EQuIP

Enhancing the Quality of Industrial Policies

TOOL 4

Diversification – Domestic and Export Dimensions

EQuIP Tool 4:

Diversification – Domestic and Export Dimensions

Summary Sheet

Enhancing the Quality of Industrial Policies (EQuIP) – Tool 4	
Name of the tool:	Diversification – domestic and export dimensions
Objective:	The aim of this tool is to help analysts find out whether a country's industrial and export structures are diversified or rather concentrated in a few activities/sub-sectors and markets. It covers both domestic and export dimensions and points to different possible approaches to measure the degree of diversification (or, conversely, concentration) of a country's manufacturing sector, export basket and export markets.
Key questions addressed:	How does the degree of diversification of the country's productive and export structures compare to peer or benchmark countries?
	How concentrated or diversified is a given country's export structure? That is, is the country's export basket dominated by a few products only? Are its exports concentrated in a few export markets only? Which are the dominant products and markets?
	How has all this changed over time in the recent past? Has the country been diversifying its productive and export structures?
	How does the degree of diversification of the country's productive and export structures compare to peer or benchmark countries?
	What are promising avenues to (further) diversify? Which new/additional export markets could be targeted? Which products or product groups could a country possibly add to its export basket to increase diversification?
Indicators used:	Share of top-3 manufacturing sub-sectors in total manufacturing value added (MVA); Share of top-3 manufactured exports in total exports; Hirschman-Herfindahl Index (HHI) for the domestic industry; HHI for export products; HHI for export markets; Manufactured product diversification index (MPDI); Export market diversification index (EMDI).

Contents

1. Introduction

In many low-income countries, the variety of productive activities undertaken is quite limited and economic activities are concentrated in a few sectors. As a corollary, these countries often export only a handful of different products, often only to a small number of export markets. Diversification of a country's productive and export structure is, thus, commonly considered an important driver of economic development. Indeed, empirical studies have shown a positive relationship between industrial diversification and country income levels, especially at earlier stages of economic development.

There are different facets and forms of diversification. First, diversification may be about making a country's **domestic** productive (industrial) structure more diverse and broad-based and less dependent on only a few activities. Such diversification is therefore about expanding the range or mix of economic (industrial) activities, for example through starting production in new sectors or through introducing new product lines and taking up new activities within existing sectors. Second, on the **export** side, diversification can be about expanding a country's export basket and/or about entering new export markets. Broadly speaking, thus, one can distinguish between product diversification and market diversification (which could include a focus on emerging regional markets or a rediscovery of the domestic market).

For countries at lower stages of development, i.e. those with low income, slow growth and low levels of technology and skills, diversifying their production structures appears to be particularly pertinent to achieve productivity gains. This is particularly true for resource-based economies trapped in the production and export of primary goods; they, in particular, should seek to engage in new areas as this can help to reduce their dependence on a narrow set of productive activities and to avoid undesired developments such as the "natural resource curse" or "Dutch disease". Diversification can also facilitate structural change towards activities with higher levels of technology and skills and, hence, development in a more holistic sense. From this point of view, achieving diversification in many ways also reflects the ability of countries to move beyond the confines and dictates of their natural resource endowments and to build productive capabilities in other sectors. Moreover, it is often argued that a broad industrial and export base facilitates the entry and exit of firms based on market demands, which constitutes the foundation of a globally competitive economy. Productive firms enter and expand while less competitive ones will close down.

In summary, there are several arguments in favour of **diversification of the production and export mix**, especially in countries with lower levels of technology and skills. First, it can serve as an instrument of risk management whereby risk is spread across a larger variety of activities and assets. This also helps to reduce vulnerability to shocks, including natural disasters (e.g. drought or flooding) and external shocks (e.g. volatility in world market prices, fluctuations in demand from trade partners, etc.). Moreover, diversification can also help to reduce dependency on certain income-generating activities and to stabilise export earnings. Diversified economies typically also experience less volatility in output and offer more potential for skills learning and innovation. More generally, in low-income countries economic activity tends to be concentrated in a few mainly low-productivity activities so that structural change, defined as a shift towards activities and sectors with greater potential for value addition, necessarily requires diversification of the productive structure. Finally, another argument for the benefits of diversification relates to consumer behaviour and preferences: consumption patterns typically change as income grows whereby the demand for product variety increases so that the productive structure also has to diversify to meet this demand for variety/diversity. However, it should be pointed out that diversification might not be a universally applicable industrial strategy that is desirable for all countries at all times. For some countries (re-)specialising, for example in certain niche markets, might be a more attractive and beneficial strategy at certain stages of their development process. Indeed, empirical studies show that at a certain (rather high, though) income level countries tend to re-specialise, i.e. reduce the degree of diversification.

Market diversification is equally important since an over-reliance on a single or very few markets has the obvious disadvantage that a reduction in demand can adversely affect the economy more strongly than if this is diluted or offset by more stable demand in other markets. Moreover, there are externalities to be reaped by accessing new markets with new products that lie at the core of a country's path to industrial competitiveness. For example, technologies need to be mastered and marketing channels created to open up potential export outlets. Specialised skills need to be developed and institutions created to support firms engaged in new product lines. Overall, market diversification reduces the vulnerability to external shocks, demand slowdowns and new competition. Moreover, exporting to more than one country also indicates the country's ability to compete internationally.

Looking at the degrees of product diversification and market diversification together gives a good picture of the precariousness of a country's production and export structure. A more diversified structure of production is in most cases preferable to one that relies on a few goods, especially primary commodities. Similarly, relying on a greater number of export products and export destinations, in general, is better than fewer. Production and trade diversification may be a costly, risky and long-term process but the potential developmental benefits cannot be underestimated. Above all, it helps to reduce vulnerability to shocks and to stabilise the industrial growth process. In short, it appears that diversification – understood as entering into new activities through a discovery process – matters for industrial competitiveness as well as inclusive and sustainable industrial development.

Against this backdrop, the key questions that analysts will learn to address through this tool include: How concentrated – or, conversely, how diversified – are a country's industrial sector and its productive and export structure? Which are the dominant sub-sectors? Do only a few products dominate the country's export basket? Are its exports concentrated in a few export markets only? And what are promising avenues to (further) diversify? Which new/additional export markets could be targeted? Which products or product groups could a country possibly add to its export basket to increase diversification? While the focus in this tool will be on the manufacturing sector, the methods presented herein are generic so they can also be applied for an analysis of non-manufacturing activities, such as agriculture[1] or (tradable) services.

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1 Market diversification to reduce dependence on a small set of buyers is also a straightforward objective for the agriculture sector. However, with product diversification, two caveats are worthwhile to be mentioned: Efforts to diversify towards a crop that usually does not grow in the region might not be sensible and sustainable. The focus should be on increasing value addition, which often warrants a shift away from primary towards industrial goods. However, there are some agricultural niche markets that offer stable and comparatively high returns.

2. Methodology and Analytical Steps

This section provides a guide to calculate a selection of indicators that shed light on the degree of diversification of a country's industry. It covers both domestic and export dimensions of diversification 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 a country's level of diversification concerning its production and export structures? How are they calculated? Which data is needed, and where can one get it from? How does the data need to be manipulated? What does the diagnostic process look like, and which analytical steps need to be taken?

At the outset, it is worthwhile to note that there are a number of approaches, methodologies and indicators to measure diversification. They range from very simple to more complex. In the following, we will present just a selection and we will move from the simpler to the more sophisticated measures. It should also be mentioned that these methodologies and indicators can be applied to **different units of analysis**; they can be deployed to assess how diversified is:

- A country's economy as a whole?
- Its industry or manufacturing sector (or certain manufacturing sub-sectors)?
- Its export basket (both in terms of products and markets)?

To illustrate how these methodologies can be applied, Section 3 of this tool provides an empirical example, looking at South Africa as a case study and taking the remaining BRICS countries (Brazil, the Russian Federation, India and China) as comparator countries.

