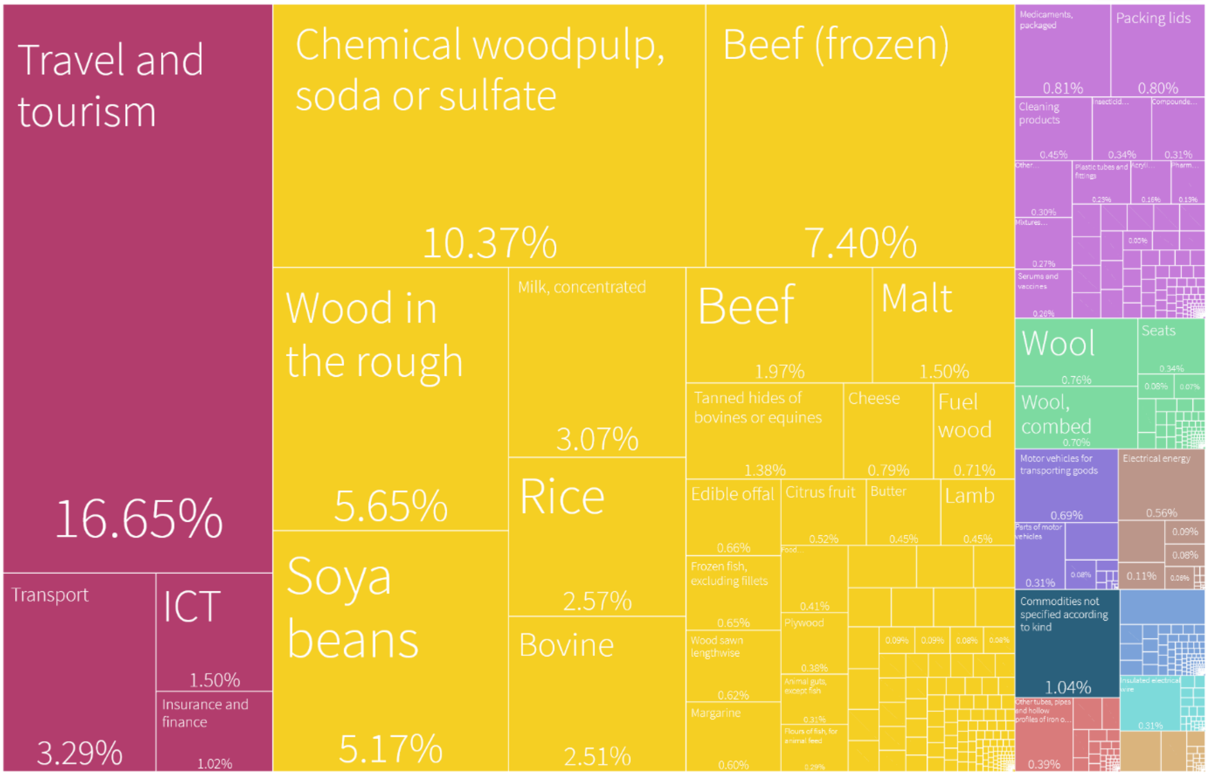
3.2 Measuring the composition of trade

While simple export and import ratios can provide a general overview of a country's integration in the global economy, it does not say much about *how* the country is integrated. One important dimension when considering a country's successful or otherwise integration in the global economy relates to the composition of its exports and imports, with the relevant dimensions including the economy's sectoral composition, the variety of products being exported and imported, and the technology content of the country's exports and imports. Before turning to these dimensions of trade composition, it is recommended to first take a more impressionistic approach to understanding the country's export structure using a tree chart at a suitable level of resolution.

A comparative example of the use of such a tree chart can be found in the Harvard Growth Lab's Atlas of Economic Complexity. The approach presented in the Atlas is to use goods trade data at the 4-digit

HS level[11], as well as data on services trade using the Extended Balance of Payments 2010 (EBOPS) classification across five categories: (i) communications; (ii) insurance and finance; (iii) transportation, (iv) travel, and (v) other. **Figure 5** and **Figure 6** report data on the composition of Uruguay and Zambia's exports in 2018 using this approach and data. These examples demonstrate how radically different the composition of two countries' exports can be when looking at a highly detailed level of products, with the structure of Uruguay dominated by agricultural and food products and Zambia's dominated by the extraction of metals and minerals. The two figures also show differences in the level of diversification across products, with over 60 per cent of Zambia's exports accounted for by two 4-digit products (unrefined copper and refined copper and copper alloys).

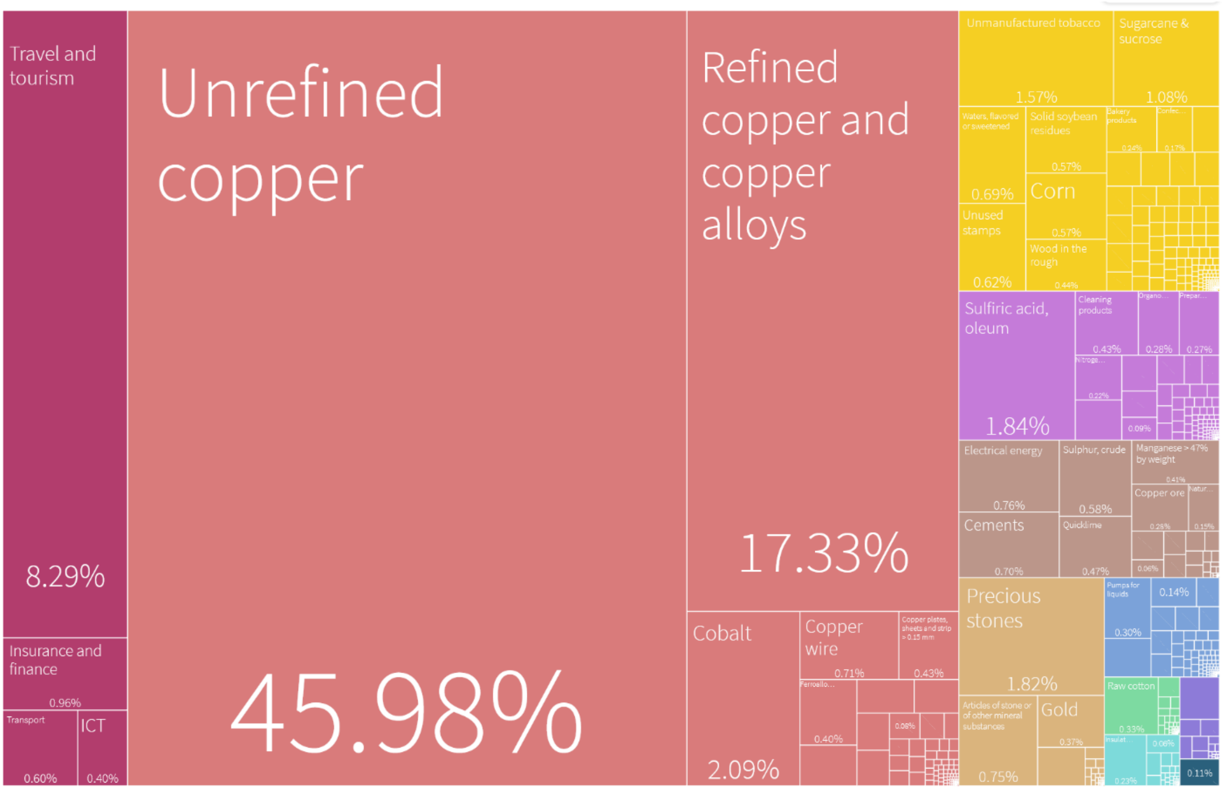
Figure 5: The composition (in shares) of Uruguay's exports in 2018 (HS4 classification)



Source: The Atlas of Economic Complexity by Harvard's Growth Lab

[11] HS refers to the Harmonized System (HS) classification, which is the World Customs Organization's Harmonized Commodity Description and Coding System. The HS codes are composed of 6 digits, with the first two digits being the chapters, the first four digits representing headings and the full six digits denoting subheadings. There are around 5,200 HS codes in the 2012 HS classification, with around 1,400 4-digit headings.

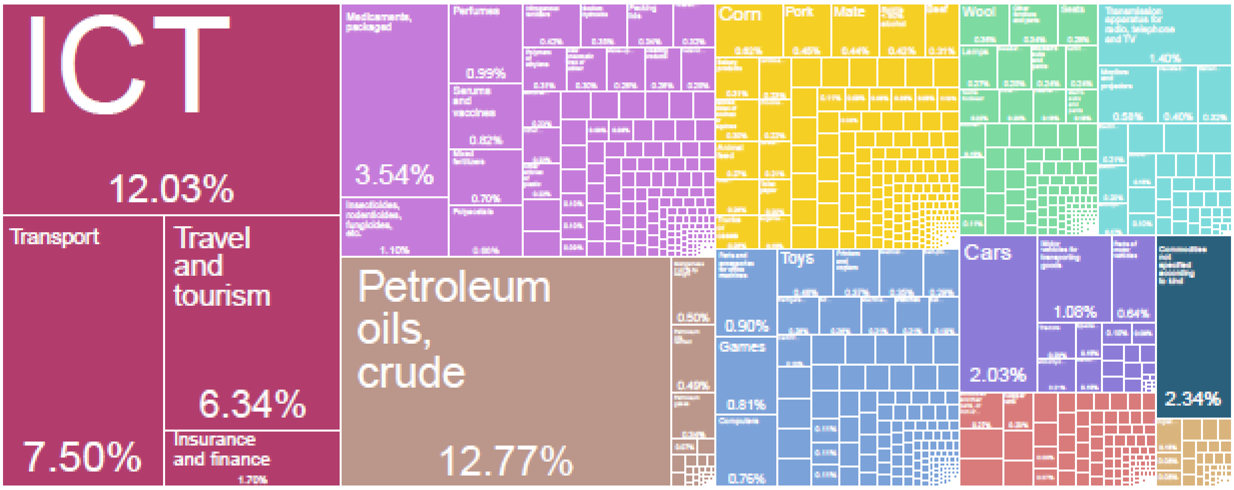
Figure 6: The composition (in shares) of Zambia's exports in 2018 (in HS4 classification)



Source: The Atlas of Economic Complexity by Harvard's Growth Lab

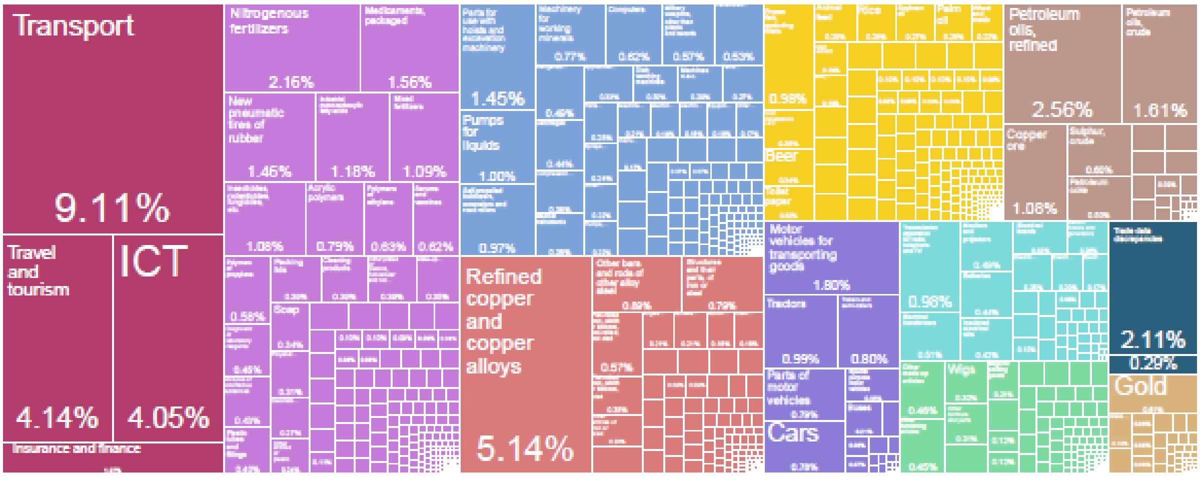
Figure 7 and **Figure 8** report similar information, but for imports. The figures again reveal a number of differences in the composition of imports between countries, with Uruguay being more reliant on imports of petroleum products and information and communication technology (ICT) than Zambia, for example, and Zambia more reliant on certain metals. The figures further highlight the differences between the two countries' import and export structures, with their import structure looking far more diversified than their export structure. The set of products imported and exported by the two countries also differ considerably, although certain sectors—e.g. metals and refined copper specifically—appear to be important exports and imports for Zambia.

Figure 7: The composition (in shares) of Uruguay's imports in 2018 (in HS4 classification)



Source: The Atlas of Economic Complexity by Harvard's Growth Lab

Figure 8: The composition (in shares) of Zambia's imports in 2018 (in HS4 classification)



Source: The Atlas of Economic Complexity by Harvard's Growth Lab

While providing a useful visual indicator of trade structure, the drawback of the above figures is that they are too detailed and disregard the sectoral dimension, the use of the exported (or imported) goods, and their levels of complexity or technological content, among others. Moving beyond this basic composition of exports or imports, this tool therefore also considers the composition of exports and imports across different dimensions. These dimensions include: (i) manufacturing sectors; (ii) broad economic categories (BEC), which break down products according to their functional properties (i.e. cross categorizations between the consumption/intermediate/capital dimension and primary/processed goods), and (iii) technological classification, which distinguishes groups of products according to the necessary technological capabilities to produce them. These different categorizations capture different policy-relevant outcomes, with sectoral and technological aggregations relating to the question whether countries are specialized in low-tech segments and natural resources, for example, which likely involves the export of goods that do not require sophisticated capabilities, which may result in limited opportunities for upgrading (i.e. the ability to move towards more complex products that require more sophisticated capabilities), and which may have other negative characteristics (e.g. declining terms of trade[12], income inelastic demand[13], etc.).

The data used to capture these different dimensions are retrieved from UN COMTRADE (2022), which provide information on bilateral export and import values (in US$) at a granular level (i.e. around 5,000 product definitions based on the Harmonized System at the 6-digit resolution, HS 6-digit).

Error! Reference source not found. describes how to retrieve data that are more detailed than available in the World Development Indicators database used above.

Box 1. Data sources for trade data

UN COMTRADE data can be readily retrieved via the WITS platform or the COMTRADE website. Both websites offer an intuitive interface for analysts to define their query. Detailed data are needed for some of the analyses, however. It is generally recommended for analysts to use the WITS platform, which allows for larger downloads. At least, this was true at the time of writing this document.

The most detailed data used in this tool is HS 6-digit data in the 2012 version. This detailed classification includes over 5,000 goods and is mostly needed to convert to BEC Rev. 5 classification and to the ISIC industry classification later in this document. In many cases, the analyst can also download HS 4-digit aggregates and still convert to BEC rev.5.

It should be noted that in some countries, the most detailed HS 6-digit information does not aggregate to the 4-digit numbers in all cases. For example, information on beverage exports may be available, but not on detailed beverages. If analysts start with the details, they will skip the group of beverages as a whole. This is often due to confidentiality. For this reason, and to not disregard potentially important information, the analyst might want to look at 4-digit aggregates or even 2-digit aggregates to ensure that the sums of the 6-digit data are approximately the same. The analyst can also cross-check graphical export baskets from websites such as the Harvard Complexity Atlas (see above) to ensure no important items have been missed.

In any case, the analyst will often end up with large queries. Earlier versions of the WITS platform only allowed downloads of 100,000 rows at a time while the UN COMTRADE website also limits the number of rows by restricting the combination of years, countries and goods that can be selected at once. The user must either restrict the query to a smaller size or conduct multiple downloads. It is highly recommended to check whether all data have been successfully downloaded and not truncated by the data provider.

Downloading the imports and exports of HS 6-digit goods for every reporting country to every partner country results—depending on the year—in close to or above 10 million rows (and 10–20 columns). This makes it cumbersome or impossible to conduct manually via the platforms and will prevent the analyst to open the data in Excel, for example.

There are several possible solutions for this: the easiest is to define the query more narrowly in terms of years, countries or goods. We are often interested in total imports or total exports to the world without needing information on the trading partners. Sometimes, just one recent year suffices or the number of goods can be restricted to one industry. Two years of data might be sufficient for simple average annual growth rates over a span of time.

Analysts can also use the BACI dataset by CEPII instead of the raw COMTRADE data. While BACI uses a version of COMTRADE, its data have some advantages and disadvantages.

[12] Terms of trade refers to the ratio of export prices to import prices.

[13] Income elasticity of demand refers to the sensitivity of demand to changes in income. Income inelastic demand refers to the situation in which demand is not very responsive to changes in income.

Biggest advantage:

- Trade flows are balanced. Exports from A to B are equivalent to imports of B from A. This is not necessarily the case for COMTRADE data for various reasons.
- Users can download all detailed trade flows in bulk for a single year. This is not possible for most users of WITS or other sources of COMTRADE data.

Biggest disadvantages:

- There is no user-friendly interface that allows analysts to download specific data, the user must download all data. These data cannot be opened in Excel but only in statistics software. The user needs to have knowledge of R, Stata or a similar software to carry out the analyses.
- The cleaning procedures that guarantee balanced trade flows are not necessarily transparent or easy to follow for most users.

The indicators listed above do not require the bilateral dimension, with the bilateral data aggregated to the level of total exports or imports of a particular HS 6-digit category for each country (i.e. exporter or importer).[14] At the same time, the structure of exports and imports with regard to trade partners is a relevant dimension and will be discussed further below. Concordances[15] between HS 6-digit categories and manufacturing sectors (ISIC-4), the BEC taxonomy and the technological classification are used to classify/aggregate the trade data into the dimensions we want to examine.

Based on similar arguments to those presented above—namely that using the simple levels or values of exports and imports is not suitable for a reasonable analysis as larger countries will tend to report higher values—the initial indicators of the composition of exports are all expressed in shares. For example, the share of medium- and/or high-tech products in the country's export or import portfolio, or the share of processed intermediate goods in its import portfolio. By not relying on GDP or population to normalize the export values, the problem mentioned above (i.e. that larger countries tend to be more diversified and therefore have lower shares of exports to GDP or population) is avoided.

Indicator 3 – Export composition

The export share of a particular category of goods is calculated as the ratio of the value of exports (in current US$) of a particular category (e.g. of a particular sub-sector, technology content, end-use) to the value of some aggregate of exports (current US$), usually total exports or total manufacturing exports. Combining this information for all relevant categories (e.g. all sub-sectors, all technology classes) provides a complete overview of the composition of the country's exports. In principle, the same approach can be adopted to consider the share and composition of exports across various categories, meaning that this document does not describe the methodology separately for constructing compositions for different categories.

[14] Data can also be aggregated to different levels of aggregation, including 4-digit headings, 2-digit chapters or to a set of 21 sections.

[15] A concordance maps the different product categories in the HS system and the categories used in other aggregations.

Strategic questions:

- Which manufacturing sectors dominate the country's export structure?
- To what extent is the country reliant on low-tech manufactured exports?
- What are the uses of products exported by the country?

Equation: The export composition of a particular type of good is measured as:

$$ExpComp_{it} = \frac{ExpByType_{it}}{Exp_{it}}$$

$ExpByType$ = value of exports (in current US$) of a particular type (e.g. sub-sector, technology class, end-use)
Exp = total value of exports (in current US$)

The subscripts i and t refer to countries and time periods, respectively.

Variables required	Data source	Notes
Export values of particular aggregates (ExpByType)	UN COMTRADE (2022) database via the WITS platform	To construct the different aggregates of exports, it may be necessary to use concordances to translate the detailed product-level export data to the appropriate level of aggregation.
Export values (Exp)	UN COMTRADE (2022) database via the WITS platform	

Constructing export (and import) shares

For a more formal exposition of the construction of export shares and indicators of export composition, we define the variable $\boldsymbol{E}_{\boldsymbol{k,t}}^{\boldsymbol{i,j}}$ which provides the value of product $\boldsymbol{k}$ (in US$) in the exports of country *i* to country *j* in year *t*, where products refer to the set of around 5,000 products in the HS 6-digit categorization. The variable can also be used to indicate the value of product *k* which is imported by country *j* from country *i* in year *t*.

Using this definition, a particular export share (SE) can be constructed based on the following equation:

$$\boldsymbol{SE}_{\boldsymbol{c,t}}^{\boldsymbol{i}} = \frac{\sum_j \sum_{k\in c} \boldsymbol{E}_{\boldsymbol{k,t}}^{\boldsymbol{i,j}}}{\sum_j \sum_k \boldsymbol{E}_{\boldsymbol{k,t}}^{\boldsymbol{i,j}}}.$$

where $\boldsymbol{c}$ refers to the particular category or aggregate we want to construct the share for (e.g. sub-sector, technology class, end-use).

