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EQuIP

Enhancing the Quality of Industrial Policies

TOOL 1

Industrial Capacity and Growth – Domestic and Export Dimensions

EQuIP Tool 1:

Industrial Capacity and Growth – Domestic and Export Dimensions

Summary Sheet

Enhancing the Quality of Industrial Policies (EQuIP) – Tool 1	
Name of the tool:	Industrial Capacity and Growth – Domestic and Export Dimensions
Objective:	The aim of this tool is to provide a general overview on the magnitude, strengths, competitiveness and performance of a country's industrial sector. It outlines how an analysis of a country's industrial capacity and its patterns of growth can look like. It covers both the dimensions of domestic production and exports, thereby recognizing the capacity to produce and the capacity to export as key ingredients for economic growth and industrial competitiveness.
Key questions addressed:	Where does a country stand with regard to the level of industrialization of its economy? How has this changed over a certain period of time in the past? At which pace is the country moving from an agrarian state to an industrial one? What can be said about the country's capacity to produce and export manufactures competitively – and how can this be improved? How does its capacity and growth performance compare to peer or benchmark countries? What is the importance of a country's industrial sector in the global (or regional) arena? Is it a small or a large global (or regional) player?
Indicators used:	Share of manufacturing value added (MVA) in gross domestic product (GDP) Share of manufactures in total exports MVA per capita Manufactured exports per capita Share in world MVA Share in world manufactured export

Contents

1. Introduction

The purpose of this tool is to provide a general overview and perspective on the scale and performance of a country's industrial sector as well as on its position within a country's economy and the global arena. It outlines how an analysis of a country's industrial capacity and growth can look like, covering both domestic production and export dimensions, thereby recognizing the capacity to produce and the capacity to export as key ingredients for economic growth and industrial competitiveness. To provide for a comprehensive analysis of a country's industrial development trajectory, this tool suggests a set of indicators to monitor a country's economic and export structure, its capacity to produce and export as well as its impact on global (or regional) industrial production and trade.

In many developing countries, the manufacturing sector is small and underdeveloped. That is, their capacity to produce manufactured goods is limited. In these cases, there is, thus, the potential and indeed the need for industrial growth. Successful episodes of industrialization are characterized by industrial growth being sustained over long periods of time. Such industrial growth generates income for different actors on the ground, including firms and workers, thereby contributing to an improvement in material well-being while also acting as a key driver for poverty alleviation. At the same time, such industrial growth indicates an expansion of a country's productive capacity and, hence, reflects an increase in the ability of its productive sector to meet the material needs and demands of the country's population. Such an increase in a country's productive capacity may also reduce its dependence on imports for the supply of final goods and services and makes it more likely that the country produces something that is demanded in international markets.

Globalisation and decades of trade liberalisation, which have made national economies increasingly interlinked, imply that local producers are increasingly exposed to foreign competitors, requiring them and the industrial systems within which they operate to possess a certain degree of competitiveness. Simultaneously, global economic integration, at least in theory, also means that it has become easier to access foreign markets. UNIDO, in its *Industrial Development Report* 2002-2003, has thus defined industrial competitiveness as the "*capacity of countries to increase their industrial presence in domestic and international markets, while developing industrial structures in sectors and activities with higher value-added and technological content*".

This tool will focus on the first part of this definition by providing a methodology for the analysis of national industrial capacity and growth.[1] The second part of this definition, which refers to the importance of the continuous transformation in a country's economic structure, is addressed in a separate tool on industrial upgrading and deepening (see Tool 3). Based on earlier work of UNIDO on a Competitive Industrial Performance (CIP) Index, this tool outlines methodologies that help assess a country's industrial and export capacity, the impact of its industrial sector on global industry, and its past performance in terms of industrial value added (VA) and exports. The tool also outlines methodologies on how to shed light on a country's future potential for growth in value added and exports. Using the different measures presented here will help the analyst to get an idea of the magnitude and strength of the country's industrial system.

It is important to emphasize that the methodologies presented in this tool are for an analysis at the aggregate or macro-level. That is, the unit of analysis in this tool is the industrial (or manufacturing)[2] sector as a whole. This allows the analyst to get a general overview and perspective on the positioning, competitiveness and performance of the country's industrial sector. At the same

1 This implies a focus on domestic production and exports while leaving out imports from the diagnosis. However, the importance that imports can play in terms of industrial development needs to be recognised. Successful industrialisation is driven by integrated global markets and value chains, characterised by more exports *and* more imports. This is addressed in Tool 7 on global value chains.

2 The term "industry" is sometimes used with slightly different meanings or scopes. Some use the word industry to refer to the manufacturing sector more narrowly. Others use it to refer to the entire secondary sector, which not only includes manufacturing but also mining, construction, and public utilities. Here, we will almost exclusively focus on manufacturing more narrowly.

time, the methodologies presented here can equally be applied for an analysis of other sectors of the economy (e.g. agriculture and services) as well as for an analysis of individual industrial sub-sectors such as food and beverages, textiles and clothing, or transport equipment, for example. This is exactly what is presented in Tool 2 on sub-sectoral competitive performance.

One reason for focusing on the manufacturing sector here is that in most low-income countries industrial policy is mainly concerned with promoting structural change whereby the economy moves away from the (dominant) agriculture sector and into manufacturing. Another important reason for focusing on the manufacturing sector is that empirical evidence and history have demonstrated that the manufacturing sector plays a strategic role in the development process. For one, manufacturing has historically been the main source of innovation and productivity growth in modern economies with the research and development (R&D) activities of manufacturing firms as major drivers of technological progress. Manufacturing is also a major conduit for the diffusion of new technologies to other sectors of the economy. Moreover, there are typically strong linkage and positive spill over effects associated with manufacturing activities. That is, the manufacturing sector is a critical source of demand for other sectors as manufacturing firms are important consumers of financial, transport and communication services but also of raw materials and agricultural products. Consequently, manufacturing has strong forward and backward linkages to other sectors, thereby contributing to productivity enhancements, domestic investment, employment and economic growth in the development process.

Manufacturing is also attractive because the share of agricultural products in total household expenditure falls as per capita income rises while the share of manufactures increases. That is, many manufactures are characterised by a higher income elasticity of demand. This implies that manufactures offer significant opportunities for future demand, market expansion and output growth as well as exports. Industrial manufacturing also has a higher potential for employment creation relative to agriculture, traditional processes of manufacturing and many traditional services. As a country's population grows and urbanisation takes place, there is a need for growth in manufacturing employment to absorb the displaced agricultural labour.

Despite the critical role manufacturing plays in the development process, it is important for policymakers not to seek industrial development at the expense of other sectors. In fact, the competitiveness of the manufacturing sector is also shaped by the adequate provision of producer services and supply of resource and agricultural inputs. Sustainable industrial development is, thus, best understood through its complementarity with other sectors such as agriculture and services. In this context, the challenge for policymakers is how to create mutually supportive linkages between the industrial and non-industrial sectors of the economy.

The key questions that analysts will learn to address with this tool include: Where does a country stand with regard to the level of industrialization of its economy? What can be said about its capacity to produce and export manufactures competitively? How has this changed over a certain period of time in the past? What is the impact of a country's industrial sector in the global arena? How does its capacity and growth performance compare to peer or benchmark countries? And what is the potential for its future growth?

2. Methodology and Analytical Steps

This section provides a guide to calculate a selection of indicators on industrial capacity and growth. It covers both domestic and export dimensions of industrial growth while the next session will outline how these two dimensions can be interpreted together. It addresses questions such as: Which indicators can be used to measure industrial capacity, impact and growth? How are they calculated? Which data is needed, and where can one find the appropriate data to answer these questions? How does the data need to be manipulated? What is the diagnostic process looking like, which analytical steps have to be taken?