1.1 Diversification of a country's manufacturing system

As a first step to shed light on the degree of diversification of a country's industrial sector, this tool suggests to look at the distribution of manufacturing value added (MVA) across the different sub-sectors of a country's industry. The following two measures can be used for this (see Table 1).

Table 1: Degree of concentration or diversification in manufacturing sector value added

Indicator	Variable	Source
Share of top-3 sub-sectors in total MVA	Sum of value added of the three most important manufacturing sub-sectors	UNIDO INDSTAT database
	Manufacturing value added (MVA)	UNIDO INDSTAT or World Development Indicators (WDI)
Hirschman-Herfindahl Index (HHI)	Sum of the squared shares of sub-sectors in total MVA	UNIDO INDSTAT database

1.1.1 Share of top-3 sub-sectors in total manufacturing value added

A first simple measure of the degree of diversification – or, conversely, concentration – of a county's

industrial system is the share that the three largest sub-sectors contribute to total MVA.[2] This can be done using ISIC[3] data at the 2-digit or the 4-digit level of disaggregation (with the availability of the latter, however, often being a problem for developing countries). This gives an indication of the extent to which the generation of MVA is dominated by the three most important manufacturing sub-sectors. The higher the percentage of total MVA that the three largest sub-sectors contribute, the more concentrated is the country's industrial system in just a few activities – possibly signalling the need for (industrial policy) efforts to promote diversification. By contrast, if the top three sub-sectors make up only a comparatively small share of total MVA, this signals a more diversified productive structure.

1.1.2 Hirschman-Herfindahl Index (HHI) for the domestic industry

The share of the top three sub-sectors in total MVA is a very simple measure of industrial diversification that can be quickly calculated. However, it only looks at a segment (the top segment) of the distribution and does not say anything about how evenly the remaining (i.e. non-top-3) sub-sectors contribute to total MVA. The Hirschman-Herfindahl Index (HHI) is a more sophisticated indicator in that it takes into account the full spectrum of the distribution. It is a measure of concentration and can help to determine the extent to which a country's industrial system is diversified across different industrial sub-sectors (or, conversely, concentrated in a few industrial sub-sectors).

In the context of measuring domestic industry diversification, the HHI is calculated by squaring the shares of individual sub-sectors in total MVA and then summing the squares, as per the following formula):

$$HHI = s_1^2 + s_2^2 + \cdots + s_N^2 \sum_{i=1}^{N} (s_i)^2$$

Where s_i is the share of sub-sector i in the country's total MVA and N is the total number of sub-sectors. The HHI can take on values that range from $1/N$ to one. To normalise[4] the HHI so that it only assumes values that range from 0 to 1, the following formula has to be used:

$$HHI^* = \frac{HHI - 1/N}{1 - 1/N}$$

The HHI for domestic industry diversification can be computed using ISIC data at the 2-digit, 3-digit or the 4-digit level of disaggregation from UNIDO's INDSTAT2 or INDSTAT4 databases, respectively. A country with a perfectly diversified industrial system will have an index close to zero, whereas a country that is active in only one industrial sub-sector will have a value of one (least diversified). That is, the more diversified a country's industry is, the lower its HHI value will be.

Before moving to the export side, it is important to note that our unit of analysis has so far been the

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2 The analyst can also decide to look at the share of the five or ten largest (i.e. top-5 or top-10) sub-sectors in total MVA. Generally speaking, if the total number of individual items or entities (e.g. industrial sub-sectors like here or export markets like below) is rather small, then looking at the share of the top-3 is a good choice. However, if there is a large number of individual items or entities – which is the case at high levels of product disaggregation, e.g. at the 4- or 6-digit level (see below) – then it might be more meaningful to look at the share of the top-5 or top-10.

3 ISIC is the acronym for International Standard Industrial Classification of All Economic Activities which is a system for classifying economic data.

4 Another reason why an analyst might want to normalise an index (apart from making its values range from 0 to 1) is that normalisation also helps to better show the distance between different countries' performances.

manufacturing sector as a whole. In principle, all the methodologies presented above can also be applied for an analysis at the sub-sectoral level. However, in most cases domestic industry data are not recorded at a sufficiently disaggregated level and are therefore not available. As we have seen, for example, UNIDO's INDSTAT databases report data according to the ISIC classification schemes at the 2-digit, the 3-digit and the 4-digit levels only.[5] Therefore, undertaking an analysis of the degree of diversification within certain sub-sectors of the domestic industry (e.g. food and beverages, or textiles and clothing, or machinery and equipment) is not possible for most developing countries. However, the situation changes once we start to analyse the export side. Trade data are typically available at higher levels of disaggregation, for example at the level of product groups or even individual products. The United Nations Commodity Trade Statistics Database (UNCOMTRADE), for example, offers data at the 4-digit and 5-digit levels in the SITC classification scheme and even down to the 6-digit level in the HS classification scheme[6]. This more detailed data, thus, allows for an analysis at the sub-sectoral level. However, in the following, when we present methodologies to investigate the level of diversification of export products and export markets, our illustrations will stay at the sectoral level (i.e. the manufacturing sector as a whole).

1.2 Exports: product diversification

This sub-section and the following one will focus on the export side. We will, first, present methodologies to analyse export *product* diversification, which will allow us to better understand the export performance of a country and its comparators regarding the variety of manufactured products that these countries offer competitively in the world market. Second, we will present methodologies to analyse export *market* diversification for a better understanding of a country's ability to open up new markets and move into different export destinations.

To measure the extent of product diversification that a country has achieved in its export basket, at least three different methodologies can be applied (see Table 2, but also Section 4 on "possible extensions"). However, since two of them (share of top-3 sub-sectors, HHI) were already discussed in the previous section on domestic industry diversification, and because their logic and calculation are very similar, they will not be presented again in great detail here.

5 In some cases, national statistics provide data at a more disaggregated level but using these data might complicate international comparisons.
6 SITC stands for Standard International Trade Classification, while HS is the abbreviation for Harmonized Commodity Description and Coding System. Both are internationally standardised systems of names and numbers to categorise and classify traded products.

Table 2: Degree of diversification in a country's manufactured products export basket

Indicator	Variable	Source
Share of top-3 sub-sectors in total manufactured exports	Sum of export value of the three most important manufacturing sub-sectors	UNCOMTRADE
	Total manufactured export value	UNCOMTRADE
Hirschman-Herfindahl Index (HHI)	Sum of the squared shares of sub-sectors in total manufactured exports	UNCOMTRADE
Manufactured product diversification index (MPDI)	Sum of the differences between the shares of individual products (or product groups) in a country's export structure and in the world's export structure (*see below for the exact formula*)	UNCOMTRADE

1.2.1 Share of top-3 export sub-sectors or export products in total exports

A first simple measure to shed light on how concentrated (or, conversely, how diversified) a country's (industrial) export basket is can be derived from looking at what share of total exports is accounted for by the top-3 products or product groups at a suitable level of disaggregation, such as SITC 4-digit or HS 6-digit level.[7] The analyst can look at the share of the top-3 export sub-sectors within the whole manufacturing sector or, alternatively or additionally, at the share of the top-3 export products within a given manufacturing sub-sector. This allows the analyst to grasp the extent to which a country's export basket in manufacturing, or within a specific manufacturing sub-sector, is dominated by the three most important export sub-sectors or products, respectively.

1.2.2 Hirschman-Herfindahl Index for export product diversification

As mentioned above, the Hirschman-Herfindahl Index (HHI) is a measure of concentration and can help to determine the extent to which a country's industrial exports are diversified across different industrial sub-sectors or products. However, it is important to note that the HHI for export product diversification can be applied to different units of analysis: (1) a country's entire merchandise export basket including not only manufactures but also raw materials and agricultural products (which is readily available and can be directly downloaded from the World Integrated Trade Solutions (WITS) database); (2) a country's manufactured export basket; or, (3) a country's export basket within a given sub-sector. We are particularly interested in the latter two.

For its calculation, the same basic formula as described above under section 2.1.2 applies. However, in the context of measuring export product diversification, we have to square the shares of individual sub-sectors (or products) in total manufactured exports and then sum up the squares to derive the HHI: where s_i is the share of sub-sector (or product) i in the country's total manufactured exports and N is the total number of sub-sectors.