The equation states that the share of a category or aggregate $\boldsymbol{c}$ in the country's total (manufacturing) export basket is constructed as the sum across all trade partners (i.e. importers *j*) of the value of all exported products (*k*) that are part of category $\boldsymbol{c}$ divided by the sum across all trade partners of the value of all (manufactured) exported products.

Export composition across manufacturing sectors

This is a basic indicator of a country's export composition that offers information at a fairly aggregated level, but also a level that is comparable with data used in other tools (e.g. production data). All else being equal, a greater variety of products would be associated with a higher degree of integration. The indicator provides a description of the share of each sector in the country's total manufacturing export portfolio. The indicator allows the identification of the manufacturing sectors with the highest export activity. By considering changes in these shares over time, it is possible to examine their dynamics as well as those sectors that are gaining (and losing) relevance in the country's overall export basket.

Before constructing the composition of exports from the manufacturing sector, we must consider which sectoral aggregation to use. An obvious choice is to use the International Standard Industrial Classification (ISIC), although this raises the question which level of aggregation to consider.[16] This will depend on how the data are ultimately used. If the focus is on the performance of specific sectors, then using data at the 3- (i.e. group) or 2- (i.e. section) digit level could be informative.

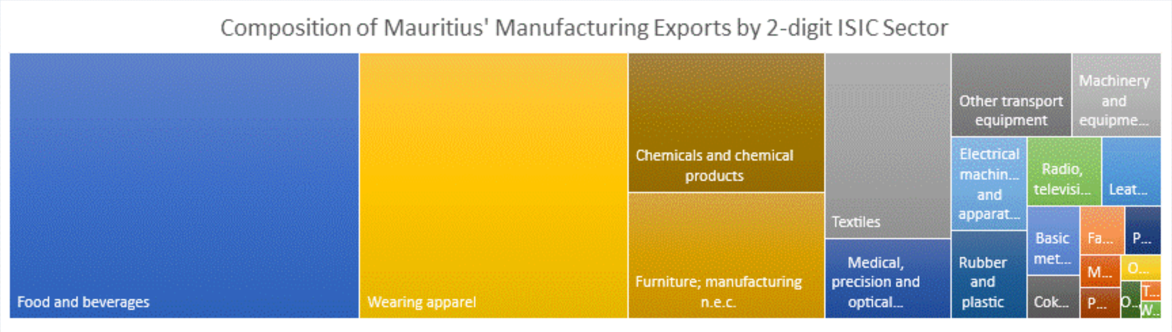
As an example of how the indicators can be used, we consider the composition of Mauritius' manufacturing exports by sector in comparison to a set of countries with a similar GDP per capita for the year 2015. It would also, of course, be possible to examine Mauritius' performance over time to determine whether its export composition has changed and if so, in which direction, but for the purpose of this particular example, the focus is on a cross-country comparison. According to the World Development Indicators database, Mauritius' GDP per capita in 2015 was US$ 9,260 (in constant US$). Only few other African countries had a similar GDP per capita that year. For the comparison purposes, we therefore focus on two countries that are considered to be highly integrated in the global economy, namely China (GDP per capita of US$ 8,066) and Mexico (US$ 9,616), with China also recording a relatively rapid per capita GDP growth up to and including this time also, along with Malaysia (US$ 9,955).

The results are reported in the four panels of **Figure 9**, which breaks down manufacturing exports into the different 2-digit ISIC divisions. What is evident from this figure is that Mauritius appears to be heavily specialized in what could be considered low-tech sectors, with over 60 per cent of its manufactured exports concentrated in food and beverages, textiles and wearing apparel. Conversely, when we consider the other three countries, we generally find a more diversified export structure (with the exception of radio, television and communication equipment in Malaysia and motor vehicles in Mexico, no 2-digit sector accounts for more than 30 per cent of all manufactured exports in the three comparator countries). Moreover, the structure of manufactured exports in these three countries involves a higher share of exports in more high-tech products (e.g. radio, television and communication equipment; motor vehicles, trailers and semi-trailers; office, accounting and computing machinery), with relatively low shares in food and beverages and textiles.

[16] Using ISIC Rev. 3 is an obvious choice, with a concordance between this classification and trade data (in either HS or SITC) readily available: see https://wits.worldbank.org/product_concordance.html.

Figure 9: Export composition of the manufacturing sector by 2-digit ISIC Division in 2015

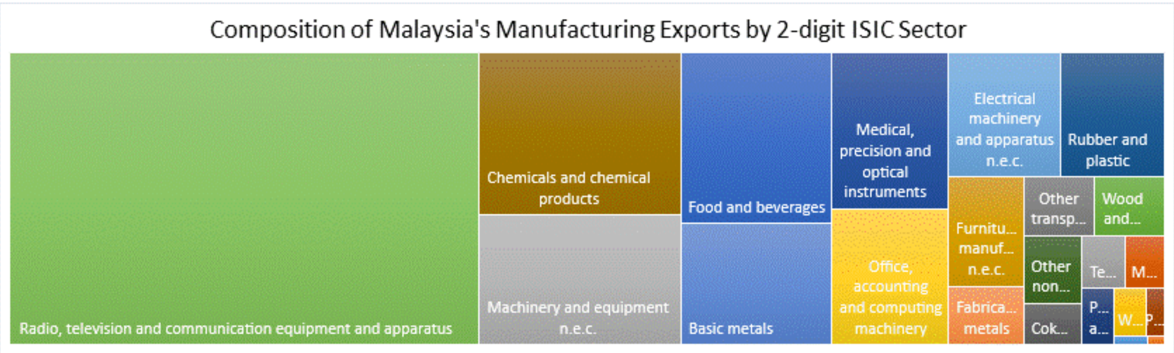
Panel A



Panel B

Panel C

Panel D



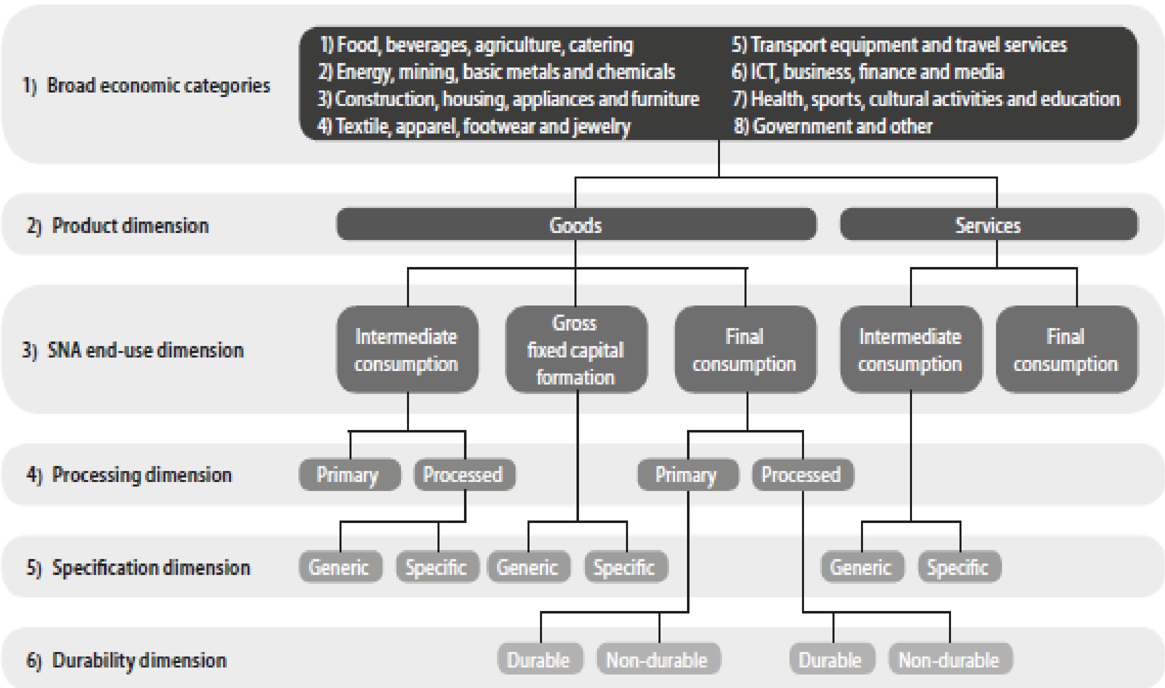
Data Source: UN COMTRADE

Export composition across BEC categories

The BEC (Broad Economic Categories) classification is a high-level aggregation of existing product classifications that categorizes products across several independent dimensions, with the latest BEC Revision 5 classification using six dimensions (see **Figure 10**). An initial distinction is made between eight broad sectors, with the lower level distinguishing between goods and services trade. The use of HS data retrieved from UN COMTRADE (2022) implies that the focus of the analysis is on trade in goods and commodities. While services trade data are collected and made available through UN COMTRADE (2022), such data will not be considered in this analysis. The reasons are manifold, including the more aggregated nature of services data and the focus of EQuIP on industrial performance. It should be emphasized that when we refer to export or import shares, we often mean the share of goods and commodities (or manufacturing specifically) exports and imports only.

Focussing on the classification of goods and commodities, BEC begins with a three-way functional breakdown, indicating whether a product is meant for consumption, as an intermediate input to production or to be used as a capital good. In the case of intermediate goods and final consumption goods, a further distinction is made between primary and processed goods, with a further distinction being made between primary durable and primary non-durable consumption goods. The latest BEC Rev. 5 classification[17] adds a new variable to differentiate intermediates that are generic, i.e. that are consumed by a wide range of industries, from those which are specific, i.e. intermediates that are typically consumed by specific industries only.

Figure 10: BEC Revision 5 relationships



Source: United Nations, 2018

[17] HS data must be used in the analysis to attain BEC Revision 5 data, as it is not yet integrated in many databases. The concordance table that helps translate HS into BEC Rev. 5 is available here.

Several options are therefore possible when using the BEC Rev. 5 to disaggregate exports. One initial approach is to distinguish between intermediate exports, final consumption exports and capital goods exports to determine the share of each of these three broad aggregates in total exports. This approach—as discussed below—is of relevance for the import side, given the significance of intermediate and capital goods for domestic production. In the case of intermediate and final consumption exports, the share of primary and of processed exports can also be identified. Such a distinction can be particularly relevant in the context of the above discussion on the terms of trade effects and export instability associated with certain primary products. Finally, and linked to the discussion on GVCs (see Tool 4), the distinction between generic and specific exports of intermediate and capital goods is useful for understanding a country's integration in GVCs as well as its potential attractiveness as a destination for inward foreign direct investment (FDI), for example, with countries that are able to export a relatively high share of specific intermediate and capital goods potentially demonstrating a high degree of export capability.[18] The term 'export capability' is used here in a broad way. It includes production capabilities at the firm and sectoral level more broadly, as well as various institutional and systemic aspects such as logistics, infrastructure, innovativeness, financial constraints, etc.

The indicators that identify the shares of these different export types (as well as the changes in these indicators over time) can be constructed at the aggregate level (e.g. overall manufacturing) or at the sectoral level.[19] The indicators of generic and specific products can also be constructed for the aggregate level of intermediate and capital goods exports or for each of these two product types separately.

The initial indicator, which uses the BEC Rev. 5 classification, distinguishes between intermediate, final consumption and capital goods. The respective equation is presented in the discussion above. The category c in this case denotes the three different types of goods.

Moving beyond the broad distinction between intermediate, final consumption and capital goods, the next step is to construct indicators for the share of processed and primary exports in the cases of both intermediate and final consumption goods and for generic and specific intermediate and capital goods.

It is possible in both cases to construct indicators for exports as shares of each of the broad categories (i.e. intermediate, final consumption and capital goods) as shares of the combined categories (e.g. shares of total intermediate and final consumption goods in the case of primary or processed goods), or as shares of total aggregate exports. Accordingly, the numerator sums up the exports of a particular processing dimension (i.e. primary or processed goods) or a specification dimension (i.e. generic or specific) across all importers by broad category (i.e. intermediate, final consumption and capital goods), while the denominator sums up across any of the three mentioned values the analyst wants to construct the share of.

To carry out an analysis using the BEC Rev. 5 classification, the very detailed trade of the HS classification must be converted to the BEC classification using a concordance table.[20] A concordance

[18] The dimension of durable and non-durable consumer goods is less relevant for the purposes of this tool.

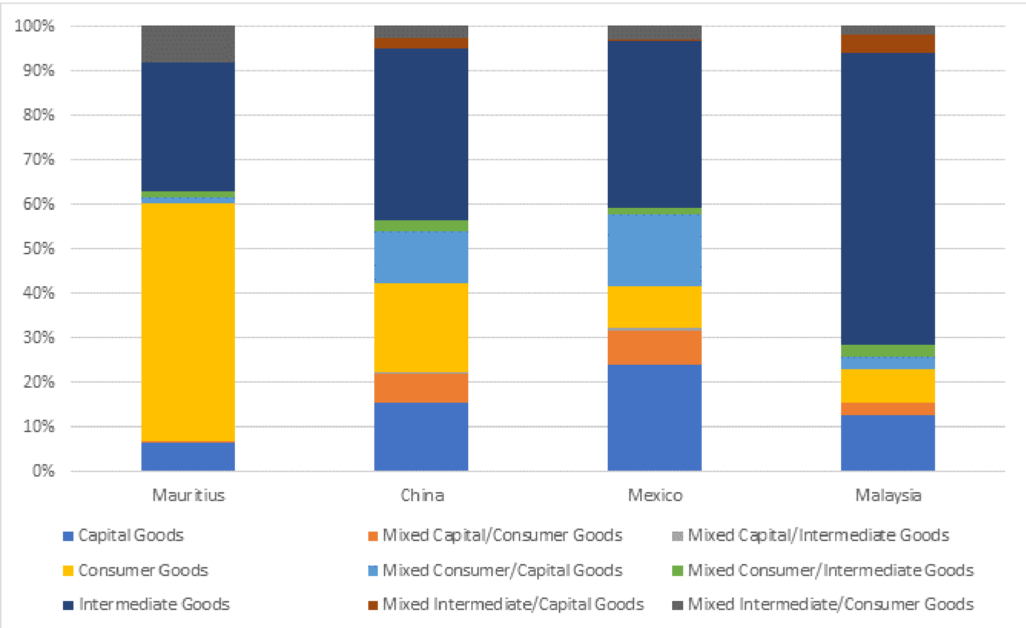
[19] It should be noted, however, that some sectors may not have any products of a particular BEC type (e.g. the food and beverages sectors do not entail any products that are considered capital goods).

[20] At the time of writing, websites such as the World Bank's WITS platform, which provides traded data, still used the older 4th revision of BEC, which is very different from the one described here.

table currently exists between the BEC classification and the 2012 version of the HS classification.[21] Moreover, the analysis requires export data at the 6-digit level. If information on certain product categories is only available at the 4-digit level, certain assumptions will need to be made to classify the products according to the BEC classification, specifically when the 4-digit code includes 6-digit codes of different BEC categories. One assumption would be that such 4-digit cases are mixed categories (e.g. mixed consumer and intermediate goods), which is a possibility in the BEC classification.

The analysis now turns to the BEC categories, with **Figure 11** presenting a breakdown of exports into the three broad end use categories (capital, intermediate and consumer goods) alongside a set of mixed categories.[22] The figure illustrates that Mauritius' export structure differs considerably from that of the other three countries in terms of the broad end use categories. Specifically, while the other three countries' share of capital goods exports lies between 15 per cent and 33 per cent, only 7 per cent of Mauritius' exports consisted of capital goods. Similarly, the other three countries' shares of intermediate goods exports are relatively large (between 40 per cent and 72 per cent), while Mauritius' share accounts for around 37 per cent. This means that Mauritius' share of consumer goods exports is much larger (56 per cent) relative to that of the other comparator countries. In the context of GVCs, this may suggest that Mauritius' position in GVCs is relatively downstream (i.e. close to the final consumer).

Figure 11: Export composition of manufacturing by BEC-5 end use categories



Data Source: UN COMTRADE (2022)

[21] The concordance is available at: https://unstats.un.org/unsd/trade/classifications/bec.asp

[22] Note that it is possible to aggregate mixed categories to and be left with just the three broad categories. In particular, capital, capital/consumer and capital/intermediate can be aggregated to form capital goods; consumer, consumer/capital and consumer/intermediate can be aggregated to form consumer goods, and intermediate, intermediate/consumer and intermediate/capital goods can be combined to form intermediate goods. Such an aggregation is consistent with the construction of the BEC classification at higher levels of disaggregation (e.g. when split between primary and processed or generic and specific).

Benchmarking exercises are useful when reviewing the composition of exports, with the various BEC-5 classifications representing an obvious choice for such exercises. At the same time, it is necessary to identify which specific categories of goods are considered targets. At the level of end use categories, a high export share in intermediate and/or capital goods may be considered a useful target, given the expectation that the production of such goods likely involves higher capabilities. Table 2 reports information on the shares of the three different end use categories covered in Figure 11, along with the relative shares of these categories, where the relative share is calculated in relation to the country with the highest share. Note that the country with the highest share is different for each end use category, which is unsurprising, and which again justifies the need to identify the specific categories of interest.[23] Focussing on intermediate and capital goods, the results in **Table 2** suggest that Mauritius' share of capital goods in total exports is around one-tenth of that of the leading country (Mexico), while its share of intermediate goods is just 42 per cent of the leading country's (Malaysia). These ratios are in both cases significantly below those found in the other comparator countries, providing additional support to the finding that Mauritius' performance in terms of share of capital and intermediate goods exports is relatively poor in comparison to countries at a similar level of income per capita. The analysis provides no answer to the question why Mauritius performs relatively poorly and whether this is attributable to factors that can be changed by policy (e.g. infrastructure) or not (e.g. geography), but it provides an initial input into understanding the challenges that Mauritius faces. Similar benchmarking exercises can be performed for different shares of exports, such as the more detailed BEC-5 decompositions below and the sectoral export shares discussed above. In any case, it is important to specify which shares to focus on when conducting such benchmarking exercises.

Table 3: Manufacturing export composition and relative export composition by BEC-5 end use categories in 2015

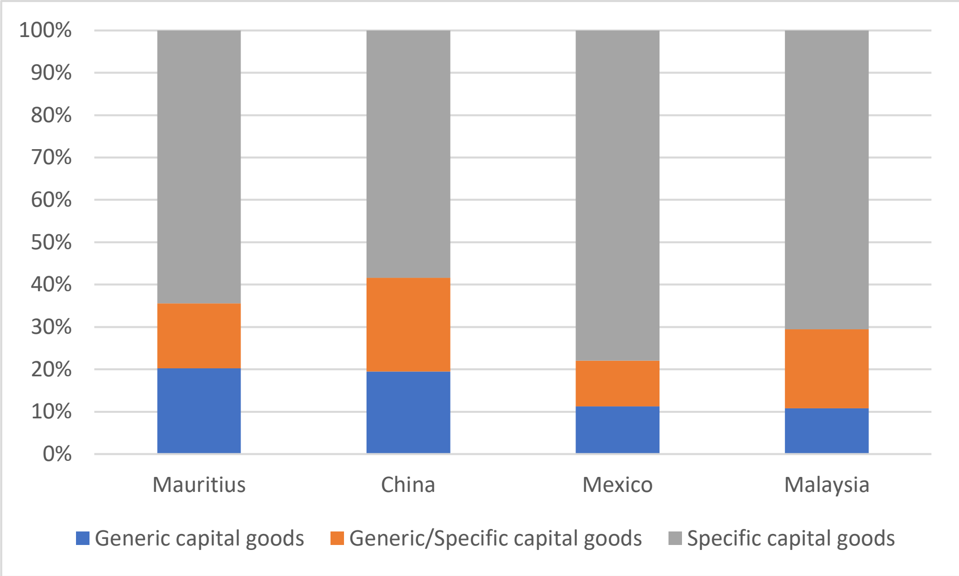
Country	Share of capital goods (%)	Share of consumer goods (%)	Share of intermediate goods (%)	Relative share of capital goods (Mexico = 100)	Relative share of consumer goods (Mauritius = 100)	Relative share of intermediate goods (Malaysia = 100)
Mauritius	6.83%	56.20%	36.96%	21%	100%	52%
China	22.48%	33.88%	43.64%	70%	60%	61%
Mexico	32.24%	27.04%	40.71%	100%	48%	57%
Malaysia	15.44%	13.04%	71.52%	48%	23%	100%

Data Source: UN COMTRADE (2022)

Notes: Data are aggregated to the three broad end use categories (capital, consumer and intermediate goods) using the approach described in Footnote 21.