To illustrate how the methodology presented in this tool can be applied, Section 3 of this tool provides an empirical example, using Kenya as a case study, while considering the four other member states of the Eastern African Community (EAC), i.e. Burundi, Rwanda, Tanzania and Uganda, as comparator countries.

2.1 Economic structure: Manufacturing's contribution to total output (GDP) and total exports

As a first step to shed light on the importance and strength of a country's manufacturing sector, this tool suggests looking at the contribution of manufacturing to national economic output. A first measure is, thus, the **share (in %) of manufacturing value added (MVA)[3] in the country's gross domestic product (GDP)**. This sheds light on the intensity of national industrialisation and can be compared to the contribution of other sectors (such as agriculture or services) to total output as well as to manufacturing's share in GDP in comparator countries (see further below for a graphical depiction in a stacked area chart).

Similarly, the **share of manufactured exports in total exports** captures the role of manufacturing in export activity. This indicator helps to see whether a country has moved towards exporting manufactured products, or whether its export basket is still dominated by agricultural products or raw materials.

Table 1: Manufacturing's contribution to total output and total exports

Indicator	Variable	Source
Share of MVA in GDP	Manufacturing Value Added (MVA)	World Development Indicators (WDI)
	Gross Domestic Product (GDP)	WDI
Share of manufactures in total exports	Country's manufactured exports	UNCOMTRADE database
	Country's total exports	UNCOMTRADE

3 Manufacturing value added is the net output of the manufacturing sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.

Moreover, it makes sense to look at trends over time to see whether manufacturing has increased or decreased in importance for a country's economic output and exports. To achieve this, we examine how the share of MVA in GDP and the share of manufactured exports in total exports have changed over a certain period of time, typically the last five, ten or twenty years. This can be measured as changes in percent or as changes in percentage points. Another possibility is to look at annual growth rates (e.g. of MVA); there are two possible indicators: the average annual growth rate or the compound annual growth rate (CAGR). Both are measured in percent and give an idea about how fast (or slow) MVA or manufactured exports have expanded per year in a given country.

Finally, it is worth highlighting that these indicators can be combined with indicators on the share of medium- and high-technology activities (MHT) in MVA and in manufactured exports. This equation would render a measurement of the **intensity of industrialisation** where the former indicator captures the role of manufacturing in the economy and the latter the technological complexity of manufacturing. Similarly, the share of manufactured exports in total exports can be combined with an indicator of the share of MHT products in manufactured exports to obtain a measure of the **quality of exports** where the former captures the role of manufacturing in export activity while the latter captures the technological complexity of exports, along with the ability to make more advanced products and move into more dynamic areas of exports. Please note, however, that these additional measures on MHT activities and export products will not be presented here but are discussed in a different tool on industrial deepening (Tool 3).

2.2 Industrial capacity and manufactured export capacity

In a second step, the industrial diagnosis moves on to measure industrial capacity in domestic and export markets. This can be done using various indicators. In general, MVA is the basic indicator for measuring industrial performance. However, in order to account for country size and to facilitate comparisons across countries, it is important for this indicator to be divided by the population size. We have therefore determined the **MVA per capita** as the **key indicator of a country's industrial capacity**. It provides insight into the country's level of industrialisation (adjusted for population size) and provides an indication of its capacity to add value in the manufacturing process (see Table 2).

However, one issue is that for countries which protect their domestic markets excessively – and where the exposure of domestic industries to global competition is, thus, limited – this indicator may provide a distorted picture of industrial capacity, competitiveness and performance as it does not fully take account of whether a country's industry is able to stand up to international competition, which itself is a quality seal. It is therefore important to combine the MVA per capita indicator with one capturing exposure to global competition and export orientation, which places the competitiveness of industrial activity in the international scene. This has become even more important in the context of a world economy that in the last decades has been characterized by increasing integration of national economies.

For this purpose, we use **manufactured exports per capita** as the basic indicator of a country's **manufactured export capacity** and trade competitiveness; it shows the capacity of countries to meet global demand for manufactured goods in a globalizing world, i.e. in a highly competitive and changing environment. Manufactured exports indicate whether national production is really competitive internationally. Furthermore, by dividing manufactured exports by the country's population we take into account the size of the country, making the indicator comparable across economies. However, trade analysis out of context can produce misleading results in the case of countries with low domestic capabilities which are used by multinational corporations (MNCs) for assembly activities or as export platforms. That is because trade statistics, including export data, are based on gross terms, reflecting not only local value addition but also the value of imported inputs and intermediate goods, which is a major shortcoming, especially in a world with an increasingly

refined international division of labour where production is fragmented across different countries.[4] Therefore, the study of industrial capacity and MVA also adds to trade analysis as it gives an indication of the extent of value that domestic companies contribute to exports (see Table 2).

Table 2: Industrial capacity: domestic and export dimensions

Indicator	Variable	Source
Industrial Capacity	Manufacturing Value Added (MVA)	World Development Indicators (WDI)
	Population	WDI
Manufactured export capacity	Manufactured exports	UNCOMTRADE database
	Population	UNCOMTRADE database

Besides studying levels of industrial capacity and manufactured export capacity at a certain point in time, it is again also useful to look at trends and changes over time to see whether a country's capacity has increased or decreased over a certain number of years and/or whether it has done so faster than in comparator countries.

2.3 Impact in world MVA and world manufactured trade

As a third measure we will look at the impact of a country's industry on the global stage. To capture a country's industrial performance it is not sufficient to analyse indicators only influenced by nation-wide factors. Given the dynamism of today's globalised world economy, it is necessary to also include impact dimensions to assess the industrial performance of countries taking into account exogenous factors that play a fundamental role in shaping up the international industrial scene, such as third country competition.

The first indicator in this context is a given country's **impact in world MVA**, measured by its **share in world MVA**, which indicates the relative performance and impact of a country taking into account global volumes of manufacturing production. This indicator gives the position of a country relative to others in contributing to world MVA. It thereby shows whether a country is rather a large or rather a small global player in manufacturing production (see Table 3).

The second indicator is a country's **impact in world manufactured trade**, measured by its **share in world manufactured exports**. This indicator is also known as **world (export) market share** and not only gives the competitive position of a country relative to others in international markets but, in a sense, also allows insight into any export threats that may exist. Gains in world market shares reflect improved competitiveness, while losses signal a deterioration of competitive position. It is important to note, however, that on a global scale this indicator implies a zero-sum game. That is, the analysis of this indicator necessarily shows improvements for some countries but deterioration for others.

4 In recent years, efforts have intensified to address this issue. As a result of these efforts, data on trade in value-added (TiVA) and world input-output data (WIOD) have become available during the past couple of years, see http://stats.oecd.org/Index.aspx?DataSetCode=TIVA_OECD_WTO and www.wiod.org. These data net out foreign (i.e. imported) content/inputs from a country's exports, thereby helping to capture more accurately the extent of domestic value addition in a country's exports. However, the key limitation of these databases is that, at the moment, data are available only for a rather small number of countries (with most of them being advanced economies). That is, data coverage of developing countries currently still is very poor. See also section 7 below.

Table 3: Impact in world MVA and world manufactured trade

Indicator	Variable	Source
Share of country's MVA in world MVA	Country MVA	World Development Indicators (WDI)
	World MVA	WDI
Share of country's manufactured exports in world manufactured exports	Country's manufactured exports	UNCOMTRADE database
	World manufactured exports	UNCOMTRADE database

In general, it can be expected that larger countries will have a greater impact than smaller ones. Therefore, maximising global impact may not be a strategic objective for all countries. Some countries, in fact, might focus on expanding their position and standing within their own continent or region. In particular for small countries it might, thus, be more meaningful to look at their impact in a specific region rather than at their impact in the world as a whole. Moreover, the exact numerical value of their impact indicator may often not be very telling; comparing against benchmarking countries might, in general, be a more useful exercise.

