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PRODUCT SPACE ANALYSIS AND INDUSTRIAL POLICY

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PRODUCT SPACE ANALYSIS AND INDUSTRIAL POLICY

Identifying Potential Products For India's Export Expansion and Diversification

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[1] *The paper has greatly benefitted from discussions and inputs from Dany Bahar and Saurabh Mishra.*

1. Introduction

India is the sixth largest economy in the world, on its way to becoming the fifth largest within a couple of years.[2] It is already the third largest economy in terms of Gross Domestic Product (GDP) based on Purchasing Power Parity (PPP).[3] In contrast, its ranking for global trade is much lower. According to the World Trade Organization (WTO), India was the 20th largest merchandise exporter and the 14th largest importer in the world in 2016. For commercial services, it was the eighth largest exporter and the 10th largest importer in the world.[4] The relatively lower trade ranking of India masks the fact that India has a high level of trade-integration in the world. In 2016, India's ratio of trade in goods and services (exports plus imports) to gross domestic product (GDP) was 40 per cent, higher than for example China (37 per cent), which is the second largest global trader. This picture changes if we consider only goods trade (i.e. exclude trade in services). China's global integration for merchandise is far larger than India. In 2016, the ratio of India's *merchandise* trade to GDP in 2016 was 27.5 per cent, while that of China was 32.9 per cent.

A significant concern for India's policymakers is that its merchandise imports significantly exceed its merchandise exports, resulting in a large trade deficit (Table 1). This is accompanied by a decrease in India's share of manufacturing in GDP for the past several years.[5] Thus, though the country's foreign exchange reserves are equivalent to more than a year's merchandise imports,[6] there is now a major focus in India on improving export performance. India's Trade Minister has announced growth and diversification of exports as a major priority.[7] Goods exports (i.e. manufactured product exports) assume a larger importance in this context, given that they are a prominent part of total exports and are also considered important for achieving a number of economic, social and strategic objectives.

[2] *See https://knoema.com/nwnfkne/world-gdp-ranking-2017-gdp-by-country-data-and-charts*
[3] *http://databank.worldbank.org/data/download/GDP_PPP.pdf*
[4] *https://www.wto.org/english/news_e/pres17_e/pr791_e.htm*
[5] *http://databank.worldbank.org/data/reports.aspx?source=2&series=NV.IND.MANF.ZS&country=IND*
[6] *The current account deficit of India in 2016-17 was 0.7 per cent of GDP.*
[7] *http://www.financialexpress.com/economy/new-commerce-minister-suresh-prabhu-exports-share-in-gdp-must-improve/844415/*

In a world market with growing competition and importance of global value chains, better export performance requires improved domestic competitiveness of goods and services. Recent insights suggest that industrial policy has played a significant role in this context.[8] An assessment of the experience with industrial policy suggests that there is a major role for generic or system-oriented policies ("horizontal or soft policies"), as well as certain sector-specific policies ("vertical or hard policies").[9] An important aspect to bear in mind is that these policies should be consistent with the international obligations of the nations, primarily the WTO obligations.[10]

Table 1. India: Merchandise exports and imports, 2010-11 to 2017-18, Million US$

Fiscal Year	Merchandise Exports	Merchandise Imports	Trade Balance
2010-11	249,816	369,769	-119,954
2011-12	305,964	489,319	-183,356
2012-13	300,401	490,737	-190,336
2013-14	314,405	450,198	-135,792
2014-15	310,338	447,964	-137,626
2015-16	262,290	381,006	-118,716
2016-17	275,852	384,355	-108,503
2017-18	303,376	465,578	-162,201

Note: Figures rounded up to nearest $0.5 million.
Source: Department of Commerce, Government of India, http://commerce.nic.in/eidb/default.asp

Lessons from the experience with industrial policy become relevant in this context. A review of such experience, by Alice Harrison and Rodriguez-Claire (2010) summarises some of its findings as follows: [11]

[8] *See, for example, Stiglitz, Joseph E., and Justin Lin Yifu (eds.). 2013. The Industrial Policy Revolution I: The Role of Government Beyond Ideology. Palgrave Macmillan; and, Salazar-Xirinachs, J., I. Nübler, and K. Kozul-Wright. 2014. "Industrial Policy, Productive Transformation and Jobs: Theory, History and Practice." Transforming Economies: Making Industrial Policy Work for Growth, Jobs and Development. Geneva: International Labour Office.*

[9] *For more detailed discussion in a similar framework, see Stein Crespi and Eduardo Fernandez-Arias and Ernesto Stein (eds.), 2014, Rethinking Productive Development. Sound policies and Institutions for Economic Transformation, Inter-American Development Bank, Washington DC.*

[10] *For a discussion of industrial policies and WTO, see Harsha Vardhana Singh and Rashmi Jose, 2016, "Industrial Policy and the WTO Rules-Based System", Overview Paper, E15 Expert Group on Re-invigorating Manufacturing: New Industrial Policy and the Trade System, ICTSD and WEF, Geneva.*

[11] *A. Harrison and A. Rodriguez-Claire, 2010, "Trade, Foreign Investment and Industrial Policies for Developing Countries", in D. Rodrik and M. Rozensweig eds. "Handbook of Development Economics", North Holland. See also another piece written by the same authors in 2010: "From Hard to Soft Industrial Policies in Developing Countries", Vox article.*

"There is an important role for what we refer to as 'soft' industrial policy, whose goal is to develop a process whereby government, industry, and cluster-level private organizations can collaborate on interventions that can directly increase productivity. The idea is to shift the attention from interventions that distort prices to interventions that deal directly with the coordination problems that keep productivity low in existing or raising sectors. Thus, instead of tariffs, export subsidies, and tax breaks for foreign corporations, we think of programs and grants to help particular clusters by increasing the supply of skilled workers, encouraging technology adoption, and improving regulation and infrastructure. While 'hard' industrial policy is easier to implement than 'soft'' industrial policy measures, tariffs and subsidies become entrenched and are more easily subject to manipulation by interest groups.

"While economists are generally skeptical of the benefits of intervening in trade, they are much more likely to have interventionist priors when it comes to FDI [foreign direct investment]. There is significant research interest in FDI as a vehicle through which developing country firms learn about new technology. … The evidence can be interpreted as suggesting that trade and FDI policies are most successful when they are associated with increasing exposure to trade. One implication is that interventions that increase exposure to trade (such as export promotion) are likely to be more successful than other types of interventions (such as tariffs or domestic content requirements).

"Similarly, new evidence suggests that industrial policy through FDI promotion may be more successful than intervention in trade, in part because FDI promotion policies focus on new activities rather than on protecting (possibly unsuccessful) incumbents. If such measures are part of a broader effort to achieve technological upgrading then they may be helpful, whereas if they are implemented in isolation they are likely to fail."

Another lesson from industrial policy experience is that sector-specific policies should focus on those product areas whose links spread across a large number of economic activities.[12] Once the relevant sectors are identified, further assessment and interaction with domestic industry can pave the way for more understanding of both generic and sector-specific policies to support an initiative to promote potential export performance of the nation.[13]

The structure and detail of the "product space" analysis are very well suited to focus on these issues. It provides a good basis for an overlap between trade and industrial policy because its data is in terms of trade and its underlying concepts emphasise capabilities that are easier to tap and have relatively larger potential for growth. The analysis helps to identify sectors which have larger linkages to other sectors, and also those which have a more significant impact on upgrading domestic capacity. Using product space analysis, the relevant products/sectors, and

[12] *See for example, the discussion in O. Cattaneo, G. Gereffi, S. Miradout and D. Taglioni, 2013, "Joining, Upgrading and Being Competitive in Global Value Chains", Policy Research Working Paper 6406, The World Bank, April.*

[13] *For a recent detailed analysis of industrial policy in the context of investment, see UNCTAD, 2018, "World Investment Report 2018", UNCTAD, Geneva.*

the appropriate policy package could be determined in terms of "soft" and "hard" industrial policy options. This is particularly relevant at present as India is developing its new industrial policy framework.

The product space analysis is based on the concepts and information provided by the Atlas of Economic Complexity (or "Atlas").[14] The Atlas' dataset on traded products uses both Harmonized System (HS) and Standard International Trade Classification (SITC) data. The HS data is from 1995 onwards, while the SITC data is from 1962 onwards. Presently, data up to 2016 is available for nearly 800 products classified under SITC, and about 1240 categories under HS classification.[15] Both SITC and HS could be used for our purpose. The paper conducts most of the analysis in terms of HS product classification. However, we provide the relevant information also in terms of SITC (Annex Tables 1 to 3) for those interested to work using that classification. The substantive results from both classification systems are similar.

Though there has been some previous work on India's product space analysis, this framework is still not part of the main discussion on trade policy.[16] With an increasing focus on improving competitiveness, enriching technological capabilities, and widening the scope and potential of export activity in India, it is important that analysis based on the product space also becomes part of the policy discussion improving export performance, particularly goods exports which are currently emphasised by the Government of India.[17]

The purpose of this paper is three-fold. One is to provide a simple presentation of the product space methodology, with its underlying conceptual framework, and the significant information base that is updated to remain reasonably current for policy analysis. This would be a good basis for generating greater interest of scholars and policymakers to follow up various ideas that can be examined using this approach. Second, is to identify a list of products that

[14] *For more information, details, see http://atlas.cid.harvard.edu/. More detail is provided in Ricardo Hausmann, César A. Hidalgo, Sebastián Bustos, Michele Coscia Sarah Chung, Juan Jimenez, Alexander Simoes, and Muhammed A. Yıldırım, "The Atlas of Economic Complexity. Mapping Paths To Prosperity", at https://atlas.media.mit.edu/static/pdf/atlas/AtlasOfEconomicComplexity_Part_I.pdf*

[15] *For more information, please see http://atlas.cid.harvard.edu/learn/faq*

[16] *See, for example, Rahul Anand, Kalpana Kochhar, and Saurabh Mishra, 2015, "Make in India: Which Exports Can Drive the Next Wave of Growth?", IMF Working Paper WP/15/119; Rajat Kathuria and Mansi Kedia 2015, "HVM and Employment Creation: Friends or Foes?", Review of Development and Change, Volume XX, Number 2, July to December, pages 15-34; Rajat Kathuria, Mansi Kedia and Uttara Balakrishnan, 2018, "Mapping the future of High Value Manufacturing in India", in Jayant Menon and T. N. Srinivasan (eds), "Integrating South and East Asia. Economics of Regional Cooperation and Development", Asian Development Bank and Oxford University Press.*

[17] *For an interesting analysis of the approach to services, see Saurabh Mishra, Ishani Tiwari and Siavash Toosi, 2017, "Economic Complexity and Globalization of Services".*

are more likely to be relevant for developing dynamic export opportunities for India. Third, as scholars and policymakers work on this database and use the policy space framework over time, experience will provide a basis for improvement in the database and understanding of this methodology to getting better insights to understand the links between capabilities and diversification of exports.

This paper provides two kinds of lists of selected products. One identifies an aggregated level of products at two-digit HS (or HS2 categories), and the other more disaggregated categories at HS4 level. These products will be selected based on criteria such as items with high export potential, products relatively easier to produce for export diversification, those with relatively higher job opportunities, or the products more likely to improve dynamic opportunities for agriculture exports. Both horizontal sectoral and product-specific policies may be relevant for the first group, while more product-specific policies are likely to be relevant for the second.

In addition to a shortlist of products, more detailed information based on different criteria are provided in Annex Tables 1 to 6 of this paper. This information can be further examined by researchers to address their perspectives and questions relating to industrial policy and export diversification.

The main results of this paper are based on 2016 data available in the Atlas. The data over time helps identify some dynamic export possibilities for products that are new compared to some previous work using product space analysis. This analysis is supplemented with insights from the work carried out by some other experts including, for example, two recent studies mentioned in Section 5, and the work at International Trade Center Geneva,[18] a paper on this topic from the International Monetary Fund (IMF), and Dany Bahar of the Brookings Institution, Washington D.C.[19]

The export items highlighted by this paper would be an initial basis to identify product areas to focus on for improving India's exports prospects. The insights have to be supplemented by discussions with exporters to determine the relevant policy support. This support could be

[18] *More information on ITC, Geneva can be obtained at www.intracen.org/*

[19] *See, for instance, Dany Bahar, Ernesto Stein, Rodrigo Wagner, and Samuel Rosenow, 2017, "The Birth and Growth of New Export Clusters: Which Mechanisms Drive Diversification?", Center for International Development at Harvard University Research Fellow and Graduate Student Working Paper No. 86 September 2017*

both in terms of generic or system-oriented policies, as well as sector-specific policies once the strategic sectors are identified. Importantly, at the sector-level too, we would have policies that are more horizontal to the specific sector as a whole, and those which are specific to parts of the sector concerned.

A very important point to keep in mind is that policy support to augment capabilities and create additional market opportunities would need to focus on both domestic policies as well as addressing constraints and obstacles faced by exports in markets abroad. An important feature of the results in this paper is that the sectors identified for emphasis would be relevant for both policy-makers and industry. They could also be the initial focus of a discussion between the government and industry to get the relevant insights for relevant policy to help prioritise policy options, improve performance, competitiveness and diversification of India's export structure.

Section 2 of this paper introduces some key concepts underlying product space analysis that are useful in an analysis of products that provide larger opportunities for any country in international trade.[20] Section 3 provides a short pictorial illustration of product space analysis. Section 4 takes a closer look at the evolution of India's export structure within the framework of product space analysis. Section 5 summarises the key points made in two recent studies using product space analysis for India. Section 6 considers some policy-relevant criteria which can help identify products which should be encouraged for export diversification, such as products for which India has:

- significant untapped export markets,
- capability to produce relatively easily,
- the sustained possibility of building domestic capacity to produce more complex goods,
- agricultural products that could be part of the initiative for improving exports and diversification,
- the possibility to create more jobs, and
- the ability to focus on those products which have the potential for greater exports in selected foreign markets.