[23] The approach adopted here is selecting countries with similar per capita incomes as benchmark countries. One common argument for using per capita income relates to the possibility that it somehow correlates with the extent of factor endowments that may determine the composition of a country's exports. As discussed above, however, various factors—including geography, infrastructure, trade policy, etc.— will determine the extent and composition of trade, which has consequences for how benchmark countries are defined.

Figure 12: Composition of manufactured capital goods exports by BEC-5 specification dimension in 2015

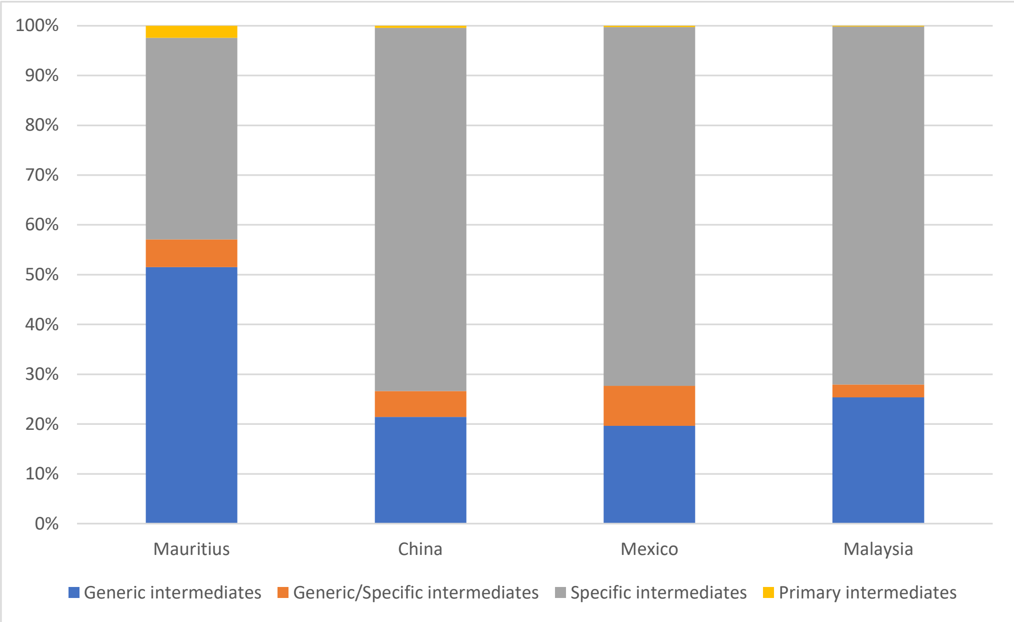


Data Source: UN COMTRADE (2022)

The general lack of capital goods in the composition of Mauritius' exports could be considered a problem – related, for example, to a lack of sophistication or capabilities in the production of such goods. **Figure 12** presents information on the composition of capital goods exports, with exports divided into generic, specific and mixed goods. The figure reveals that Mauritius has a relatively high share of generic capital goods (at just over 20 per cent) compared with other comparator countries, which might suggest that Mauritius has a low level of export sophistication.

A similar picture emerges when a distinction is made between generic and specific products in the context of intermediate goods (**Figure 13**). The figure reveals that over 50 per cent of Mauritius' intermediate exports are generic, while that share is less than 25 per cent in comparator countries. Conversely, specific intermediates account for much larger shares in the comparator countries (i.e. more than 70 per cent) when compared with Mauritius (just over 40 per cent). When combined, the results suggest that Mauritius' capital and intermediate goods exports have a low level of complexity, which again is indicative of limited productive capabilities and limited opportunities for learning through exporting.

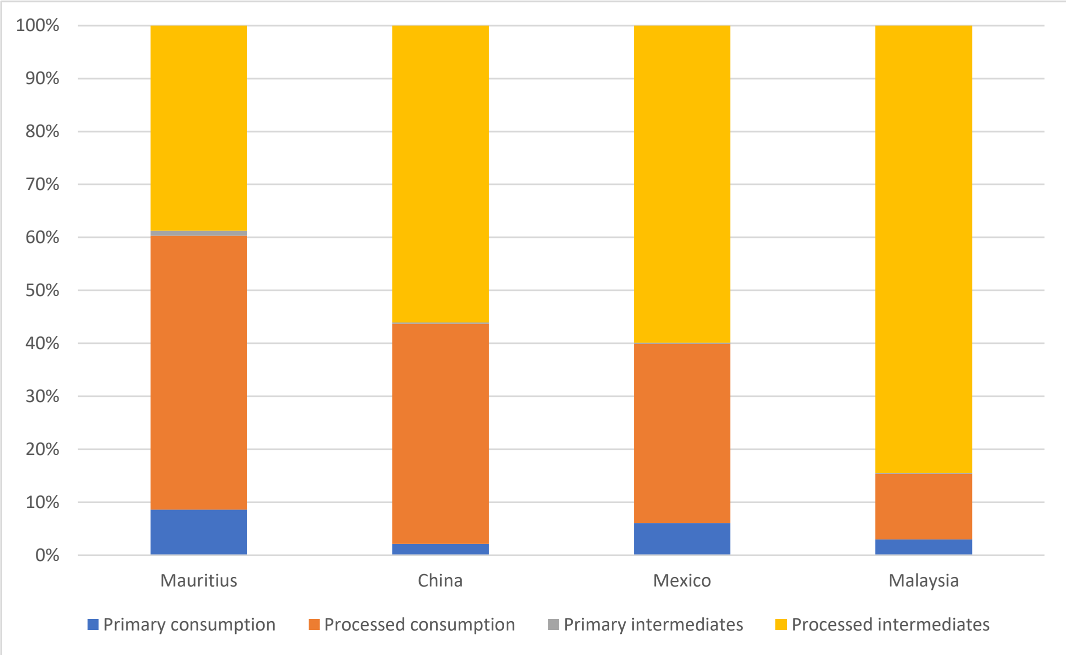
Figure 13: Composition of manufactured intermediate goods exports by BEC-5 specification dimension in 2015



Data Source: UN COMTRADE (2022)

The final dimension we consider is the distinction between primary and processed goods in the case of consumption and intermediate goods (**Figure 14**). Setting aside the already observed differences in Mauritius' shares of consumption and intermediates relative to those of the comparator countries, the results for Mauritius are more similar to those of the comparator countries, with processed consumption and intermediate goods accounting for the majority of consumption and intermediate exports.

Figure 14: Export composition of manufacturing consumer and intermediate goods by BEC-5 processing dimension in 2015



Data Source: UN COMTRADE (2022)

Export composition across UNIDO technological categories

Another indicator of export composition is based on UNIDO's classification of sectors by technology intensity (UNIDO, 2010). UNIDO's approach classifies ISIC Revision 3 sectors into three categories (i.e. medium high- and high-technology industries, medium-technology industries and low-technology industries) (see **Table 4**).

Table 4: UNIDO's technology intensity classification

ISIC INDUSTRY BY TECHNOLOGY INTENSITY	ISIC Rev. 3
Medium-high and high-technology industries	
Chemicals	24
Machinery and equipment, n.e.c.	29
Office, accounting and computing machinery	30
Electrical machinery and apparatus, n.e.c.	31
Radio, TV and communications equipment	32
Medical, precision and optical instruments	33
Motor vehicles, trailers and semi-trailers	34
Other transport equipment	35

Medium-technology industries	
Coke, refined petroleum products and nuclear fuel	23
Rubber and plastic products	25
Other non-metallic mineral products	26
Basic metals	27
Fabricated metal products	28

Low-technology industries	
Food products, beverages and tobacco	15–16
Textiles, textile products, leather and footwear	17–19
Wood, pulp, paper, paper products, printing and publishing	20–22
Manufacturing, n.e.c., Recycling	36–37

Source: UNIDO, 2010.

In terms of their construction, the indicators that use UNIDO's technology classification are similar to the previous ones, but the focus is on a different dimension of export structure, namely the technology intensity of exports, with a larger share of high-tech exports considered to offer greater opportunities for learning and thus for growth, but also signifying higher levels of productive capabilities. The indicators using UNIDO's classification can be constructed at the country level. The different technology groupings are identified at the sectoral level, however. It is therefore not possible to construct the indicators at the sectoral level because the argument becomes circular, i.e. the food sector by definition is already considered to be low-tech, and the low-tech industry comprises the food sector. First, a variable that categorizes each of the different UNIDO technological categories, namely HT, MT and LT, which refers to high-, medium- and low-tech sectors, respectively, needs to be defined. The analyst can use the general equation presented above, with the technology categories representing categories *k*.

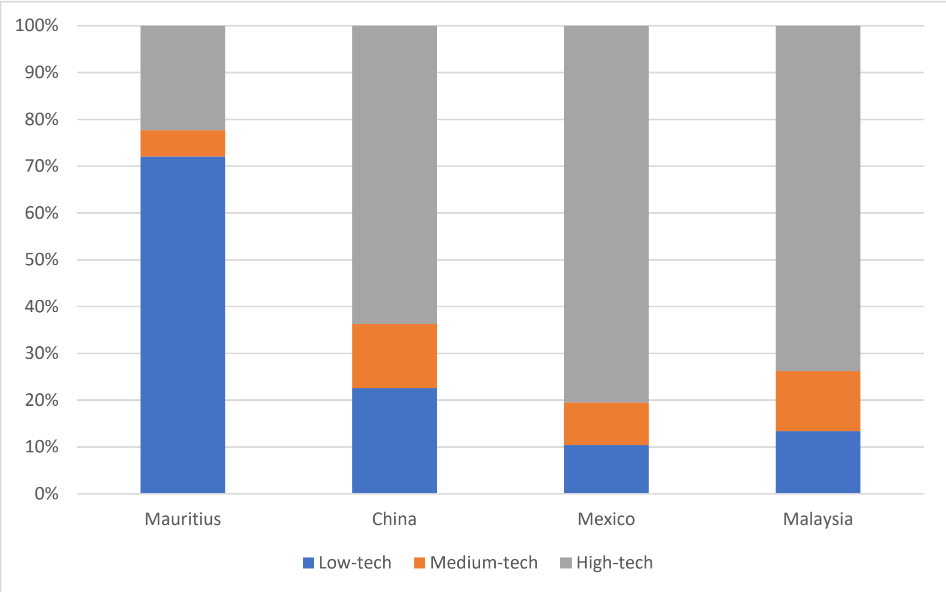
To construct the indicators based on UNIDO's taxonomy, the product level export data need to be translated into the UNIDO classification. The UNIDO classification is based on the ISIC Revision 3 classification, while trade data are commonly collected using the HS classification. To move from HS to the UNIDO categories, an intermediate step of converting trade data in the HS classification into ISIC will be necessary. Concordance tables are available that allow for such a conversion.[24]

Figure 15 presents information on the composition of manufactured exports for Mauritius and comparator countries using UNIDO's classification. The results strongly support the conclusion reached above when considering the structure of manufacturing exports based on ISIC 2-digit division, namely that while Mauritius' economy is heavily concentrated in low-tech manufacturing, other countries included for comparison purposes have relatively low shares of low-tech exports and have been successful in developing exports in high-tech segments. All three comparator countries have an export share of more than 60 per cent in the high-tech segment, while over 70 per cent of Mauritius' exports are considered low-tech. One conclusion that can be drawn from this analysis, therefore, is

[24] See https://wits.worldbank.org/product_concordance.html. However, the concordance table for BEC Rev. 5 already includes the mapping from HS to ISIC.

that Mauritius' export structure differs from that of countries at a similar level of development (i.e. income per capita). Moreover, the country's structure tends to be dominated by products and sectors that are less likely to generate significant learning effects and that require limited productive capabilities.

Figure 15: Export composition of manufacturing exports by OECD technology classification in 2015



Data Source: UN COMTRADE (2022)

As with the case of the BEC-5 classification, it may be useful to conduct benchmarking exercises on the country's export composition using UNIDO's technology classification. In this case, it is most useful to focus on the share of exports of more technologically advanced goods, which in this case can be represented by high-technology goods. The results of this exercise are reported in **Table 5**, with the comparator economy again being different for high-tech (Mexico) and medium-tech goods (China). Mauritius performs relatively more poorly in both cases, with an export share in high-tech goods that is just 28 per cent of Mexico's and a share in medium-high tech goods that is just 40 per cent of China's.

Table 5: Export composition and relative export composition of manufacturing by UNIDO technology classification in 2015

Country	*High-tech share*	*Medium-tech share*	*Relative high- tech share*	*Relative medium- tech share*
Mauritius	22.35	5.55	28	40
China	63.70	13.79	79	100
Mexico	80.48	9.07	100	66
Malaysia	73.85	12.77	92	93

Data Source: UN COMTRADE (2022)

Overall, the analysis suggests that Mauritius is quite open and integrated into global markets when considering its exports (and compared to countries of a similar economic size), but when comparing Mauritius to countries with a similar per capita income, its export structure is found to be quite different. Specifically, Mauritius seems to be reliant on consumer as opposed to intermediate and capital goods exports. Moreover, its export structure is dominated by low-tech products and products that are generic rather than specific. The impression, therefore, is that despite Mauritius' relatively high export share, its export performance is relatively weak and vulnerable. The country relies on low-tech, generic manufactured goods—particularly consumption goods—indicating a relatively low sophistication of exports and a lack of integration in upstream GVCs, that is, in early stages of GVCs that may potentially allow higher value-added capture.

While the above presents some interesting results and serves as an example of how benchmarking can be undertaken, some of the disadvantages and pitfalls of this approach should be highlighted. First, the approach compares countries along one specific dimension, namely income per capita. While the countries considered have a similar income per capita level, they are different along other dimensions (e.g. country size, island versus non-island economies, etc.). Secondly, they also differ in terms of their per capita income growth rates (i.e. some countries are currently more dynamic than others). This means that the choice of variable used to identify comparator countries will have a crucial influence on the analysis.

Indicator 4 – Import composition

The import share of a particular category is calculated as the ratio of the value of imports (in current US$) of a particular category (e.g. of a particular sector, technology content, end use) to the value of some aggregate of imports (current US$), usually total imports or total manufacturing imports. Combining this information for all of the relevant categories (e.g. all sectors, all technology groups) provides a full overview of the composition of imports. In principle, the same approach can be adopted when considering the share and composition of imports across various categories, meaning that this document does not describe the methodology for constructing compositions for different categories separately.

This set of indicators, which breaks down imports into various dimensions, is identical in construction to the previous set of indicators, only that they are based on imports instead of exports. They illustrate the diversity in the country's import structure and, accordingly, indicate the areas where the country is dependent on foreign resources and capabilities.

Strategic questions:

- Imports from which manufacturing sectors dominate the country's import structure?
- To what extent is the country reliant on manufactured imports for intermediate and capital goods?
- What is the technological content of the country's imports?

Equation: The import structure for a particular type of good is measured as:

$$ImpComp_{it} = \frac{ImpByType_{it}}{Imp_{it}}$$

> $ImpByType$ *= value of imports (in current US$) of a particular type (e.g. sub-sector, technology group, end use)*
> Imp *= total value of imports (in current US$)*

The subscripts i and t refer to countries and time periods, respectively.

Variables required	Data source	Notes
Import values of particular aggregates (ImpByType)	UN COMTRADE (2022) database via the WITS platform	To construct the different aggregates of imports, it may be necessary to use concordances to translate the detailed product-level import data to the appropriate level of aggregation.
Import values (Imp)	UN COMTRADE (2022) database via the WITS platform	

Import composition across sectors

Similar to the export share indicator, SE, the country's total imports, are decomposed in terms of the products' sectoral nature. It should be noted that trade data do not indicate how much of which product is imported by which sector in the importing country, but only by the sector of the exporting country, i.e. the information thus essentially relates to import substitution.

In formal terms, for each manufacturing sector *m* of country *i*, the indicator of import share (SI) is constructed as:

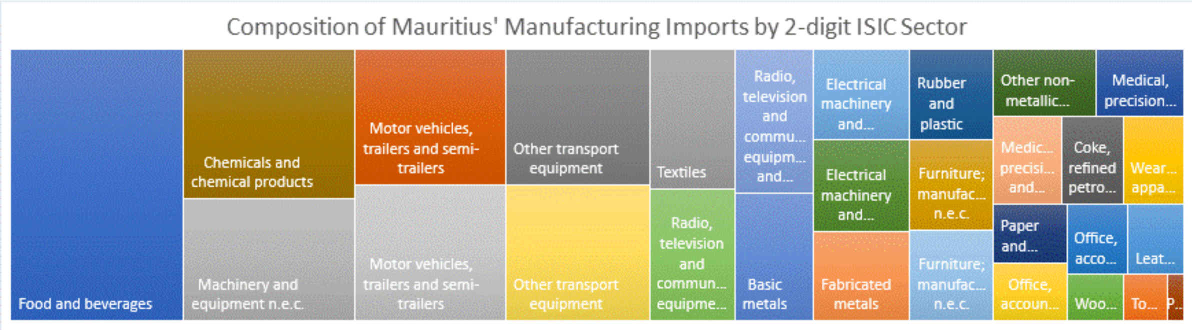
$$SI_{m,t}^{i} = \frac{\sum_j \sum_{k \in m} E_{k,t}^{j,i}}{\sum_j \sum_k E_{k,t}^{j,i}},$$

with the superscripts *i* and *j* being reversed to indicate that we are referring to exports from country *j* to country *i*, or in other words, to imports in country *i* from country *j*.

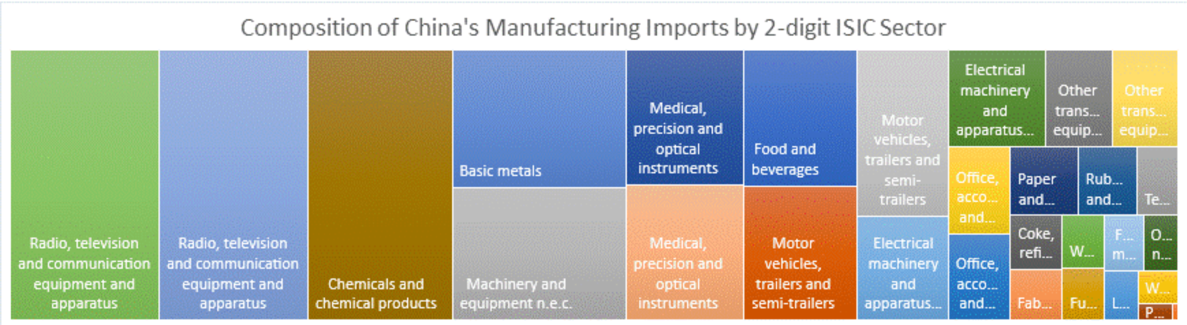
Following the approach used above for exports, a visualization and discussion of Mauritius' integration in the global economy on the import side is also provided by focussing on the composition of manufacturing imports entering Mauritius in comparison to countries at a similar level of development.