As with the previous indicators, it is useful to look at changes over time to see whether a country's impact in world industry has increased or decreased. In fact, for some countries, especially small ones, looking at trends will be more relevant than looking at levels. In particular, it is interesting to examine whether a country has gained or lost world market shares within a certain period of time – which shows whether or not a country has been able to keep pace with industrial and/or export expansion in the rest of the world.

3. Interpretation of Findings and Conclusions

The previous section discussed different diagnostic methods to evaluate a country's economic structure as well as the capacity and impact of its industrial sector. The indicators presented allow the analyst to give a snapshot on various facets of a country's industrial growth and competitiveness both from a domestic industry perspective and an export perspective. They allow the analyst to assess a country's performance in a given year as well as presenting changes in performance over time. They can also be used to compare performance across countries, e.g. against benchmark countries or role models. In the following, this section outlines how the findings from applying these diagnostic methods can be interpreted, using empirical examples as well as graphical devices for illustration. In doing so, it will also show how to combine the findings from different methods to provide a more comprehensive picture about a given country's industrial capacity and growth performance.

To illustrate how the methodology presented in this tool can be applied in practice, we will look at Kenya as a case study. From the point of view of industrial strategy-setting and policy design, it is important to contextualise the status and performance of a country's industrial sector by comparing or **"benchmarking"** it against that of other countries. In fact, benchmarking is necessary because industrial competitiveness is a relative concept. Comparisons are necessary in order to position a country on the global industrial stage and to understand whether a country is more or less competitive or has performed better or worse relative to other countries. They also serve to identify "role models" and at the same time to study the impending competitive threat from other countries.

Benchmarking of an economy's industrial performance should be done against relevant regional or global comparators. Here, we therefore take the remaining four member states of the EAC, i.e. Burundi, Rwanda, Tanzania and Uganda, as comparator countries.

To begin with, Table 4 provides an example of how the **economic structure** indicator can be represented; it shows how much value added was generated, respectively, in the agriculture, industry and services sectors. Table 4, thus, provides a summary of the productive sector development trends in the EAC countries between 2000 and 2012. It thereby shows the levels of value addition in the three sectors of economic activity as well as the composition of total gross value added for the EAC countries. The table also allows comparisons across EAC countries and a monitoring of trends over time.

Table 4: Composition of value added in EAC countries (2000-2012)

	Value added (in constant 2005 US$ million)			Average annual growth rate (in %)
	Sector	**2000**	**2012**	**2000-2012**
Kenya	Agriculture	3,783	5,082	2.5%
	Industry	2,561	4,365	4.5%
	Services	7,757	12,928	4.3%
	Total gross value added	14,100	22,258	3.9%
Burundi	Agriculture	504	495	-0.2%
	Industry	241	258	0.6%
	Services	244	634	8.3%
	Total gross value added	989	1,387	2.9%
Rwanda	Agriculture	738	1,352	5.2%
	Industry	229	686	9.6%
	Services	802	2,328	9.3%
	Total gross value added	1,768	4,365	7.8%
Tanzania	Agriculture	3,264	5,373	4.2%
	Industry	1,856	5,053	8.7%
	Services	4,096	9,999	7.7%
	Total gross value added	9,199	20,525	6.9%
Uganda	Agriculture	1,848	2,475	2.5%
	Industry	1,448	3,613	7.9%
	Services	2,855	6,913	7.6%
	Total gross value added	6,100	13,255	6.7%

Source: World Bank World Development Indicators (WDI) database

Meanwhile, Table 5 shows the contribution of the manufacturing sector to total output[5], measured as the percentage share of MVA in GDP, for the five EAC member states for three different years. It also reports the changes of MVA's share in GDP in percentage points for two time periods: 2000 to 2012 and 2005 to 2012. For comparison and to illustrate that the same indicator can also be derived for other sectors of the economy, Table 6 reports how much agriculture and services contribute to the GDP of Kenya and the four other EAC member countries.

5 Please note that while Table 4 reports value-added numbers for *industry* in its broader sense – which includes not only manufacturing but also mining, construction, and public utilities – Table 5 reports the contribution of *manufacturing* (more narrowly defined) to GDP. This is why the numbers reported in Tables 5 and 6 do not add up to 100% for any given country.

Table 5: Manufacturing's contribution to total output in EAC countries (2000-2012)

	Share of MVA in GDP (%)			Change (in percentage points)	
	2000	2005	2012	2000-2012	2005-2012
Kenya	11.62	11.82	10.41	-1.21	-1.41
Burundi	11.88	12.95	9.12	-2.75	-3.82
Rwanda	6.97	7.03	5.93	-1.04	-1.10
Tanzania	9.39	8.69	10.17	0.78	1.47
Uganda	7.58	7.46	9.09	1.51	1.63

Source: WDI database

Table 6: Contribution of agriculture and services to total output in EAC countries (2000-2012)

	Share of Agricult. Value Added in GDP (%)			Share of Services Value Added in GDP (%)		
	2000	2005	2012	2000	2005	2012
Kenya	32.36	27.20	29.88	50.72	53.71	52.73
Burundi	48.06	44.50	40.58	35.01	37.05	42.53
Rwanda	37.19	38.39	32.95	49.23	47.55	51.12
Tanzania	33.48	31.76	27.58	47.34	45.52	47.40
Uganda	29.38	26.70	25.95	47.72	48.26	45.48