[20] *The description of the methodology draws from the paper by Dany Bahar and Vanessa Cheng Matsuno, 2016, "Trinidad and Tobago: Lessons from a Product Space Analysis", paper written as part of preparation for the IDB Program: "Support for the National Competitiveness and Innovation Agenda" (TL-L1043).*

Section 7 discusses policy objectives and initiatives that become relevant in different contexts. Since addressing constraints and obstacles faced by exports need to be addressed also for conditions faced by them in markets abroad, we need to examine the situation for specific important markets. Section 8 has a short discussion on this with the specific example of Korea, using product space analysis and trade data. Section 9 summarises the list of sectors at HS2 level, and the more disaggregated products (HS4 level), that are identified using the various selection criteria. These products are suggested as the categories that should be focused upon by policymakers through horizontal policies as well as sector-specific policies to address the needs to more disaggregated categories. Section 10 suggests some policy options, and Section 11 provides key conclusions.

2. Product Space Analysis: Some Key Concepts

Product space analysis maps connectedness between about 1200 HS products based on real-world export data from a large number of countries (it does so also for 800 SITC categories). The basic building block is an understanding of what each country is able to produce relatively competitively, and products that are co-exported by various countries. Higher the probability of two products being co-exported, larger is the "proximity" of these two products in the product space. According to Hausmann et al. (2013), "[T]he collection of all proximities is a network connecting pairs of products that are significantly likely to be co-exported by many countries. This network is what we call the product space. We use the product space to study the productive structure of countries." (page 52)

According to Hausmann, et. al.,[21] the complexity of a country's economy reflects the amount of productive knowledge it contains. This "productive knowledge" refers to the technical "knowhow" that goes into making a certain product. This knowledge is costly to acquire and transfer because countries cannot create products that require capabilities they do not have. Therefore, in general, the more complex the product, harder it is to acquire the capabilities to be able to produce it.

Product space analysis categorises products into 34 sectors or communities (sometimes referred to as clusters), based on their relatedness and proximity in the network.[22] When illustrating the product space, products that provide more extensive opportunities are placed in the core of the product space map, while the periphery has products that require know-how which is less relevant for many new industries (see Section 3 below).

[21] *Ricardo Hausmann, Cesar A. Hidalgo, Sebastian Bustos, Michel Coscia, Alexander Simoes and Mohammad A. Yildirim (2013), "The Atlas of Economic Complexity. Mapping Paths to Prosperity", MIT and Center for International Development, Harvard University. https://growthlab.cid.harvard.edu/files/growthlab/files/atlas_2013_part1.pdf*

[22] *Product space analysis focuses only on goods. The work has been extended to services as well, but much more needs to be done in that context to reach a similar level of details and understanding of complexity. Moreover, since the main focus of Indian policy-makers is on goods, the product space analysis provides a good basis for identifying the key exports to emphasise for improving exports capabilities. The policies that are devised to improve such capabilities would include horizontal and vertical significance of the relevant services.*

Product space analysis is based on the understanding that "countries move from things they know how to do, to things that are nearby or related, or what they call the adjacent possible."[23] This insight provides a basis to examine the likelihood of a new product emerging in a country's export basket, taking account of the correlation of a product with its "nearby" products in the product space network.[24] If countries already have what it takes to make one product, they will find it relatively easy to move to the next ones which require similar capabilities. It follows that potential products with the most connections to existing products will be the easiest to develop in the future.

This relationship is captured by the concept of "**distance**" between products, which measures how "close" a potential new product is to the country's current export basket. The estimate for distance lies between 0 and 1.[25] It indicates the likelihood that a country will start exporting a product given its current export structure. "Closer" a product is in the product space map to other products which the country already exports, more likely it is for that product to emerge as a new export item.[26] A lower value of distance for a product indicates that the country has achieved comparative proficiency in producing many nearby products. The underlying thought is that products with low distance require similar operational conditions (skills, infrastructure, resources, linked markets) and are either already being exported from the country or their exports can emerge relatively more easily than others.

Thus, the easiest way for a country to diversify is by moving from the products it already exports to others that require a similar set of embedded knowledge, a basic concept whose empirical information is the basis of product space analysis. The export of such a new product would, in turn, make feasible some other new products that require similar capabilities. The process of diversification of the export (or production) structure could hence continue over time. In this way, the product space indicates the paths to industrial diversification and provides a basis to predict the "evolution of a country's industry, along with recommendations

[23] *http://atlas.cid.harvard.edu/learn/glossary*

[24] *See, Hidalgo, C.A., B. Klinger, A.-L. Barabasi and R. Hausmann (2007), "The Product Space Conditions the Development of Nations", Science, Volume 317, July 27, 2007, pages 482 to 487. http://nwb.cns.iu.edu/papers/2007-hidalgo-prdspc-sci.pdf*

[25] *Distance is defined "as the sum of the proximities connecting a new good p to all the products that country c is currently exporting. [This concept is measured so as to] normalize distance by dividing it by the sum of proximities between all products and product p." See page 54, https://atlas.media.mit.edu/static/pdf/atlas/AtlasOfEconomicComplexity_Part_I.pdf.*

[26] *The Atlas of economic complexity explains it as: "A measure of a location's ability to enter a specific product. A product's distance (from 0 to 1) looks to capture the extent of a location's existing capabilities to make the product as measured by how closely related a product is to its current exports. A 'nearby' product of a shorter distance requires related capabilities to those that are existing, with greater likelihood of success." See, http://atlas.cid.harvard.edu/learn/glossary*

of those products that offer … products at a shorter distance (more existing know-how, reducing risk), and high opportunity gain (opening more adjacent products for continued diversification opportunities)."[27]

The ability of countries to diversify and move into more complex products is crucially dependent on their initial location in the product space. Hausmann et al. (2014) show that low-income countries, which tend to export products on the periphery of the network, have fewer opportunities for diversification. In contrast, countries like India, Greece, Turkey, Brazil, and Indonesia tend to export some products near the core of the network, i.e., products which are highly connected and therefore opportunities are relatively plentiful.

Some relevant concepts for product space analysis, in addition to "distance", are:

- Density: The value of density is inversely related to distance. Distance is equal to one minus density.[28] Therefore, we can conduct our analysis with either distance or density, keeping the relationship between these two concepts in mind. Higher the value of density for a product, more products are closer to it and easier it is to produce another new product. It is interesting to note that in the pictorial illustration of Product Space, "more-sophisticated products are located in a densely connected core whereas less-sophisticated products occupy a less-connected periphery".[29]

- Revealed Comparative Advantage (RCA) broadly indicates the existing competitiveness of countries for a specific exported product. Based on Balassa's (1965) definition of Revealed Comparative Advantage, an RCA greater than one for any product is achieved by a country if the ratio of the exports of that product to its total exports is more than the share of that product's global exports in total world trade.[30] RCA > 1 indicates that the country has above average competitiveness in exporting that product. This measure helps to identify the relatively large or small importance of a country in the global market for the product.

[27] *http://atlas.cid.harvard.edu/learn/glossary*

[28] *See line 288 in https://github.com/cid-harvard/atlas-data/blob/master/DO_Files/atlas_variables.do*

[29] *See page 482 of C. A. Hidalgo, B. Klinger, A.-L. Barabási and R. Hausmann, 2007, "The Product Space Conditions the Development of Nations", Science, 27 July 2007, Vol. 317, Issue 5837, pages 482-487. The measure of density of a product is also scaled so as to vary from 0 to 1. It is estimated as "the ratio between (a) the sum of all proximities between that particular product and all products in which the country has an RCA > 1; and (b) the sum of all proximities of the product (irrespective of whether or not the country has an RCA in the other product)" See page 38 of Rahul Anand, Kalpana Kochhar, and Saurabh Mishra, 2015, "Make in India: Which Exports Can Drive the Next Wave of Growth?", IMF Working Paper WP/15/119, May 2015. WP/15/119*

[30] *See Technical Box 2.2 in the link http://atlas.cid.harvard.edu/learn/glossary*

• Opportunity Gain shows the possibility of opening up of additional opportunities if a particular export product is produced by a country. It is "the strategic value of a product based on the new paths to diversification in more complex sectors that it opens up."[31] This concept indicates the potential opportunities that are opened up when an additional product is added to the export basket. A higher estimate of opportunity gain for a product implies that the product is relatively close to products that are more complex and that the links with these products create the possibility of "opening new doors" to connect in a step-wise manner to newer and more complex products in the product space network.

• Diversity of a country is based on how many different types of products are exported by the country; larger the number of products the country produces, greater the diversity.

• Ubiquity of a product is shown by the number of countries that are able to export a particular product; larger the number of countries that do so, more ubiquitous is that product.

• Complexity: Products that are less common (i.e. have low ubiquity), would likely be more complex than others. This implicitly reflects that the knowledge required to make that particular product is not widely available, or difficult to acquire. An iterative process combining ubiquity and diversity is used to estimate an Economic Complexity Index for a country, and a Product Complexity Index for individual products.[32] The economic complexity of a country is linked to the complexity of the products it is able to export.

• Product Complexity Index (PCI): This shows the level of sophistication or technical competence to produce the product.[33]

[31] *http://atlas.cid.harvard.edu/learn/glossary. The Atlas of economic complexity explains Opportunity Gain as measuring: "how much a location could benefit in opening future diversification opportunities by developing a particular product. Opportunity gain quantifies how a new product can open up links to more, and more complex, products."*

[32] *See Chapter 2 of Hausmann et. al. (2013)*

[33] *According to the Atlas of Economic Complexity, Product Complexity Index: "Ranks the diversity and sophistication of the productive know-how required to produce a product."*

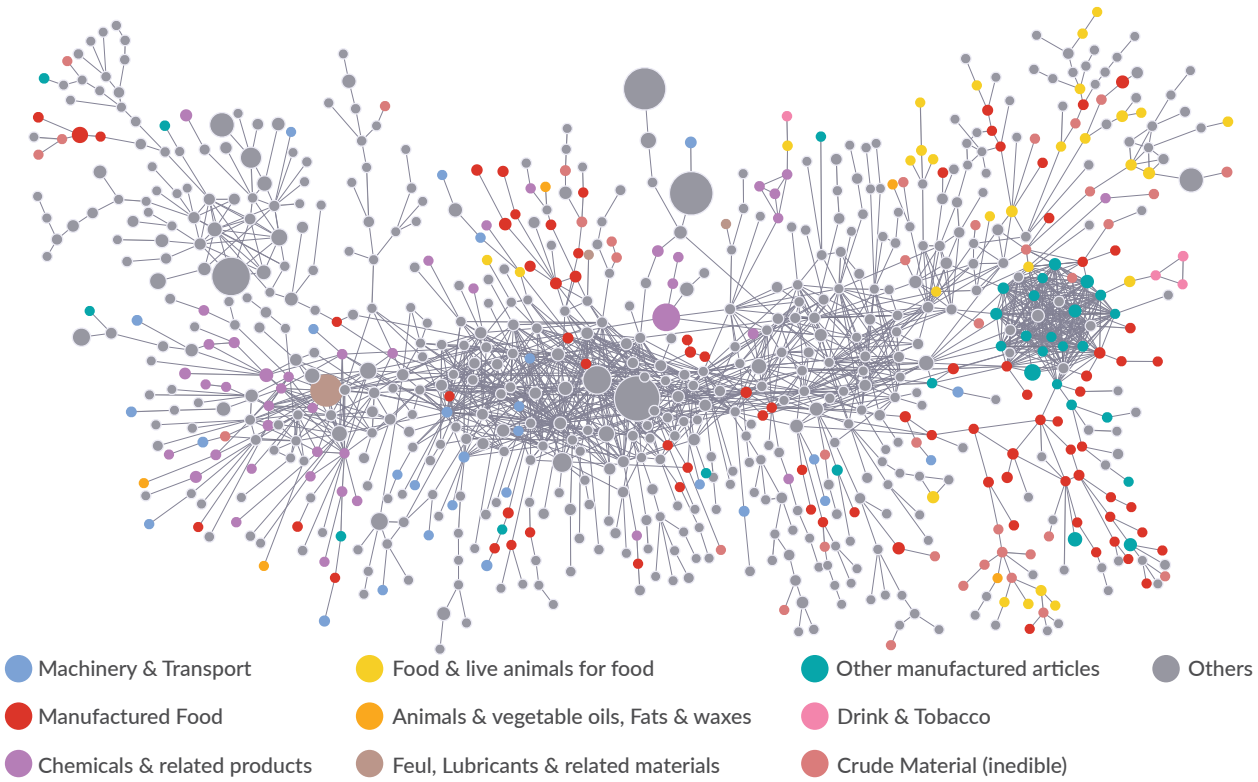
The Atlas of Economic Complexity provides measurements for both the complexity of an economy as well as for an individual product.[34] The various concepts mentioned above will help us make a deeper assessment to identify the relevant export areas that may be facilitated to create dynamic export capabilities and opportunities for India. The overall product space map includes all products traded and thus covers much more than the product space relevant to any single country. Each country's export structure is a subset of the overall or global export product structure. For each country, a unique product space map can be created based on the export structure of that particular country. It is noteworthy that product space and related capabilities can also be shown through a pictorial representation. Section 3 provides a short pictorial example of product space.