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7 At higher levels of disaggregation, e.g. at the HS 6-digit level, there is also a larger number of items so in these cases it might also make sense to look at the share of the top-5 or even top-10 products or product groups.

Similar to what we described above, a country with a perfectly diversified export portfolio will have an index close to zero, whereas a country that exports only one product will have a value of one (least diversified). More generally, the more diversified a country's export basket is, the lower its HHI value will be. These HHI values and their development over time can be presented in a table, such as in Table 3 above (for the domestic economy) or Table 8 below (for export markets).

1.2.3 Manufactured product diversification index

Diversifying one's export basket just for the sake of it may not necessarily be the right strategy for all countries. In fact, a relatively high level of export product concentration can be justified by world demand – it makes no sense to diversify into product lines that have little or no market demand. A more refined analysis of product diversification, therefore, requires an exploration not just of the country's export structure but also of the world's export structure. The logic is that if a country has an export structure that is similar to that of the world then its industry conforms to global demand.

Our final measure of export product diversification, the manufactured product diversification index (MPDI), picks up this logic, which makes it an indicator that is more complex to calculate but also more sophisticated compared to the measures presented so far. For example, it is possible for two countries to have very similar HHI values with exports being spread across sub-sectors (or products groups) to a similar extent but with one country's export basket being less in line with world demand than the other country's export basket.[8]

The MPDI methodology analyses the manufactured export structure of each country as well as the world's manufactured export structure. The MPDI shows the extent to which a country depends on particular export products, taking into account the world's manufactured export structure. That is, the index compares a country's export structure with that of the world according to the following formula:

$$MPDI_j = 1 - \frac{\sum(|h_{i,j} - h_i|)}{2}$$

Where $MPDI_j$ is the manufactured product diversification index value of country j; is the sum of all values in brackets; h_{ij} is the share of product i in total manufactured exports of country j; h_i is the share of product i in total world manufactured exports; and is the absolute value of the difference between h_{ij} and h_i.

When looking at a sample of countries, the values of the MPDI for the different countries can be normalised to form an index I that only takes on values between 0 and 1, using the following formula:

$$I_j = \frac{MPDI_j - Min(MPDI_j)}{Max(MPDI_j) - Min(MPDI_j)}$$

where $MPDI_j$ is the manufactured product diversification index value for country j; Min is the lowest value in the sample; and Max the highest value in the sample.

Overall, the MPDI gives an indication of the distance of a given country's manufactured export structure from the world's export structure. Lower MPDI values indicate a lower degree of export product diversification and a larger difference between the country's export structure and the world's export structure. Unlike with the previous two (simpler) measures presented in this section

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8   Likewise, the share in total manufactured exports that is taken by the top-3 export products can be very similar between two countries but the importance of these top-3 export items in total world trade can be very different.

(i.e. share of top-3 export products and HHI), the industrial policy implication of a low MPDI value would not simply be to promote export product diversification no matter how, but rather to promote it in a way that brings the country's export basket closer to being in line with world demand patterns.

Similar to the other methodologies presented so far in this section, the MPDI can be used to assess the degree of export product diversification for the manufacturing sector as a whole or for a specific manufacturing sub-sector. An example of how the MPDI can be presented in tables or graphs will be shown further below. Moreover, as will also be shown below, the MPDI can be used to analyse a country's diversification pattern and to benchmark it with comparator countries.

1.3   Exports: market diversification

To undertake a diagnosis of the extent of export market diversification that a country has achieved, there are again at least three different methodologies that may be applied (see Table 3). All of them were already described in the two preceding sections. We will, therefore, not discuss them in great detail again here. What is worthwhile noting, however, is that in the following we will be focusing less on the supply side (industrial activity and products) but rather on the demand side (markets).

Table 3: Degree of diversification of a country's manufactured export markets

Indicator	Variable	Source
Share of top-3 export markets in total manufactured exports	Sum of export value of the three most important manufactured export markets	UNCOMTRADE
	Total manufactured export value	UNCOMTRADE
Hirschman-Herfindahl Index (HHI)	Sum of the squared shares of individual export markets in total manufactured exports	UNCOMTRADE
Export market diversification index (EMDI)	Sum of the differences between the shares of individual export markets in a country's export structure and in the world's export structure (*see below for the exact formula*)	UNCOMTRADE

1.3.1   Share of top-3 export markets in total manufactured exports

A first indicator for export market diversification is the share of a country's total manufactured exports that is sold to the country's three most important export partners, i.e. the top-3 export markets.[9] This share can be calculated for the manufacturing sector as a whole and/or for specific manufacturing sub-sectors. The higher the share of the top-3 export markets, the more dependent is the country from export demand from a few trade partners only, signalling a low degree of market diversification of a country's (total manufactured or, alternatively, sub-sectoral) exports.

1.3.2   Hirschman-Herfindahl Index for export market diversification

The HHI described above can also be used to assess how much a country's manufactured exports are diversified across different export markets. We can employ the HHI to analyse the manufacturing

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9 Alternatively, the analyst may want to decide to look at the share of the five or ten largest (i.e. top-5 or top-10) export markets in total exports.

sector as a whole, but also individual manufacturing sub-sectors.[10]

The calculation follows the same basic formula as described above under section 2.1.2. However, in the context of measuring export market diversification, we have to square the shares of individual export markets in total manufactured exports and then sum up the squares to derive the HHI. The more diversified a country's export markets, the lower will be its HHI value. That is, a country whose exports are well distributed across a large number of markets will have an index close to zero, whereas a country which sells all exports to one export market only will have a value of one (least diversified).

1.3.3 Export market diversification index

The methodology of the export market diversification index (EMDI) follows the rationale of the manufactured product diversification index (MPDI) explained above. It shows the extent to which a country depends on specific markets for its manufactured exports relative to how important these markets are in world manufactured imports. The underlying logic is that a heavy reliance on a large market might not be ideal, but still preferable to an equally strong reliance on a much smaller market. In other words, concentrating exports on a few key markets can be justified by world demand - it does not make much sense to try to diversify exports to markets that absorb little or no imports. Similar to the MPDI, the EMDI is based on the premise that it is desirable for countries to mirror world demand for manufactures as closely as possible.

On account of this, the EMDI compares the composition of a country's export markets[11] with the world's import structure according to the following formula:

$$EMDI_j = 1 - \frac{\sum(|h_{i,j} - h_i|)}{2}$$

where $EMDI_j$ is the Market Diversification Index value of country j, Σ is the sum of all values in brackets, h_{ij} is the share of country j's manufactured exports to market i in country j's total manufactured exports to the world, h_i is the share of market i in total world manufactured imports, and is the absolute value of the difference between h_{ij} and h_i, i.e. a measure of the difference between the country's export market portfolio and the world's.

As with the MPDI, the values of the EMDI can be normalised for a sample of countries to form an index I that only takes on values between 0 and 1, using the following formula:

$$I_j = \frac{EMDI_j - Min(EMDI_j)}{Max(EMDI_j) - Min(EMDI_j)}$$

where $EMDI_j$ is the Export Market Diversification Index value for country j, Min is the lowest value in the sample and Max the highest value in the sample.

Overall, the EMDI gives an indication of the degree to which the composition of a given country's export market portfolio corresponds to the distribution of manufactured import demand across world markets. Lower EMDI values indicate a lower degree of export market diversification and a larger difference between the country's export structure and world import demand patterns. In terms of industrial policy implications, a low EMDI value would not simply point to the need to

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10   Note that the HHI for export market diversification at the most aggregate level, i.e. for countries' merchandise exports in general which include not only manufactures but also raw materials and agricultural products, is readily available for download from the WITS database.
11   For the purpose of the EMDI, the analyst can define export markets at the level of individual countries or regions (e.g. East Asia, Sub-Saharan Africa, etc.) or economic communities (e.g. SACU, EAC, etc.).

promote export market diversification no matter how (which is what one would conclude from a high share of the top-3 export markets and a high HHI) but rather to promote it in a way that targets large markets and that brings the country's export market portfolio more in line with global (or, if the analyst decides to focus on a particular region as export market, regional) import patterns.