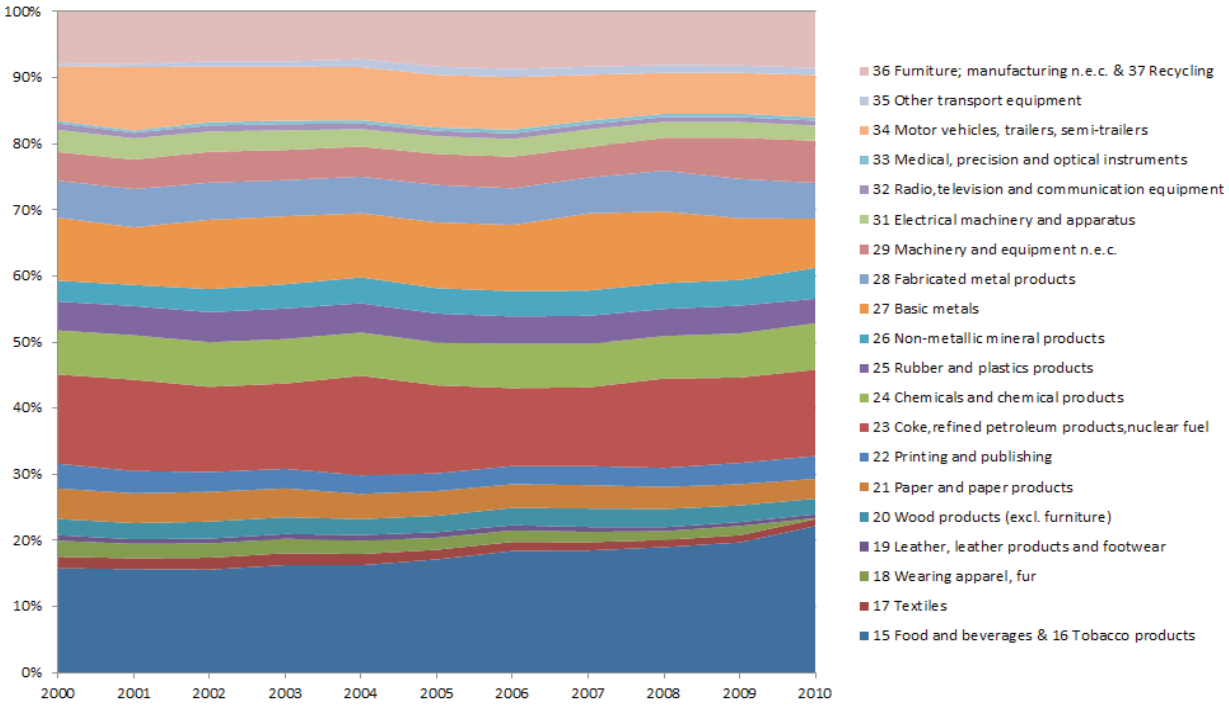
Source: WDI database

The information presented in Tables 4 to 6 can also be summarized graphically. Figure 1 provides an example of how the economic structure indicator for a given country can be displayed in a distribution graph (a stacked area chart in our case). The graph allows monitoring structural change dynamics in a given country's economy over time. As can be seen in Figure 1, in Kenya industry's contribution to total value added, i.e. GDP, has basically remained unchanged between 2000 and 2012. In contrast, services increased at the expense of agriculture's share in GDP until approximately 2010 by which time agriculture regained its share by increasing its contribution to total value added. Overall, thus, Kenya's economy has not seen a lot of structural change in the 2000s and, in fact, just a slight increase in industry's share in GDP.[6] It is important, however, to combine this analysis of shifts in the different sectors' shares with an analysis of trends in levels (i.e. the absolute values of sectoral value added). For example, it is theoretically possible that value added declines in all sectors but that industry increases its share in GDP simply because it is shrinking more slowly than agriculture and services. That is, of course, not a desirable scenario. Ideally, all sectors grow at decent rates. In a virtuous circle of economic growth, industry growth could drive growth in agriculture and service value added. Indeed, as can be seen in Table 4 above, between 2000 and 2012 all sectors of the Kenyan economy have increased their value added. This resulted in overall GDP growth – which is something that cannot directly be seen from Figure 1. What Table 4 above also reveals is that industry grew faster than agriculture in all EAC countries – reflecting slow moves from agrarian-based economies towards broader-based economic structures where industry and manufacturing play larger roles. In fact, industrial growth exceeded GDP growth

6 Please note again that Table 5 above reports the share in GDP of *manufacturing* more narrowly, not *industry* more broadly. As we can see in Table 5, manufacturing's share in GDP actually declined a bit. The overall increase of industry's share in GDP, thus, must have been driven by over-proportional growth of the other sub-sectors of industry, i.e. mining, construction, and public utilities.

in all EAC countries except Burundi – implying an increase in industry's share in GDP in these countries. Please note that industry both in Table 4 and in Figure 1 refers to the entire secondary sector, which not only includes manufacturing but also mining, construction, and public utilities. Most other indicators and graphs, by contrast, focus on manufacturing more narrowly.

Figure 1: Distribution of value added across sectors in Kenya (2000-2012)



Source: WDI database

At the export side, the economic structure indicator can be presented in a similar table. Table 7 provides an example and shows the share of manufactured exports in the total exports of the five EAC countries as well as their changes in percentage points over 2000-2012 and 2005-2012. As can be seen there, Kenya has seen an unsteady trend. While the share of manufacturing exports in total exports increased between 2000 and 2012, there was a reversal of this upward trend in the mid-2000s so that the figure for 2012 was lower than in 2005 (while higher than in 2000). All the other EAC countries, on the other hand, have experienced more continuous upward trends. In particular, Uganda has seen the most impressive growth rates and is now the EAC country with the highest share of manufacturing exports in total exports (at 55.1%) followed by Rwanda (54.7%) and then Kenya (48.9%).

Table 7: Manufacturing's contribution to total exports in EAC countries (2000-2012)

	Share of mfg. exports in total exports (%)			Change (in percentage points)	
	2000	2005	2012	2000-2012	2005-2012
Kenya	37.31	58.14	48.85	11.54	-9.29
Burundi	6.33	7.60	17.05	10.72	9.45
Rwanda	40.08	39.07	54.65	14.57	15.58
Tanzania	19.71	18.96	37.24	17.53	18.28
Uganda	8.12	17.11	55.13	47.01	38.02

Note: In the case of Kenya, the figure for 2012 is actually for the year 2010
Source: UNCOMTRADE database

Moving to the next indicator presented above, Table 8 reports the industrial capacity, measured as MVA per capita in US$, for the five EAC member states for three different years. It also shows the changes in the EAC countries' industrial capacity in percent for two time periods: 2000-2012 and 2005-2012. Similarly, Table 9 reports the manufactured export capacity of the five EAC countries as well as changes (in %) between 2000-2012 and 2005-2012. These tables reveal that Kenya has (by far) both the highest industrial capacity and the highest manufactured export capacity in the EAC. The data also shows that from 2000-2012 the capacity to export manufactured goods increased considerably in all EAC countries. Similar (albeit less pronounced) upward trends can be observed for the (domestic) industrial capacity indicator – with the stark exception of Burundi.

Table 8: Industrial capacity of EAC countries (2000-2012)

	MVA per capita (in constant 2005 US$)			Change (in %)	
	2000	2005	2012	2000-2012	2005-2012
Kenya	54.26	55.17	60.36	11%	9%
Burundi	26.30	17.09	13.20	-50%	-23%
Rwanda	13.41	19.24	22.56	68%	17%
Tanzania	22.41	28.96	41.46	85%	43%
Uganda	19.35	22.00	26.70	38%	21%

Source: World Bank World Development Indicators (WDI) database

Table 9: Manufactured export capacity of EAC countries (2000-2012)

	Manufacturing exports per capita (in current US$)			Change (in %)	
	2000	2005	2012	2000-2012	2005-2012
Kenya	18.73	55.56	61.72	229%	11%
Burundi	0.41	1.11	4.00	885%	260%
Rwanda	2.56	4.49	19.79	672%	340%
Tanzania	3.80	7.52	43.23	1,038%	475%
Uganda	1.24	4.16	35.76	2,778%	759%

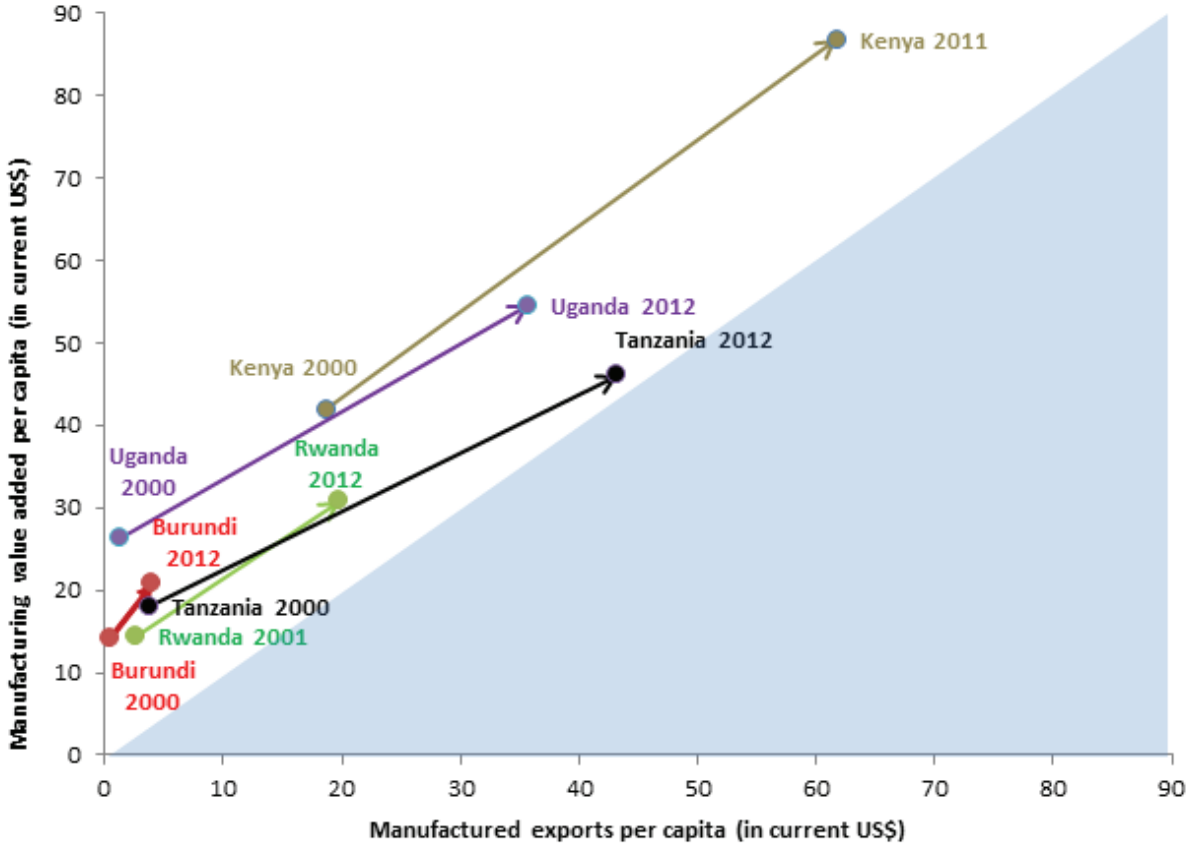
Note: In the case of Kenya, the figure for 2012 is actually for the year 2010
Source: UNCOMTRADE database