[34] Except for RCA, other concepts mentioned can be numerically estimated in terms of probabilities based on diversity and ubiquity. These numerical estimates, available in the Atlas' database, help evaluate a country's overall position in the product space by calculating how far are the potential products from current exports, and how complex are these potential products.

3. Pictorial Representation of Product Space Analysis

Figure 1 illustrates a country's current productive knowledge and its capacity to expand that knowledge by moving into other, nearby products (the products shown in these Figures are SITC categories with RCA equal to or more than one). Such a representation of the product space network shows a central dense core made up of machinery, metal products, chemicals and capital-intensive goods. At the periphery are products such as petroleum, seafood, garments and raw materials, i.e., products that are weakly related to other products. In general, products along the periphery are less sophisticated and associated with lower income elasticity than those at the core. This representation in the Atlas of Economic Complexity is expressed through colour-coding and mapping of links between different product categories, with the colour representing the community it belongs to. The closeness between nodes in the visual representation indicates the proximity of the products in terms of the probability that they are co-exported.

Figure 1. India's Product Space Shown in the Overall Product Space, 2016

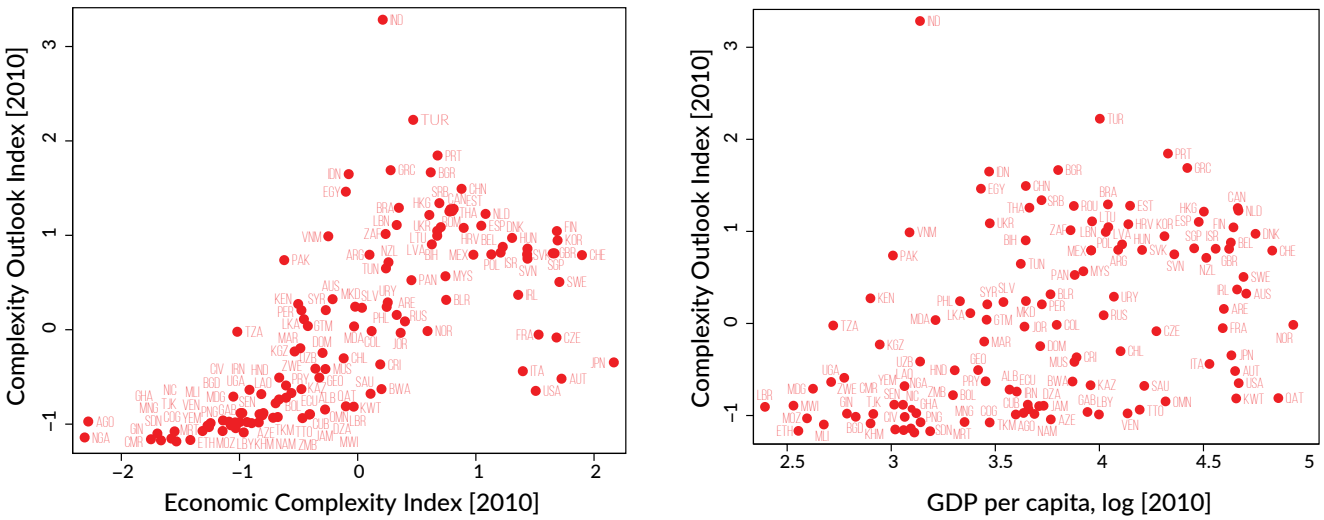


Source: : http://atlas.cid.harvard.edu/

A number of concepts used in product space analysis are co-related. For example, Figure 2 below shows that higher the index for any country, greater, in general, is its capability to have a higher opportunity gain. Further, the link between Economic Complexity Index and Opportunity Value is far closer than the link between GDP per capita and Opportunity Value. Thus, potential exports can be better analysed and identified based on a concept used in product space analysis than by GDP per capita.

Figure 2 also suggests that even countries with relatively lower per capita income could have high capabilities or the potential to increase the future opportunities using those capabilities. A corollary of such a link is that it may be better to focus on improving the economic capabilities which in turn will have a positive impact on its GDP per capita. Such a focus will also pave the way for more sustained progress for a nation with increasing competitiveness and ability to move on to more complex activities as technologies and global competition change.

Figure 2. Complexity Outlook Index as Function of the Economic Complexity Index and GDP per capita



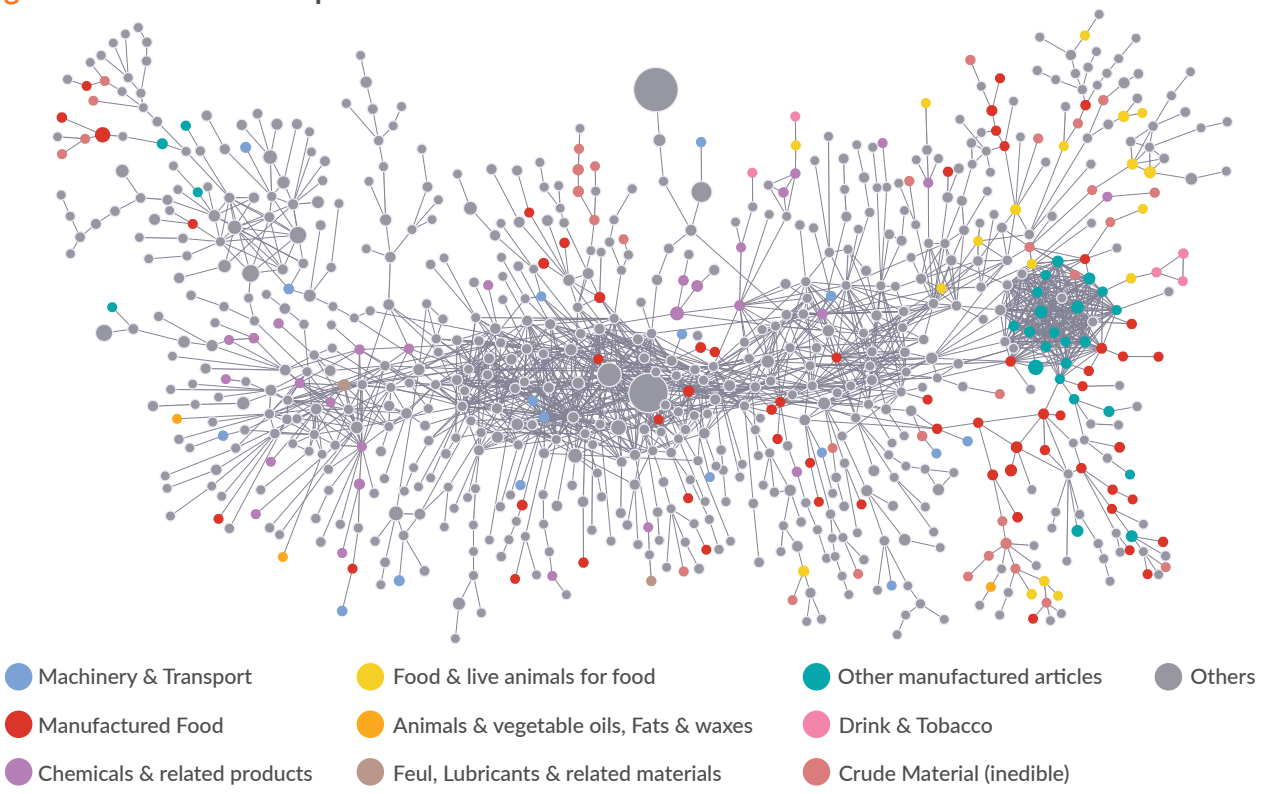
Note: Complexity Outlook Index (COI) is "a measure of how many complex products are near a country's current set of productive capabilities. The COI captures the ease of diversification for a country, where a high COI reflects an abundance of nearby complex products that rely on similar capabilities or know-how as that present in current production."
Source: Page 56, https://growthlab.cid.harvard.edu/files/growthlab/files/atlas_2013_part1.pdf

Based on these relationships, an interesting aspect of the product space analysis is that it helps predict the likely path of growth and product structure for various countries. This method of projecting growth opportunities has indicated that over the next 10 years India is potentially a top performer in terms of potential growth momentum. This strong potential needs to be realised through specific policies that facilitate competitiveness (and exports), keeping in mind, for example, sectors which have greater potential prospects and growth linkages.

4. Evolution of India's Product Space

Figures 1, 3 to 5 show India's export basket for the years 1990, 2000, 2010 and 2015, respectively, mapping the products competitively exported by India in those years (e.g., with RCA > 1) in the product space network. The source for all the diagrams is the website of the Atlas.[35]

Figure 3. Indian Product Space in 1990



Source: : http://atlas.cid.harvard.edu/

[35] *See, for example, one of the pictorial representations for India in 2016 at http://atlas.cid.harvard.edu/explore/k/?country=104&nodeSizing=CountryTrade&partner=undefined&product=undefined&productClass=SITC&startYear=undefined&target=Product&year=2016 . These figures illustrate product space in terms of SITC. The same kind of illustration is also possible for HS categories. The reason for illustrating the evolution of product space over time in terms of SITC is that SITC data goes back much longer in time. HS data is not available in product space for 1990, one of the years selected by us.*

Hausman and Klinger (2007) found "that the space of relatedness, or what we call the product space, is highly heterogeneous: there are very dense parts of the product space with highly inter-connected products and goods that are in very sparse sections of the products space." (page 3) India's product space shows a similar pattern.

In 1990, manufactured goods comprised 57 per cent of India's total goods exports. The snapshot of India's export basket in 1990 shows that it was relatively well-diversified even at that time.

However, many of the most important manufactured goods for which India had RCA>1 were located in the periphery of the product space network in low-skill or low-tech sectors. These included for example, "diamonds (non-industrial), not mounted" (which accounted for 15 per cent of total exports), food industry (15 per cent of exports), or "blouses" (which accounted for 3 per cent of total exports). Not only are India's top exports but also the densest areas on India's product map are located mainly around the periphery. This indicates that while India produced many products with RCA above one in 1990, they were concentrated in low-value industries.

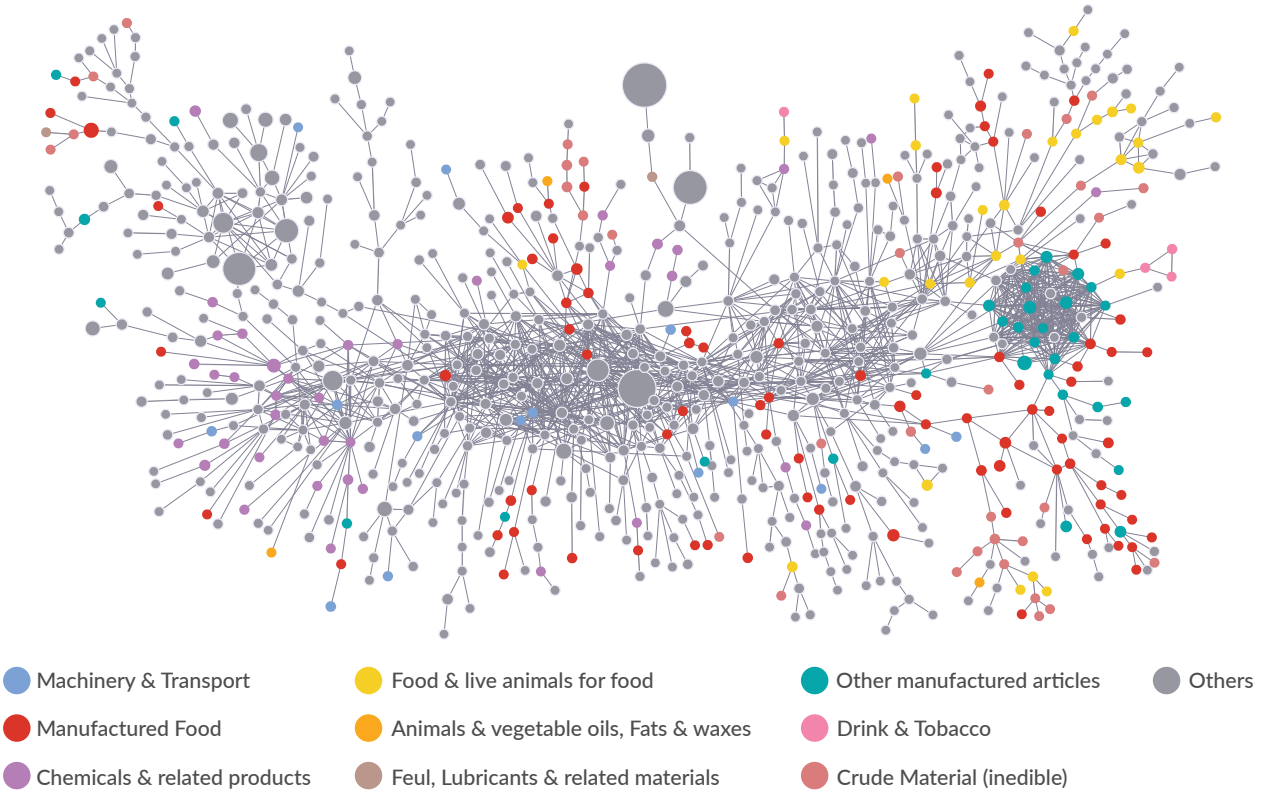
Despite the concentration of products in low-value industries, it is important to note that India's product space also shows some products located at the core of the network. Some of the products located towards the centre include those related to the manufacture of metals, such as "articles, n.e.s. [not elsewhere specified], of copper, nickel, aluminium, lead, zinc and tin," the manufacture or rubber, such as "transmission, conveyor or elevator belts, of vulcanized rubber," and those related to "special products of textile materials." These products have closer connections to other potential products, such as "parts of railway vehicles," "electrical equipment", and "special parts and accessories for motor vehicles."