Similar to the other methodologies presented so far, the EMDI can be used to assess the degree of export market diversification for the manufacturing sector as a whole or for individual manufacturing sub-sectors. As will be shown below, the EMDI can also be analysed together with the MPDI to assess a country's overall diversification pattern and to benchmark across comparator countries.

3.Interpretation of Findings and Conclusions

The previous section presented different diagnostic methods. They allow the analyst to assess a country's diversification performance in a given year as well as changes of performance over time. They can also be used to compare performance across countries, e.g. against benchmark countries or role models. In the following, we will briefly outline how the findings from applying these diagnostic methods can be interpreted, using empirical examples as well as graphical devices for illustration. In doing so we will show how to compare the results across different indicators and methods to check whether the findings are consistent and to see whether different methods provide complementary information. We will moreover show how to collate the findings from different methods to provide a more comprehensive picture about a given country's diversification performance.

To illustrate how the methodologies can be applied, we will look at South Africa as a case study. When using the findings created by applying diagnostic tools for industrial strategy-setting and policy design, it is always insightful to contextualise a country's performance or trajectory by comparing or "benchmarking" it against that of other countries. This helps to understand whether a country has performed better or worse relative to other countries but also to identify "role models" who set the standard in terms of diversification.

Benchmarking of a country's performance should be done against relevant regional or global comparators. South Africa is one of the BRICS countries, an association of five major emerging economies, which also includes Brazil, the Russian Federation, India and China. We, therefore, use the remaining four BRICS countries as comparator countries here.

In the following, this section will present different methodologies to describe the level of industrial diversification that South Africa and its comparators exhibit in both products and markets. This will allow us to see whether South Africa's economy – or that of any other BRICS country – depends on only a few sectors and whether or not it´s (industrial) exports are highly concentrated in a few markets only.

A first quick overview can be gained by producing "distribution graphs" that show how the generation of MVA is distributed across the different sub-sectors of a country's industry.[12] This can be done using ISIC data at the 2-digit or the 4-digit level of disaggregation (coming from UNIDO's INDSTAT2 or INDSTAT4 databases), although availability of the latter is often a problem for developing countries. Possible graphical devices include pie charts, stacked bar charts and stacked area charts (see below for examples). Such graphs give a snapshot about how much individual sub-sectors contribute to total MVA and the degree to which value addition is concentrated in certain sub-sectors.[13] The more these graphs are dominated by individual sub-sectors, the more unbalanced and the less diversified is the country's industrial sector. These graphs can also be used to monitor trends over time and to undertake comparisons with other countries. Figures 1 and 2 provide examples of such MVA distribution charts.

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12 However, one caveat has to be highlighted: the larger the number of sub-sectors or product groups to be shown in a graph, the less legible it becomes. That is, these graphs are only useful for displaying diversification across a limited number of industrial activities and exports, i.e. when using data at higher levels of aggregation. Similarly, when producing such distribution graphs to display diversification of export markets, it often makes sense to summarise small export markets in a category called "other export markets" as otherwise legibility suffers.

13 This relates the present tool to the tool on sub-sectoral competitive performance analysis where one indicator (the one on "structure") looks at the share in total MVA of the sub-sector that is analysed. However, while the sub-sectoral performance analysis tool is concerned with the analysis of only one particular manufacturing sub-sector, the present tool looks at all sub-sectors simultaneously to observe how evenly they contribute to total MVA.

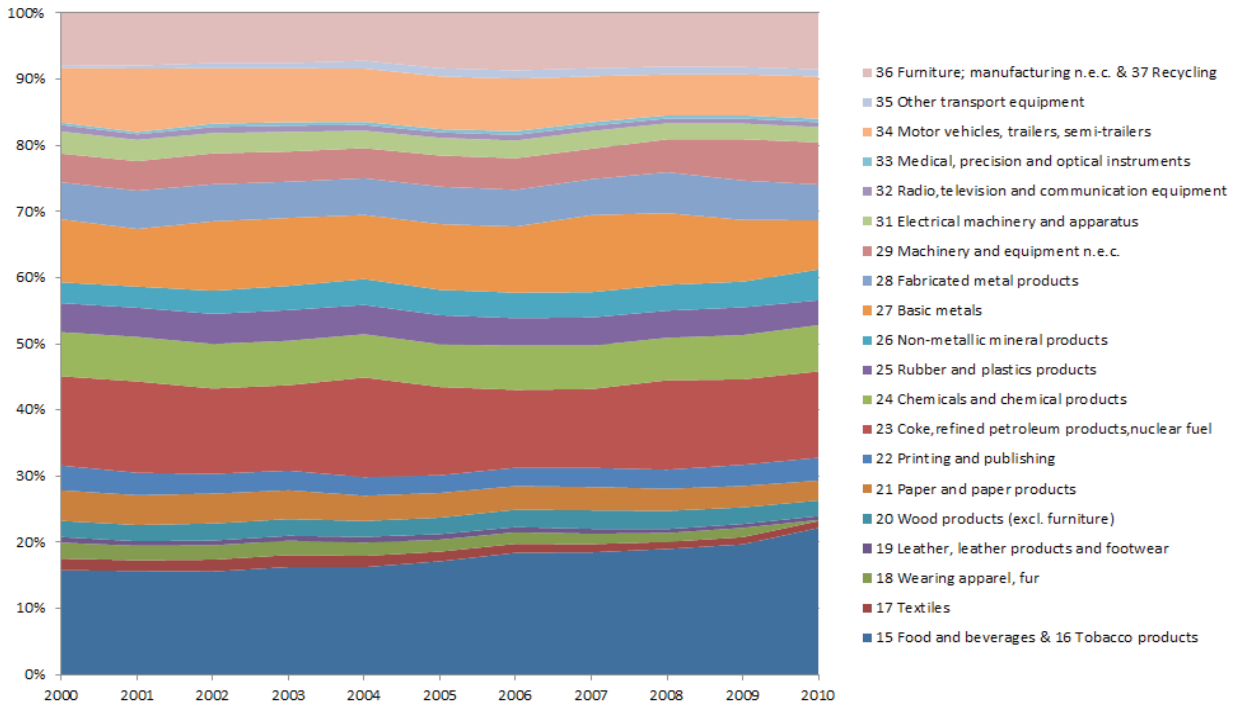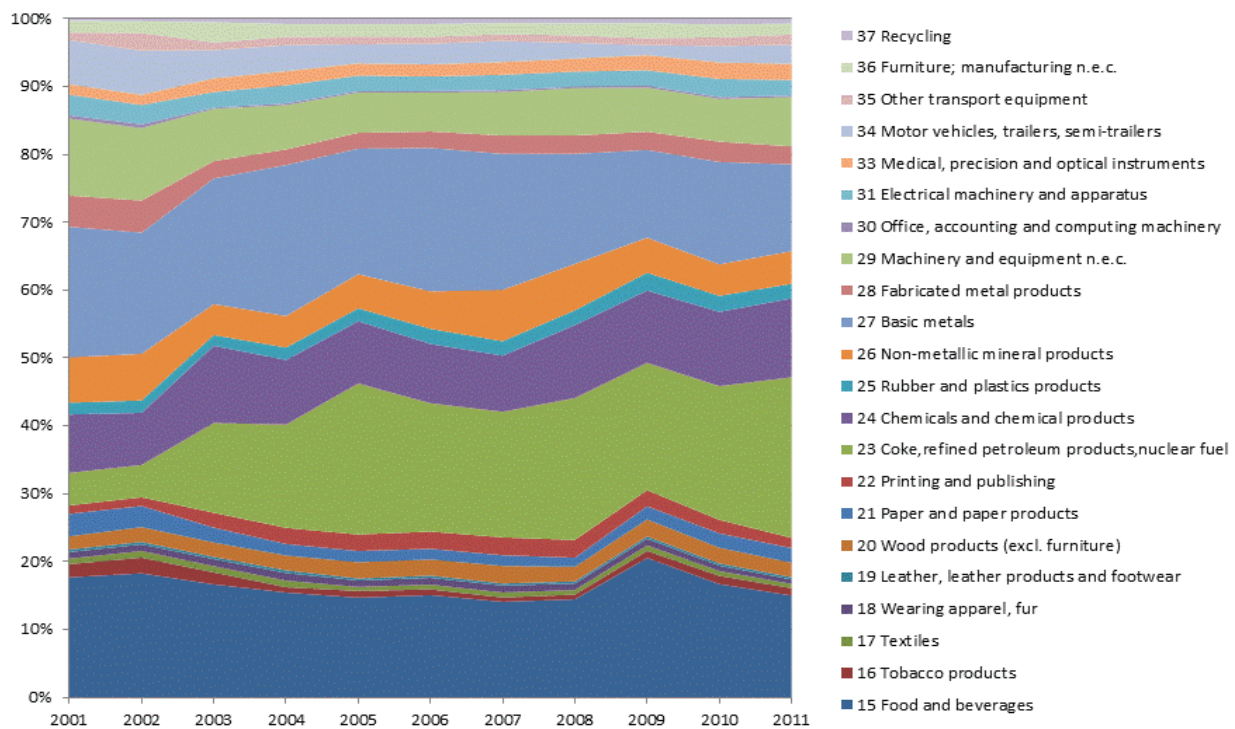**Figure 1: Distribution of MVA across ISIC 2-digit sectors in South Africa**