Figure 2 compares the EAC countries' production capacity with their manufactured export capacity. Please note that unlike in Section 2 and Table 8 above, where industrial productive capacity is measured in constant 2005 US$ per capita, here it is measured in current US$ to ensure comparability with the indicator for manufactured export capacity, which is also measured in current US$. If a country is located above the 45-degree line, this signals that its production capacity (measured as MVA per capita) exceeds its manufactured export capacity (measured as manufactured exports per capita). Conversely, if a country is positioned below the 45-degree line, its manufactured exports per capita are higher than its MVA per capita, i.e. its manufactured export capacity exceeds its production capacity.

Creating such a graph can help to get an idea of the difference or discrepancy between a country's capacity to produce manufactured goods and its capacity to export them. For example, if a nation's export capacity exceeds its production capacity a lot, this could signal low local value addition, maybe because the country's industrial sector is mainly engaged in assembly activities for foreign companies whereby most of the products' value is generated abroad. From an industrial strategy-setting perspective this points towards the importance of attempts to capture greater value addition domestically.

Interestingly, as can be seen in Figure 2, all EAC countries are located above the 45-degree line, indicating that in all five countries MVA per capita exceeds manufactured exports per capita. This is an interesting finding. A favourable interpretation would be that this signals that these countries' industries are actually engaged in activities that generate quite some value addition domestically. Given their – by international standards – rather low levels of production capacity, however, this does not seem to be a very plausible explanation. A more likely explanation is that these countries' industries have not yet truly entered the manufactured export business, but rather focus on domestic markets. This could be due to a lack of international competitiveness or due to trade barriers. To some extent, this interpretation is reinforced by Figure 3 below, which reveals that it is true for all EAC countries that their share in world MVA exceeds their share in world manufactured products. An additional – and related – reason may be that currently EAC countries are presently characterised by a rather low degree of integration into cross-border (i.e. regional or global) value chains with weakly developed backward and forward linkages to foreign suppliers and buyers so that if value addition happens, it mostly occurs domestically. A healthy consideration of the domestic market is not a bad thing, especially for relatively large countries (like Kenya or Tanzania) where the domestic market has or can reach a meaningful size. On the contrary, if a country's industrial sector is able to meet the (material) needs and demands of the country's population, taking into account local tastes, preferences and habits, this can be an important contributor to improvements in material well-being and potentially also poverty alleviation. However, for smaller countries (like Burundi or Uganda) tapping into export demand might be necessary if their industries want to reap economies of scale and spur productivity (growth).

Figure 2: Manufacturing production and export capacity in EAC countries (2000-2012)



Note: Unlike Table 8, where it is measured in constant 2005 US$, industrial capacity is measured here in current US$ to ensure comparability with the indicator for manufactured export capacity, which is also in current US$
Source: WDI and UNCOMTRADE databases

Another way of combining and presenting the data in a useful way is through tables like Tables 10 and 11, they help the analyst to capture the ability of countries to produce and export manufactures competitively. In Table 10, MVA is reported as one of the basic indicators of industrial performance. As can be seen there, Kenya has the largest manufacturing sector among EAC countries, which in 2012 generated MVA worth US$ 2.6 billion, followed by Tanzania where MVA reached US$ 1.98 billion in 2012 – after having experienced the fastest annual growth rates since 2000 among all EAC member states. Kenya also has the highest MVA per capita – our measure for industrial capacity. However, as is revealed in the final column of Table 10, Kenya's MVA per capita has grown by a mere average rate of 1% per year. In contrast, Kenya experienced a 4% average annual growth rate of its total MVA, revealing that MVA growth has managed to only slightly exceed population growth. Table 10 also shows that growth rates – both for total MVA and for MVA per capita – have been higher in Tanzania and Rwanda, albeit from much smaller starting levels. Burundi is revealed to be the poorest performer on all fronts.

Table 10: Manufacturing Value Added in EAC countries (2000-2012)

	MVA (in million constant 2005 US$)		Avg. annual growth rate (%)	MVA per capita (in constant 2005 US$)		Avg. annual growth rate (%)
	2000	2012	2000-2012	2000	2012	2000-2012
Kenya	1,698	2,606	4%	54.26	60.36	1%
Burundi	176	130	-2%	26.30	13.20	-6%
Rwanda	113	258	7%	13.41	22.56	4%
Tanzania	762	1,981	8%	22.41	41.46	5%
Uganda	470	970	6%	19.35	26.70	3%

Note: Average annual growth rates are calculated as compound annual growth rates (CAGR)
Source: WDI database

Table 11: Manufactured exports of EAC countries (2000-2012)

	Manufactured exports (in million US$)		Avg. annual growth rate (%)	Manufactured exports per capita (in US$)		Avg. annual growth rate (%)
	2000	2012	2000-2012	2000	2012	2000-2012
Kenya	586	2,525	13%	18.73	61.72	10%
Burundi	3	39	25%	0.41	4.00	21%
Rwanda	22	227	21%	2.56	19.79	19%
Tanzania	129	2,066	26%	3.80	43.23	22%
Uganda	30	1,300	37%	1.24	35.76	32%

Note: Average annual growth rates are calculated as compound annual growth rates (CAGR)
Source: UNCOMTRADE database

Similarly, the indicators presented in Table 11 help the researcher to gauge the EAC countries' manufactured export capacity and performance. As can be seen there, Kenya is again the EAC country with the highest capacity as measured by total manufactured exports (at US$ 2.5 billion) as well as exports per capita (at US$ 60). Moreover, both indicators demonstrate impressive average annual growth rates, 13% in 2000 and 10% in 2012. However, Tanzania's manufactured exports have grown even faster, helping it to significantly narrow the gap to Kenya's level and capacity and cement its rank as second largest manufactures exporters of the EAC. Yet, Tanzania's export growth performance was even topped by Uganda's where manufactured exports expanded from a slim US$ 30 million in 2000 to US$ 1.3 billion in 2012. Burundi is again the EAC country with the lowest capacity to export manufactures. However, unlike its MVA, its manufactured exports have grown in the 2000s.