Figure 4 shows India's product space for 2000. The share of manufactured goods increased to 62 per cent of India's total exports. Food industry remained the second largest industry in India's export basket, but its share fell to 12 per cent of total exports. At the same time, India further diversified its export basket as several new industries emerged, primarily in the manufactured goods industry. This diversification is visually indicated by an increase in the total number of coloured nodes in the figure below. Looking at the network, it is evident that the new goods that emerged in 2000 were proximate to already existing nodes in 1990. For example, "men's and boys' outerwear" and "iron or steel sheets or plates of rolled thickness

3mm to 4.75 mm" emerged during 1990 to 2000 and are located in the network near "women's girls, and infants' outerwear" and "iron or steel sheets rolled of thickness 4.75mm," respectively, which were present earlier.

This evolution is consistent with the findings of Hausmann and Klinger (2007)[36] and Hidalgo et al. (2007), that the emergence of new sectors is strongly determined by proximity to already existing products in the network.

Figure 4. Indian Product Space in 2000



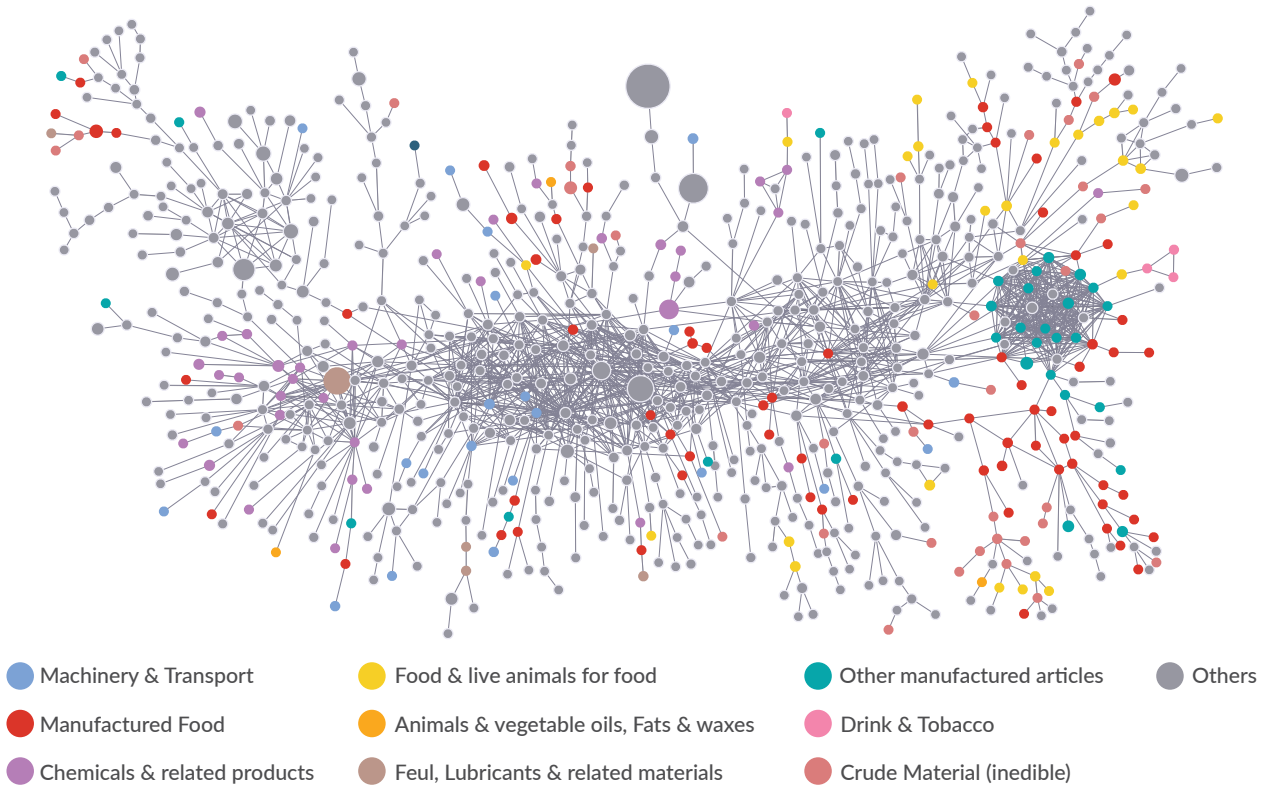
Although the density at the core of the network for India remained quite low relative to that in some categories around the periphery, several new industries emerged that were closer

[36] *Ricardo Hausmann and Bailey Klinger, 2007, "The Structure of the product space and the Evolution of Comparative Advantage", Center for International Development at Harvard University, Working Paper No. 146, April.zz*

to the core of the network. For example, "iron, steel or copper springs and leaves for springs" and "base metal indoors sanitary ware" emerged in 2000.

It is worth noting that RCA fell below one for a number of products, which thus disappeared in the product space diagram for 2000 because the product space diagrams shown in this section show products with RCA above one. For example, "Ores and concentrates of uranium and thorium" and "special purpose vessels and floating structures" appeared on the outskirts of the map in 1990 but were no longer present in 2000. Despite the emergence of new exports and the disappearance of others, the most important products in India's export basket were still located at the periphery of the network.[37]

Figure 5. Indian Product Space in 2010



[37] *Not mounted diamonds still accounted for 15 per cent of total exports, cotton yarn accounted for 3 per cent, and crustaceans and molluscs accounted for 3 per cent.*

Between 2000 and 2010, the value of India's overall merchandise export basket increased more than 500 per cent. One major source of this growth was the impressive growth of India's oil industry, which contributed 17 per cent of India's export basket in 2010. Consequently, the oil industry replaced the food industry as the second largest industry in India's export basket. While manufactured goods (43 per cent) remained the largest category in terms of exports, their share fell relative to that in 2000. The global boom in oil prices in that period contributed to the growth of India's oil industry observed during the same time-period.

It is noteworthy that by 2010, a further number of products that were previously exported with RCA>1 and located near the core of the network disappeared (Figure 5). These included "iron or steel sheets and coils," "special products of textile materials," and "articles, n.e.s., of copper, nickel, aluminium, lead, zinc and tin." Meanwhile, products with less complexity and at the outskirts of the network remained, such as "not mounted diamonds" (which represented 10 per cent of India's export basket) and "not agglomerated iron ore" (which contributed 4 per cent to India's export basket). The most important new product that emerged in India's product space with R>1, was "lubricating petroleum oils," which alone accounted for $35.8 billion, or 16 per cent of to India's total export basket.

In 2016, manufactured goods remained the top contributor to India's export basket (40 per cent). Notably, machinery and transport equipment were among the largest industry item for exports, accounting for 18 per cent of the value of total exports ($38.4 billion). This industry includes products such as "cars" and "aircrafts". The chemical industry also experienced growth in the years between 2010 and 2016, contributing 16 per cent to total exports. The most important product in the chemical industry in terms of value is "medicaments," which added $12.4 billion to total exports. While exports of these industries experienced growth relative to their share of total exports in 2010, the oil industry's share of total exports shrank to 12 per cent in 2016. This is not surprising given the decline in global commodity prices that followed the financial crisis of 2008.

Part of the reason for the growth of the machinery and transport industry and the chemical industry reflects the fact that India has made inroads in diversifying its export base to include more complex sectors, such as chemicals, vehicles, and certain electronics. Examples of new products with RCA>1 that emerged in 2016 in these high complexity sectors include products under the categories "provitamins and vitamins," and "organo-sulphur compounds."

Again, it is evident that the new goods that appeared in 2016 were proximate to existing products (Figure 1). In general, it appears that the density of products nearer the core increased relative to 2010, indicating that the complexity of India's economy increased. Indeed, India's Economic Complexity Index increased in 2016.

This shows that India has become better positioned to continue diversifying into new areas, given the capabilities accumulated to date. Although the network core remains less dense than some areas around the periphery with low-skill or low-tech sectors such as textiles, the fact that India is relatively diversified and has connections to many parts in the product space implies significant opportunity for future growth and expansion into new industries (Figures 1 and 5).

5. Products Identified By Some Recent Product Space Studies on Diversifying Indian Exports

We summarise the products suggested by two studies using product space analysis for India, one by Rajat Kathuria et. al. (2018) and Rahul Anand et. al. (2015). The former focuses on high value manufacturing (HVM) and the latter on goods and services.

5.A Rajat Kathuria et. al.:

The analysis takes account of distance, revealed comparative advantage, sophistication of a product, and high skill and technological intensity. The study finds, *inter alia* that the "two product categories amongst the top 10 products exhibiting both high levels of sophistication and high densities are 3103 (superphosphates, in packs >10 kg) and 2814 (anhydrous ammonia). They belong to the chemical cluster in India's product space." The top 10 sectors in terms of HVM index are identified as textile and clothing products (ISIC 1711 and 1810), basic iron and steel (2710), pharmaceuticals (2423), automobile parts etc. (3430), tobacco products (1600), certain food products (1549), sugar (1542), grain mill products (1531) and plastic products (2520).

The study identifies the top ten products according to PRODY, a concept which indicates the "sophistication" level of the product.[38] In terms of HS4, these are other paints and varnishes (3210), cinematographic cameras and projectors (9007), organic surface-active products and preparations (3401), casein, caseinates etc, (3501), ammonia (2814), wrist watches etc. (9101), mineral and chemical fertilisers (3103), wood tar etc. (3807), artificial corundum (2818), and other inorganic compounds (2851).

[38] *See Rajat Kathuria, et. al. (2018), page 214.*

Likewise, their top 10 high skill- and technology-intensive products in terms of revealed comparative advantage descending order of revealed HS are in the categories 28, 29 and 33.[39] This paper also identifies high skill and technology intensive products that are more important in terms of India's export share. In terms of HS2, these products are in categories 29, 30, 38, 85 and 88,[40] i.e. organic chemicals, pharmaceutical products, chemical products n.e.s., electrical machinery and parts, and aircraft and parts.

5.B
Rahul Anand et. al.:

This study suggests the possibility for India to diversify "into a large number of income enhancing marginal products such as aircraft, machinery, motor vehicles (passenger and transport), auto parts, rail construction, and heterocyclic compounds could enhance the income potential of Indian exports." (page 27)

The study finds that India's emerging comparative advantage in Research and Development Services is comparable to a number of advanced economies, including for bio-informatics, aerospace, pharmaceuticals, management, chemical or mechanical engineering. Design-based systems for services across industrial engineering, information technology, and banking and financial sector would be particularly significant in this context. They also see the possibility of India finding additional export markets in various parts of the world, including South Asia, East and Central Asia, Eastern Europe, Latin America, and Africa.

These sectors overlap with those identified in the discussion of Kathuria et. al., with additional emphasis on motor vehicles and parts, rail construction, and certain services.

[39] *This study has identified these ten products in terms of six-digit HS categories. They are in HS6 categories 283190, 290242, 290362, 290611, 294200, 292142, 293929, 330124, 330125 and 330190. For ISIC categories, all the items are in 2411, 2423 and 2429.*

[40] *At HS6 level, these categories are 290220, 290243, 294200, 300420, 300490, 380810, 390210, 851790, 852520 and 880330.*

6. Priority Products To Increase and Diversify Exports from India

According to the product space methodology, we could use the estimates for certain key concepts to help identify products relatively easier to produce given India's resource endowments, or those with significant potential to increase future export opportunities and diversification. Data for 2016 is used in this study[41] for the criteria of distance, density, revealed comparative advantage, opportunity gain and productivity complexity index. Based on these concepts, we see that the products are related to each other as follows:

(a) Products which are characterised by a small "distance" (or high "density"), i.e. products relatively easier to produce/export, have in general an RCA greater than one for India. Likewise, products with large estimate for distance have RCA of less than one. This shows that products relatively easier to export are already being exported reasonably well by India.

(b) In contrast, products with a positive opportunity gain for India in general have an RCA of less than one (some very small or zero), showing that the export share of these products in India's exports is less than the corresponding average of such products for world exports. This implies that new exports will need more sustained and focused effort to be developed.

(c) The need for additional effort is also indicated by the fact that products with high opportunity gain have a high product complexity index (PCI), i.e. they are more complex to produce.

(d) It is interesting that while products with high Product Complexity Index (PCI) tend to have RCA of below one, products with RCA > 1 are found in virtually the entire range of PCI.

[41] *This is the most recent database which is used till date for product space analysis study of India's exports.*

(e) However, a number of products with a positive opportunity gain have low PCI, i.e., they are relatively less complex to produce. These products should be part of a focus group for dynamic export opportunities, because they combine relative ease of production and high opportunity gain.

The above relationships suggest that if we focus on products which may be easier to produce, in general those products would not have a high potential for enhancing domestic capabilities and diversification of India's export performance. Similarly, if we focus on products with high opportunity gain, then they will not be easy to produce, and products easier to produce will likely not have high opportunity gain. Therefore, if we wish to focus on both these objectives, namely identify products with easy potential for exports and identify those products which will lead to greater competencies and diversification possibilities, there will be little overlap between such products. This is shown for example from a list of top 100 SITC product categories in the Annex Tables 1 to 3, ranked according to different criteria such as:

(1) Low distance (same as highest density)
(2) High PCI
(3) High opportunity gain
(4) High RCA

The top 100 ranked according to distance have zero common categories with the top 100 categories based on opportunity gain. Similarly, there are no common categories amongst the top 100 for opportunity gain and RCA. Nonetheless, the top 100 SITC categories ranked according to distance have 55 categories in common with the top 100 categories ranked according to PCI, showing that India could move on to producing and export several complex products which could in turn pave the way for connecting with products that provide a new base of capabilities to move towards sustained opportunity gain.