Legend (top to bottom):
- 36 Furniture; manufacturing n.e.c. & 37 Recycling
- 35 Other transport equipment
- 34 Motor vehicles, trailers, semi-trailers
- 33 Medical, precision and optical instruments
- 32 Radio, television and communication equipment
- 31 Electrical machinery and apparatus
- 29 Machinery and equipment n.e.c.
- 28 Fabricated metal products
- 27 Basic metals
- 26 Non-metallic mineral products
- 25 Rubber and plastics products
- 24 Chemicals and chemical products
- 23 Coke, refined petroleum products, nuclear fuel
- 22 Printing and publishing
- 21 Paper and paper products
- 20 Wood products (excl. furniture)
- 19 Leather, leather products and footwear
- 18 Wearing apparel, fur
- 17 Textiles
- 15 Food and beverages & 16 Tobacco products

Figure 2: Distribution of MVA across ISIC 2-digit sectors in the Russian Federation

Legend (top to bottom):
- 37 Recycling
- 36 Furniture; manufacturing n.e.c.
- 35 Other transport equipment
- 34 Motor vehicles, trailers, semi-trailers
- 33 Medical, precision and optical instruments
- 31 Electrical machinery and apparatus
- 30 Office, accounting and computing machinery
- 29 Machinery and equipment n.e.c.
- 28 Fabricated metal products
- 27 Basic metals
- 26 Non-metallic mineral products
- 25 Rubber and plastics products
- 24 Chemicals and chemical products
- 23 Coke, refined petroleum products, nuclear fuel
- 22 Printing and publishing
- 21 Paper and paper products
- 20 Wood products (excl. furniture)
- 19 Leather, leather products and footwear
- 18 Wearing apparel, fur
- 17 Textiles
- 16 Tobacco products
- 15 Food and beverages

Moreover, as an alternative to using MVA data, similar graphs can be produced using employment data to display how manufacturing employment is distributed across the different sub-sectors of a country's industry.[14] Such graphs show how one key factor of production – labour – is allocated across different industrial activities and therefore gives a sense of how diversified a country's productive system is. Such pie charts or stacked area charts or stacked bar charts can also be

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14   The tool on productive industrial employment analysis suggests a similar strand of analysis.

generated for the export side to provide a quick visual snapshot on the degree of a country's export product diversification and/or export market diversification – either for a country's total manufacturing exports or for its exports within a given sub-sector.

Meanwhile, Table 4 presents an illustration of one of the measures discussed above: it reports the percentage share that the top-3 manufacturing sub-sectors contribute to total MVA in the BRICS economies. As can be seen from Table 4, in China the three most important manufacturing sub-sectors make up 34% of total MVA while in the Russian Federation the same indicator stands at 51%. China's industrial system is, thus, the most diversified while Russia's is the least diversified among the BRICS countries. South Africa is positioned somewhere in the middle, with the top-3 sub-sectors contributing 44% to total MVA but – similar to Brazil and the Russian Federation – this share has increased from 39% in the year 2000, indicating a decrease in the degree of diversification of South Africa's manufacturing sector.

Table 4: Share of Top-3 manufacturing sub-sectors (ISIC 2-digit) in total MVA in the BRICS

	Share of Top-3 manufacturing sub-sectors in total MVA			Diversification
	2000	**2005**	**2011**	**2000-2011**
Brazil	39%	42%	43%	⬇
Russian Federation	48%	55%	51%	⬇
India	43%	44%	39%	⬆
China	37%	33%	34%	⬆
South Africa	39%	40%	44%	⬇

Note: For the Russian Federation, the figure reported for 2000 is actually for 2001; for India and South Africa, the figure reported for 2011 is actually for 2010; and for China, the figure reported for 2011 is actually for 2007
Source: UNIDO INDSTAT2 database

Similar tables can be produced for the HHI as well as for the export side. Table 5, for example, reports the HHI values for the industrial systems of the BRICS economies. In line with what could already be seen in Table 4, China's industry is shown to be the most diversified while that of the Russian Federation is revealed to be the least diversified. South Africa has the second highest HHI among BRICS countries; i.e. its industry is less diversified and more concentrated in a few sub-sectors than that of China, India and Brazil. Moreover, South Africa's HHI increased between 2000 and 2010, indicating a decrease in the degree of diversification of South Africa's manufacturing sector. Brazil and the Russian Federation have shared the same fate while only China and India have managed to lower their domestic industry HHI, still further diversifying their manufacturing sector.

Table 5: Domestic Industry Hirschman-Herfindahl Index (HHI) for the BRICS countries

	Hirschman-Herfindahl Index (HHI)		Domestic Industry Diversification
	2000	**2010**	**2000-2010**
Brazil	0.078	0.095	🔻
Russian Federation	0.106	0.121	🔻
India	0.095	0.083	🔺
China	0.084	0.070	🔺
South Africa	0.084	0.102	🔻

Note: For the Russian Federation, the figure reported for 2000 is actually for 2001; for China, the figure reported for 2010 is actually for 2007. The HHI value indicates how evenly total MVA is distributed across 23 industries at the ISIC 2-digit level; the minimum value is 1/N = 1/23 = 0.0435.
Source: UNIDO INDSTAT2 database

From these different measures of diversification of a country's *domestic* industrial sector, we can see that South Africa is a medium performer within the BRICS group. This finding is consistent across different indicators. Both in terms of the HHI and the share of the top-3 sub-sectors in total MVA, China is shown to be the best performer among the BRICS with the most diversified industrial system and continuous improvements since 2000. South Africa, by contrast, only ranks fourth among the BRICS in terms of the HHI and the share of the top-3 sub-sectors, and its level of industrial diversification has decreased since 2000, signalling that industrial activity is increasingly concentrated in a smaller number of sub-sectors. However, as can be seen from Figures 1 and 2 as well as Tables 4 and 5, South Africa's industrial sector is still significantly more diversified than Russia's, which is the worst performer among the BRICS.