These trends are, to some extent, also reflected in Tables 12 and 13, which report the impact of the five EAC member states in world manufacturing and their impact in world manufactured trade (measured as each country's share in world MVA and world manufactured exports, respectively) as well as in Figure 3 which depicts each EAC country's trajectory in terms of how their impact in world MVA and in world manufactured exports has developed between 2000 and 2012. Indeed, the growth in industrial and export capacity that is documented in Tables 10 and 11 also shows up in upward-sloping lines for all EAC countries (except Burundi) in Figure 3, indicating that the growth rates that they have experienced in the 2000s exceeded the world average. The right-hand panels of Tables 12 and 13 specify these growth rates.

Table 12: Impact in world MVA of EAC countries (2000-2011)

	Share in world MVA			Change (in %)	
	2000	2005	2011	2000-2011	2005-2011
Kenya	0.026%	0.027%	0.031%	20%	16%
Burundi	0.003%	0.002%	0.002%	-39%	-9%
Rwanda	0.002%	0.002%	0.003%	90%	33%
Uganda	0.007%	0.009%	0.012%	66%	40%
Tanzania	0.012%	0.015%	0.023%	93%	48%

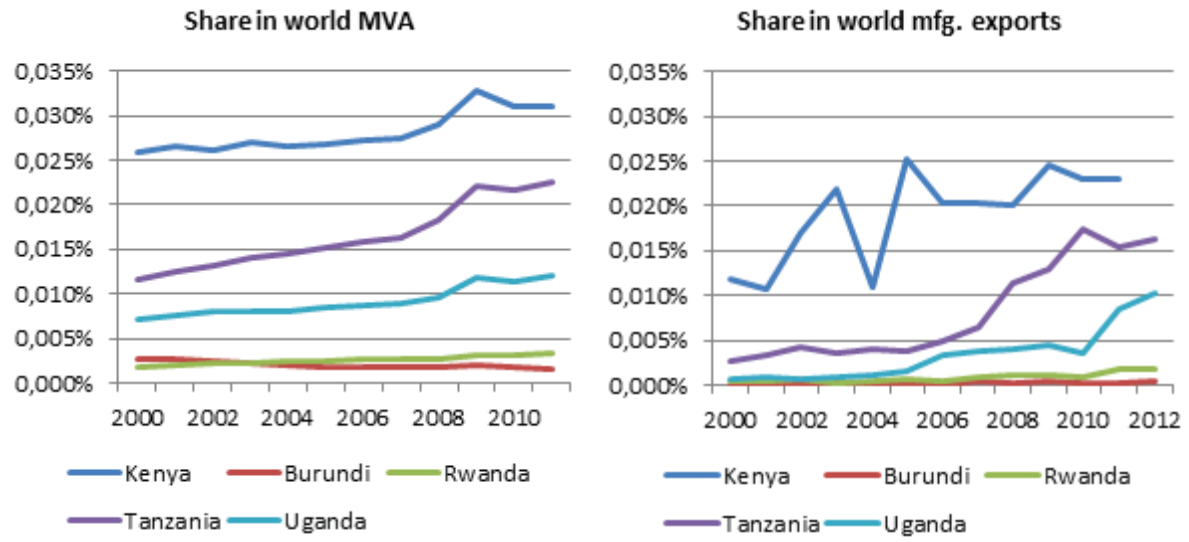
Note: Based on real MVA data measured in constant 2005 US$
Source: World Bank World Development Indicators (WDI) database

Table 13: Impact in world manufactured exports of EAC countries (2000-2012)

	Share of mfg. exports in world mfg. exports (%)			Change (in percentage points)	
	2000	2005	2012	2000-2012	2005-2012
Kenya	0.0119%	0.0253%	0.0231%	0.011	-0.002
Burundi	0.0001%	0.0001%	0.0003%	0.000	0.000
Rwanda	0.0005%	0.0005%	0.0018%	0.001	0.001
Tanzania	0.0026%	0.0037%	0.0162%	0.014	0.012
Uganda	0.0006%	0.0015%	0.0102%	0.010	0.009

Note: In the case of Kenya, the figure for 2012 is actually for the year 2010 and in the case of Rwanda, the figure for 2000 is actually for the year 2001;
Source: UNCOMTRADE database

Figure 3: Impact in world MVA and world manufactured exports in EAC countries (2000-2012)



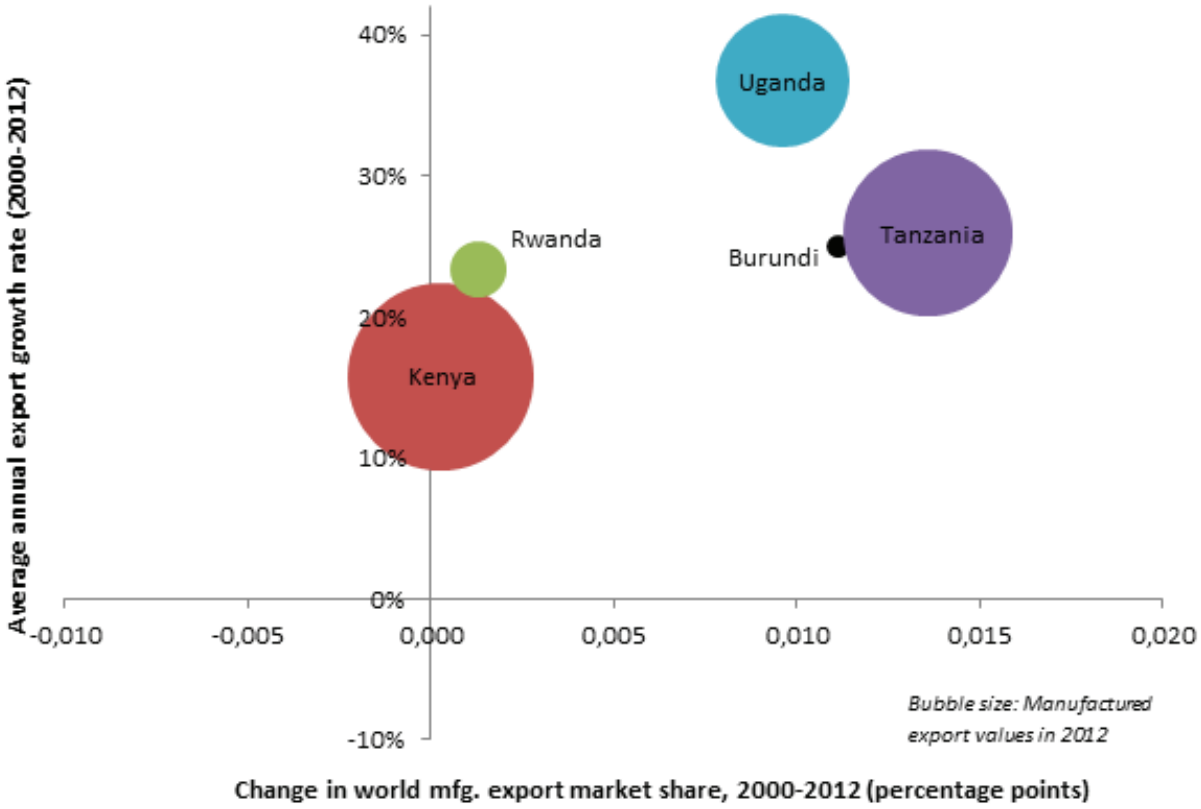
Source: WDI and UNCOMTRADE databases

A closer look at Figure 3 shows that Kenya is the EAC member state with the largest impact in both world MVA and world manufactured exports. While Kenya's impact in world MVA has increased more steadily, its impact in world manufactured exports has grown erratically but also more significantly. Meanwhile, both Tanzania and Uganda have experienced a more steady increase in their share of world MVA and world manufactured exports. The two smallest EAC member states, Rwanda and Burundi, have only very minor impact in world manufacturing; while Burundi's impact has basically remained unchanged in terms of manufactured exports, it has declined in terms of MVA, allowing Rwanda to overtake Burundi on the export impact front.