One way of combining the various criteria could be to consider first the product categories which show a potential for improving competencies and provide a basis for dynamic export opportunities through diversification. These would be the product categories with a positive opportunity gain. We could specify some threshold level, say opportunity gain of 0.75 or more, to identify the relevant list of products (see Annex Table 1 and Annex Table 4). We discuss below the results based on this threshold level.

Annex Table 1 shows the list of SITC product categories organized in terms of opportunity gain of 0.75 or more. There are 167 SITC categories above this specified threshold of opportunity gain.[42] Within this list, we could identify those products which are easier to produce. This could be seen by ranking these products according to distance (smaller to larger). Lower the value of distance, or higher the value of density, easier it would be to produce the two linked products because similar capabilities are likely to be required to produce the two products. Another criterion could be to consider products for which India has relatively greater global competitiveness. This would be shown by the estimate of RCA.

Annex Table 2 ranks these 167 SITC products according to distance, with a higher ranking of products with lower distance. Annex Table 3 ranks the SITC products according to RCA. It is interesting to note that each product in the category with opportunity gain of 0.75 or more for India, is a product with RCA less than one, i.e. none of these products is at present relatively competitive in world trade. Therefore, a specific focus on improving competitiveness for these sectors is needed by addressing operational constraints in both the domestic and export markets.

6.A
Identifying the more important SITC categories

Based on the information provided by SITC four-digit categories, we can identify more aggregated categories at SITC two-digit in terms of those with a relatively larger number of products at four-digit level identified for specific emphasis based on the criteria discussed above. There are six product categories at SITC two-digit level, which together account for 87 out of the 167 SITC four-digit categories in Annex Table 1. The relatively larger coverage of these two-digit categories suggests that amongst the product categories from the more detailed list in Annex Table 1, these 27 aggregated categories could be emphasised in the context of promoting greater diversification of Indian exports. They cover machinery, plastics, or metals, and they include several residual items in the category of manufactures. The capabilities and operational conditions within these categories could be improved through generic policies and policies specific to the selected sectors.

[42] *These can be aggregated into 27 SITC 2-Digit categories.*

Table 2. Main SITC 2-Digit Categories That Could Provide a Focus to Diversifying Exports

SITC 2-Digit Category	4-digit SITC Categories Covered	Product Name
74	21	General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.
72	17	Machinery specialised for particular industries
77	15	Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)
58	13	Plastics in non-primary forms
89	11	Miscellaneous manufactured articles, n.e.s.
69	10	Manufactures of metals, n.e.s.

6.B
Identifying the more important HS categories

Similar to the methodology used to identify the important SITC categories, we could examine the major HS two-digit categories which are predominant amongst the list of items with opportunity gain of 0.75 or more. Annex Table 4 shows that there are 264 HS4 categories with opportunity gain of 0.75 or above. Table 3 below shows those categories which have at least ten HS4 level products among the list of categories with opportunity gain more than 0.75.[43] Tables 2 and 3 show a major overlap for the products selected according to SITC and HS, i.e. machinery, apparatus, metals and plastics. In addition, the HS categories also show the importance of chemical products, while SITC includes several manufactures not elsewhere specified. Further details of the HS based categories in this group can be seen in Annex Table 4.

[43] *Some HS two-digit categories have relatively small number of HS4 level lines. Those categories may be selected for emphasis based on other criteria which we use here.*

Table 3. Main HS 2-Digit Categories For Diversifying Exports

HS 2-Digit Category	4-digit HS Lines Covered	Product Name
84	56	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof
85	26	Electrical machinery and equipment and parts thereof; sound recorders and reproducers; television image and sound recorders and reproducers, parts and accessories of such articles
90	21	Optical, photographic, cinematographic, measuring, checking, medical or surgical instruments and apparatus; parts and accessories
39	13	Plastics and articles thereof
38	11	Chemical products n.e.s.
72	10	Iron and steel

6.C
Some additional considerations that may be relevant

We consider three additional aspects to further identify the list of exports to be emphasized.

6.C.I Easier to Produce

One important criteria is to identify products which are relatively easier to produce, within the group with Opportunity Gain of at least 0.75. We select products for which distance is relatively lower amongst the category with opportunity gain of at least 0.75. Table 4 below shows the top 25 SITC products under this category. A number of products in Table 4 are already covered by the list in Table 2. Those products which are also in Table 2 are highlighted in Table 4. The estimates for distance for these products is between 0.65 and 0.7 (the corresponding value for density thus ranges between 0.3 to 0.35, since it is one minus distance).

Table 4. Products Ranked By Distance For SITC Categories With Opportunity Gain Above 0.75

SITC Category	Product Name	RCA	PCI	Opportunity Gain	Distance
6975	**Base metal indoors sanitary ware N.E.S.**	**0.868824**	**1.703579**	**0.7767**	**0.658318**
7245	**Weaving, knitting & yarn preparing machines**	**0.460483**	**2.604887**	**0.784725**	**0.660763**
6731	Iron/steel wire rod	0.605026	1.896946	0.831558	0.666144
6993	**Pins and needles**	**0.380047**	**1.973455**	**0.809439**	**0.669462**
7247	**Cleaning & cutting textile machinery N.E.S.**	**0.347005**	**1.741433**	**0.844115**	**0.675102**
6573	Coated textile fabrics N.E.S.	0.656098	2.115209	0.872274	0.67586
6572	Not coated bonded fibre fabrics	0.508809	2.257104	0.940436	0.676192
7722	**Printed circuits & parts N.E.S.**	**0.216545**	**2.125023**	**0.75727**	**0.67866**
7781	**Batteries**	**0.28652**	**1.993142**	**0.767252**	**0.680722**
8939	**Miscellaneous articles of plastic**	**0.479181**	**1.908662**	**0.774519**	**0.681086**
7414	Non-domestic refrigerators & parts N.E.S.	0.32837	2.143868	0.818306	0.683529
7162	AC electric motors & generators	0.829684	2.115379	0.815943	0.683536
6553	Elastic knitted fibres	0.32914	2.160708	0.896846	0.684155
7821	Trucks & vans	0.357558	1.928083	0.83372	0.684544
6996	**Miscellaneous articles of base metal**	**0.788288**	**1.870484**	**0.756645**	**0.684703**
7621	Vehicles radio receivers	0.080885	2.462968	0.88612	0.685661
8932	**Plastic sanitary & toilet articles**	**0.12266**	**1.821822**	**0.776902**	**0.686546**
6991	**Base metal locksmiths wares N.E.S.**	**0.478789**	**2.034568**	**0.848942**	**0.686703**
6631	Polishing stones	0.741843	2.960159	1.030515	0.687809
7252	**Paper making machines**	**0.747421**	**2.798532**	**0.9936**	**0.689132**
6997	**Articles of iron or steel N.E.S.**	**0.81512**	**2.274937**	**0.835828**	**0.689288**
7911	Electric trains	0.000131	2.808641	0.949309	0.689301
6253	Tires & pneumatic for aircraft	0.352884	2.089175	0.762793	0.689537
7913	Mechanically propelled railway	0.009361	3.529621	1.091947	0.689985
7782	**Incandescent & fluorescent bulbs**	**0.465934**	**2.605118**	**0.90773**	**0.690402**

Notes: (1) The highlighted products in this Table are those which are also covered by the products given in Table 2 above. (2) Density is one minus distance. Since the ranking according to distance is from shorter distance to higher distance, the ranking is the same as for density.

6.C.II Building further insights with Distance or Density as an indicator of potential diversification

For the group of products with high opportunity gain, the importance of distance emerges *inter alia* from the insights provided by Dany Bahar, et. al (2017).[44] This recent paper examines the significance of supply and demand side factors that support diversification of exports. The most important supply side factors are found to be technology and diffusion of knowledge across industries. The authors find that a "one standard deviation of higher technology linkages makes the emergence of a new product up to three times more likely and is associated with a subsequent annual export growth of 14.8 extra percentage points over the next decade." (page 5) This suggests the significance of higher capabilities reflected in higher opportunity gain.

Another important result of this paper is that while workforce similarity across industries leads to growth of the relevant industry, this factor is significant only after an export sector is already established. For developing countries such as India, it is consumer demand in competitive industries that would be important for providing incentives for emergence of new industries that are linked via customer demand.[45] The study thus finds that spillovers through backward linkages are an important stimulus for emergence of new industries. The conceptual link with policies that support the creation of supply chain capabilities becomes obvious in such a situation. This suggests to some extent the importance of focusing on products with greater "density" or smaller "distance".

The estimate of density is a surrogate for existing export sectors that have the potential to diversify with greater ease. Annex Table 5 provides a list for HS4 categories with density of above 0.41.[46] We see that all the products in Annex Table 5 have an opportunity gain of zero. Thus, to the extent we wish to go into production of complex products, there is another concept in the product space realm which captures complexity, namely the "Product Complexity Index". Table 5 below identifies for the products in Annex Table 5, those items which have a positive product complexity index. Based on product space analysis, we see a basis for diversified complex products linked to these HS4 categories in Table 5 being more likely to emerge.

[44] *Op. cit. See, https://growthlab.cid.harvard.edu/files/growthlab/files/clusters_cidrfwp_86.pdf*

[45] *They find that one standard deviation of higher downstream relatedness increases the likelihood of emergence of a new export by around 2.5 times; almost as strong as technology. Op. cit., page 5.*

[46] *This threshold is chosen so that the products in this list are with a density substantially above that for those with opportunity gain of 0.75 or above.*

Table 5. Products With Both High Density (Shown in Annex Table 5), And Positive Product Complexity Index

HS4 Category	Product Name	RCA	PCI	Density
2932	Tetrahydrofuran	1.72399	3.345252	0.4522
2934	Heterocyclic compounds with an unfused thiazole ring	1.19079	3.100392	0.517177
2923	Choline, salts	2.77164	2.088766	0.419948
6906	Ceramic pipes, conduits, guttering and fittings	2.05821	0.872403	0.412924
9203	Harmoniums, pipe organs, etc	6.39884	0.82684	0.561547
2941	Penicillins, derivatives, in bulk, salts	24.677	0.5781	0.446136
7322	Radiators and parts thereof, cast iron	2.83161	0.513967	0.424821
2817	Zinc oxide and peroxide	1.73667	0.476886	0.413226
5503	Staple fibres of nylon, polyamides, not carded, combed	6.11444	0.217703	0.419491
8214	Paper knives, letter openers, pencil sharpeners etc	1.19803	0.022072	0.428057

6.C.III Products with relatively high untapped export potential

We now consider some recent results of the work of the International Trade Center in Geneva, which has identified for 64 countries, products which have a high export potential. According to them: "Export potential assessments are a quantitative approach to identify promising export sectors and markets on a global scale, based on trade and market access data. ... EPI is derived from a decomposition of trade into supply and demand shares and allows estimating potential export values ... [It] is based on a structural model that (i) identifies potential shares of products from supply and demand capacities and (ii) converts them into potential values using a projection of bilateral exports. Any gap between what countries could export and what they actually do export results from factors that trade advisers can possibly address together with local companies, such as lacking information about the rules and regulations of the target market or difficulties in complying with them or in meeting the (quality) preferences of its consumers. The indicated (unused) potentials point to short-term opportunities to increase exports."[47]

[47] *See pages 2 and 3, International Trade Center (ITC), 2015, "Spotting Products With Export Potential - An ITC Assessment to Support Promotion Activities in 64 Developing Countries", ITC Geneva. http://www.intracen.org/uploadedFiles/intracenorg/CBIpolicyreport.pdf*

These products have been identified in terms of HS categories. Though the information is somewhat dated, the list of products with export potential does provide an additional basis to consider export opportunities that could be encouraged for India. Table 6 shows 25 such items identified by ITC, Geneva.[48] The highlighted items in Table 6 show those which are also in the list of products with opportunity gain of 0.75 or more (i.e. they are in Annex Table 4). All these products are therefore doubly important because they will contribute to significant additional exports and lead to building domestic capacity for dynamic advantage.