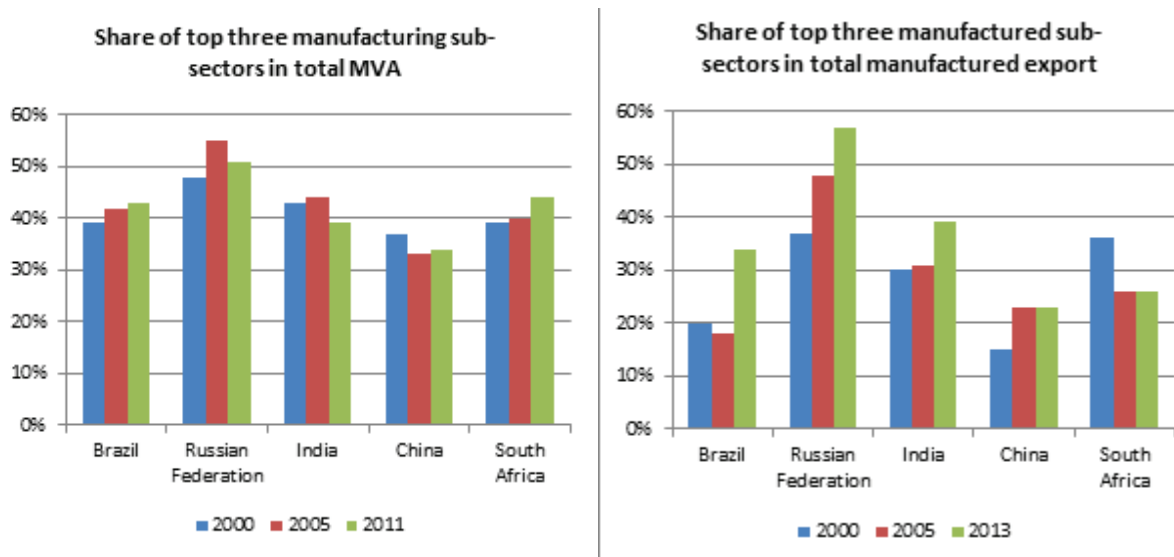**Table 6: Share of Top-3 sub-sectors in total manufactured exports in the BRICS**

	Share of Top-3 manufactured sub-sectors in manufactured exports		total	Diversification
	2000	**2005**	**2013**	**2000-2013**
Brazil	20%	18%	34%	🔻
Russian Federation	37%	48%	57%	🔻
India	30%	31%	39%	🔻
China	15%	23%	23%	🔻
South Africa	36%	26%	26%	🔺

Note: Based on export data at the SITC 3-digit level.
Source: UNCOMTRADE database

One can also produce such tables to compare the domestic industry side with the export side. Table 6 shows the percentage shares that were contributed to total manufactured *exports* by the top-3 export sub-sectors as well as their development over time for the five BRICS countries. Meanwhile, Figure 3 explicitly brings together the domestic dimension and the export dimension; it shows the share of the top-3 manufacturing sub-sectors in total MVA (left panel) and in total manufactured exports (right panel) for the BRICS countries.[15] It is interesting to observe that in South Africa the top-3 manufacturing sub-sectors decreased their share in total manufactured exports but increased their share in total MVA. That is, South Africa has managed to somewhat diversify its manufactured export basket but at the same time its domestic industry saw an increase in concentration. India had exactly the opposite experience. Moreover, while South Africa's manufactured export basket is the second most diversified among the BRICS, its industrial system is the second most concentrated after that of the Russian Federation. Again, in India the situation is exactly the reverse. South Africa also has the highest number of products in its manufactured export basket, namely 198, but this figure is not much lower in the other BRICS countries (see Table 9).
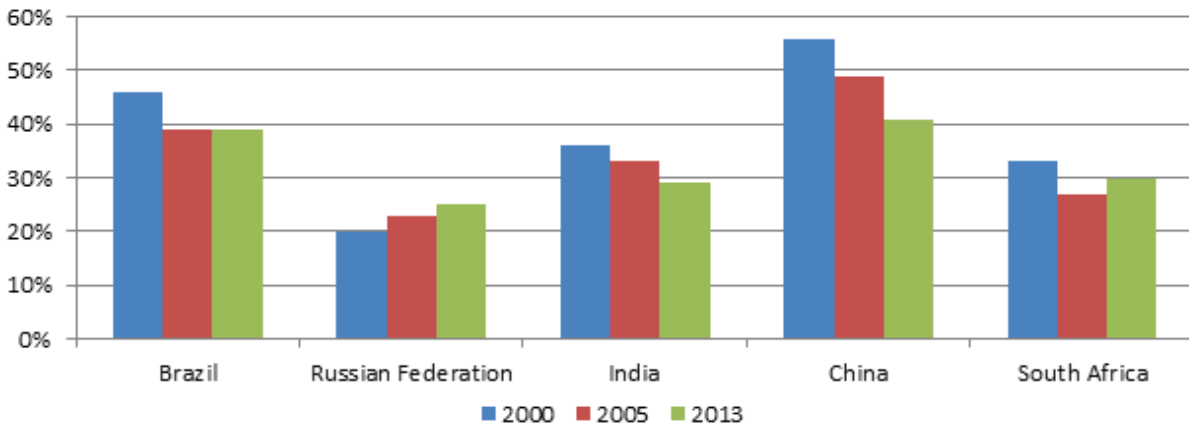
Figure 3: Share of top-3 manufacturing sub-sectors in total MVA and total manufactured exports

Let us now turn to the representation and analysis of the measures for export *market* diversification that we presented above. The data and indicators can, again, be displayed in simple tables and graphs. Figure 4, for example, shows the shares of the top-3 export markets as well as their development over time for the five BRICS countries. Similarly, the HHI values and their development over time can be presented in a table like Table 7 which shows the degree of export market diversification, as measured by the HHI, for the five BRICS countries.

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15   Alternatively, one could also plot HHI values for the domestic diversification and export product diversification (either in one single graph or in two separate graphs such as in Figure 3).

Figure 4: Share of top-3 export markets in total manufactured exports of the BRICS

Source: UNCOMTRADE

Table 7: Export market diversification – Hirschman-Herfindahl Index for the BRICS countries

	Hirschman-Herfindahl Index (HHI)		Export market diversification
	2000	**2013**	**2000-2013**
Brazil	0.110	0.065	⬆
Russian Federation	0.035	0.044	⬇
India	0.075	0.044	⬆
China	0.114	0.073	⬆
South Africa	0.044	0.052	⬇

Note: The HHI value indicates how evenly a country's manufactured exports are distributed across a total of 237 possible export markets (countries and territories); the minimum value is 1/N = 1/237 = 0.004.
Source: UNCOMTRADE database

Finally, Table 8 gives an example how one can report the EMDI values for the BRICS countries for 2000 and 2013. As will be shown a bit further below, the EMDI can also be analysed together with the MPDI to assess a country's overall diversification pattern and to benchmark across comparator countries.

Table 8: Export market diversification index (EMDI) for the BRICS countries

	Export market diversification index (EMDI)		Export market diversification
	2000	**2013**	**2000-2013**
Brazil	0.620	0.592	⬇
Russian Federation	0.507	0.505	⬇
India	0.700	0.657	⬇
China	0.640	0.687	⬆
South Africa	0.648	0.531	⬇