Figure 16: Import composition of manufacturing sector by 2-digit ISIC Division in 2015

Panel A

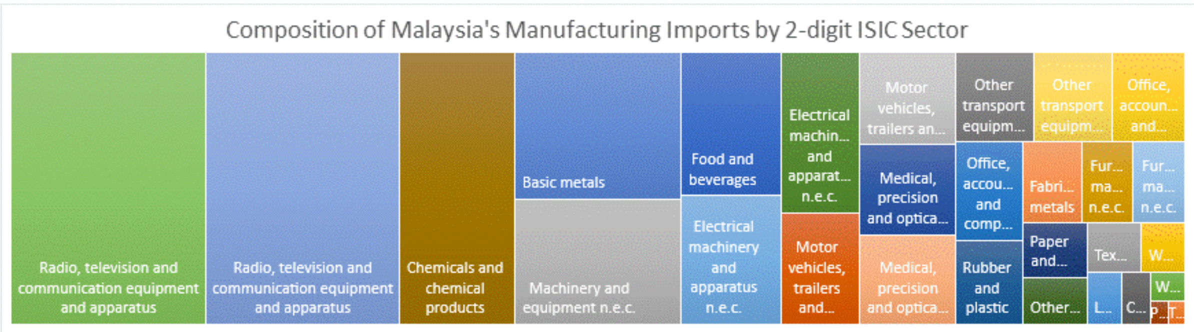


Panel B



Panel C

Panel D



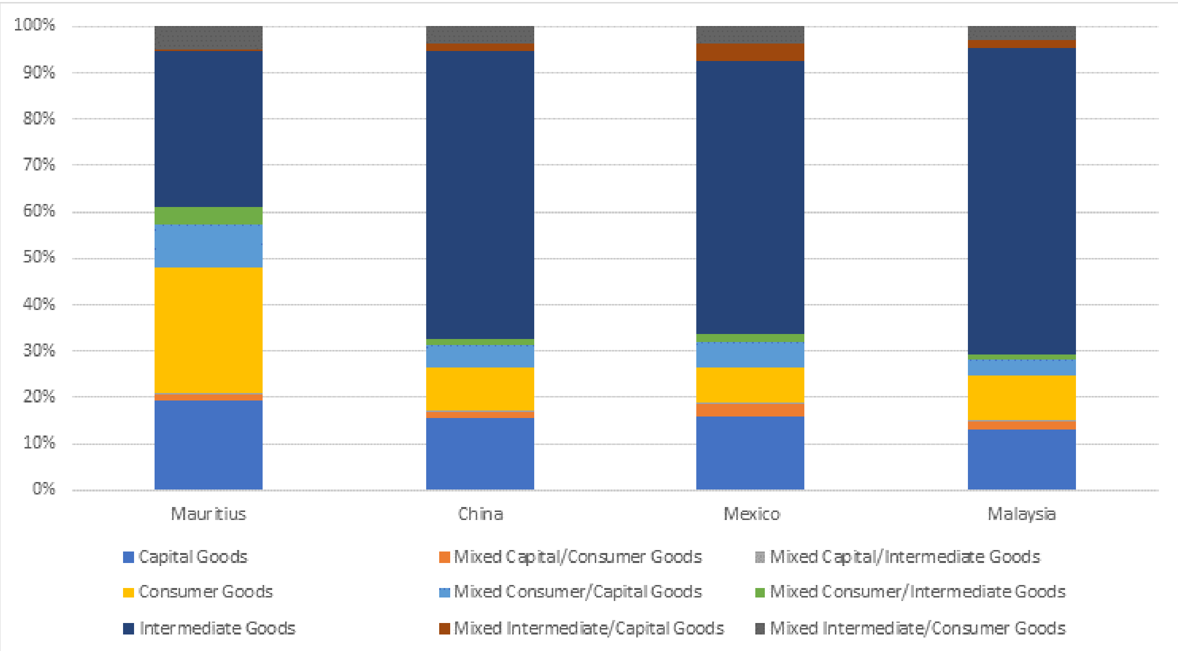
Data Source: UN COMTRADE (2022)

We begin the analysis in Figure 16, which presents the composition of manufacturing imports in 2015 by the 2-digit ISIC Division. The most notable difference between Mauritius and the other countries is the relatively large shares of food and beverages and textiles in Mauritius' manufactured imports and the relatively low share of radio, television and communication equipment and apparatus and office, accounting and computing machinery in the country's manufactured imports compared with the comparator countries. These results are thus somewhat similar to those for exporting, suggesting a significant amount of intra-industry trade. It also indicates that Mauritius imports intermediates and other inputs from the same sectors it ultimately exports from. These results suggest that GVCs play an important role in Mauritius, particularly in the food and beverages and textiles sectors, i.e. these sectors import various intermediate inputs and ultimately export final goods. This is more comprehensively explored in the GVC tool (Tool 4).

Import composition across BEC categories

This indicator, which uses the BEC Rev. 5 classification for imports, again distinguishes between intermediate, final consumption and capital goods. The calculation follows the same logic as in the case of exports.

Figure 17: Import composition of manufacturing by BEC-5 end use categories



Data Source: UN COMTRADE (2022)

Turning to end use categories, **Figure 17** reports the share of imports into Mauritius and comparator countries by type. This figure reveals that Mauritius has a relatively high share of consumer goods imports in comparison to other countries, and correspondingly low shares of capital and intermediate goods imports. One of the major benefits of imports is the possibility of obtaining high-quality intermediate and capital goods that are not available domestically. The relatively low share of these types of goods in Mauritius—along with the high share of consumer goods imports—may raise questions about whether Mauritius is maximizing the potential benefits of its imports for its production activities. Conversely, these shares may suggest that Mauritius' basic consumption needs are highly reliant on foreign sources.

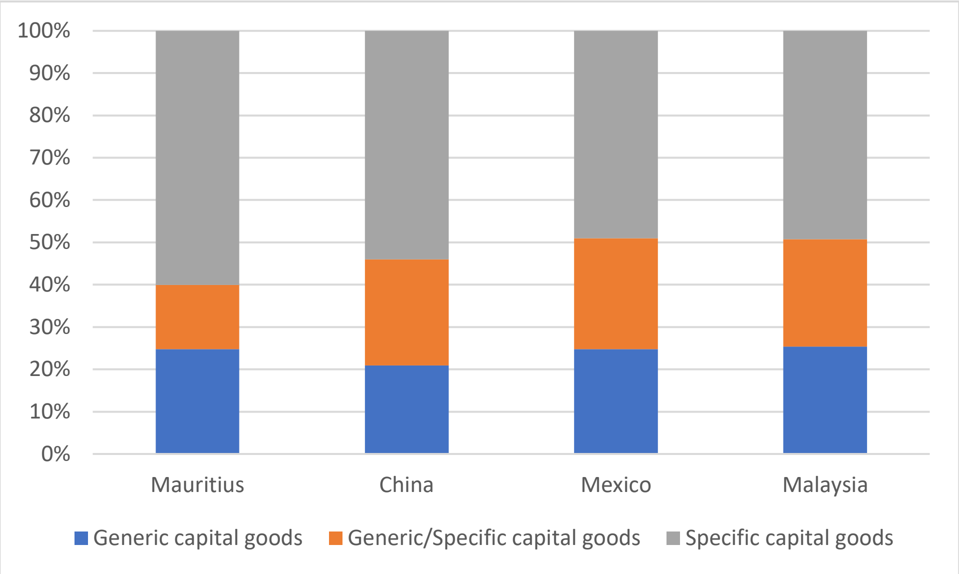
Once again, a benchmarking exercise can be carried out to examine the composition of the country's imports across many dimensions. Table 6 presents the results of such an exercise for BEC-5 end use categories. As with the case of exports, the analyst must specify which end use category to focus on. Table 6, however, compares all three end use categories. It shows that Mauritius has the highest share of both capital and consumer goods, with the share of capital goods in Malaysia, Mexico and China accounting for 73 per cent, 91 per cent and 83 per cent of Mauritius', respectively, and the shares of consumer goods in these countries accounting for only 36 per cent, 36 per cent and 38 per cent of that of Mauritius, respectively. Conversely, Mauritius' share of intermediate goods exports is only 55 per cent of Malaysia's.

Table 6: Import composition and relative import share of manufacturing by BEC-5 category in 2015

Country	*Share of capital goods (%)*	*Share of consumer goods (%)*	*Share of intermediate goods (%)*	*Relative share of capital goods (Mexico = 100)*	*Relative share of consumer goods (Mauritius = 100)*	*Relative share of intermediate goods (Malaysia = 100)*
Mauritius	20.87	40.05	39.08	100.00	100.00	55.35
China	17.30	15.23	67.47	82.91	38.04	96.54
Mexico	19.09	14.53	66.38	91.47	36.28	94.01
Malaysia	15.14	14.25	70.61	72.55	35.58	100.00

Data Source: UN COMTRADE (2022)

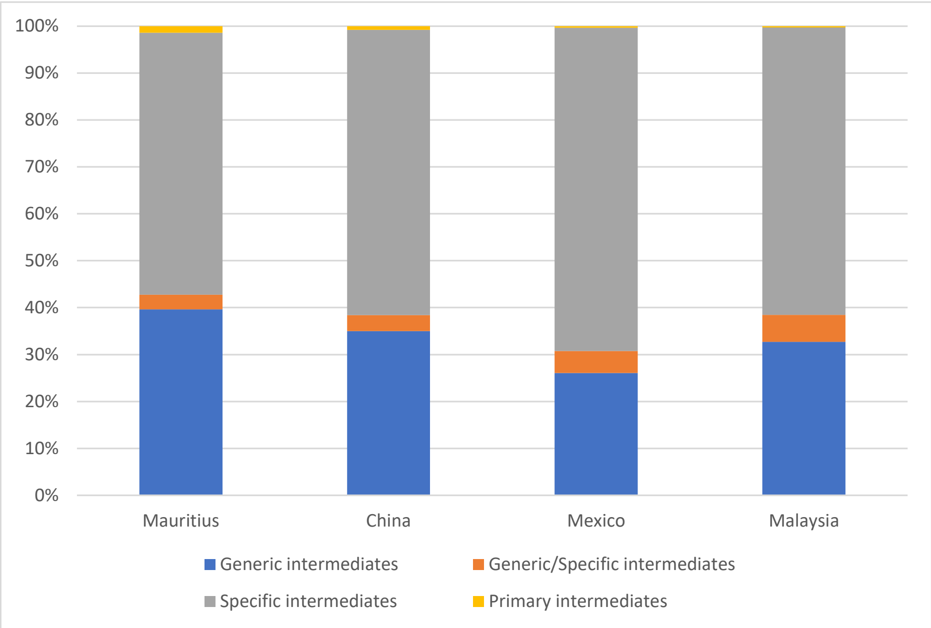
Figure 18: Composition of capital goods imports by BEC-5 specification dimension in 2015



Data Source: UN COMTRADE (2022)

Delving deeper into the types of capital and intermediate goods Mauritius imports, **Figure 18** and **Figure 19** report information on the shares of capital and intermediate goods imports that are either generic or specific (or mixed). In the case of capital goods (**Figure 18**), the results do not differ considerably across countries. Mauritius has a slightly higher share of both generic and specific capital goods imports than the comparator countries, with a slightly smaller share of mixed capital goods. Similar results are found for intermediate goods imports (**Figure 19**), with Mauritius reporting a somewhat higher share of generic intermediate goods imports, though its share of specific intermediate goods imports is slightly smaller than Mexico's.

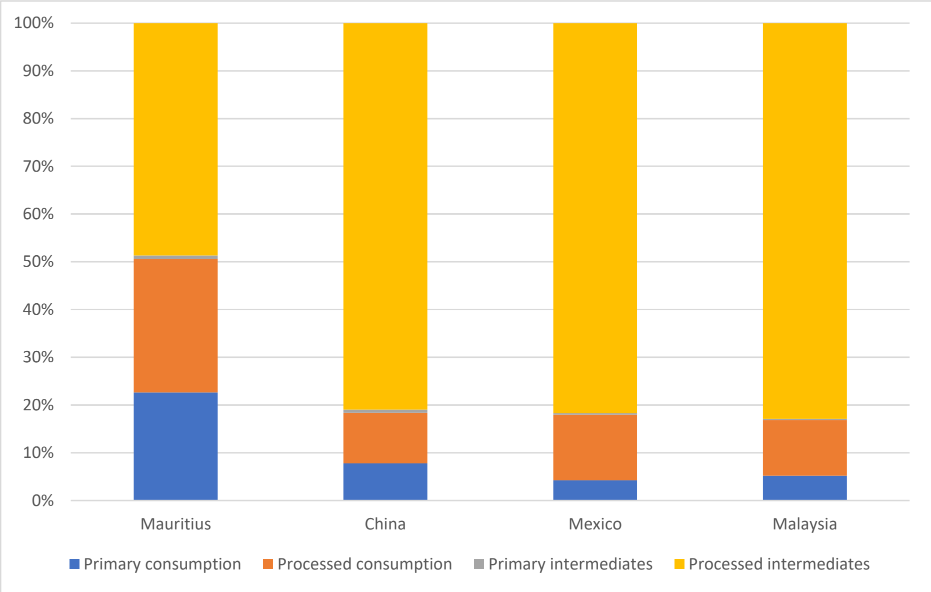
Figure 19: Composition of intermediate goods imports by BEC-5 specification dimension in 2015



Data Source: UN COMTRADE (2022)

Finally, **Figure 20** reports information on the shares of primary and processed consumer and intermediate goods imports. As already discussed, the major difference between Mauritius and the comparator countries lies in the share of consumer goods imports, which is again evident in **Figure 20**. Mauritius has a relatively low share of processed imports (around 77 per cent) compared with the comparator countries (which have shares between 91 per cent and 96 per cent). This difference is driven by the relatively low share of processed consumer goods in total consumption (55 per cent in Mauritius versus 76 per cent in Mexico), combined with the overall high share of consumer goods in Mauritius, which seems to provide further confirmation of Mauritius' reliance on imports for basic consumption needs.

Figure 20: Import composition of manufacturing consumer and intermediate goods by BEC-5 processing dimension in 2015



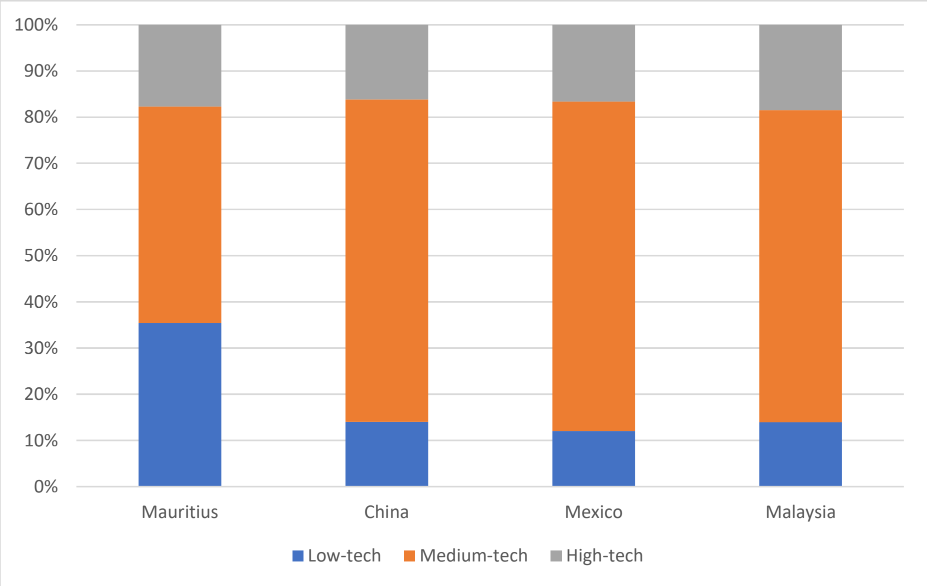
Data Source: UN COMTRADE (2022)

Import composition across UNIDO technology categories

Analogous to the analysis of exports, the share of imports of UNIDO's different technology categories involves defining a variable that categorizes each of the them separately, where HT, MT and LT refers to high-, medium- and low-tech sectors, respectively. The calculation of shares follows the same logic as discussed above.

Different from the results for exports, the shares of high-tech products in imports in Mauritius are not substantially different from those for other comparator countries (**Figure 21**). The share of medium-tech sectors is slightly lower in Mauritius, which imports a relatively high share of low-tech products relative to the comparator countries. Combined with the relatively low shares of exports from Mauritius' medium- and high-technology segments, evidence suggests that the country heavily relies on technology imports for its production and consumption, suggesting that Mauritius uses relatively high-tech imports to produce and export products that are often less technologically sophisticated.

Figure 21: Import composition of manufacturing exports by OECD technology classification in 2015



Data Source: UN COMTRADE (2022)

Table 7 presents a similar benchmarking exercise as the one conducted above, comparing the shares of high-tech and medium-tech imports to that of the leading country in **Figure 21**. The table reveals that the share of high-tech imports in Mauritius was 96 per cent of Malaysia's share in 2015 and only 66 per cent of Mexico's medium-tech share in 2015.

Table 7: Share of high-tech and medium high-tech manufacturing imports and relative shares in 2015

Country	*High-tech share of imports (%)*	*Medium-tech share of imports (%)*	*Relative high-tech import share*	*Relative medium-tech import share*
Mauritius	17.71	46.79	95.88	65.63
China	16.15	69.83	87.42	97.95
Mexico	16.63	71.30	90.01	100.00
Malaysia	18.47	67.63	100.00	94.85

Data Source: UN COMTRADE (2022)

Overall, the results on the import side suggest that Mauritius is relatively integrated into the global economy and that its import structure is, in many respects, not so different from that of other comparator countries at a similar level of development (GDP per capita). At the same time, certain aspects of the country's import structure differ and may warrant a deeper analysis. First, Mauritius' import structure consists of relatively high shares of food and beverages and textile products. This may reflect the country's role in these sectors' GVCs (i.e. a relatively high number of imports and exports of such products), but may also imply that Mauritius is heavily reliant on imports to meet its consumption needs in these sectors. Secondly, and related to this, Mauritius reports a relatively high share of consumer goods imports (particularly of primary consumer goods) and relatively low shares of capital and intermediate goods imports, providing some evidence of Mauritius' over-reliance on imports to meet its consumer needs (in comparison to other comparator countries).

3.3 Geographical structure of trade

The indicators above focus on export and import structure in terms of the product types a country imports and exports. An alternative way of thinking about the structure or composition of trade is to focus on with *who* the country trades with as opposed to *what* the country trades.[25] While the geographical structure of trade is to a large extent driven by exogenous factors (such as distance to trade partners, sharing a common language or common border, etc.), such indicators may provide insights into the country's degree of integration in the global economy.

On the export side, it is important to consider the degree to which a country exports to rich world markets. Successfully exporting to rich world markets might provide an indication that the country exports high-quality products (i.e. those that meet the quality and other standards of rich world markets), and that it has been able to enter large and rich markets that may potentially allow for the exploitation of economies of scale in domestic production.[26] Such trade may also be associated with increased opportunities for learning given the higher levels of knowledge and technology available in rich world markets. On the import side, it is important to consider where capital and intermediate goods are being imported from, with expectation and evidence suggesting that imports from richer markets of intermediates that are not available domestically at the technological frontier can boost domestic firm performance (e.g. Goldberg et al., 2010) and their export performance (e.g. Torres Mazzi and Foster-McGregor, 2020).

Obviously, the analysis of the geographical structure of exports and imports can be carried out at the country level (i.e. aggregate imports and exports), but can also be considered at the sectoral level (particularly in the case of exports) as well as for different product types, such as the BEC classification (particularly in the case of imports). This is especially relevant in the case of exports: not only is it important to export to high-income countries, it is also important to successfully export high-tech products to these countries, as opposed to a more dependency theory outcome involving peripheral countries that export resources, primary commodities and low-tech manufacturing to the core.

Indicator 5 – Geographical structure of exports

The geographical structure of exports can be constructed by considering the export shares to different country groups, groups that can be defined on a purely geographical basis (e.g. by continent) or more indirectly (e.g. by income level). These export shares are calculated as the ratio of the value of exports (in current US$) to a particular country group to the value of some aggregate of exports (in current US$), usually total exports or total manufacturing exports. Combining this information for all relevant

[25] See, for example, Granér and Isaksson (2009).

[26] Even here, however, a cautious approach should be taken. Given the rise of GVCs, low-income countries may indirectly serve rich country markets by exporting certain—potentially sophisticated—intermediates to another low-income country that assembles and ultimately exports to rich country markets.

country groups (e.g. all continents or income groups) provides a full overview of the composition of exports.

Strategic questions:

- To what extent is the country able to export to rich world markets?
- How reliant is the country on specific geographical markets?

Equation: The geographical structure of exports is measured as:

$$GeogExpStruc_{it}^{A} = \frac{Exports\ to\ Region\ A_{it}}{Aggregate\ Exports_{it}}$$

$Exports\ to\ Region\ A$ = *value of exports (in current US$) from country* i *to countries in region A*

$Aggregate\ Exports$ = *total value of exports (in current US$)*

The subscripts i and t refer to countries and time periods, respectively.

Variables required	Data source	Notes
Bilateral export values	UN COMTRADE (2022) database via the WITS platform	To construct the geographic distribution of exports, a particular country group must be determined, with the World Bank's geographical country grouping being one example.

The first question to address when considering the geographical structure of exports relates to the relevant country grouping. If the focus is on regional integration, for example, then a distinction can be made between two groups of countries, i.e. countries in the neighbourhood and in the rest of the world. Conversely, if the focus is on the extent to which a country is able to export to rich markets, a distinction can be made between rich and poorer or developed and developing countries. A number of options are available in this case, including: (i) the aggregate of high-income countries versus the rest of the world using the World Bank country classification;[27] (ii) the set of OECD countries versus the rest of the world; or (iii) Europe plus North America plus Japan versus the rest of the world. While these three choices (or other similar approaches) are likely to be highly correlated, important differences may emerge in certain cases.

Indicators for the share of exports of a specific country group are likely difficult to interpret in isolation. A second question, therefore, relates to an appropriate comparison. Not using an external comparator (providing an appropriate benchmark for the shares of exports going to developed markets, for example) and instead focussing on changes in these shares over time is one option. In this case, the direction of change of these shares is relevant, with a shift towards a higher share of exports to developed markets being considered an improvement in the country's export structure. While offering an indication of the direction of change, this approach does not provide the analyst with a useful benchmark for an appropriate share of exports going to a particular set of markets. A comparison with other countries is therefore a relevant consideration. In terms of identifying a suitable comparator or group of comparators, two major considerations are necessary: (i) the country's income level (i.e. GDP per capita), which is expected to correlate with the quality of production and therefore, the opportunities for exporting to developed markets; and (ii) the country's geographical location which, as discussed above, is an important (exogenous) determinant for the direction of trade. Ideally,

[27] https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

therefore, comparator countries with a similar level of income per capita and that are in close geographical proximity to the country of interest.