Figure 4 adds one facet to this story while focusing on the export side alone. What this graph shows is that in order for a country to gain world export market shares (which is the same as increasing its impact in world manufactured exports) it is necessary for its manufactured export to grow faster than the world average. That is, for improving (export) competitiveness it is not enough to run fast (i.e. expand export rapidly) but necessary to run faster than the rest (i.e. expand export faster than the rest). This is a reminder of the fact that competitiveness is a relative concept.

What can also be seen in Figure 4 is that for countries that are already exporting larger values of manufactured goods, statistically it is easier to gain export market shares. Compare Tanzania and Uganda, for example: While Uganda's manufactured exports grew faster than Tanzania's between 2000 and 2012 (which is reflected in the graph where Uganda's bubble is located above Tanzania's), its increase in world export market share was smaller than Tanzania's (which can also be seen in the graph where Uganda's bubble is located to the left of Tanzania's). The explanation lies in the difference of the bubble sizes for the two countries: the bubble for Tanzania is bigger than the one for Uganda, reflecting the fact that in 2012 Tanzania's manufactured exports exceeded those of Uganda.

Figure 4: Growth and impact of manufactured exports of EAC countries (2000-2012)



Finally, once all the indicators are calculated, the different pieces of information on the growth and performance of a given country's manufacturing sector can be summarised in an **industrial competitiveness scorecard**. An example for Kenya is presented below (see Figure 5). Such a scorecard allows to easily monitor a country's performance over time. Furthermore, scorecards for different countries can be compared with one another for cross-country comparisons.

From the analysis presented above and by looking at this scorecard, certain conclusions about the competitiveness of Kenya's manufacturing sector can be drawn. First, while the manufacturing sector increased its contribution both to GDP and to total exports in the first half of the 2000s, its share went down again in the second half of the decade. That is, in terms of structural change towards the manufacturing sector, Kenya has had a somewhat mixed experience. Second, the country seems considerably more capable of producing manufactures than exporting them, although this gap has narrowed over time. As suggested above, there may be various reasons for this, for example that the quality of the goods is not competitive on international markets, that trade restrictions make exports difficult, that integration into GVCs is low, or that domestic demand is dominant. In any case, Kenya's capacity has increased on both the production and the export sides. Finally, Kenya's share in both world production and world exports of manufactures is far below 1 %. Nonetheless, it has increased world market share, indicating that other countries have expanded their MVA and third exports at a slower rate than Kenya.

Figure 5: Example of an Industrial Competitiveness Scorecard for Kenya

SCORECARD: Kenya's Manufacturing Sector								
Dimensions	**Industry Indicators (MVA)**				**Trade Indicators (Exports)**			
	2000	**2005**	**2012**	**2000-2012**	**2000**	**2005**	**2012**	**2000-2012**
Structure (%)	11.62	11.82	10.41		37.31	58.14	48.85	
Capacity (current US$)	41.89	55.17	86.77		18.73	55.56	61.72	
Impact (%)	0.026	0.027	0.031		0.012	0.025	0.023	

4. Possible Extensions

The different methodologies described above allow the analyst to generate an evidence-based diagnosis about the level of a country's industrial capacities, while monitoring the pace of its industrial and export growth. However, these figures say little about how further industrial and export growth can be achieved and/or sustained. To address this question, additional analyses are useful. In the following, this section suggests some additional methods that are more amenable for industrial strategy-setting.

Growth of (domestic) industrial capacity and MVA:

Given the often limited availability of necessary manufacturing data, identifying possible and promising avenues for spurring and/or sustaining industrial growth (beyond exports) is not an easy task. However, the analyst can combine the methods presented above with measures of industrial deepening, industrial diversification, and untapped domestic demand potential, all of which are presented in separate tools. Another interesting indicator that could be included in the analysis is **(labour) productivity** in the manufacturing sector (see also tool 5). Labour productivity is typically calculated by dividing MVA by manufacturing employment. Growth in (labour) productivity can be an important driver of industrial growth and is commonly a variable of key interest to policymakers.

In addition, in cases where a large discrepancy between a country's industrial capacity and its manufactured export capacity in favor of the latter is diagnosed, an exploration of how more value addition can be captured domestically can be warranted. In such cases, where the indicators presented above show the capacity to export greatly exceeding the capacity to produce, this might signal low local value addition in productive activities, for example because the country's industry is mainly engaged in assembly activities. Input-Output analyses and value chain analyses can be useful complements here. Moreover, such an analysis can draw on diagnostic exercises such as those presented in the tool on "industrial organization and firm profiling at sub-sector level" (Tool 8). For example, it might be worthwhile to look at the ownership structure of the industrial base to investigate the share of foreign-owned firms in total MVA (maybe based on sub-sector analyses). Foreign-invested and foreign-owned firms are often more export-oriented than domestic firms, for example because they produce for global value chains. They are also often less "embedded" in the domestic economy, with less pronounced linkages to domestic suppliers. Also, foreign-owned firms and MNCs in particular often transfer profits abroad. All these can be possible explanations for a discrepancy between a country's industrial capacity and its manufactured export capacity – and point of departure for an analyst to identify further industrial growth potential. However, such an investigation most likely requires national data.

Growth of manufactured exports:

Given better data availability, identifying possibilities for promoting manufactured export growth is a somewhat easier task. Again, looking at industrial deepening at the export side as well as investigating opportunities for export product diversification and export market diversification can be insightful in this context but, as mentioned, these topics are discussed in separate tools.

There are some additional possibilities. In line with the idea of expanding exports at the "intensive margin" (which is about exporting more of the same products to existing trade partners), an additional indicator that the analyst could look at is the **"Trade Complementarities Index"** (TCI).[7] The TCI is computed for bilateral trade relationships and provides insight on how complementary two countries' trading structures are. Speaking in statistical terms, the TCI expresses the degree of correlation between one country's exports to the world and another country's imports from the world. It can be a useful measure to judge whether there's a good fit between what a country exports

7 For more details, see World Bank (2012): "Trade Competitiveness Diagnostic Toolkit", pp. 37-38. The idea of expanding exports at the "extensive margin", which is about exporting new products and/or about exporting to new trade partners, is discussed in the tool on diversification.

and what a potential trade partner imports. The maximum score indicates that the two countries in question are ideal trading partners. A lower score, by contrast, indicates that the two countries export similar products so that there is probably little scope for expanding one's exports to the other. In short, looking at the TCI values for different bilateral trade relationships might help to identify which of a country's existing trade relationships can be further strengthened to spur manufactured export growth. For example, it can be deployed to assess the prospects of expanding regional trade and/or trade with fast-growing economies (e.g. the BRICS or other emerging economies). At the most aggregate level (i.e. the macroeconomic level, which not only includes manufactures but also other goods), TCI values are readily available for download from the World Bank's World Integrated Trade Solution (WITS) online database. However, for our purposes a more narrow focus on trade in manufactured goods is useful which requires manual computation of TCI scores.

Another approach to measure a country's **"untapped export potential"** (at the intensive margin of export growth) could involve the following analytical steps:

a. Look at the country's top-20 or top-25 manufactured export products;

b. Establish a list with the world's top importers of these products;

c. Rank this list of top importers according to how dynamically their imports are growing;

d. For each of these top (and most dynamic) importers, check what share of their imports comes from countries other than the one under investigation; the higher this share, the more potential there theoretically is to expand exports;

e. Moreover, for each of these top importers, look at the list of countries from which they are currently importing; if this list includes other countries at similar levels of development or with a similar economic structure and endowments, this signals a higher degree of feasibility of export expansion;

f. In addition, one could also separate sectors and importing countries on the basis of unit values to also examine feasibility and/or attractiveness of expanding exports. Export markets which pay higher unit values for their imports are more attractive but probably also more demanding with regard to product quality and sophistication. Meanwhile, export markets that pay unit values that are in the vicinity or slightly below the average export unit values of the country in question might be easier to penetrate but there might also be more competition among suppliers.