Source: UNCOMTRADE database

Looking at the different measures of export basket diversification, it is interesting to observe that China is the best performer among the BRICS, not only in terms of the EMDI and the share of the top-3 export markets in total manufactured exports but also when it comes to number of export markets (exporting to 207 markets; see Table 9 below). In the Russian Federation, the situation is exactly the opposite: Its top-3 export markets absorb a comparatively small share of exports (which, however, has increased since 2000 – a unique development among BRICS; see Figure 4), but it also only reaches a relatively small number of export markets, namely 153.
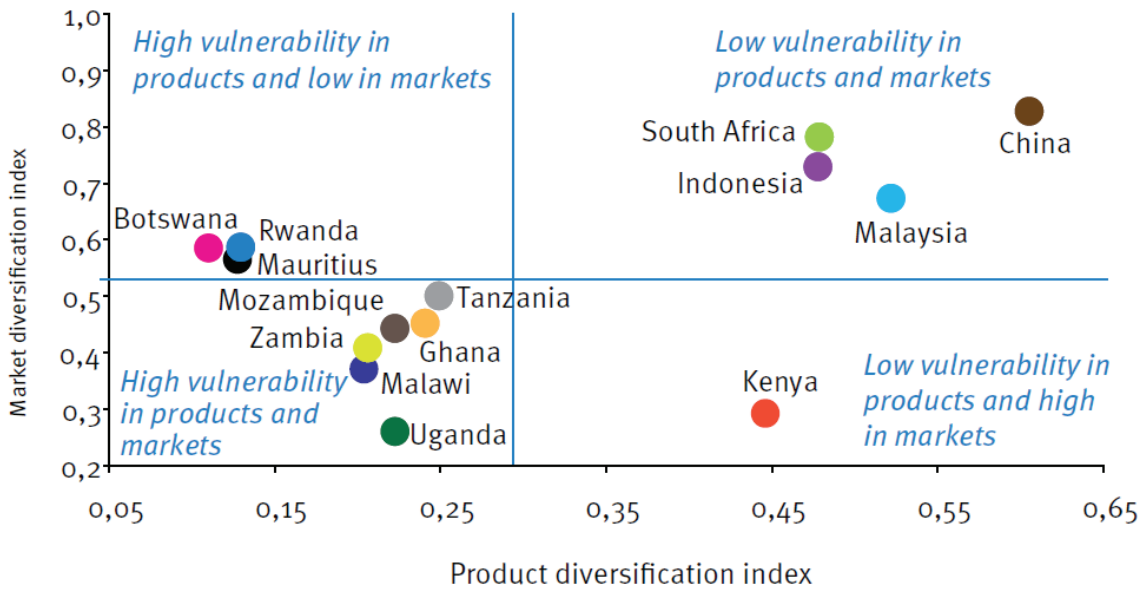
With regard to these two measures, South Africa, again, is located in the middle but has seen an improvement, that is a diversification of export markets (see Figure 4 and Tables 8 and 9). However, what is interesting to note is that the HHI and the EMDI values for South Africa actually show the opposite, i.e. a deterioration in the degree of export market diversification between 2000 and 2013 (see Tables 7 and 8). One interpretation is that while South Africa has increased the number of export markets for its manufactured exports and reduced the share of the top-3 export markets in total manufactured exports, its manufactured exports still have become slightly more concentrated in certain markets, as indicated by a rising HHI value. Moreover, the decrease in the EMDI signals that this increase in concentration in certain export markets has not been in line with world market trends; i.e. South Africa's export structure has become increasingly different from the world's import structure. As can be seen in Table 8, the latter fact is actually true for all BRICS except for China.

Finally, comparing HHI values and EMDI values, the Russian Federation emerges as a striking case: While it has the lowest HHI value among BRICS (signalling a high degree of export market diversification), it also has the lowest EMDI value. That is, while its exports are rather evenly exported to a number of different export markets, it apparently exports to the "wrong" markets in the sense that these markets take a share of the Russian Federation's manufactured exports that is over-proportional compared to their share in world imports.

To get a better understanding of a country's overall diversification patterns and overall degree of vulnerability, it is useful to analyse the export product and export market dimensions together. One possibility to do so is to combine measures of export product diversification and export market diversification into a "vulnerability matrix". This can be done using the share of the top-3 sub-sectors and markets, the HHI values or the MPDI and EMDI values. Figure 5 provides an illustration of such a vulnerability matrix using the MPDI and EMDI values for South Africa and different comparator countries. Calculating the average MPDI and EMDI values for the sample of countries

allows to separate the graph into four quadrants and to group countries into four categories: Low vulnerability in products and markets (the best performers), high vulnerability in products and markets (the worst performers), and two intermediate cases: Low vulnerability in products but high vulnerability in markets, and low vulnerability in markets but high vulnerability in products (see Figure 5). The rationale is that higher diversification (in products and markets) reduces vulnerability. South Africa is shown to exhibit a comparatively low degree of vulnerability.

Figure 5: Vulnerability matrix for South Africa and selected comparator countries

Source: UNIDO (2012) Tanzania Industrial Competitiveness Report, p. 41

4.Possible Extensions

Two other rough and simple indicators of export diversification that the analyst could include in the analysis are (1) a count of the total number of different (manufactured) products that a country exports (as a measure for export *product* diversification), and (2) a count of the total number of export markets reached by a country's manufactured exports (as a measure for export *market* diversification). The higher the number of (manufactured) products exported and the higher the number of export markets served, the more diversified is the country's export portfolio. In order to avoid including miniscule export products and negligible export markets in the count, the analyst may consider setting a threshold or minimum export value (which, however, should depend on the country's size; e.g. US$ 10,000 or US$ 1 million). Moreover, one may observe changes over time in these numbers to see whether the country's export portfolio has become more or less diversified.

In principle, this method can be applied to different units of analysis. At the most aggregate level, one can count the number of export markets for a country's total exports as well as the number of products within a country's entire merchandise export basket (which includes not only manufactures but also raw materials and agricultural products).[16] However, here we are more narrowly interested in industrial exports. We therefore only want to count the number of manufactured products exported by a country and the number of export markets that buy manufactured products from the country in question. This can be done at different levels of aggregation: We can use, for example, data at the 3-digit, 4-digit or 5-digit levels in the SITC classification scheme or, alternatively, data at the 4-digit or 6-digit level in the HS classification scheme. Moreover, such a count can be undertaken across the entire manufacturing sector or, by contrast, just for a specific manufacturing sub-sector, for which we need to collect data at a higher level of disaggregation.[17] Similarly, we can count the export markets for all manufactured products or, by contrast, just for a specific manufacturing sub-sector.

At the SITC 3-digit level, there are a total of 203 different groups of manufactured products. Table 9 reports how many out of these total of 203 manufactured product groups were exported by the five BRICS countries in the years 2000, 2005 and 2013. Since all the BRICS countries are quite large economies, we set a minimum export value of US$ 1 million. Meanwhile, Table 9 reports to how many different export markets the five BRICS countries exported manufactured goods in 2000, 2005 and 2013.

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16   This information is readily available from the "Trade Outcomes Indicators" menu in the WITS database and can be directly downloaded from there. The count of the number of export products is done at the HS 6-digit level and a product is counted if it is exported to at least one destination in a given year with a value of at least US$ 10,000. Similarly, an export market is counted if the exporter ships at least one product at the HS 6-digit level to that destination in the given year with a trade value of at least US$ 10,000.

17   Again, to not count miniscule export products, one can consider setting a threshold or minimum export value (e.g. US$ 10,000 or US$ 1 million) which should depend on the level of disaggregation chosen (the higher the level of disaggregation, the lower the threshold) and which should also be informed by the country's size (the smaller the country, the lower the threshold).

Table 9: Number of manufactured export products and number of export markets for manufactured exports, BRICS countries (2000-2013)

	No. of manufacturing products exported*		Export product diversification	No. of export markets for manufactured products**		Export market diversification
	2000	**2013**	**2000-2013**	**2000**	**2013**	**2000-2013**
Brazil	184	191	⬆	130	168	⬆
Russian Federation	187	197	⬆	135	153	⬆
India	187	197	⬆	164	192	⬆
China	199	196	⬇	183	207	⬆
South Africa	195	198	⬆	128	165	⬆

Note:* Out of a total of 203 manufactured product groups existing at the SITC 3-digit level; only counting exports with a minimum value of US$ 1 million;Based on SITC 3-digit export data; only counting export markets with a minimum trade value of US$ 1 million.**
Source: WITS database

All the different methodologies described above allow the analyst to reach an evidence-based diagnosis about the general level of diversification of a country's industrial sector (or certain sub-sectors) and exports. However, if the diagnosis is that the country's industrial sector is rather concentrated, a burning question arises: Diversifying – but into what? To tackle this question, additional analyses might be useful. In the following, this section offers some suggestions.

To identify possible and promising avenues for diversification in its different forms, the analyst shall try to find answers to the following questions:

Industrial diversification:

o   Which manufacturing sub-sectors are weak and underrepresented in overall MVA? Which sub-sectors have a high import intensity?

Export market diversification:

o   Which countries are important importers of the products we export, and to which of them do we not yet supply?