We use Egypt as an example of this approach. A number of dimensions is relevant when considering relevant comparator countries. First, as highlighted above, geography is an important driver of trade and trade patterns. The focus should therefore be on comparator countries located in the same region. This approach entails a comparison with other countries located in the Middle East and North Africa region. Secondly, a country's ability to export to different markets—particularly to rich markets—is likely to depend on its factor endowments and capabilities, which can be correlated with a variable such as GDP per capita. Our analysis includes a number of comparator countries, with Table 8 presenting information on that set of countries' per capita GDP and GDP levels. Among the comparator countries, Egypt's GDP per capita level is closest to Morocco's, with Tunisia and Algeria's level of GDP per capita being slightly higher and that of other countries being a lot higher than Egypt's GDP per capita level. In terms of level of GDP, Algeria's is comparable to Egypt's. Algeria can therefore be considered to be the most relevant comparator country, with a level of GDP that is similar and a slightly higher level of GDP per capita that Egypt could target in a relatively short period of time.

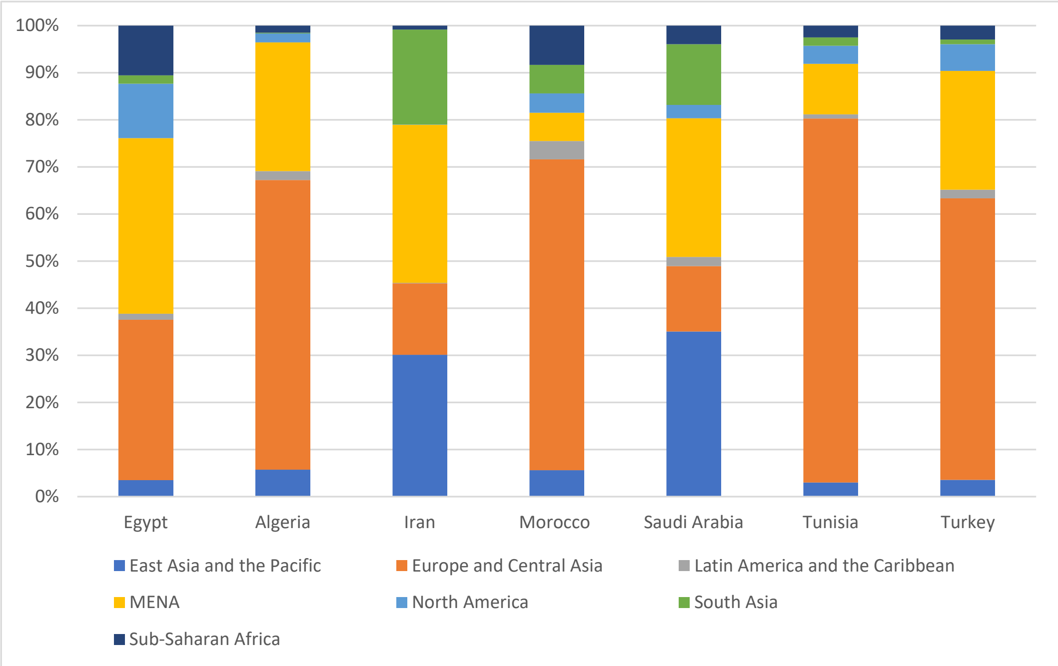
Table 8: GDP and GDP per capita of Egypt and comparator countries in 2015

Country	*GDP per capita (in US$)*	*GDP (in US$ billion)*
Egypt	2704.92	250.05
Algeria	4,777.42	189.80
Iran	6,070.19	476.46
Morocco	3,222.05	113.38
Saudi Arabia	21,399.1	678.73
Tunisia	4,304.55	48.12
Turkey	13,924.13	1,093.45

Data Source: World Development Indicators, World Bank (2022)

We begin the analysis of the regional structure of Egypt's exports in **Figure 22**, which reports information on the share of manufacturing exports destined for seven different regions (the regions used by the World Bank) in 2015. The data reveal that Egypt exported a relatively large share of goods to Europe and Central Asia (34 per cent) and to the Middle East and North Africa (37 per cent), with low shares of exports to all other regions. The cases of Iran and Saudi Arabia are quite specific (in terms of their export structure and reliance on oil), with relatively large export shares destined for East Asia and the Pacific. The notable difference of the other countries in comparison to the results for Egypt is the very large shares of exports destined for Europe and Central Asia (ranging from 60 per cent for Turkey to 77 per cent for Tunisia). In short, the results suggest that other countries in the region have been able to successfully enter and export goods to the relatively rich European and Central Asian market to a far greater extent than Egypt, which in relative terms is still reliant on exports to the local Middle East and North African region.

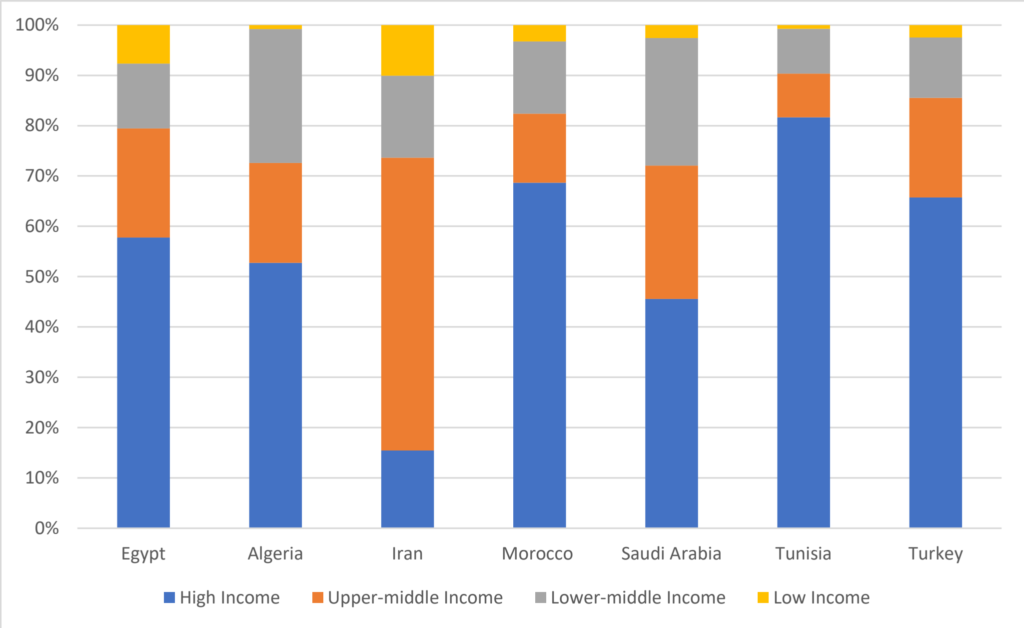
Figure 22: Manufacturing export shares by region in 2015



Data Source: UN COMTRADE (2022)

Complementing the results in **Figure 22**, **Figure 23** presents information on the share of manufacturing exports destined for different countries by income level (again using the World Bank classification). The figure again reveals that Saudi Arabia and particularly Iran are outliers, with their export structure more reliant on lower middle- and upper-income countries than other countries in the region (which in the case of Iran may also be attributable to political sanctions). These examples thus highlight the importance of selecting suitable comparator countries and some of the challenges that may arise in relation thereto. The figure also reveals that the share of exports from Egypt to high-income countries is lower than that of most of the other countries, with Egypt's share significantly below Morocco, Turkey and Tunisia's.

Figure 23: Manufacturing export shares by income level of destination country, 2015

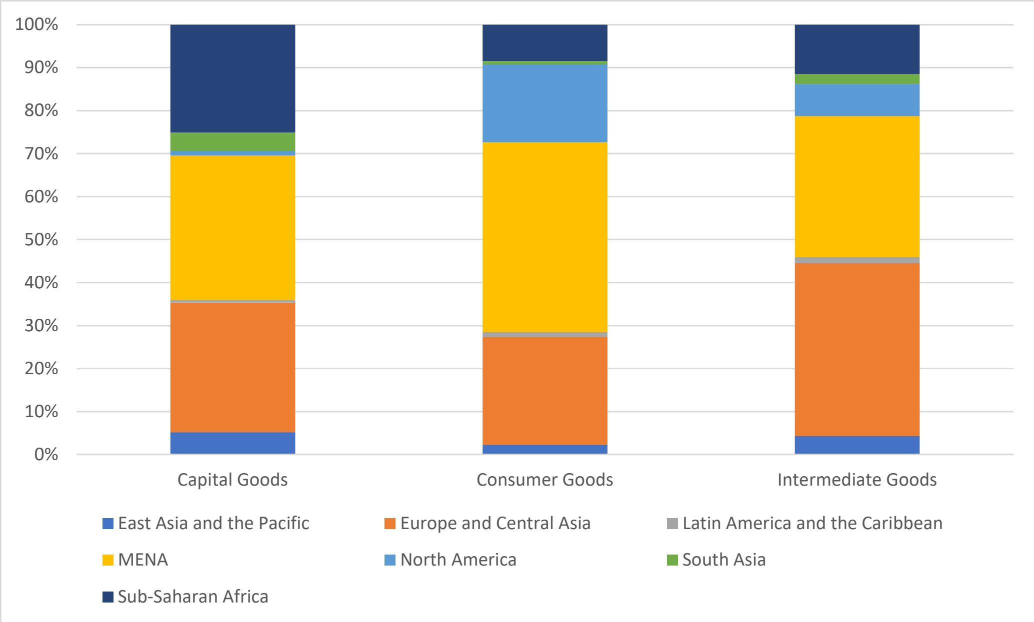


Data Source: UN COMTRADE (2022)

Subsets of products such as the distinction between capital, intermediate and final consumption goods, as well as their sub-components (i.e. the BEC classification), or the distinction between the technology intensiveness of goods (i.e. the UNIDO classification) can also be considered when constructing the geographical structure of exports. **Figure 24** and **Figure 25** provide an example of this for Egypt and Algeria, with the figures presenting the two countries' geographical structure of capital, consumer and intermediate goods exports.

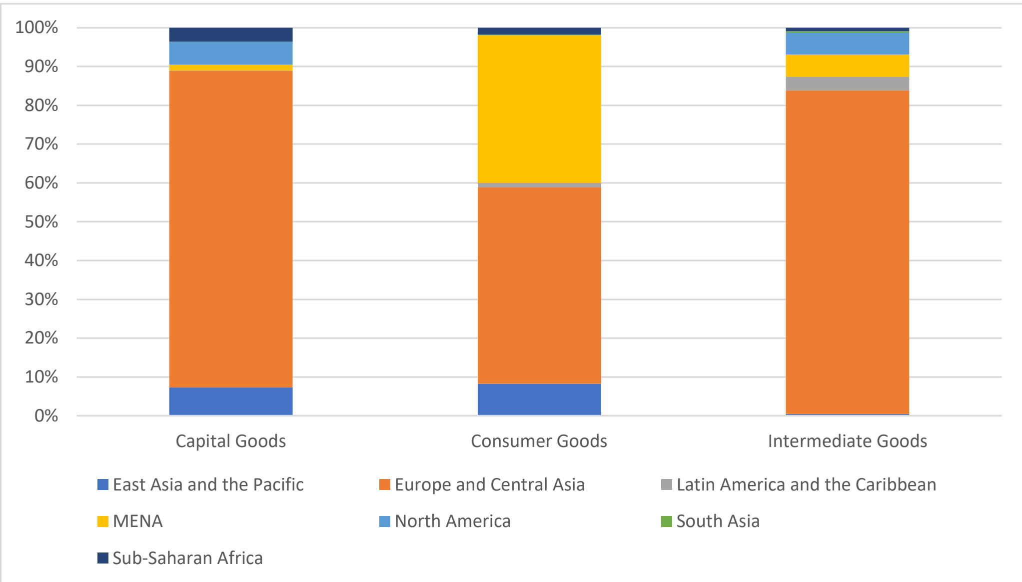
We find that Egypt has relatively large shares of exports in all BEC categories destined for the local Middle East and North Africa region. Export shares to Europe and Central Asia are also noteworthy (particularly in the case of intermediate goods, with Europe and Central Asia accounting for more than 40 per cent of such exports from Egypt). Capital goods exports from Egypt to sub-Saharan Africa also account for a relatively large share of Egypt's total exports (around 25 per cent). In contrast, exports from Algeria of all three types of BEC categories are dominated by exports to Europe and Central Asia. It thus appears that Egypt has not been able to penetrate the rich European and Central Asia markets to the extent Algeria has, a comparator country of similar size and distance to the European market, but with a slightly higher per capita GDP.

Figure 24: Manufacturing export shares by region and BEC-5, Egypt



Data Source: UN COMTRADE (2022)

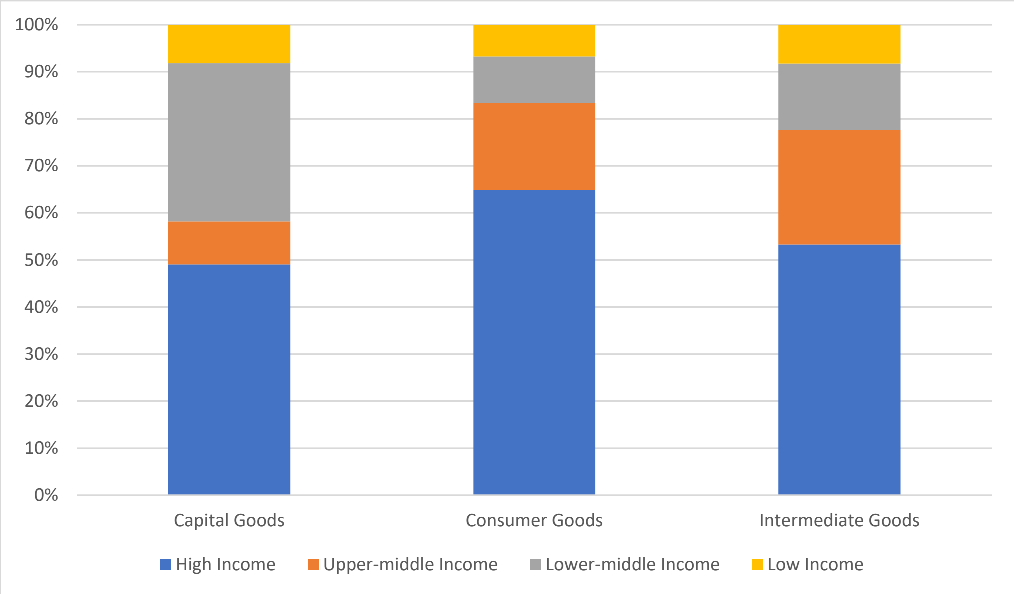
Figure 25: Manufacturing export shares by region and BEC-5, Algeria



Data Source: UN COMTRADE (2022)

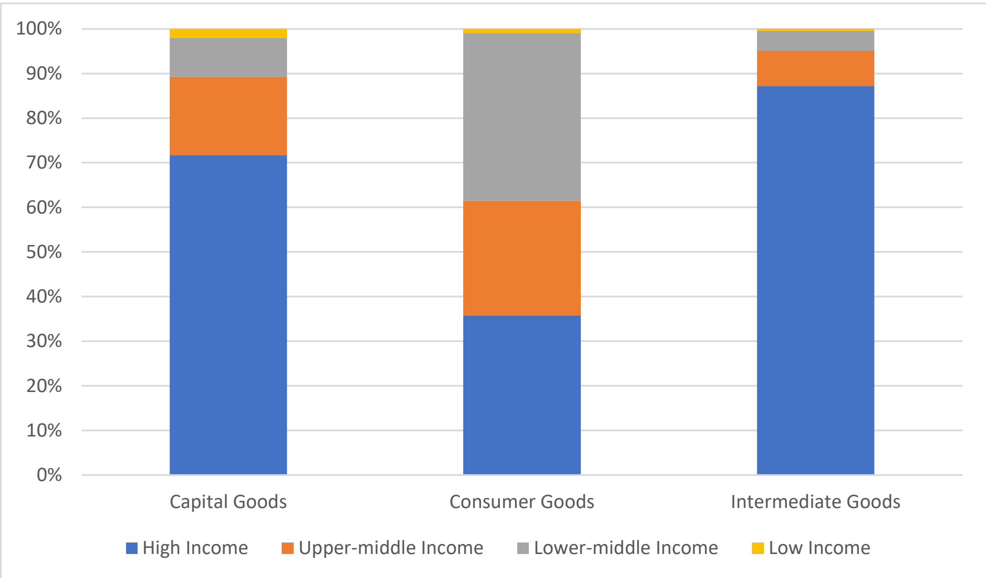
Figure 26 and **Figure 27** report similar results for Egypt and Algeria, respectively, but consider shares of exports of BEC-5 categories by the destination countries' income level rather than their region. Results again point to the conclusion that, relatively speaking, Egypt has been less successful than Algeria in penetrating rich markets. Egypt exports 49 per cent of its capital goods, 65 per cent of its consumer goods and 53 per cent of its intermediate goods to high-income markets, but also exports over 30 per cent of its capital goods to lower middle-income countries, for example. Conversely, Algeria's share of exports to high-income countries is considerably larger for most types of goods, with over 70 per cent of its capital goods and 87 per cent of its intermediate goods destined for high-income countries.

Figure 26: Manufacturing export shares by income and BEC-5, Egypt



Data Source: UN COMTRADE (2022)

Figure 27: Manufacturing export shares by income and BEC-5, Algeria



Data Source: UN COMTRADE (2022)

Information on the share of high- and medium-high technology goods that are exported to high-income markets could be a particularly useful indicator. The use of information on the geographical structure of exports intends to capture whether a country has the ability to export high-quality goods (i.e. those that meet the applicable standards of rich world markets), while the UNIDO classification focuses on the technology intensity of a country's exports. Combining the two indicators can be revealing in that a country that is able to export a relatively high share of high- and medium-high technology goods to rich markets can be perceived as being able to successfully compete in the high-tech segment of production by exporting high-quality products. Conversely, a country that is able to export relatively high shares of exports to high-income markets, albeit in low-tech segments can be considered to be performing relatively robustly (i.e. the country is able to meet destination countries' quality requirements, but only for relatively simple products) and in line with dependency theory arguments.

Indicator 6 – Geographical structure of imports

The geographical structure of imports can be constructed by considering the import shares to different country groups which can be defined on a purely geographical basis (e.g. by continent) or more indirectly (e.g. by income level). These import shares are calculated as the ratio of the value of imports (in current US$) to a particular country group to the value of some aggregate of imports (in current US$), usually total imports or total manufacturing imports. Combining this information for all relevant country groups (e.g. all continents or income groups) allows for a full overview of the composition of imports.

Strategic questions:

- How reliant is the country on particular geographical markets for imports?
- Does the country import its intermediate and capital needs from rich or poor regions?

Equation: The geographic structure of imports is measured as:

$$GeogImpStruc_{it}^{A} = \frac{Imports\ from\ Region\ A_{it}}{Aggregate\ Imports_{it}}$$

$Imports\ from\ Region\ A$ = value of imports (in current US$) from countries in region A to country i

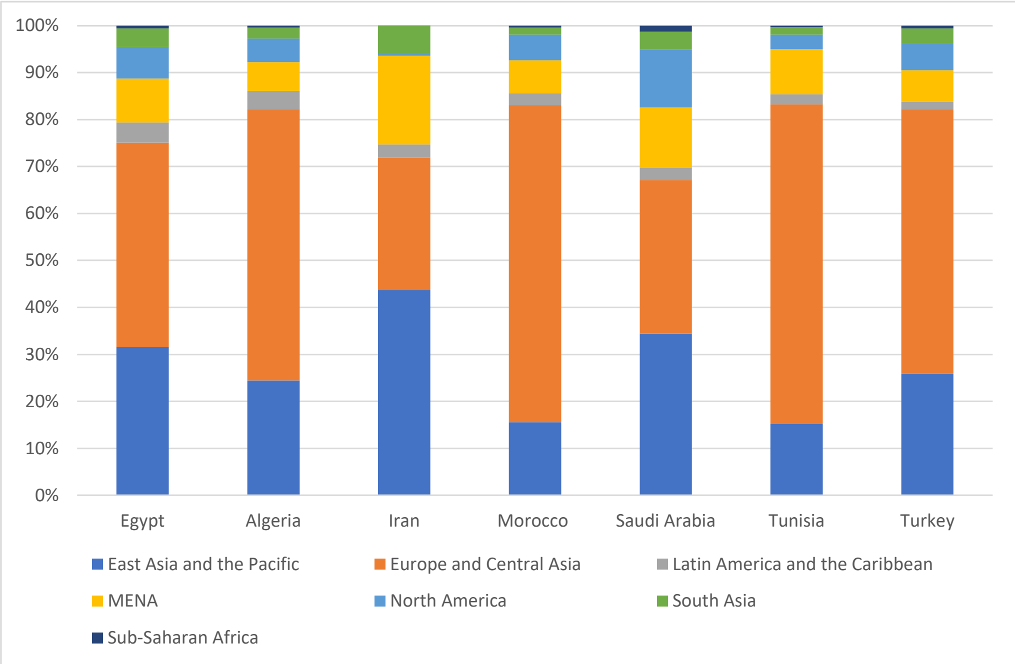
$Aggregate\ Imports$ = total value of imports (in current US$)

The subscripts i and t refer to countries and time periods, respectively.