Table 6. Untapped Export Potential Identified By ITC, Geneva

HS Code	Description	Untapped export potential ($ mn)
710239	Diamonds, worked, but not mounted or set (excluding industrial diamonds)	18,965
711319	Articles of jewellery and parts thereof, of precious metal other than silver, whether or not plated or clad with precious metal (excluding articles > 100 years old)	12,502
100630	Semi-milled or wholly milled rice, whether or not polished or glazed	5,191
30XXXX	**Pharmaceutical products, except lubricants and ostomy appliances**	**4,106**
870322	**Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm³ but <= 1.500 cm³ (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)**	**2,554**
740311	Copper, refined, in the form of cathodes and sections of cathodes	2,530
230400	Oilcake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of soya-bean oil	1,936
0306Xb	Shrimps and prawns, frozen	1,682
520100	Cotton, neither carded nor combed	1,681
8708XX	**Miscellaneous parts and accessories, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles**	**1,674**
020230	Frozen, boneless meat of bovine animals	1,527
871120	Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 50 cm³ but <= 250 cm³	1,518
711311	Articles of jewellery and parts thereof, of silver, whether or not plated or clad with other precious metal (excluding articles > 100 years old)	1,505
610910	T-shirts, singlets and other vests of cotton, knitted or crocheted	1,301

[48] *This is an updated product list provided by ITC, Geneva. The previous list can be seen on pages on the country page for India in "Complementary Material I: Country Fact Sheets. Spotting Products With Export Potential", at http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/Countryfactsheets.pdf*

870323	**Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal ombustion reciprocating piston engine of a cylinder capacity > 1.500 cm³ but <= 3.000 cm³ (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)**	1,241
870321	**Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity <= 1.000 cm³ (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)**	958
3808	Insecticides, rodenticides, fungicides, herbicides, anti-sprouting products and plant-growth regulators, disinfectants and similar products, put up for retail sale or as preparations or articles, e.g. sulphur-treated bands, wicks and candles, and fly-papers	953
170199	Cane or beet sugar and chemically pure sucrose, in solid form (excluding cane and beet sugar containing added flavouring or colouring and raw sugar)	930
390210	Polypropylene, in primary forms	923
100590	Maize (excluding seed for sowing)	863
721049	Flat-rolled products of iron or non-alloy steel, of a width of >= 600 mm, hot-rolled or cold-rolled "cold-reduced", not corrugated, plated or coated with zinc (excluding electrolytically plated or coated with zinc)	805
6403XX	Footwear with outer soles of rubber, plastics or composition leather, with uppers of leather (excluding incorporating a protective metal toecap, sports footwear, orthopaedic footwear and toy footwear)	780
130232	Mucilages and thickeners, derived from locust beans, locust bean seeds or guar seeds, whether or not modified	748
730511	Line pipe of a kind used for oil or gas pipelines, having circular cross-sections and an external diameter of > 406,4 mm, of iron or steel, longitudinally submerged arc welded	730
870190	Tractors (excluding those of heading 8709, pedestrian-controlled tractors, road tractors for semi-trailers and track-laying tractors)	720

Notes: The highlighted products in this Table are those with opportunity gain above 0.75.

ITC's work also identifies exports based on certain other criteria as well, such as stability of export earning, sectors which are relatively important for small and medium enterprises (SMEs), and those in which women are more likely to be employed.

Creating job opportunities is an important policy objective. In this context, sectors significant for SMEs amongst the HS categories in Table 6 are, diamonds (710239), jewellery (711311 and 7113119), rice (100630), oilcake etc. (230400), frozen shrimps and prawns (0306), frozen boneless meat of bovine animals (020230), motorcycles etc. (871120), cane and beet sugar (170199), and tractors (870190). Most of these categories are agricultural items. We consider below the potential for various agriculture products as a whole.

6.C.IV Exports of agriculture

We now consider the HS categories which are classified as agriculture,[49] beginning with the top 25 products of agriculture in terms of Opportunity Gain (Table 7). Most of these products have relatively low export levels. If we combine with this list the products with a significant export level, say above $100 million,[50] we see that there is only one category with exports above $100 million (HS 1806, or cocoa powder, sweetened) in Table 7. Lowering this threshold to $10 million in 2016-17 and considering only those with opportunity gain of at least 0.75, we have only two product categories that qualify, Dextrins and other modified starches (3505), and casein (3501).[51]

A noteworthy feature is that products in Table 7 are those with a relatively low RCA. For example, if we consider RCA of 0.8 as the threshold level, none of the products meet this criterion. Likewise, these products have very low estimates for density (or high distance). This means that selecting agriculture export items based on opportunity gain is likely to give us a small number of additional potential export products for policy focus. We therefore need to consider additional criteria for agricultural products, e.g. high level of exports. More detailed analysis taking account of various criteria emphasized in this paper is conducted in Section 9 to identify the agriculture product categories that would qualify for policy focus.

Table 7. Agriculture HS Categories Ranked By Opportunity Gain – Top 25 Categories

HS	Product Name	RCA	Opportunity Gain	Density	Exports 2016-17 $ million
3809	Finishing agents & dye carriers, amylaceous	0.644793	1.189544	0.261001	47.92 (*)
3505	Dextrins and other modified starches	0.348768	0.956358	0.275747	35.08
1501	Lard, other pig fat and poultry fat, rendered	0	0.846078	0.267791	0
1105	Potato flour or meal	0.430034	0.838322	0.267103	4.43
1506	Animal fats, oils, fractions not chemically modified n.e.s	0.407642	0.820709	0.264482	0
3504	Peptones, proteins and derivatives, n.e.s, hide powder	0.598486	0.802605	0.270603	6.59
0203	Swine carcasses and half carcasses, fresh or chilled	0.000714	0.799409	0.264999	0.03
1002	Rye	0.009424	0.776372	0.239711	0

[49] *We include in this the WTO definition of agriculture and fish. Annex 1 of WTO's Agreement of Agriculture defines the coverage of agriculture as HS chapters 01 to 24 (less fish and fish products), plus 290543, 290544, 3301, 3501 to 3505, 380910, 382360, 4101 to 4103, 4301, 5001 to 5003, 5101 to 5103, 5201 to 5203, 5301 and 5302.*

[50] *See Annex Table 6.*

[51] *As explained in the note to Table 7, the agriculture category under HS 3809 is a six-digit one, i.e. 380910. The exports under this category were very small in 2016-17.*

3501	Casein	0.576649	0.775798	0.261389	35.36
0209	Pig and poultry fat, unrendered	0.000475	0.747163	0.27292	0
0404	Whey	0.009013	0.738615	0.259391	0.13
1210	Hop cones, not ground, powdered or pelleted	0.011499	0.646088	0.260876	0.01
0210	Hams and shoulders, swine, salted, dried or smoked	0.002242	0.628566	0.291759	0
1109	Wheat gluten	0.000862	0.610999	0.260032	0.02
1503	Lard stearin, oleostearin & oils, natural tallow oil	0	0.597896	0.275877	0
3503	Gelatin & derivatives, isinglass, glues (animal) n.e.s	0.115079	0.581004	0.272982	41.45
0101	Horses, live pure-bred breeding	0.011973	0.577162	0.264854	0.69
0505	Feathers and down used for stuffing	0.002972	0.56832	0.296039	0.04
2206	Fermented beverages n.e.s (eg cider, perry, mead, etc)	0.006533	0.561156	0.27064	0.1
1514	Canola, rape, colza or mustard oil, crude	0.040268	0.551656	0.260457	5.08
1806	Cocoa powder, sweetened	0.283873	0.536795	0.276675	106.68
1518	Processed animal, vegetable oils, industrial preps n.e.s	0.46184	0.533318	0.276373	28.26
1601	Sausages, similar products of meat, meat offal & blood	0.003954	0.5264	0.275963	0.6
2003	Mushrooms, prepared or preserved, not in vinegar	0.389768	0.512213	0.286777	7.71
2303	Residues of starch manufacture and similar residues	0.058947	0.509731	0.276405	4.07

Notes: (1) (*) means that more detailed consideration of information is required, because while the Table above is given in terms of HS4 categories, certain categories are defined at the six-digit level by WTO for inclusion into agriculture. These are 290543, 290544, 380910 and 382360. HS 380910 had very low exports in 2016-17. (2) HS 290544 had exports of $30.35 million in 2016-17. HS 290543 and 382360 had very low exports. These three categories are not in the Table above because their opportunity gain is very low.

Source for Exports: Department of Commerce, Government of India.

7. Identifying Products and Policies Based on Combining More Than One Criteria

Based on different selection criteria or product characteristics, product space analysis can help indicate the policies that may be relevant for various product categories. For example, Figure 11 of Hausmann and Klinger (2009)[52] have shown an interesting way of addressing diversification and expansion of existing products. Their Figure 11 is reproduced in Table 8 below as a matrix, to suggest the areas which may become a focus of industrial policy, and other areas where the Government should let private efforts be the main basis of growth and diversification. Of course, the horizontal policies implemented by the Government (such as infrastructure improvement) would have a positive impact on all areas of production.

The matrix shown in Table 8 classifies products based on two criteria: (1) the ease of upgrading and increasing production within the existing product categories, and (2) the ease of moving to new products. In terms of our analysis till now, the first criterion could be considered as reflecting "density" and the second one indicating "opportunity gain" (see Table 9 below).

[52] *Ricardo Hausmann and Bailey Klinger, 2009, "Policies for Achieving Structural Transformation in the Caribbean", Private Sector Development Discussion Paper #2, No. IDB-DP-163, Inter-American Development Bank, October. https://publications.iadb.org/bitstream/handle/11319/5672/policiesforachievingstructuraltransformationinthecaribbean.pdf?sequence=1*

Table 8. Sectors Characterised By Different Ease Of Moving To New Products or Room To Upgrade Existing Product Structure

	Low Room To Upgrade and Grow In Existing Products ↓	High Room Possible To Upgrade and Grow In Existing Products ↓
High Ease of Moving To New Products →	Box 1 **Stairway to heaven: Parsimonious Industrial Policy** (Help jump short distances to new products)	Box 2 **Let it be: It ain't broke** (Ample space to move in all directions)
Low Ease of Moving To New Products →	Box 3 **Bridge over troubled waters: Strategic bets** (Little space to improve quality and few nearby trees, i.e. sectors)	Box 4 **Hey Jude make it better: Competitiveness policy** (Improve the quality of what already exists)

Note: If we consider the matrix as a chart, the y-axis would represent how easy it will be for the country to grow by moving to new products, and the x-axis represent how easy it will be for the country to grow within existing sectors.
Source: Figure 11 of R. Hausmann and B. Klinger (2009).

The first criterion in Table 8 identifies products for which export growth could relatively easily take place within the existing export products themselves, i.e. domestic producers have the ability and operational conditions to easily expand exports for such products (Box 2 and 4). For these products, considerable success could be achieved by addressing generic constraints faced by exports in general, such as poor infrastructure, high delivery time, or high operational costs including for trade. Thus, in general, products in Box 2 and 4 would not require other sector-specific policy support. The sector-specific efforts to improve quality may however be considered based on an additional consideration, e.g. products which have a high export potential or result in larger employment generation.

The second criterion in Table 8 provides a basis to identify products with a high potential for export diversification (Box 1 and 2). Among these, products in Box 1 would require sector-specific support, but not those in Box 2. Prioritisation amongst these products could be considered by considering additional criteria for emphasis, such as large exports potential. Box 3 in Table 8 shows products which have low potential for moving to new products and low possibility of growth or upgradation. Among such products, product-specific attention should be given only to those items which are important strategic products, and a sector-specific strategy should be considered for them.

Similar to the combination of two different criteria in Table 8, we could combine Opportunity Gain and Density (or Distance) to identify the products and policies that would be relevant determining the potential for export diversification. This is shown in Table 9.

Table 9. Combination Of Ease Of Moving To New Products or Room To Gain The Opportunity Of Developing New Capabilities and Products

	Low Potential For Opportunity Gain ↓	**High Potential For Opportunity Gain**
High Ease of Moving To New Products →	Box 1 **Producers Easily Move To New Products But Not Those With High Cumulative Gain** (Policy makers need to identify priority areas for diversification)	Box 2 **Possible for Producers To Themselves Sustain Cumulative Move To New Products** (Mainly Horizontal or "Soft" Policies)
Low Ease of Moving To New Products →	Box 3 **Identify Some Strategic Sectors for Support** (Choose criteria to identify strategic sectors, e.g. addressing key domestic constraint)	Box 4 **Larger Group For Identifying Strategic Products** (Give greater attention to sector-specific support for more complex products)

Notes: (1) A corresponding graph with similar information as this Table would have on the y-axis, the range of "density" or the one minus the "distance" for products. The x-axis would represent how much "opportunity gain would be possible by focusing on any specific product. (2) Horizontal or competitiveness-enhancing policies will have a positive impact on all the sectors above.
Source: Based on Figure 11 of Ricardo Hausmann and Bailey Klinger, 2009, op. cit.

Table 9 shows that a particular focus on sector-specific support would be needed for products in Box 1 or 4, and to a limited extent for products in Box 3. Based on this Table, if we consider the products in various Tables mentioned till now, we see the following:

- Agricultural products in Table 6 are in Box 3 or 4.

- In Annex Table 6 for agriculture, most products are in Box 3. A few products are in Box 4, namely HS4 categories 0303 (fish), 1806 (cocoa sweetened, including in chocolate), 3502 (albumen), and 3505 (Dextrins). These are the products for policy emphasis to support capabilities that will potentially sustain export diversification.

- Tables 2, 3 and 4 have products that have opportunity gain of at least 0.75. Their density is low. Therefore, these products are Box 4 of Table 9, i.e. low density and high opportunity gain (see also, Annex Table 2).

- As far as untapped exports identified in Table 6 are concerned, most of the products are in Box 3 of Table 9. A number of them, however, are in Box 4, i.e. soya-bean oil-cake and other solid residues (2304), glands and other organs, dried, for therapeutic uses (3001), and snowmobiles, golf cars, similar vehicles (8703).

- A very important aspect of working with strategic set of products is that their operational conditions and competitiveness need to be improved by addressing both policy obstacles or other operational constraints in the domestic markets, and also constraints faced by them in the markets abroad. We address the latter issues in the following section.

The criteria for determining strategic products could be high threshold levels for opportunity gain, high RCA, high density, or products address key domestic strategic constraint. We could also focus on products with relatively high opportunity gain which are close to becoming globally competitive. This group of products could be identified by considering criteria such as products with RCA between 0.8 to one. The Annex Tables in this paper provide a basis for selecting the products based on most such criteria.

8. Identifying Potential Exports To Specific Foreign Markets To Improve Their Access By Addressing Constraints Faced By Them Abroad

There are a number of ways to determine the products for export potential.[53] We adopt here a simple method similar in its thrust as the concept of revealed comparative advantage. We take as an example India's exports to South Korea and calculate two types of ratios relating to HS4 level product categories.[54] One, the share of India's exports of the HS4 product to the global exports of that product category (S1). Second, the share of Korea's imports from India for that HS4 category in the total imports of that product by Korea (S2). We then take the list of products for which S1 is greater than S2 and identify the products with high value of S1 minus S2 for policy focus. Tables 10 and 11 show this estimate as an indicator of India's export potential for Korea.