This can be complemented by an analysis of the "most dynamic manufactured products" in world export markets. The idea is to establish a list of the 20 or so manufactured products that have seen the fastest growth in world exports during the last decade or so. Since international trade in these products is expanding so rapidly, there might be chance for a developing country to tap into this dynamism and to expand its own exports of some of these products. This approach is presented in somewhat more detail in the tool on diversification (Tool 4). It could be complemented by looking at the list of the slowest growing (or even declining) manufactured products or product groups which can point to a strategy of moving out of these products or avoiding them altogether. However, this already moves into the territory of sub-sectoral analyses – which are the topic of a separate tool (i.e. Tool 2).

Finally, in a similar vein of thinking, one can analyse a given country's **export growth orientation.** This involves looking at a country's export portfolio both in terms of products and export markets and checking whether or not it is exporting products where trade is increasing fast and/or to destination markets whose imports are growing fast. Using these variables, one can produce two types of scatter plots or 2x2 matrices: (1) A scatter plot with world trade growth of products vs. product's share in the country's exports on the two axes, and (2) a scatter plot with import growth of destination markets vs. destination's share in country's exports. This allows the analyst to distinguish between four groups of performers: champions, overachievers, underachievers, and decline. Again, this approach, in fact, makes most sense at the sub-sectorsub-sectoral level of analysis – which is precisely why it is presented in Tool 2 on "sub-sectoral competitive performance".

5. Link to Other Areas

In a developing country context, where the industrial sector is often small and where the capacity to produce and export manufactures is typically low, industrial development strategies are commonly centered around the strategic objective of achieving industrial growth. Nevertheless, the topic of industrial growth can be closely linked to other areas of analysis, especially if a broader understanding of *inclusive and sustainable* industrial development is applied.

For one, what often is important is not just the pace of industrial growth but also its **stability** and sustainability (in the sense of longevity). From this point of view, issues such as structural transformation and **diversification** of the productive sector towards activities that are characterized by higher growth potential, higher productivity, higher value added, more dynamic and/or stable foreign demand, higher entry barriers, etc. become important (see Tools 3 and 4). Also, in this context, the establishment or strengthening of **domestic (backward and forward) linkages** between different industrial activities and across sectors is highly relevant since they tend to reduce dependency on foreign inputs or foreign demand. Both diversification and the reinforcement of domestic linkages will make industrial growth more **broad-based**, thereby reducing **vulnerability** to economic shocks and contributing to the stability of a country's growth trajectory. Input-output analyses and value chain analyses can prove very useful in this context (see Tool 7).

Moreover, to get a better idea of the **"quality"** of industrial growth, an analysis of the extent or pace of **industrial deepening** (i.e. the technological upgrading of a country's production and export structures) can be very illuminating. Measuring industrial deepening will help the analyst to better understand whether industrial growth is accompanied with structural change and a shift in the composition of manufacturing activities towards more sophisticated (i.e. more technology- and/or skill-intensive) sectors and activities where more value is generated and added (see Tool 3).

Such industrial deepening typically requires the simultaneous building-up of new or refined industrial and technological **capabilities.** A thorough analysis of different **drivers of industrial development –** including technology, skills and finance – can therefore be very useful to complement industrial growth analyses (see Tool 9).

There is also a very close link between industrial growth and environmental issues. For one, industrial growth in and of itself is very likely to generate **negative environmental impacts** by requiring a growing supply of natural resources (possibly leading to their depletion and/or environmental degradation), and by causing an increase in pollution and creating (material) waste. That is, since absolute **decoupling** between industrial growth and environmental pressures is very difficult (if not impossible) to achieve, one can expect there to be certain trade-offs between industrial growth and environmental outcomes. At the same time, the growing demand and competition for inputs and resources (including natural resources) created by industrial growth can provide incentives for economic actors to become more **efficient in the use of resources**. In this context, industrial strategies can include the objective of containing or mitigating the ecological impacts of industrialization, including through promoting resource efficiency, and support activities and measures that go in that direction (see Tool 6). Such efforts aimed at the **"greening of industries"** (i.e. improving industries' environmental performance) may require the establishment of **"green industries"** (i.e. industries that provide environmental technologies, goods and services that contribute to reducing negative environmental impacts or address the consequences of various forms of pollution). Such green industries can, in turn, themselves be sources or drivers of industrial growth.

It is often assumed that industrial growth automatically translates into job creation. However, there can be differences across countries and across sub-sectors with regard to the growth elasticity of **employment generation**. Moreover, the jobs created through industrial growth might not always be **decent** (i.e. well-paid and with good working conditions). Particularly when industrialization is export-oriented, there are often concerns about potential trade-offs between production costs, which include labor costs (especially in labor-intensive sectors), and international competitiveness.

However, to be **socially sustainable**, the industrial growth process should be **inclusive and broad-based**. First and foremost, this implies that the industrial growth process generates jobs and thus allows as large a number of people as possible to participate in and get a return for value generation (see Tool 5).

6. Possible Data Sources

World Bank World Development Indicators (WDI): http://data.worldbank.org/data-catalog/world-development-indicators

UNCOMTRADE database http://comtrade.un.org/, which is also freely available through: World Bank World Integrated Trade Solution (WITS): https://wits.worldbank.org/

UNIDO INDSTAT2 and INDSTAT4 databases: CD-ROM and http://stat.unido.org/

United Nations Statistics Division, National Accounts Estimates of Main Aggregates: http://data.un.org and http://data.un.org/Data.aspx?d=SNAAMA&f=grID%3a202%3bcurrID%3aUSD%3bpcFlag%3a0

UNCTADStat database: http://unctadstat.unctad.org/EN/ (for data on trade in services)

United Nations Service trade database: http://unstats.un.org/unsd/ServiceTrade/syslogin.aspx?ReturnUrl=%2funsd%2fservicetrade%2fdqQuickQuery.aspx

7. Potential Other Data

The following indicators, if available, can further improve the analysis of industrial and export growth:

Contribution of domestic enterprises to MVA and manufactured exports	This indicator addresses the issue of how much of industrial growth results from domestic efforts, and how much comes from foreign-invested firms or multinational corporations locating some operations in the country. Data may be available from national sources.
Manufactured export capacity based on Trade in Value-Added (TiVA) data Share of country's manufactured exports in world manufactured exports based on TiVA data	Conventional trade statistics are typically reported as gross figures. That is, conventional trade data do not take into account the share of imported inputs or imported intermediate goods (i.e. foreign value-added) in a country's exports. TiVA addresses this issue by netting out the share of foreign value-added from a country's export data. That is, TiVA provides data on the value added in a given country in the production of goods that are consumed abroad. This is increasingly important in the context of an increasing international fragmentation of production. TiVA data-based indicators can, therefore, complement trade indicators since a country may have relatively high exports which, however, contain relatively low domestic value-added. However, at the moment TiVA data are available for a rather small set of (mostly advanced) economies. TiVA data can be extracted from the OECD and the World Input-Output Database (WIOD) databases: http://stats.oecd.org/Index.aspx?DataSetCode=TIVA_OECD_WTO www.wiod.org/

8. References and Further Readings

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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
E-mail: policy@unido.org

DEUTSCHE GESELLSCHAFT FÜR INTERNATIONALE ZUSAMMENARBEIT (GIZ) GMBH
Friedrich-Ebert-Allee 40, 53113 Bonn, Germany
E-mail: sv-nawi@giz.de

Website: **www.equip-project.org**