Variables required	Data source	Notes
Bilateral import values	UN COMTRADE (2022) database via the WITS platform	To construct the geographic distribution of imports, it is also necessary to select a particular country group, with the geographical country grouping from the World Bank being one example.

Using the example of Egypt and following the same approach as for exports, the geographical integration of Egypt on the import side can be illustrated. **Figure 28** reports information on the import shares from different regions to Egypt in 2015 and the same set of comparator countries. The results on the import side reflect those from the export side. While Saudi Arabia and Iran are again outliers (they import relatively high shares from East Asia and the Pacific and relatively low shares from Europe and Central Asia), the results for the other five countries suggest that Egypt imports only a relatively small share from Europe and Central Asia in comparison to Algeria, Morocco, Tunisia and Turkey. Conversely, of these five countries, Egypt has the highest share of imports from East Asia and the Pacific, with relatively small shares from other regions.

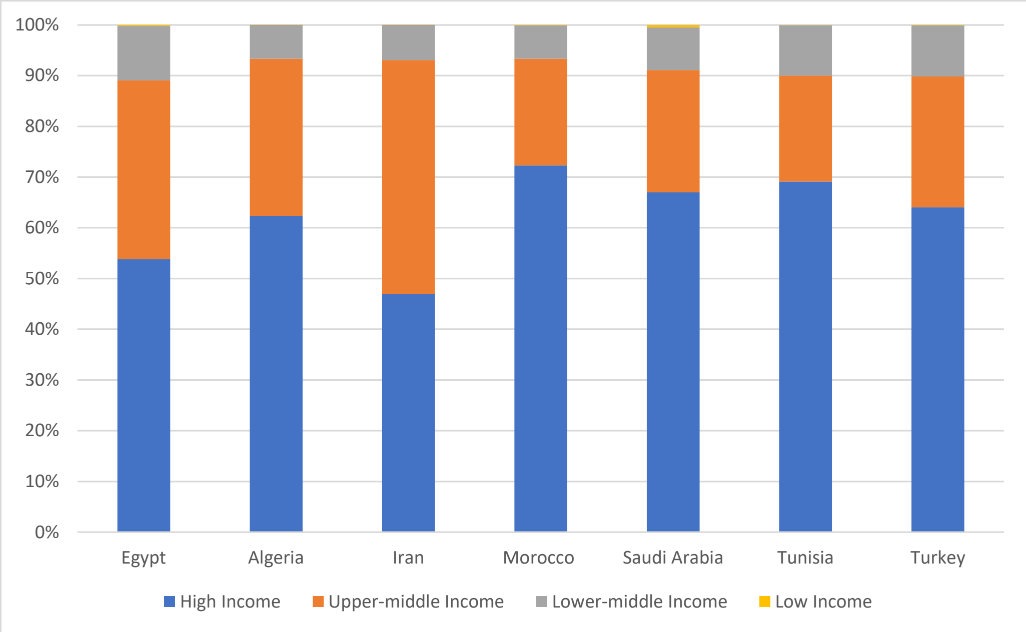
Figure 28: Manufacturing import shares by region, 2015



Data Source: UN COMTRADE (2022)

When looking at import shares by income level (**Figure 29**), the results are consistent with those for exports, indicating that Egypt imports a relatively small share from high-income countries. While this share still lies above 50 per cent, only Iran imports a lower share from high-income countries (47 per cent), with all other countries importing shares above 60 per cent. To the extent that the quality of goods and the technology embodied in imports is higher when these are sourced from high-income countries, such a result is consistent with the argument that Egypt is not maximizing the benefits of its imports.

Figure 29: Manufacturing import shares by income level, 2015

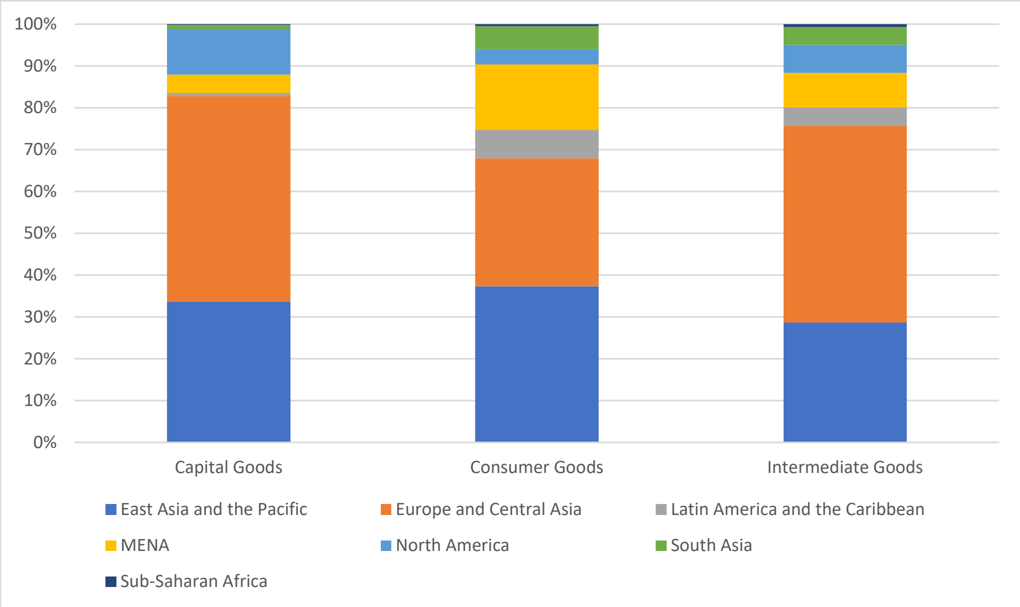


Data Source: UN COMTRADE (2022)

The categorization according to the BEC classification is likely to be a particularly useful indicator in the case of imports. As highlighted above, one important benefit of importing is that it provides access to intermediate and capital goods that may not be available domestically, that are of a higher quality than those that are available domestically, and that may be cheaper than those available domestically, all of which could result in productivity and production gains. Moreover, it is to be expected that intermediate and capital goods imports from high-income markets are, on average, more likely to be of a higher quality and embody more sophisticated technology. A country with a relatively high share of intermediate and capital goods imports from high-income markets could therefore indicate that the country is using high-quality and high-tech machinery and components in its production. Conversely, a relatively low share of such goods from high-income markets could be interpreted in the more negative sense of the country being reliant on foreign production for intermediate and capital goods, but also for inferior components and machinery.

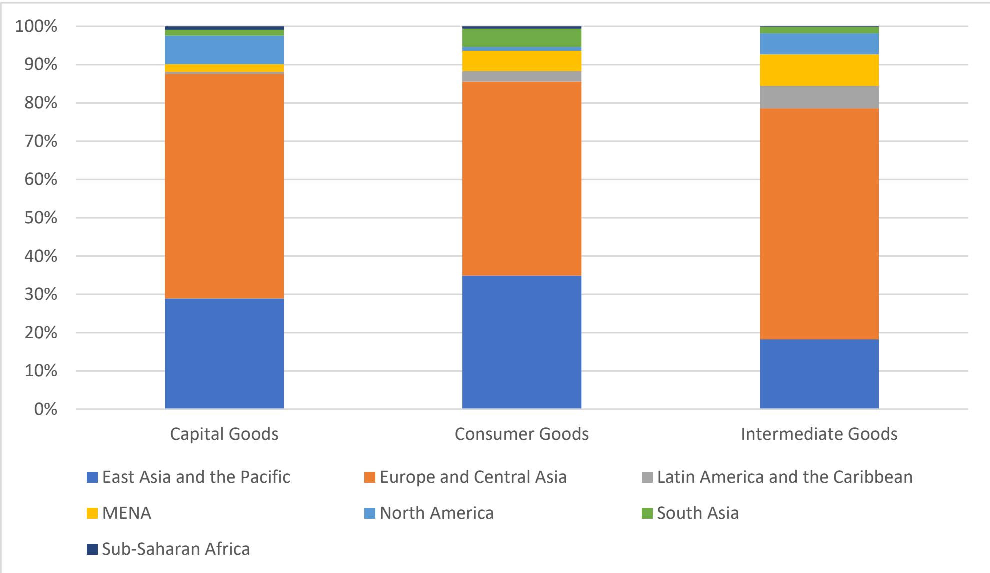
Figure 30 and **Figure 31** report information for Egypt and Algeria, respectively, on the shares of capital, consumer and intermediate goods imports that originate from different regions. Egypt's imports are concentrated in two regions, Europe and Central Asia and East Asia and the Pacific. Interestingly, the share of capital and intermediate goods imports from Europe and Central Asia is higher than that of consumer goods, with a relatively high share of consumer goods imports coming from the Middle East and North Africa. The results for Algeria also indicate that large shares of all types of goods are imported from Europe and Central Asia and East Asia and the Pacific, although the shares of imports from these two countries are significantly larger for all types of goods.

Figure 30: Manufacturing import shares by region and BEC-5, Egypt



Source: UN COMTRADE (2022)

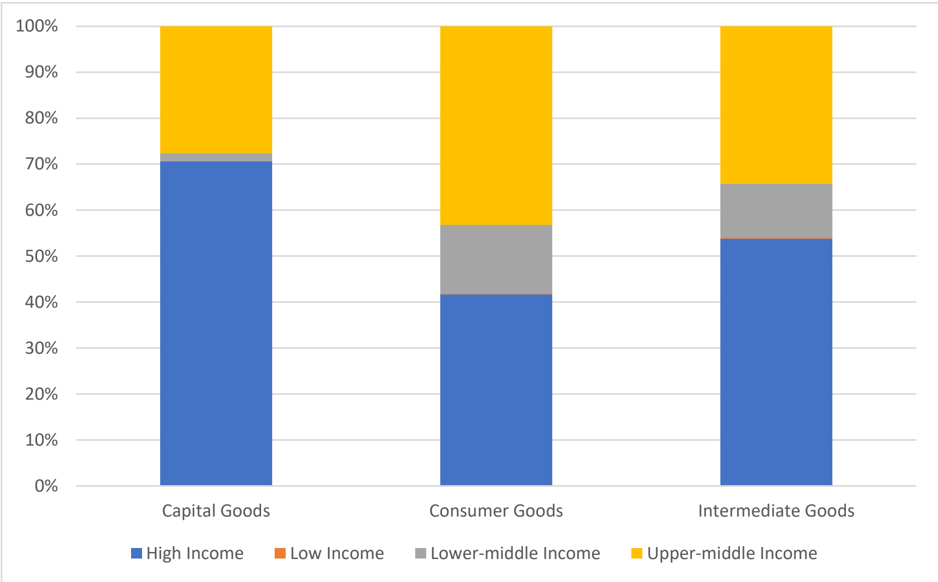
Figure 31: Manufacturing import shares by region and BEC-5, Algeria



Data Source: UN COMTRADE (2022)

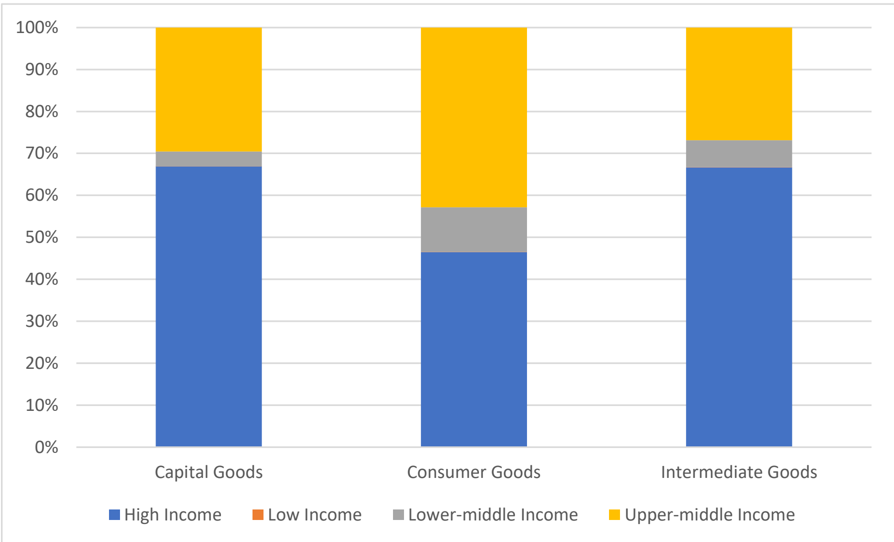
Finally, **Figure 32** and **Figure 33** report the same information for Egypt and Algeria, respectively, but aggregate the exporting countries by income level rather than by region. Fewer differences are evident in this case between Egypt and Algeria. Both countries' import structure is dominated by imports from high-income and upper middle-income countries, particularly in the case of capital goods. The notable difference between the two countries is that Algeria imports a larger share of intermediate imports from high-income countries, while Egypt has a relatively higher share of intermediate imports from upper middle- and lower-middle income countries.

Figure 32: Manufacturing import shares by income level and BEC-5, Egypt



Data Source: UN COMTRADE (2022)

Figure 33: Manufacturing import shares by income level and BEC-5, Algeria



Data Source: UN COMTRADE (2022)

Combined with the other findings from this section, the results suggest that Egypt is less reliant on Europe and Central Asia for imports than the comparator countries. Egypt also has a relatively low share of imports from high-income countries. Part of this difference relates to the relatively low share of intermediate imports from high-income countries, which may indicate that there is room for improvement for Egypt's position within GVCs (see the GVC tool).

Examining a country's export and import shares by income level also provides an interesting opportunity for benchmarking exercises. In the case of exporting, such an exercise can address whether a country has the ability to export to rich markets and how this ability compares to (similar) leading countries. In the case of importing, a similar comparison may provide insights into the potential for technology spillovers from imports and the requirement to use high-tech imports in domestic production. **Table 9** presents this benchmarking exercise for both exports and imports using the countries and data used in Figures 23 and 29, focussing on the shares of either exports or imports with high-income and upper middle-income trade partners. The table reveals that Egypt's export share to high-income countries is 71 per cent of that of the leading country (Tunisia) while Egypt's export share to upper middle-income countries is just 37 per cent of the leading country's (Iran). In the case of imports, the respective shares are 75 per cent in the case of import shares to high-income countries and 76 per cent in the case of import shares to upper middle-income countries, with Morocco and Iran being the comparator countries, respectively.

Table 9: Relative manufacturing export and import shares with high- and upper middle-income trade partners in 2015

	Exports				Imports			
Country	*High- income share*	*Upper middle-income share*	*Relative high-income share*	*Relative upper middle-income share*	*High- income share*	*Upper middle-income share*	*Relative high-income share*	*Relative upper middle-income share*
Egypt	57.8	21.7	70.76	37.22	53.9	35.2	74.52	76.31
Algeria	52.7	19.9	64.58	34.16	62.4	31.0	86.29	67.13
Iran	15.4	58.2	18.92	100.00	46.9	46.1	64.95	100.00
Morocco	68.7	13.7	84.10	23.55	72.3	21.1	100.00	45.71
Saudi Arabia	45.6	26.5	55.80	45.54	67.0	24.1	92.72	52.22
Tunisia	81.6	8.7	100.00	14.91	69.1	20.9	95.64	45.26
Turkey	65.7	19.8	80.52	34.00	64.0	25.8	88.61	55.93

Data Source: UN COMTRADE (2022)

3.4 RCA-based indicators of subsector trade performance

The indicators have thus far used simple export and import shares by type of product.[28] While providing an overall indicator for the structure of trade, such indicators are limited in the sense that they rely on export values without providing any indication (or metric) of whether a country is 'successful' or not in exporting a particular good. In this section an alternative set of indicators is

[28] It should be noted that measuring openness or outward orientation in a reliable way is fraught with difficulty, with Pritchett (1996) noting that many standard measures of openness are not highly correlated with each other, suggesting that they are unlikely to be capturing some common aspect of trade openness.

introduced which, on the one hand, allows for a comparison with world export patterns, and on the other, allows for a categorization of whether a country is 'successful' in exporting a given product. In this sense, the indicators represent indicators of specialization in international trade theory, according to which specialization in a product or sector is considered an indication of a country's productive capabilities in the related sector.

Indicator 7 – Revealed comparative advantage

To construct indicators of specialization, the Balassa index of Revealed Comparative Advantage (RCA)[29] is used, which compares the share of a particular product or sector in a country's export basket with the share of that product or sector in the world export basket. If the country share in that product or sector is greater than the world share, the country has an RCA in that product.[30]

Strategic question:

- In what products and sectors has the country been able to develop specialization?

Equation: Revealed comparative advantage for a product *j* is measured as:

$$RCA_{it}^{j} = \frac{Exports\ in\ product\ j_{it}/Total\ exports_{it}}{Exports\ in\ product\ j_{Wt}/Total\ exports_{Wt}}$$

> $Exports\ in\ product\ j_{it}$ = *value of exports (in current US$) of country* i *in product j*
>
> $Total\ exports_{it}$ = *total value of exports (in current US$) of country* i
>
> $Exports\ in\ product\ j_{Wt}$ = *value of exports (in current US$) of a comparator country/region (usually the rest of the world)* W *in product j*
>
> $Total\ exports_{Wt}$ = *total value of exports (in current US$) of the comparator country/region* W

The subscripts i and t refer to countries and time periods, respectively, while subscript j refers to a particular product (or sector).

Based on the RCA index, country *i* is considered specialized in exports of products or from sectors if its market share in that product or sector is higher than the world average (i.e. larger than 1). Put differently, if the world share of country *i*'s export of the product or from the sector is larger than the world share of all its exports, country *i* is considered to be specialized in the product or sector.

This results in a binary (0/1) variable which indicates whether a country has an RCA in a given product or not. This calculation can be done at different levels of aggregation, including the sectoral level, by BEC-5 categories and by UNIDO's technology classification, for instance.

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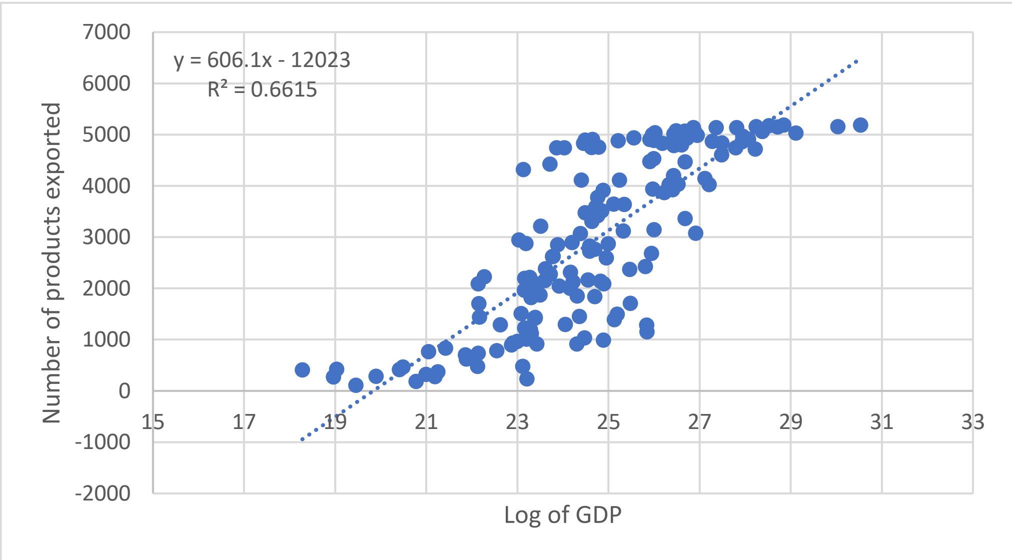
[29] This indicator is also used extensively in Tool 3 on diversification and upgrading, with Tool 3 building on the indicators developed here to consider the specialization variables as indicators of diversification, further considering changes in diversification over time as capturing upgrading.

