WORKFORCE CONNECTIONS

Labor Market Assessment Tools

Product Space Analysis[1]

▶ **What it does:** Product space analysis shows the products which a country is currently most successful at exporting, using a special mapping of the products' relationships to one another. The figure on the next page is not a geographic map but it depicts a network map in which products are closer to one another if growth in their exports are correlated.[2] Being linked on the map indicates that two products have similar knowledge requirements.

▶ **What it contributes:** A product space analysis provides a new tool to look at potential spillover effects from one sector to another – one of the key ways in which economies develop. [3] Based on conditional probability analysis of trade flows, for any given export product in which a country currently specializes (RCA>1)[4], there are other products that share the same resources. For example, countries competitive in the export of fresh flowers also tend to be competitive in the export of fresh fish, since both depend on the existence of a world-class cold chain. It depicts a network map in which products are closer to one another if growth in their exports is correlated.[5]

▶ **How it works:** The product space analysis is based on the observation that if an economy is competitive in exporting product X, then it will have higher chances of successfully upgrading to enable production of other products that are in the 'neighborhood' of product X. Product space analysis can inform practitioners about the upgrading potential and pathways of the economy.

According to Ricardo Hausmann and Cesar Hidalgo, the product space can be thought of as a forest, within which each product is a tree.[6]

> *… A country is composed of a collection of firms, i.e. of monkeys that live on different trees and exploit those products. The process of growth implies moving from a poorer part of the forest, where trees have little fruit, to better parts of the forest. This implies that monkeys would have to jump distances, i.e. redeploy (human, physical, and institutional) capital towards goods that are different from those currently under production. Traditional growth theory assumes there is always a tree within reach; hence the*

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[1] This document was produced through the Workforce Connections project funded by the USAID Office of Education and managed by FHI 360 under the FIELD-Support Leader with Associates, with the assistance of Alyson Matthews. See http://www.wfconnections.org for more information. Draft version: 9/22/2015.

[2] The Atlas of Economic Complexity. Accessed at http://atlas.cid.harvard.edu/about/glossary/

[3] DAI (2010). The World Bank Sector Competitiveness Analysis Tools (SCAT) Reference Guide. Page 35-36

[4] The Revealed Comparative Advantage (RCA) is an index used to calculate the relative success a country has had in the export of a certain good. An RCA > 1 indicates that the country's share of the world export market in that product is higher than its average world market share (across all products). See http://atlas.cid.harvard.edu/about/glossary/

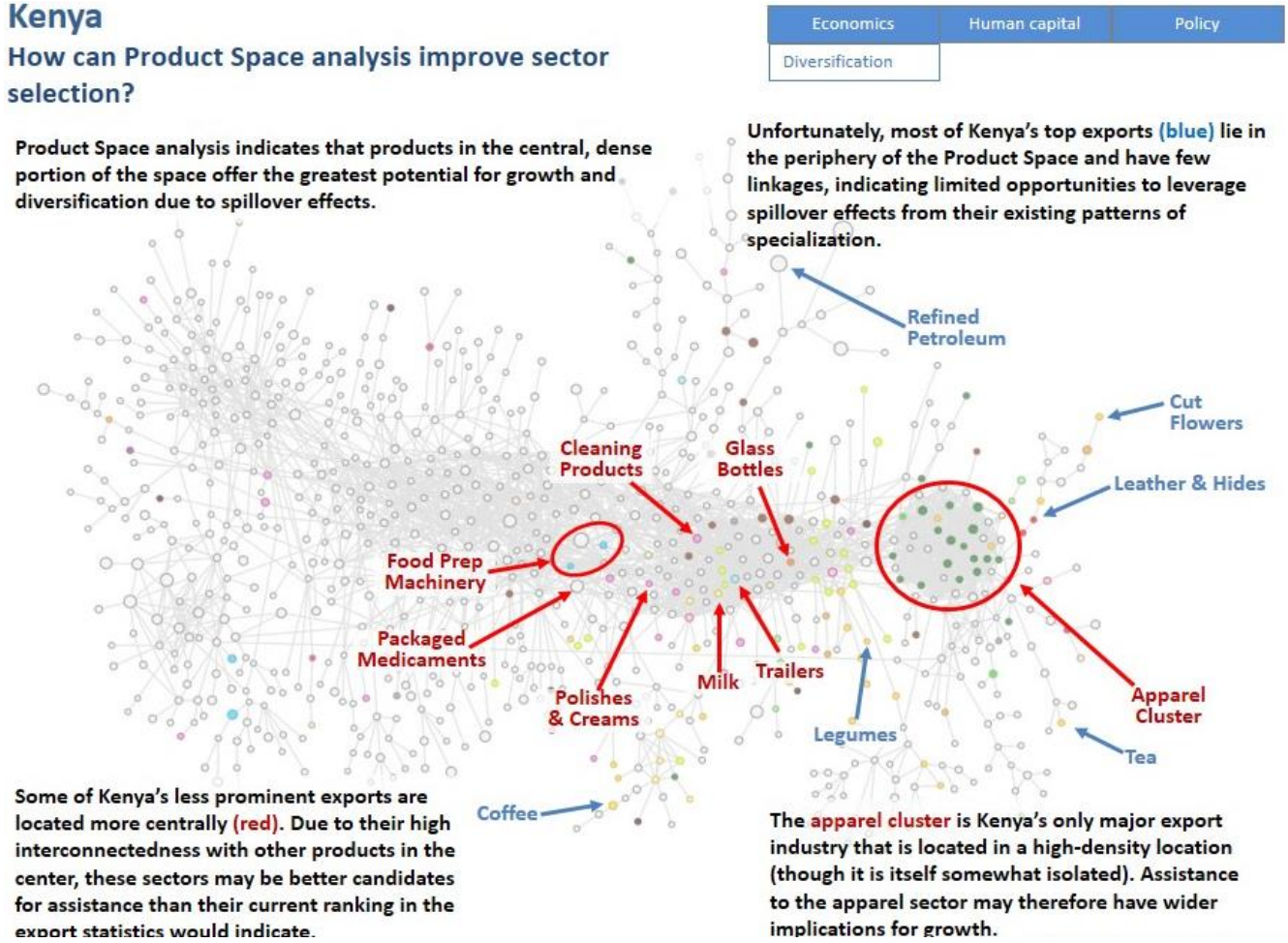
[5] The Atlas of Economic Complexity. Accessed at http://atlas.cid.harvard.edu/about/glossary/