Table 10 provides the top 25 product categories in terms of share S1 minus S2. The table also highlights those products for which India's global exports are at least $100 million. Thus, a significant global export base already exists for these products which also have a potential for exports to Korea. Moreover, by design, these products are with high opportunity gain potential, since they are from the product group with opportunity gain at least 0.75. It is also interesting to note that all these highlighted product categories have an RCA of slightly less than one: Four of them (3918, 4016, 7616 and 8502) have RCAs between 0.84 to 0.93; Two of them (3215 and 8407) have RCA of about 0.74. Thus, with some effort, these products could improve their competitiveness and market opportunities to have RCA of more than one.

[53] *For more detailed methods, see for example, Sunitha Raju, V. Revendra Saradhi, Natasha Agarwal, R. Rijesh and Arundhati Chaudhari, 2014, "Managing India's Trade Deficit With Large Trading Partners", IIFT, New Delhi (project for DFID and IPE Global); and, Ram Upendra Das, 2015, "India's Strategy for Economic Integration With CLMV ", Department of Commerce, Government of India.*

[54] *We want to thank Manpreet Singh for helping us with data for this exercise.*

Since we are trying to improve market access for selected Indian exports abroad in a specific market, once the products are identified we should examine the tariff and non-tariff measures affecting these products in the relevant market. To the extent that the tariff is not high, specific attention needs to be given to address non-tariff barriers that may be adversely affecting Indian exports to the relevant market. For this purpose, a bilateral dialogue would need to be initiated with the other country (in this case, Korea), a process which could be made more permanent to address bilateral trade related concerns.[55]

Table 10. HS4 Products For Which Share Of India In Global Exports Exceeds India's Share In Korea's Imports – Top 25 Categories

HS4 Code	Product Name	Opportunity Gain	Difference In India's World Export Share minus Korea's Import Share (S1-S2)	India's Total Exports 2016-17, $ mn
3918	**Floor, wall, ceiling cover, roll, tile, vinyl chlorid**	**0.762709**	**1.572699**	**115.77**
3801	Artificial graphite	0.991626	1.566851	23.89
7616	**Aluminium nails, tacks, staples, bolts, nuts etc,**	**0.823171**	**1.49997**	**326.63**
2929	Isocyanates	1.172646	1.486453	71.26
8417	Furnaces/ovens non-electric for ores/pyrites/metals	0.807787	1.470646	64.83
3006	**Suture materials, sterile surgical and dental goods**	**0.913658**	**1.431032**	**190.49**
7613	Aluminium containers for compressed or liquefied gas	0.80611	1.395081	5.48
8713	Wheelchairs not mechanically propelled	0.771398	1.37987	19.67
8538	Electrical boards, panels, etc., not equipped	1.032148	1.335863	506.6
4016	**Articles of cellular rubber**	**0.918341**	**1.315347**	**361.99**
8502	**Generating sets, diesel, output < 75 kVA**	**0.970263**	**1.299739**	**310.04**
8454	Converters used in metallurgy or metal foundries	1.094777	1.281603	33.08
7212	Flat rolled iron or non-alloy steel, width <600mm, plated with tin	0.93564	1.273068	51.12
3819	Hydraulic brake, transmission fluid <70% petroleum oils	0.750004	1.244314	9.07
6815	Non-electrical articles of graphite or other carbon	1.118984	1.216827	88.95
2816	Magnesium hydroxide and peroxide	0.984336	1.204707	2.17
8407	**Aircraft engines, spark-ignition**	**0.959683**	**1.197777**	**595.92**
9015	Rangefinders	0.831539	1.18999	75.22

[55] *For further detail on this point, see Harsha Vardhana Singh, 2017, "TPP and India. Learning for Future Gains", Brookings India Working Paper, Number 03/2017, June.*

3215	**Printing ink, black**	**0.902153**	**1.187597**	**151.74**
8440	Book-binding machinery including book-sewing machines	1.02681	1.182766	11.91
3812	Prepared rubber accelerators	1.020266	1.167933	79.43
2919	Phosphoric esters, their salts and derivatives	0.81526	1.131686	9.23
3505	Dextrins and other modified starches	0.802605	1.120753	35.08
3502	Egg albumin	0.775798	1.109088	13.12
7226	Flat rolled silicon-electrical steel, <600mm wide	1.076598	1.086877	35.38

Note: The products highlighted in this Table are those for which exports in 2016-17 were at least $100 million.

To the extent that the policy emphasis is on improving domestic capacity for producing complex products, we need to rank the products with a positive estimate for S1 minus S2, according to opportunity gain (see Table 11). However, some of the products with high opportunity gain have very low estimates for S1 minus S2, even 0.01. For strategic purposes, it would be useful to determine a minimum threshold for S1 minus S2, for instance, above 0.63. Products that meet this minimum threshold are highlighted in Table 11 below.

Table 11. HS4 Products For Which Share Of India In Global Exports Exceeds India's Share In Korea's Imports – Top 25 Categories According To Opportunity Gain

HS4 Code	Product Name	Opportunity Gain	Difference In India's World Export Share minus Korea's Import Share	Exports 2016-17, $ mn
8514	**Industrial electric resistance heated furnaces & oven**	**1.320036**	**0.911029**	**73.41**
8515	Electric soldering irons and guns	1.279088	0.273634	38.66
8479	**Machines for public works, building etc, n.e.s**	**1.27027**	**0.63929**	**599.56**
9027	Gas/smoke analysis apparatus	1.242274	0.251475	110.45
9026	**Equipment to measure or check liquid flow or level**	**1.23675**	**0.66826**	**142.96**
9017	Drafting tables and machines	1.236509	0.490997	15.26
8475	**Machines to assemble electric lamps, glass envelope**	**1.235831**	**0.853305**	**35.06**
3403	Lubricant <70% petroleum oil, textile or leather use	1.228986	0.194484	30.03
3908	Polyamide-6, -11, -12, -6,6, -6,9, -6,10 or -6,12	1.21392	0.297987	43.97
7318	**Screws, coach, iron or steel**	**1.211553**	**0.796003**	**451.1**
8427	Self-propelled works trucks, electric motor	1.211307	0.073876	9.95
8413	**Pumps dispensing fuel, lubricants in filling stations**	**1.208816**	**0.98161**	**751.25**
3906	Polymethyl methacrylate, in primary forms	1.206256	0.446974	71.47
8484	**Gaskets of metal sheeting, including sandwich type**	**1.196642**	**0.900149**	**72.01**
9209	Metronomes, tuning forks and pitch pipes	1.192716	0.194827	7.15

3705	Photo plates and film, exposed & developed, for offset	1.19201	0.010434	0.07
8207	Rock drilling, boring heads of sintered metal, carbide	1.191776	0.274095	226.6
8466	Tool holders, self-opening dieheads, for machine tool	1.190042	0.371368	154.85
3810	**Metal pickling preps, solder and brazing flux, etc.**	**1.189544**	**1.009363**	**14.7**
3815	Supported catalysts, nickel based	1.187659	0.471964	130.92
8209	**Tool plates/tips/etc, sintered metal carbide & cermet**	**1.18753**	**0.781146**	**49.79**
7507	Tubes and pipe, nickel, not alloyed	1.181311	0.186634	2.5
3910	**Silicones in primary forms**	**1.180218**	**0.873159**	**55.99**
8481	Valves, pressure reducing	1.17957	0.200752	1,112.19
2929	**Isocyanates**	**1.172646**	**1.486453**	**71.26**

Note: The highlighted products in this Table are those with S1 minus S2 more than 0.63.

The products in Table 12 below are selected based on a combination of two criteria. One, the product is among the top 25 products in terms of opportunity gain for categories with a positive S1 minus S2. The second criterion is that the product should have a minimum threshold value of more than 0.63 for S1 minus S2.

We could apply yet another criterion to short-list the products in Table 12, for example select products with an RCA of above 0.63. This gives an indication that the exported product from India has some presence in world market but needs support to improve its competitiveness for a larger export share. The products highlighted in Table 12 are those with an RCA above 0.63.

Table 12. Products With Both High Opportunity Gain, and Estimate of S1 Minus S2 More Than 0.63

HS4 Code	Product Name	Opportunity Gain	RCA	Density
2929	**Isocyanates**	**1.17265**	**0.914**	**0.240212**
3810	**Metal pickling preps, solder and brazing flux, etc.**	**1.18954**	**0.644**	**0.261001**
3910	Silicones in primary forms	1.18022	0.493	0.250839
7318	**Screws, coach, iron or steel**	**1.21155**	**0.848**	**0.272794**
8209	Tool plates/tips/etc, sintered metal carbide & cermet	1.18753	0.567	0.245335
8413	**Pumps dispensing fuel, lubricants in filling stations**	**1.20882**	**0.733**	**0.256996**
8475	**Machines to assemble electric lamps, glass envelope**	**1.23583**	**0.641**	**0.245208**
8479	Machines for public works, building etc, n.e.s.	1.27027	0.389	0.253133
8484	**Gaskets of metal sheeting, including sandwich type**	**1.19664**	**0.841**	**0.26436**
8514	**Industrial electric resistance heated furnaces & oven**	**1.32004**	**0.844**	**0.246535**
9026	Equipment to measure or check liquid flow or level	1.23675	0.407	0.248798

Note: The products highlighted in this Table are those with RCA of more than 0.63.

If we consider the categories in 12 in terms of the HS2 level, we see that all the products mentioned in Table 12 are covered by Table 5.[56] In the next section, we will identify certain products at HS two-digit level as sectors which too could be major thrust areas for export diversification. Our analysis will cover all the products identified in Tables 3, 5, 6 and 12 above.

Table 6 provides us with a list of products with high untapped export potential, at HS 4 or HS6 digit levels. One category is specified only at the two-digit level, i.e. HS category 30, or "pharmaceutical products". Another relevant aspect of that Table is that one particular two-digit category, HS 87 ("vehicles; other than railway or tramway rolling stock, and parts thereof") has the largest number of its sub-categories occurring in Table 6. We can see that the list of products identified by Rajat Kathuria et. al. and Rahul Anand et. al overlaps with those which we have identified till now. Section 9 below will examine in further detail the products selected by these two studies, in the process of identifying the main product categories suggested in this paper for policy emphasis.

[56] *The categories relevant in this context are: organic chemicals (HS 29), chemicals not elsewhere classified (HS 38), plastics and articles thereof (HS 39), iron and steel articles (HS 73), tools, implements, cutlery, spoons and forks, of base metal, and parts thereof (HS 82), nuclear reactors, boilers, machinery, mechanical appliances, and parts (HS 84), electrical machinery, equipment, etc. (HS 85), and Optical, photographic, cinematographic, measuring, checking etc. instruments and parts (HS 90).*

9. Identifying Strategic Products For Encouraging Export Value and Diversification

This paper has considered a range of different criteria that could be emphasised by the policy maker to develop dynamic export capabilities in India. Recalling the criteria for short-listing products for policy emphasis, we have products:

- With high potential for improving domestic production of diverse and complex products (i.e., high opportunity gain),
- Easy to produce given existing abilities (high density associated with the product),
- With high export potential (greater access to specific export markets and large existing export level),
- Which with some support could become substantively competitive in global markets (i.e., products with RCA between 0.8 and 1),
- Relevant for getting access to selected foreign markets, and
- Likely to lead to relatively higher employment impact.

From the discussion above, we have a basis to identify a more aggregated level of product categories (at HS2 level) for a sectoral-level focus of policy, as well as a more disaggregated product list (at HS4 level) for more sub-sector level emphasis. The first category would be subject to both "horizontal or system oriented" policy at the sector level as well as policies which are focused on more disaggregated product categories. The horizontal policies would include those which improve operational efficiency in general. The policy support would include many of the initiatives implemented in the context of the Indian government's "Ease of Doing Business" initiative. More sub-sector-specific policies would be required as we consider dis-aggregated categories of products for support or facilitation.[57] To help keep in mind the different focus of horizontal and other policies, the situation is summarised in Table 13.

[57] *An interesting implication of the process of diversification and products linked through opportunity gain is that the coverage of "horizontal sector- specific" policies will expand as linkages between different product groups develop with improvement in capabilities and augmentation of markets*

Table 13. The Impact of Horizontal and Sub-Sector-Specific Policies

	Horizontal Systemic Policies	Horizontal Sector-Specific Policies	Sub-Sector-Specific Policies
General Impact	Yes	No/Maybe	No
Impact Across The Sector With Possible Significant Spill-over To Related Sectors	Yes	Yes	Possible, But Limited
Impact Within The Sector	Yes	Yes	Yes

For identifying the coverage of sector-level horizontal policies, it would be useful to begin at the aggregated level of product categories. The initial basis for such an exercise was provided in Tables 2 and 3 of this paper, which show some aggregated categories derived from HS4 categories with relatively high opportunity gain. Those product categories at two-digit level are reproduced in Table 14 below.