[30] The concept of RCA measure has the advantage of being simple to calculate and as having a clear economic interpretation. At the same time, it has a number of shortcomings, including that for particular products and countries, the RCA tends to vary greatly over time, indicating that it does not necessarily capture sustained export advantage. Questions also arise about the appropriate way to aggregate the information contained in RCA indices to provide country-level information that is useful to policy analysis – e.g. simply aggregate the number of RCAs or use some kind of export share as a weighted measure. Beyond these more practical concerns, questions around the theoretical motivation for these indicators have also been raised (see, for example, Vollrath, 1991).

Variables required	Data source	Notes
Export values at the HS 6-digit level	UN COMTRADE (2022) database via the WITS platform	

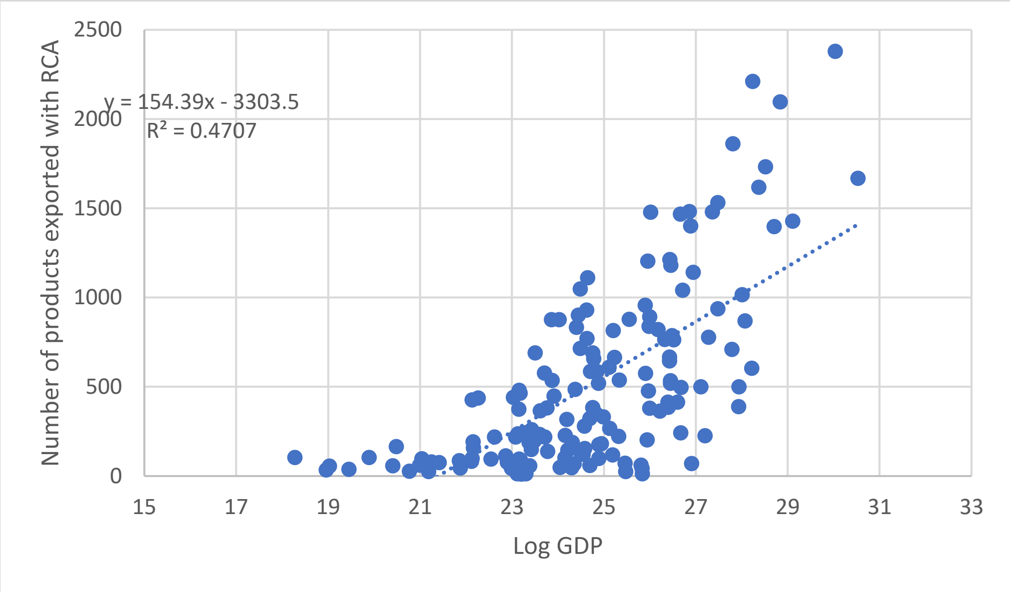
In the context of the binary distinction between having an RCA and not having an RCA, one useful indicator is to simply count the number of products in which a country has an RCA. By definition, a country can only have an RCA in a subset of the products it exports (i.e. if the country's export share is greater than the world share in some products, it must have an export share that is lower than the world average in other products). Moreover, it is expected that larger countries would have a greater number of products with RCA than smaller countries (simply because they tend to export a larger number of products). This means that in addition to examining the dynamics of the number of RCAs (i.e. how the number of products with an RCA change over time), it is also useful to compare it with other similar countries, with country size (i.e. level of GDP or population) being a suitable dimension to consider when identifying comparator countries. **Figure 34** and **Figure 35** indicate that larger countries (measured by level of GDP) both export a larger number of products and a larger number of products with an RCA. While the association between the (log) level of GDP and the number of products exported tends to be stronger than that for the association between the level of GDP and the number of products exported with an RCA, both associations are strong. Note that the intention of these figures is not to suggest any causal relationship between the number of products being exported (with an RCA) and the level of GDP, but simply to show that the number of products being exported (with RCA) is associated with the indicator country size further suggesting a need to control for country size when conducting country comparisons.

Figure 34: Relationship between the log of GDP and number of products exported, 2015



Data Source: UN COMTRADE (2022)

Figure 35: Relationship between the log of GDP and number of products exported with an RCA, 2015



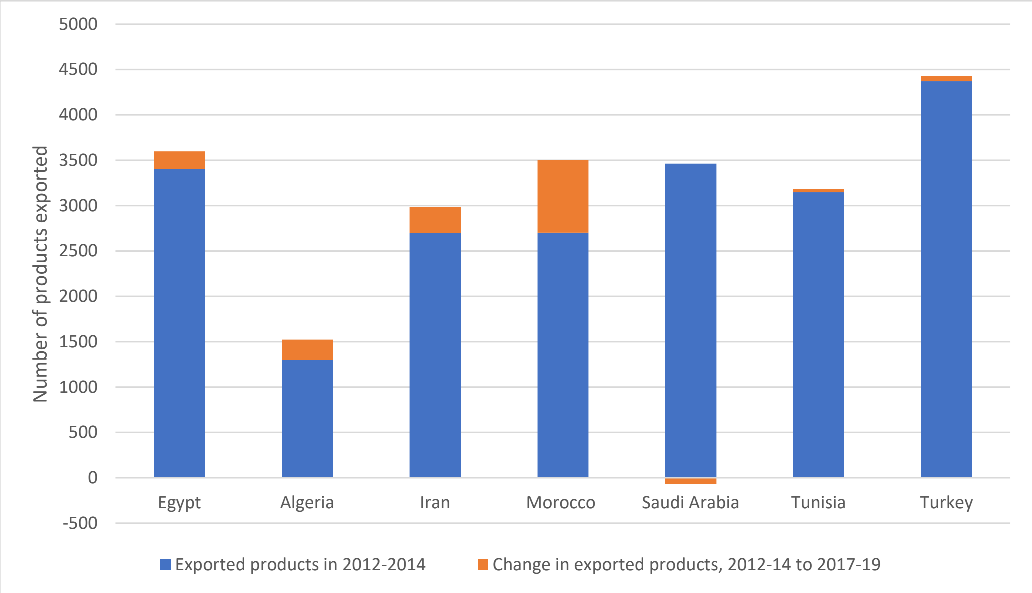
Data Source: UN COMTRADE (2022)

To illustrate the use of RCA indicators, we again turn to the example of Egypt. **Figure 36** reports information on the number of manufacturing products exported from Egypt in 2012 and the change in the number of manufacturing products exported between 2012 and 2019, and the same set of comparator countries as above. Recall from **Table 2** that Egypt has the lowest GDP per capita among this set of countries and the fourth highest level of GDP (Iran, Saudi Arabia and Turkey have higher GDP levels).

Figure 36 indicates that Egypt exported the third-highest number of products in 2012 (3,401 products) despite reporting the fourth highest GDP level, with only Turkey (4,370) and Saudi Arabia (3,462) exporting a higher number of products. Interestingly, Algeria, which has a similar GDP level as Egypt (US$ 190 billion versus US$ 250 billion) exported only 1,297 products in 2012. Conversely, Morocco (which has a GDP of US$ 113 billion) and Tunisia (which has a GDP of US$ 48 billion) had relatively high numbers of exported products in 2012 (2,701 and 3,147, respectively), with Morocco significantly increasing the number of products it exported between 2012 and 2019. The overall results for Egypt are mixed. When we compare Egypt with the comparator that has the most similar level of GDP (but a higher level of GDP per capita), Algeria, Egypt appears to be performing relatively well. Conversely, when we compare Egypt with countries that are significantly smaller in terms of GDP (namely Morocco and Tunisia), the results are not so positive, with Egypt exporting a similar number of products as these smaller (albeit richer) economies.

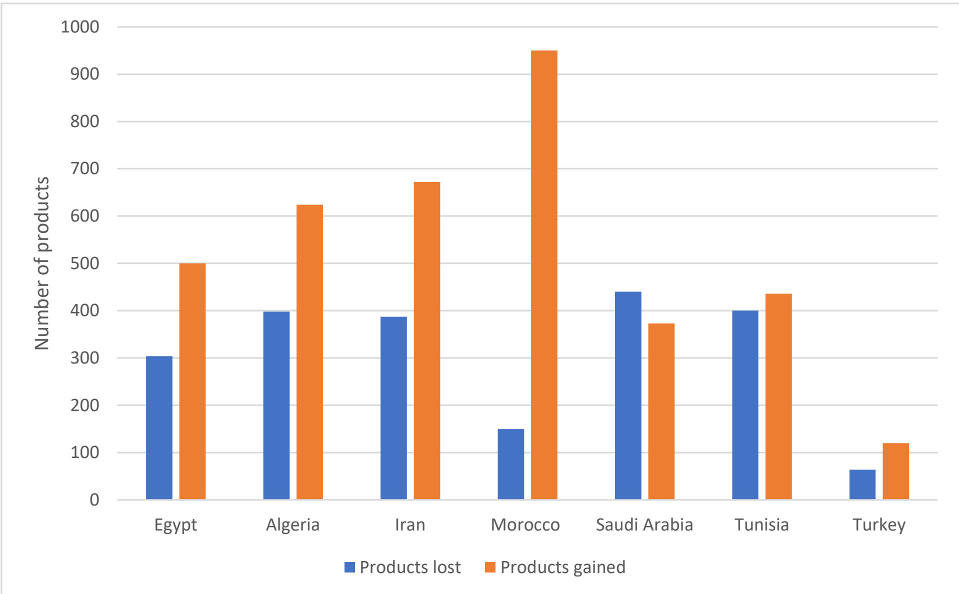
Figure 37 provides further details on the changes in the number of manufacturing products exported over time. An increasing number of products exported over time is typically associated with the addition of new products to the export basket. At the same time, however, it is likely that certain products are no longer being exported. **Figure 37** illustrates the extent to which the entry and exit of products evolves over time. The figure reveals that Morocco, Algeria and Iran were able to add more products than Egypt to their export baskets between 2012 and 2019. At the same time, however, Iran and Algeria also lost a higher number of products from their export baskets than Egypt. Morocco's export basket, by contrast, stands out as having gained a large number of new products and losing relatively few.

Figure 36: Number of manufacturing products exported in 2012 and change between 2012 and 2019



Data Source: UN COMTRADE (2022)

Figure 37: Number of manufacturing exports gained and lost between 2012 and 2019

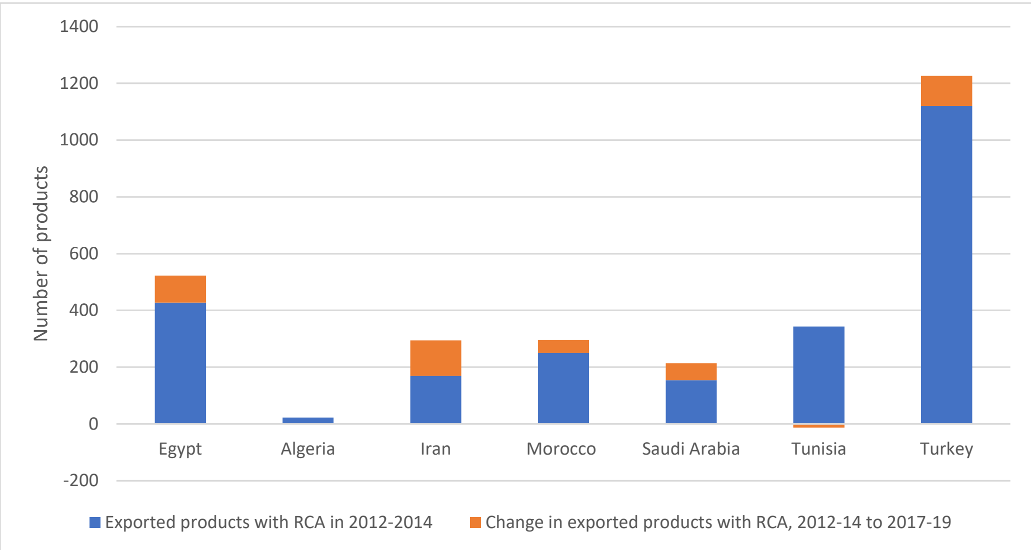


Data Source: UN COMTRADE (2022)

Adopting a similar approach, **Figure 38** reports information on the number of manufacturing exports with an RCA in 2012, along with the change in the number of products with an RCA exported between 2012 and 2019. The figure reveals some interesting patterns. Turkey recorded by far the highest number of products exported with an RCA in 2012 (1,121), with Egypt reporting the second highest number (428). The other countries exported far fewer products with an RCA. Algeria exported only 23 products with an RCA, a result that when combined with the very high share of exports destined for Europe and Central Asia suggests a potential weakness, namely that Algeria's export composition (in terms of both products and trade partners) is highly specialized. Similar conclusions can be drawn for other countries as well, with Saudi Arabia, for example, exporting a relatively small number of products with an RCA (154) compared to its overall number of exports (3,462).

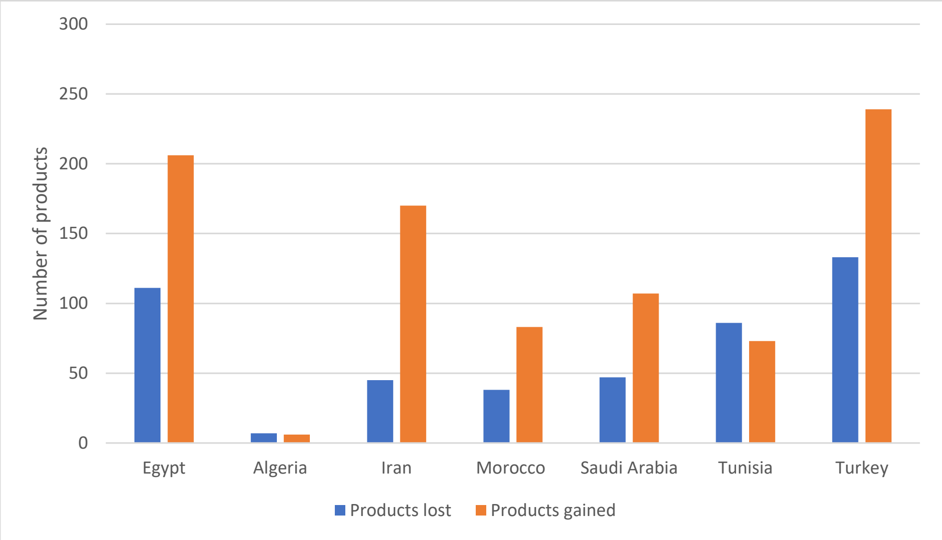
Figure 39 reports information on the number of RCAs gained and lost between 2012 and 2019. It suggests that the development of Egypt's RCAs was relatively dynamic, with a comparatively large number of RCAs gained (around half of the overall RCAs it had in 2012) as well as losing a significant number of RCAs. The developments in Egypt closely follow the pattern observed in Turkey. The results for Iran, Morocco and Saudi Arabia also indicate some dynamism in terms of gains and losses in RCAs, albeit at a lower level. The case of Algeria is essentially static, while Tunisia experienced a net loss in RCAs.

Figure 38: Number of manufactured products exported with an RCA in 2012 and change in number of products exported with an RCA between 2012 and 2019



Data Source: UN COMTRADE (2022)

Figure 39: Number of manufacturing products exported with an RCA gained and lost between 2012 and 2019



Data Source: UN COMTRADE (2022)

3.5 Trade balance and the contribution of subsectors

The discussion above highlights the importance of both exports and imports when considering trade openness. On the import side, the role of imports as a supplier of high-tech intermediates and capital goods represents an important dimension, particularly the provision of such goods that are either not available domestically or that are cheaper than domestic alternatives. Another relevant dimension to consider is the inter-relationship between exports and imports. A country needs foreign currency to buy capital and intermediate goods imports. Such foreign currency is obtained through exporting. Thus, the export sector's success or otherwise dictates the extent to which a country is able to import such goods, with poor export performance potentially constraining capital and intermediate goods imports which can in turn hamper the country's productivity potential and growth. Related concepts are found in Thirlwall's work (1979), who argues that when a country is constrained by maintaining a balance of payments equilibrium on the current account in the long run, its long-term growth rate essentially becomes the ratio of the growth rate of exports to the income elasticity of demand for imports.

Information on trade balance and its development can be used to capture this interaction and to consider the extent to which export performance constrains imports. The trade balance is simply the value goods and services exports minus the value of goods and services imports, with a positive value indicating that exports exceed imports. The World Bank's World Development Indicators report the so-called external balance on goods and services[31], which is essentially the country's trade balance expressed as a percentage of GDP.[32]

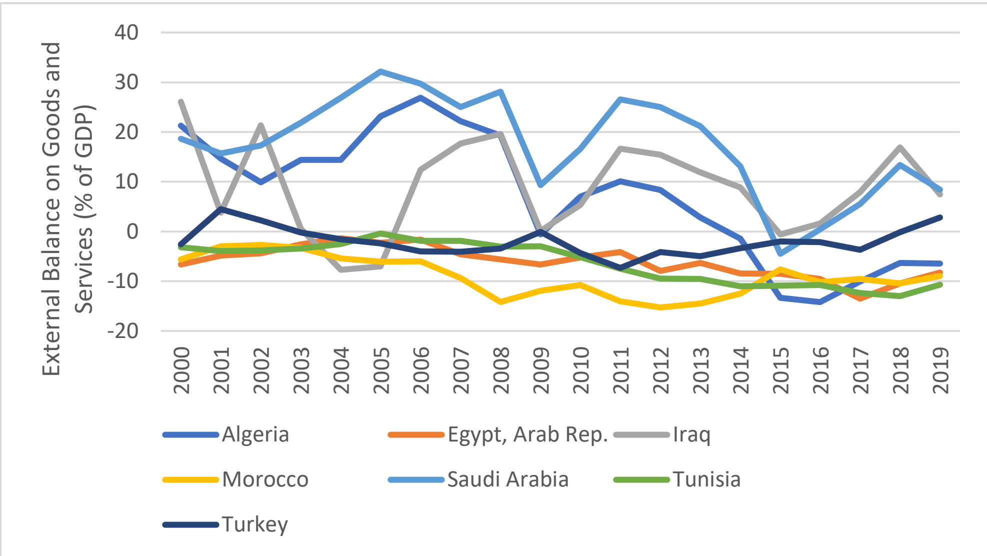
[31] https://data.worldbank.org/indicator/NE.RSB.GNFS.ZS

[32] The World Bank's World Development Indictors database also reports information on a second relevant variable, namely exports as a capacity to import (see https://data.worldbank.org/indicator/NY.EXP.CAPM.KN), which is defined as the current price value of exports of goods and services deflated by the import price index.

Figure 40 presents information on the external trade balance for Egypt and a set of comparator countries over the period 2000–2019. The figure reveals that Egypt's trade balance was negative throughout the entire period. Moreover, this trend implies that this negative balance is declining, at least up to the most recent period under observation which showed some improvement. The pattern in Egypt does not differ considerably from that of Morocco or Tunisia, while the oil states (Iraq and Saudi Arabia) often have a surplus.

While the World Bank provides this data in aggregated form, UN COMTRADE product-level export and import data can be used to create a measure of the trade balance. One potential advantage of this approach is that trade balance indicators can be constructed at a more disaggregated level. While such indicators should not be used to infer a country's capacity to export at the disaggregated (e.g. sectoral) level, since the foreign currency earned in a given sector does not need to be used to measure import demand into that sector, it can provide an indication of the extent to which sectors are a drain on foreign currency (in net terms).

Figure 40: External balance of goods and services (as a % of GDP) for selected countries



Source: World Development Indicators, World Bank (2022)

This variable is expressed in constant local currency units and would need to be converted into a common currency for cross-country comparisons.