Export product diversification:

o   Which products are we already producing (feasibility check) but not yet exporting? What are major import products of our current export partners beyond those we already supply?

o   Which products have seen rapid growth in international trade/markets in the recent past?

The very last question points to the relevance of a "dynamic products analysis" that has been introduced by UNIDO.[18] It starts with an identification of the world's most dynamic manufactured products, i.e. those 10 or 20 products or product groups[19] that have witnessed the fastest growth

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18   See UNIDO's *Training Manual on Indicators of Industry and Trade Competitiveness for Country Diagnosis*.
19   This can be done using data at different levels of disaggregation, e.g. at the 3-digit, 4-digit or 5-digit level of the SITC classification scheme or at the 4-digit or 6-digit level of the HS classification scheme

in world demand over a given period, and that at the same time are important in terms of export value. The objective of such an analysis is to measure the extent to which a country has managed to capitalise on the growth in international trade of the world's most dynamic export products of the last decade. As demand for these products grows, there is potential for countries to step in to meet this new demand and, thus, opportunities for diversification. The ability of countries to shift their production and export structure fast enough to respond to changes in global demand is an important element of competitiveness. Countries that are able to satisfy new market demands therefore demonstrate readiness to compete.

The "dynamic products analysis" helps to identify possibilities for *export product diversification* for the *short-term*. It can be complemented by looking at domestic production data and export data to find out: Which product groups or products is a country currently producing but not exporting? Additionally, the analyst can look at the import portfolio of the country's key export partners to check what other products they import in significant volumes. This can help to answer the question: What are their major import products beyond those that the country in question already supplies? To identify export product diversification opportunities for the *medium-term*, the analyst can also draw on complementary tools such as input-output analysis or the "product space".[20] The latter can help to identify products that a country currently is not yet producing but that according to the product space are close to other products that the country is already producing. These would be products which a country could potentially move (i.e. diversify) into.

When working on identifying options for export market diversification, the analyst may consider computing the *Index of Export Market Penetration* (IEMP). It assesses how many export opportunities a country is exploiting by looking at a country's total amount of exports and the number of markets that each of these products reaches. Then, the number of countries in the rest of the world that import *each of these* products is counted. Pairing products and countries this way, one obtains the maximum potential number of export relationships that a country can establish given its export portfolio at present. The actual number of export relationships is then divided by the potential to get the index with a maximum value of 100% (i.e. reaching all possible markets). The lower the index, the more potential markets there are for export market diversification.

So far, the importance of product and market diversification has been discussed with a focus on demand fluctuations. The conclusion from the above would be that export (market and product) diversification would be a hedging strategy against such demand fluctuations. Another important aspect, however, is *price volatility,* which should also be part of any vulnerability or risk analysis. For some commodities, information is available on world market prices.[21] An alternative indicator might be to look at world export unit values; however, this would need to be done at a rather disaggregated level as otherwise issues of product homogeneity may arise. One question would be whether price fluctuations are more pronounced in certain sub-sectors than in others (e.g. for resource-based manufactures?). A more comprehensive approach would be to compare world fluctuations with a country's fluctuations – ideally both in terms of price (i.e. unit values) and demand. The idea behind this is that, say, exporting 100 different products that are characterised by high volatility (both in terms of prices and demand) might not necessarily be better than exporting a smaller basket of only 50 products if these products have a lower volatility (i.e. see more stable demand and prices) in world markets.

Finally, another possible angle to look at diversification is to include a measure of the probability or risk or threat of being replaced in global markets. One possibility is to group a country's export products into four different performance categories (*champions, underachievers, overachievers,* and *decline*) based on two criteria: 1) the dynamism of world trade in this product and 2) changes in the country's world export market share.[22] The focus would be on *underachievers* (where exports are highly dynamic in world markets, but the country is losing world market share) and perhaps

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20 For the "product space", see http://atlas.media.mit.edu/ and http://www.chidalgo.com/productspace/
21 See, for example, the *Global Commodity Price Prospects* database: http://go.worldbank.org/4ROCCIEQ50
22 See UNIDO's *Viet Nam Industrial Competitiveness Report 2011*, p. 45.

also *decline products* (products from this group are slow growing exports in world markets but the country is still losing world market share). This can help identify sectors/products where a country is at risk of being replaced or extinguished in global markets but also point to opportunities for diversification.

5.Link to Other Areas

The discussion on diversification can be closely linked to the discussion on how to spur **industrial growth**. There is a debate both in the theoretical literature and among practitioners whether the better development and growth strategy for countries is to diversify their production and export structures or rather to specialise, i.e. to concentrate on "what they can do best". The latter idea is based on the concept of comparative advantage, which is at the core of conventional international trade theory. The key argument is that if a country specialises in sectors where it has a comparative advantage (thanks to its endowments), resources are put to their most productive use, leading to allocational efficiency and a higher output. Other proponents of specialisation argue that through specialisation countries can exploit economies of scale and reap learning by doing as well as agglomeration effects. In short, advocates of this school of thought believe that industrial growth is promoted best by specialising in sectors that are in line with the country's comparative advantage.

There are opponents to this line of thinking who point out that specialising in the "wrong" sectors or activities (e.g. raw materials or natural resources) can bring disadvantages. They argue that diversifying a country's productive and export structure can help to foster growth – or at least stabilise the rate of growth by reducing the country's dependency on certain income-generating activities and its vulnerability to (external) shocks. They see diversification as a form of risk management whereby diversification of the country's productive and export portfolio serves to spread risk across a variety of activities and assets.[23] They assert that diversified economies see less volatility in output and have more stable export earnings, with both deemed beneficial for a country's industrial growth performance. Through decreasing the vulnerability of a country's industrial system and through increasing its stability, diversification can be an important contributor to achieving **economic sustainability**.

The diversification analysis can also be linked to analyses on the **social and environmental dimensions** of industrial development. For example, on the social front, diversification can also be looked at from an **employment** point of view. Is diversification leading to employment being more evenly distributed across sub-sectors, i.e. to more broad-based employment patterns? And is diversification accompanied by employment growth?

On the environmental side, diversification could mean moving into the production of "**green products**". That is, expanding the range of industrial activities could take the form of introducing new product lines in "**green sectors**". Late industrialisers can theoretically also benefit from advances in environmentally friendly (e.g. energy-saving) technologies and production methods that were achieved abroad (e.g. in industrialised countries), helping them to accompany diversification with "**greening industry**" efforts. Especially diversification away from resource-intensive or energy-intensive or otherwise "brown" sectors can help to improve the overall "environmental footprint" of the country's industrial sector.

Finally, an analysis of the "**drivers**" or key determinants of industrial development and industrial performance can play an important role in informing the strategic thinking about diversification. Most notably, diversification is closely linked to the notion of **innovation**. In fact, diversification requires innovation in its different forms. Whenever diversification is about structural change away from simple activities towards activities with higher levels of **technology and skills**, it obviously requires technological progress and skills upgrading. Meanwhile, achieving export diversification requires the mastering of new technologies and the creation of marketing channels to open up potential export outlets. Moreover, the success of diversification attempts can also be expected

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23   However, in practice, developing countries often face headwind when aspiring to diversify their export products, especially when this implies a movement up the value chain, because trade policy in many advanced economies still includes tariff escalation (i.e. the increase in tariff rates in parallel with the degree of processing of a product). The analyst, thus, may also want to examine the tariff structures of his or her country's actual or potential trading partners as part of his diagnosis on diversification possibilities.

to depend to a significant degree on access to **finance,** i.e. the availability of appropriate financial instruments. In particular, entering new productive activities and engaging in new product lines is always associated with a certain level of risk and it could take some time before these new activities become profitable so the availability of venture capital and long-term investment capital can be crucial.

6.Possible Data Sources

UNIDO Industrial Statistics databases – INDSTAT2 and INDSTA4: CD-ROM and http://stat.unido.org/

UNCOMTRADE database http://comtrade.un.org/, which is also freely available through:

World Bank World Integrated Trade Solution (WITS):https://wits.worldbank.org/

National statistics

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