[6] Hidalgo, C. A., Klinger, B., Barabási, A. L., & Hausmann, R. (2007). The product space conditions the development of nations. *Science, 317*(5837), 482-487.

structure of this forest is unimportant. However, if this forest is heterogeneous, with some dense areas and other more deserted ones, and monkeys can jump limited distances, then countries may be unable to move through the product space. If this is the case, the structure of this space and a country's orientation within it become of great importance to the development of countries.[7]

▶ **How do I use this tool?** Each bubble on the chart represents a product that Kenya exports. Colored bubbles (as opposed to gray) have a Revealed Comparative Advantage (RCA) score of 1 or greater.[8] This means that Kenya is already successfully exporting the selected product. The location of the bubbles on the map reflects the degree to which the products are linked in global experience, through the kinds of technology, skill sets, or other factors required to produce them.

Figure 1: Kenya Product Space Visualization and Analysis



Source: Observatory of Economic Complexity

[7] The Product Space. Accessed at http://www.chidalgo.com/productspace/

[8] The Revealed Comparative Advantage (RCA) is an index used to calculate the relative success a country has had in the export of a certain good. An RCA > 1 indicates that the country's share of the world export market in that product is higher than its average world market share (across all products). See http://atlas.cid.harvard.edu/about/glossary/

One important conclusion from the Harvard research of global export patterns is that products in the periphery, such as petroleum, cut flowers, tea, and coffee, contribute export earnings and some employment, but do not lead to further diversification opportunities. However, export products located in the crowded neighborhoods in the center (e.g. machinery, bottles, milk, and apparel) not only generate earnings and employment but also have the potential to build skills and other capabilities that might be used to produce different, more sophisticated products. On balance, a country's investment and human resource policies should lean toward sectors in the center, even if (or because) they are absent in the country today. Economies with a higher proportion of their export products in the center of the product space tend to grow faster as they exhibit greater economic complexity.

As noted in Figure 1, a workforce development program may focus on skills development on sectors that complement one another and offer employment multiplier effects For instance, complementarity between "cleaning products" and "milk" may justify focusing on common skills requirements.

Another fascinating insight offered by *product space analysis* appears in a recent study undertaken by the African Development Bank. [9] The authors point out that although the majority of Tunisia's exports are to Europe, and a very small proportion is exported to Sub-Saharan Africa (SSA), the SSA market is growing much more rapidly, and Tunisia's exports to Africa in general exhibit a much higher degree of *economic complexity* than those to Europe. This conclusion may seem counter-intuitive, but the explanation is simple: European countries are happy to import relatively low added-value items such as olive oil, fertilizers, simple automotive components and garments, but they are more resistant to high value items such as pharmaceuticals and eyeglass lenses, for example. However, African countries on the whole are far less sensitive as to the origin of such products, as long as the quality is comparable and prices are more competitive. Thus expanding exports to Africa is likely to provide a greater spur to Tunisia's medium and long-term development, by boosting economic complexity.

▶ **Where can I find more information?**

World Bank. (2010). Sector Competitiveness Analysis Tools (SCAT) Reference Guide. http://www.wfconnections.org/983_sector_competitiveness_analysis_tools_reference_guide

Hausmann, R., & Hidalgo, C. A. (2014). *The atlas of economic complexity: Mapping paths to prosperity*. MIT Press.

Hidalgo, C. A., Klinger, B., Barabási, A. L., & Hausmann, R. (2007). The product space conditions the development of nations. *Science, 317*(5837), 482-487.

Hidalgo, C.A. (n.d.). "The Product Space." http://www.chidalgo.com/productspace/

Simoes, A. (n.d.) "The Observatory of Economic Complexity." https://atlas.media.mit.edu/en/

[9] "Comparative Study on Export Policies in Egypt, Morocco, Tunisia and South Korea", AfDB, 2012.