4 Policy options

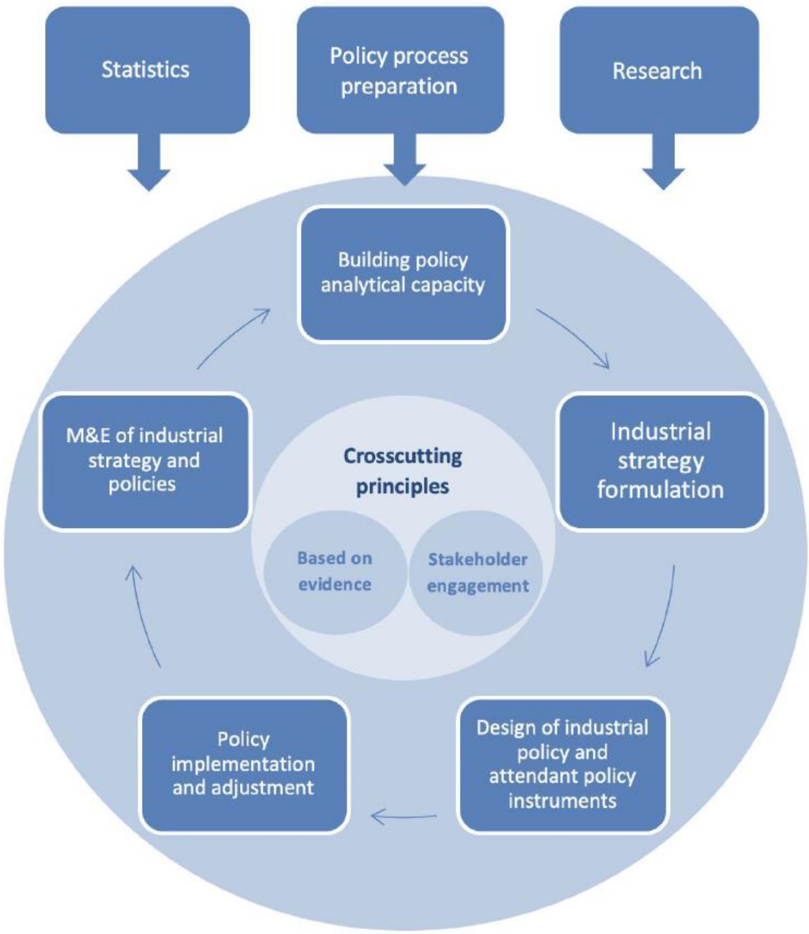
This section describes various aspects relating to trade policies. First, it briefly discusses how the analytical EQuIP tools can be used in industrial policymaking more broadly. Second, potential trade policy objectives are discussed.

4.1 How to use EQuIP for industrial strategy and policy design

The following text provides a brief overview of how to use EQuIP in strategy and policy design. A full discussion is available in *EQuIP Tool 0: Evidence for industrial policymaking*.

Industrial policymaking can be described as a cyclical or iterative process (**Figure 41**).

Figure 41. Industrial policy cycle



In the diagnostic phase, which requires analytical capacities, evidence (e.g. based on quantitative and qualitative data) is collected, systematically processed and used to identify policy challenges. Industrial strategies and related industrial policies are then defined to address these challenges. Industrial policy goals determine the choice of intervention areas and the formulation of suitable policy instruments. The implementation of these instruments is monitored and evaluated, with the results feeding back into diagnostics and evidence collection on progress made towards the intended industrial development targets, which completes the policymaking cycle. The cycle's iterative nature implies that industrial strategies and policies align with the progress achieved in the country's industrial development journey. In this dynamic process of accumulation and adjustment of industrial capabilities, emerging industrial development challenges and opportunities are continuously addressed.

EQuIP diagnostic tools are designed to support the policymaking process. By implementing training programmes, they aim to increase policymakers' analytical capacities and address the following three components of the policy cycle:

- Building policy analytical capacity – diagnostics
- Industrial strategy and policy formulation
- Monitoring and evaluation.

Building policy analytical capacity – diagnostics

Conducting a comprehensive, multidimensional assessment of the present situation and performance of the industrial sector is the first step in the policymaking cycle. The EQuIP diagnostic tools provide a solid foundation for such an assessment which covers a range of economic, social, and environmental aspects. Each tool uses data-driven methodologies that serve as a reliable starting point for identifying areas that require further investigation. Additional in-depth examinations can take the form of additional quantitative research, such as using nationally available data, or qualitative research, such as reviewing existing reports, conducting interviews, or consulting national stakeholders and experts. Such comprehensive assessments of the country's industrial sector on different economic, social and environmental aspects establish a minimum evidence base from which (evidence-based) strategies and policies can be formulated.

Industrial strategy and policy formulation

The process of strategy and policy design should be goal-oriented, evidence-based, and involves decision-making at five stages.

The first step is to determine which **national development goals** industrial strategy and policy can best contribute to.

The second step in the process is to design the **industrial development strategy**, which provides a general long-term view. This strategy outlines how inclusive and sustainable industrial development (ISID) contributes to national development goals.

Based on the objectives embedded in the industrial development strategy, the associated **industrial policy** specifies the roadmap towards achieving the strategic goals in greater detail. Industrial policy often narrows the scope of interventions, either by establishing general framework conditions for all economic activities (horizontal policy), or by providing targeted support to selected industries (vertical). The industry-related **objectives** outlined in the policy reflect the policy's explicit goals for achieving ISID. These goals need to be detailed, measurable, achievable, relevant and time-bound (SMART), taking the country's capabilities and limitations into account.

To achieve the objectives, concrete changes in the behaviour of economic actors or the overall business environment are necessary. The **intervention areas** are derived from the objectives and specify the required changes.

The evidence derived from applying the EQuIP diagnostic tools can contribute to all the steps described above, as the tools help identify the strengths and weaknesses of a country's industrial sector and its subsectors, and provide insights into the country's past developments and offer comparisons with other countries.

After the intervention areas have been defined, policymakers must select **policy instruments**, i.e. develop specific government interventions that drive the necessary changes. Policy instruments are the tools used to shape public- and private sector activities to achieve the specific goals set by the policy. Typically, several instruments are needed to achieve the intended outcome, hence necessitating the creation of a **mix of policy instruments** or a policy portfolio.

Designing a policy instrument entails determining the objective it pursues, the type of intervention to implement, the expected outputs, the strategy to achieve the predefined results, the beneficiaries or target groups, access regulations (competitive or accessible to all beneficiaries), the source and amount of funding, and the time frame.

Monitoring and evaluation

The EQuIP diagnostic tools provide indicators and a logical sequence of decisions for designing strategies and policies for industrial development and serve as a starting point for establishing a monitoring and evaluation (M&E) system. An M&E system is essential for monitoring and evaluating not only policies, but also all types of interventions or instruments. Monitoring is a continuous process that provides regular feedback on progress towards achieving milestones and intended results. It focuses primarily on tracking spending in relation to an intervention, and whether the activities are being implemented according to the roadmap. Evaluation, on the other hand, involves regular reviews of the intervention's results and its impact on the intended outcomes. The purpose of evaluation is to determine whether an intervention has the anticipated effects and whether it contributes to the continuous policy learning process that makes industrial policymaking inherently cyclical and iterative in nature (**Figure 41**).

The following subchapters address policy options specific to this tool.

4.2 Trade policies

The indicators described above provide comprehensive insights into a country's trade performance. These range from general patterns of openness to more specific dimensions such as the performance of sectors, of technology trade, and to some extent different activities within GVCs, for example. The indicators provide further insights into industries a country has been able to develop a comparative advantage in. These indicators can be used for a comparative perspective—either with respect to a suitable set of comparator countries or by considering changes over time—and to identify strengths, weaknesses and opportunities in terms of trade integration. Weaknesses may include factors such as a focus on relatively few products or sectors or an export concentration in a small set of (developing) countries, for example.

Ultimately, however, the indicators described above are outcome measures and cannot provide an in-depth understanding of why trade performance does not meet expectations. They can be used to identify weaknesses and opportunities, but do not provide a full analysis of the reasons for weaknesses in a country's trade performance or the types of policies and interventions needed to realize existing opportunities.

Policies for increased trade integration usually centre on increasing export participation. One argument in favour of this approach is that firms decide what to import, i.e. they import what they need for their production and retail activities, while designing a direct policy that involves imports of higher-end production inputs when raw materials are in fact needed is not likely to be successful. Another rationale for focussing on the export dimension is that it can provide access to the foreign exchange needed to pay for intermediate and capital goods imports, goods that often embody higher levels of technology than domestic alternatives. Moreover, trade policies, such as those that promote product upgrading or diversification, may well have an indirect impact on the extent and composition of imports due to an increased need for high-tech and high-quality intermediate goods, for example. While these arguments highlight the importance of intermediate and capital goods imports for domestic performance, countries will also require suitable technologies for their level of development (Basu and Weil, 1998), which will further depend on the level of the absorptive capacity of firms in the country (Cohen and Levinthal, 1990). Another possibility is to subsidize higher-quality machinery and equipment imports to increase firm productivity and support firm growth (an example of an ISI policy). Yet another alternative—and perhaps the best option—is the reduction of existing import barriers. Since history does not support import substitution, trade liberalization might be a viable option, even though hitherto protected firms may take a hit in the short term.[33] Complementary and mitigating policies might be necessary to compensate the "losers" of trade liberalization.

A focus on supporting firms' export participation might be a more fruitful option, which inter alia fosters increased sales, facilitates learning and technology transfers and, perhaps most importantly, generates foreign exchange which unlocks opportunities to import goods.[34] With this in mind, the remainder of this section reviews policies that focus on exporting, which calls for distinguishing between "becoming an exporter" and expanding export volumes and values, and developing comparative advantages.

Traditional trade models focus to a large extent on the factors that drive export participation at the country level, and in particular the pattern of trade. These factors often prioritize endowments and productivity differentials across countries, with some of the facilitating factors internal to firms, while others are external, for example quality and health standards. Some form of comparative advantage, such as that related to commodities, cheap labour or a specific technology or knowledge are common

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[33] It should be noted, however, that such firms are likely to be relatively uncompetitive and that their exit from the market may free up resources for more competitive firms (see, for example, Melitz, 2003; Hsieh and Klenow, 2009).

[34] Krugman (1993) writes that "Even more fundamentally, we should be able to teach students that imports, not exports, are the purpose of trade. That is, what a country gains from trade is the ability to import things it wants. Exports are not an objective in and of themselves: the need to export is a burden that a country must bear because its import suppliers are crass enough to demand payment" (p. 24).

for several of these models. While commodities or cheap labour are not directly generated by policy[35], latent comparative advantages need not necessarily be the end, that is, one policy objective may be to invest in advanced technology to create a future comparative advantage (dynamic comparative advantage). In the short run, the choice of export good is confined to existing resources and global demand.

Changing the focus to medium- and long-term policies, enhancing the skills of workers (e.g. through vocational training or an enhanced educational system), increasing the capital intensity in production (e.g. through investment support) or innovation to increase the technology content of production (e.g. through R&D subsidies), i.e. improving internal capabilities may be viable policies. Firms that respond to such policies will not only be able to diversify and produce more attractive products, they will also become more productive, allowing them to adequately deal with the fixed costs related to export activities (see Clerides et al., 1998). A relatively large body of research (see, for example, Aw et al., 2011) highlights the potential role of innovation (and technology diffusion) in driving the performance of both exports and productivity of firms, with policies aiming at enhanced innovation systems, for example.

Some of these fixed (or sunk) costs concern the ability to meet the costs associated with quality standards, among others. To be able to export food to Europe, for example, certain standards must be met, such as the quantity of pesticides used when growing agricultural produce or for the packaging of products. Safety standards for electronic products is another (necessary) barrier to trade that would-be-exporters need to address. Policies that help producers meet international standards might involve information campaigns, demonstrations or different types of training.

This brings us to common policy instruments, some of which may be controversial. These instruments do not only foster export participation, but also support an increase in incumbent exporters' export volume. Government can support firms' export activities by providing different export subsidies. Another common approach is to aim for real exchange depreciation (a nominal exchange rate depreciation might not have lasting effects) by altering relative prices and/or the nominal exchange rate. Tool 1 (structural change and productivity) covers policies that help increase productivity and indirectly serve as export promotion through the productivity effect.

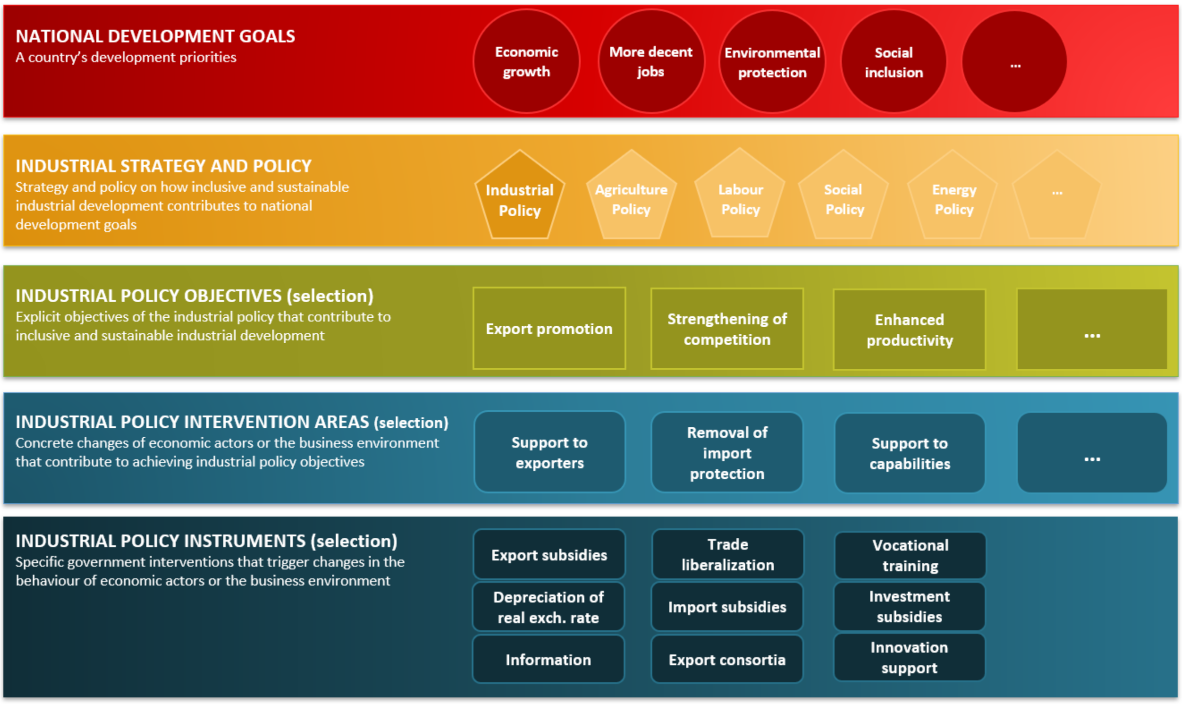
One way to achieve diversification is to encourage product variety, which has been proven to increase productivity at the country level (Feenstra and Kee, 2008), and can underpin intra-industry trade. A general policy approach that has been shown to enhance export performance more generally, but also increases performance in terms of export variety is the use of preferential trade agreements (see, for example, Falvey and Foster-McGregor, 2022). Given the lack of progress in terms of multilateral liberalization, preferential agreements are one means to engage in broad-based trade liberalization. At the same time, the design of such agreements is crucial for determining the outcomes of such agreements, with the different provisions in trade agreements shown to have several impacts on export performance (Falvey and Foster-McGregor, 2022).

In sum, direct and indirect policies that focus on export promotion through the enhancement of firms' productivity, factor endowments and capabilities coupled with policies that help firms deal with the fixed costs associated with export participation go a long way. The removal of protective policies to support import substitution would serve to strengthen firms' average performance by weeding out

[35] One policy could be to turn towards the extraction of minerals in demand, for example lithium, which has experienced increased demand for use in batteries.

uncompetitive and overly protected firms. Policies that give firms an extra nudge in the form of export subsidies or that generate a more favourable real exchange rate may also be justified, even if not justified based on a market failure. This is summarized in **Figure 42** in a policy matrix form.

Figure 42: Example of linking policy to national development



Various dimensions may be considered relevant when thinking about existing weaknesses and necessary interventions. Broadly speaking, this may include categories such as trade policy; infrastructure; endowments and capabilities. Identifying and understanding whether and to what extent these different categories of variables represent a weakness is a crucial next step for identifying a suitable response. There is clearly extensive scope for policy interventions under each of these four broad categories of variables.

In the context of trade policy, for example, considering additional data on indicators such as (average) tariff rates[36], non-tariff barriers[37] and the number, depth and breadth of preferential trade agreements[38], is a useful step, and potentially triangulating these data with the outcome-based indicators introduced above to arrive at a more holistic understanding of both the weaknesses as well as the (trade policy-related) causes of such weaknesses.

Similar arguments can be made for the other categories of variables. For example, a number of dimensions for infrastructure can be considered. One aspect is the country's internal infrastructure (e.g. the quality of road and rail), which can be an important constraint to the country's ability to trade

[36] Using the tariff data from WITS, for example: https://wits.worldbank.org/

[37] UNCTAD has a database on non-tariff measures, with data also collected in WITS: https://wits.worldbank.org/tariff/non-tariff-measures/en/ntm-bycountry

[38] Using World Bank data on the horizontal breadth of preferential trade agreements, for example: https://openknowledge.worldbank.org/handle/10986/26148

internationally. Other aspects relate to the logistics and infrastructure surrounding international trade more specifically (e.g. the quality of ports) as well as the systems, institutions and regulations in place aimed at ensuring the timely trade of goods across borders. For a comparative perspective, datasets such as the World Bank's Logistic Performance Index, may be a useful starting point when considering the performance of logistics and infrastructure across a number of dimensions.[39]

Finally, a number of dimensions need to be considered in terms of a country's capabilities and endowments, many of which relate to other EQuIP tools. These include indicators related to the economic complexity of production (see Tool 3 on diversification and upgrading), to the level and quality of human capital, and to the level and quality of physical capital.

Following an initial mapping of these different dimensions, engaging in a dialogue with a broad range of stakeholders—particularly in the private sector—is a useful next step to better understand the extent of constraints along these different dimensions. This dialogue would help provide a full picture of the strengths and weaknesses associated with these different categories of variables, and would ultimately provide insights into the relevant policy levers that can improve trade integration and trade performance.

[39] https://lpi.worldbank.org/

5 Links to other EQuIP tools

This tool on trade integration is closely linked to a number of the other EQuIP tools. The most obvious link is with Tool 3 on diversification and upgrading. Some of the indicators used in this particular tool are also used in Tool 3, albeit in a slightly different context. Moreover, part of the discussion on upgrading in Tool 3 could be used as an input to the question whether a country possesses the necessary capabilities to achieve certain degrees of global trade integration. While the concepts of economic complexity do not provide in-depth answers—since complexity is to some extent nebulous, with the indicator being derived from outcomes rather than from the absence of inputs that drive complexity—they provide some answers to the question whether capabilities are present in the country or not to meet certain integration aims.

This tool is also related to Tool 1 on production-related performance. One of the main indicators of success in terms of production can be considered the country's ability to successfully export internationally. The two tools therefore complement each other.

This tool also has strong links with Tool 4 on global value chains. A great deal of international trade today involves integration in GVCs, as evidenced by the large share of intermediates in world trade. Successful trade integration therefore usually entails and implies successful integration in GVCs. Some of the indicators used in Tool 2 are also related conceptually to those used in Tool 4, for example the indicators that focus on the composition of imports and exports by BEC categories.

Finally, the technology dimension is emphasized in part of the discussion in this tool. This, for example, relates to a country's ability to export high-tech products and to import advanced capital and intermediate goods. Firms that can invest in increasingly advanced technologies will be those best capable of adapting their baskets to export high-tech products as well as being better able to make use of the advanced imports of capital and intermediate goods (see Tool 8 on digitalization and Industry 4.0).

6 Possible extensions

The indicators described above focus in many cases on one dimension, such as sectors, technology levels and BEC categories. A more focussed approach could involve a combination of some of these dimensions and to consider exports of different BEC categories by technology intensity, for example. Similarly, the analysis could focus on specific sets of partner countries, involving the different indicators of export and import composition with respect to particular partners (e.g. specific regional partners, high-income countries, etc.).

These basic indicators focus on measures of exports and imports to GDP. While these indicators' shortcomings are discussed—in particular, related to questions of country size—they can still be useful from a comparative perspective to measure the country's general openness levels. Such an analysis can also be conducted at the sectoral level by considering exports from the sector relative to its value added. This provides an indication of the openness of particular sectors –again from a comparative perspective.

The approach described in this document also focusses on a cross-country comparison when assessing performance, with the choice of comparator including indicators such as income per capita and geographical location. These different dimensions could be expanded by including additional aspects such as information on endowments, technology level and growth rather than level of income per capita. These dimensions can also be combined in various ways when selecting suitable comparator countries. An alternative, potentially complementary approach would be to consider changes over time rather than conducting a cross-country comparison. Thereby, it can be determined whether changes in a given indicator have been positive or negative. The finding that a country performs relatively poorly in comparison to others is often a useful piece of information, but can be even more useful in combination with information on the dynamics of that indicator (also in comparison with comparator countries).

One further possible extension would be to examine not just the sectoral or technological dimension of exports (and imports), but also to consider the quality segments in which countries are able to compete in within the global economy. The notion here is that even narrowly defined products can have very different levels of quality, with the more successful exporters capable of competing in higher quality segments. One way of addressing this issue is to assume that quality is reflected in prices. Under this assumption, data on unit values—defined as the ratio of export values to export volumes—can be used to identify the quality of exports. Based on such data, the performance of countries (or sectors within countries) can be examined by considering an indicator of the average quality (i.e. average unit price) of exports or the share of exports from the high-quality segment (e.g. defined as the top x^{th} percentile of unit values in a particular sector).

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