Table 14. SITC and HS Categories at Two-Digit Level Shown in Tables 2 and 3 Above

SITC Category	Product Name	HS2 Category	Product Name
58	Plastics in non-primary forms	38	Chemical products n.e.s.
69	Manufactures of metals, n.e.s.	39	Plastics and articles thereof
72	Machinery specialised for particular industries	72	Iron and steel
74	General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.	84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof
77	Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)	85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers; television image and sound recorders and reproducers, parts and accessories of such articles
89	Miscellaneous manufactured articles, n.e.s.	90	Optical, photographic, cinematographic, measuring, checking, medical or surgical instruments and apparatus; parts and accessories

9.A
Opportunity Gain as a starting point for selecting products

Products in Table 14 have been selected from a group of HS4 categories with opportunity gain above 0.75. We now consider for HS2 categories in Table 14 and identify products at HS4 level within those categories, based on the relevant thresholds determined for the various above-mentioned criteria (see Table 15).[58]

It is evident from Table 15 that machinery products, both electrical and non-electrical machinery are very important sectors to emphasise. In addition, the other HS2-digit categories shown in Table 15 are also very important, with several HS4-digit products in each category. Significantly, a number of them meet more than one criteria for selection in the list of products that would merit a special focus. They are 3902 (Polypropylene in primary forms), 3918 (Floor, wall, ceiling cover, roll, tile, vinyl chloride), 8413 (Pumps dispensing fuel, lubricants in filling stations), 8502 (Generating sets, diesel, output < 75 kVA), 8538 (Electrical boards, panels, etc., not equipped), and 9026 (Equipment to measure or check liquid flow or level).

Criteria such as opportunity gain, density, or based on a relatively high RCA are linked to the supply side conditions for a product. Alternatively, some others, such as untapped export opportunities, the possibility of exports to selected markets (e.g., South Korea), or "exports above $100 million in 2016-17" suggest that demand is potentially available if policy support leads to an increase either in competitive supply, or to address non-tariff measures faced by our exports in foreign markets.

We now identify combinations of supply and demand-side indicators of export potential. Taking the important HS two-digit level categories identified in Table 14 as a starting point, we identify their HS 4-digit level components that meet at least two of the criteria used in this paper for short-listing export products for emphasis (Table 15). The threshold levels used for the criteria are specified in Table 15, except for "high export potential". Products with high export potential are those identified in the discussion on creating India's export opportunities in the Korean market (Section 8 above). While most of the combinations below relate to both

[58] *If we consider the top 25 HS4 categories in terms of opportunity gain, the two-digit categories shown in Table 15 cover most of them. The exceptions are 3402 (anionic surface-active agents), 3704 (photographic plate, film, paper, exposed, undeveloped), 7317 (Nails/staples/etc., iron/steel, not office stationary), 8206 (sets of hand tools, retail), 8208 (blades for metal working machines), and 9208 (musical boxes).*

demand and supply, some HS4 level products are identified also if they meet more than on demand or supply side criteria. The HS4 product categories identified below can be given more specific emphasis as an overall focus through sectoral policy support to products at HS2 level.

Table 15. HS4 Digit Products Covered by the Aggregated HS Categories in Table 14, Selected On The Basis of Various Selection Characteristics

High Export Potential, and Exports Above $100 million (2016-17), and	
RCA between 0.8 and 1	HS4 categories 3902, 8502, 8538
Top 5 HS4 categories within HS2 level for Opportunity Gain	HS4 categories 3918, 8413, 9026
Exports Above $100 million (2016-17), and	
Top 5 HS4 categories within HS2 level for opportunity gain	3811, 3907, 3909, 7225, 8474, 8482, 8537, 8504 and 8523
Top 5 HS4 categories within HS2 level for density	3901, 3923, 3926, 7201, 7202, 7209, 7220, 8445, 8534, 8543, 8544, 9027 and 9032
RCA between 0.8 and 1	3815, 7223, 8406, 8411, 8421, 8422, 8438, 8479, 8501, 8532, 8536, 8541, 9001 and 9028
High export potential	3808, 721049 and 8407
High Export Potential	
Top 5 HS4 categories within HS2 level for opportunity gain	3910, 8484 and 8514
Top 5 HS4 categories within HS2 level for density	3801 and 3812
RCA between 0.8 and 1	8440
RCA Between 0.8 and 1, and	
Top 5 HS4 categories within HS2 level for opportunity gain	3821, 7211, 7224 and 7228
Top 5 HS4 categories within HS2 level for density	9004

9.B
Combining Untapped Export Potential With Other Criteria

Table 6 above suggests that HS 30 and 87 are two good candidates at the HS two-digit level to be considered as products with export potential. Table 16 shows the HS four-digit categories that meet more than one selection criterion for HS 30 and 87. HS 30 has two four-digit categories which meet four specified criteria,[59] and HS 87 has three such categories which meet three specified criteria.[60]

[59] *Penicillins and streptomycins, derivs, in dosage (3004); and Medical dressings etc. having an adhesive layer (3005)*

[60] *Diesel powered buses (8702); Motor vehicle chassis fitted with engine (8706); and, Miscellaneous parts and accessories, for tractors,motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles (8708)*

Table 16. Closer Look At Certain HS2 Categories With High Untapped Export Potential

Exports Above $100 million (2016-17), Top 5 HS4 categories within HS2 level for opportunity gain, and RCA is between 0.8 and 1, and	
Top 5 HS4 categories within HS2 level for density	HS4 categories 3004 and 3005
Exports Above $100 million (2016-17), and Top 5 HS4 categories within HS2 level for opportunity gain, and	
RCA is between 0.8 and 1	8702, 8706 and 8708
Exports Above $100 million (2016-17), and Top 5 HS4 categories within HS2 level for density, and	
High export potential	3006
Exports Above $100 million (2016-17), and	
Top 5 HS4 categories within HS2 level for density	3002, 3003, 8701 and 8711
Top 5 HS4 categories within HS2 level for opportunity gain	3001
RCA is between 0.8 and 1	8703
Top 5 HS4 categories within HS2 level for opportunity gain, and	
Top 5 HS4 categories within HS2 level for density	8705
RCA is between 0.8 and 1	8715
High export potential, and	
Top 5 HS4 categories within HS2 level for density	8713

Tables 15 and 16 both show that products with high exports in 2016-17 (at least $100 million) are, in general, also amongst the top five products for density within the two-digit HS category. This is to be expected because if a country has high exports of a product then it would have relatively well-developed capabilities in that product, and thus be in a position to more easily move towards closely linked products to diversify its production and exports base. Furthermore, in certain cases, products which should be emphasized for greater exports in certain markets (South Korea in the case of our analysis), are also among the top five products in terms of density within the HS2 category or exports of the product was above $100 million in 2016-17.

9.C
Density as a starting point for selecting products

With regard to density, we see that products with high density (Annex Table 5) have an opportunity gain of zero. This was the reason for identifying products with high density and positive product complexity index (Table 5). We begin our assessment with the products in Table 5 and consider the two-digit HS categories in that Table. More detail at HS4 level is shown in Table 17.

Table 17. Categories Selected on the Basis of High Density and Product Complexity Index

Exports Above $100 million (2016-17), and Top 5 HS4 categories within HS2 level for density, and	
Density of product category above 0.41 (from Annex Table 5)	2923, 2932, 2934, 2941, 5503 and 5515
High export potential	7318
High export potential, and Top 5 HS4 categories within HS2 level for opportunity gain, and	
RCA is between 0.8 and 1	2929
Exports Above $100 million (2016-17), and	
Top 5 HS4 categories within HS2 level for density	6907, 6910, 7302 and 7304
Top 5 HS4 categories within HS2 level for opportunity gain	6908 and 8207
RCA is between 0.8 and 1	5504 and 7326
High export potentia	7305
Top 5 HS4 categories within HS2 level for opportunity gain, and	
RCA is between 0.8 and 1	7317

Thus, for the categories in Table 17, we could consider sequential emphasis based on density, as follows:

- Sectoral emphasis is given to HS 29 (organic chemicals). This category has 35 HS4 categories with RCA above 0.9, 6 HS4 categories with opportunity gain of 0.74 or more, in addition to featuring in two of the combinations considered in Table 17 above.

- An important category in the context of export possibilities is the one based on "high export potential", i.e. 7305 and 7318. The information relevant to this is in Table 6, and that would be taken into account when the final short-list of product categories is considered.

- Among the other categories in Table 17, greater emphasis could be given to HS4 level products meeting a threshold level combining density and exports above $100 million in 2016-17.[61] This would combine ease of moving to a new product with existing high ability to compete in export markets. In fact, this assessment could be carried out at a general level, and not limited to products in Table 17.

In this context, we consider the top 25 products ranked according to density in Annex Table 5 for further analysis. We see that many of these top 25 products have very low exports. A combination of high density and high exports is a useful indicator of potential possibilities in terms of both demand and supply factors. Therefore, we select those HS4 categories from top 25 high density products which also had exports above $100 million in 2016-17.

The relevant HS4 categories are:

- For agriculture: 0204 (Lamb carcasses and half carcasses, fresh or chilled), 0703 (Onions and shallots, fresh or chilled), 0801 (Coconuts, fresh or dried), 0902 (Tea, green (unfermented) in packages < 3 kg), 0904 (Pepper of the genus Piper, whole), 0908 (Nutmeg), 1006 (Rice in the husk (paddy or rough), 5201 (Cotton, not carded or combed).

- For non-agriculture: 2516 (Granite, crude or roughly trimmed), 2923 (Choline, salts), 2932 (Tetrahydrofuran), 2934 (Heterocyclic compounds with an unfused thiazole ring), 2941 (Penicillins, derivatives, in bulk, salts), 5205 (Cotton yarn >85 per cent single uncombed >714 dtex, not retail), 5208 (Plain weave cotton, >85 per cent <100 g/m2, unbleached) 5209 (Plain weave cotton, >85 per cent >200g/m2, unbleached), 5406 (Yarn of synthetic filament not sewing thread, retail), 5503 (Staple fibres of nylon, polyamides, not carded, combe Staple fibres of nylon, polyamides, not carded, combed), 5515 (Woven fabric polyester + viscose rayon, nes), 6104 (Womens, girls suits, of wool or hair, knit), 6110 (Pullovers, cardigans etc of wool or hair, knit), 6207 (Mens, boys underpants or briefs, of cotton, not knit), 6212 (Brassieres and parts thereof), 6301 (Electric blankets of textile material), 6802 (Stone mosaic tiles, artificial coloured chips etc), 7118 (Coin (other than gold coin) not being legal tender), 7202 (Ferro-manganese, >2 per cent carbon).

The final list of our product areas for policy emphasis will also take into account the results from our comparison with the other two recent studies.

[61] *As mentioned earlier, a combination of density and high exports includes an element of potential demand as well as supply.*

9.D
Considering additional products for emphasis identified by other recent studies

We now have a better basis to compare our results with those of the two studies discussed in Section 5 and examine the possibility of expanding the scope of our conclusions.

Comparison with products identified by Rahul Anand, et. al: The categories identified are aircraft, machinery, motor vehicles (passenger and transport), auto parts, rail construction, and heterocyclic compounds.[62] These products are covered by HS2 categories 29, 84, 85, 86, 87 and 88. We have identified for emphasis most of these, except HS 86 and 88, i.e. rail construction and aircraft. Both these sectors have very few HS4 level categories, with only nine for HS 86 and five for HS 88. Thus, by definition these two categories were not considered in preparation of Table 3, which has identified some major HS2 level sectors for emphasis based on at least 10 of their HS4 categories with opportunity gain above 0.75.

India has begun to become more active in the export of aircraft and their parts, and also emphasised rail construction domestically. They are both part of the government's "Make in India" programme.[63] Thus, both these sectors being emphasised in any case. The main issue in our context is to consider the emphasis not only in terms of domestic production, but for promoting the capability of exports from India.

Based on the selection criteria considered above, we identify HS4 products within these two categories that have high opportunity gain (say more than 0.75). These are 8602 (rail locomotives, diesel-electric), 8603 (self-propelled railway cars, external electric power), and 8606 (railway tank cars). It is interesting however that the product complexity index for the HS4 categories in HS 86 and HS 88 is high for all except two categories.[64] In addition, we could take a closer look at export potential as another consideration, especially because the export focus on these two categories is relatively recent.

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[62] *To quote the relevant text, the study states: "Building on emerging products with high income potential (accounting for 40 per cent of total emerging products in India), and developing a strategy to rediscover relative comparative advantage in disappearing products could bolster Indian exports earning and income. Similarly, diversifying into a large number of income enhancing marginal products such as aircraft, machinery, motor vehicles – passenger and transport, auto parts, rail construction, and heterocyclic compounds could enhance the income potential of Indian exports. Furthermore, increasing sophistication and diversification of manufacturing exports would result in productivity and reallocation gains similar to the one witnessed in the services sector."*

[63] *See, http://www.makeinindia.com/sectors*

[64] *The only exceptions are 8601 and 8608, with product complexity index of respectively 0.63 and 0.59. The index for other HS4 categories in HS 86 and 88 ranges between1.5 to 3.54.*

These two sectors have shown evidence of impressive potential for export growth over time. We first take a look at HS88, which has registered a high level of exports.[65] India's exports under HS 88 (aircraft and parts) were $3.3 billion in 2016-17, compared to being only 61million in 2000-01. These exports have been over $1 billion since 2008-09. It is noteworthy that in 2016-17, exports under this category were almost two and a half times the value in 2008-09. However, most of the exports are from HS 8803 (over $2.5 billion in 2016-17), and HS 8802 (nearly $800 million in 2016-17; earlier during this decade, the annual exports under this category were in billions of US dollars). Given the high export levels and the potential for increasing these exports shown predominantly from HS 8802 and HS 8803, we could consider these two as the HS4-level categories that deserve specific policy support for developing dynamic exports from India.

Though export levels for HS 86 are much lower than HS 88, the rise in India's exports under HS 86 has been quite rapid. For instance, from an export value of $10.7 million in 2000-01, Indian exports of HS 86 products increased over 20-fold to $231 million in 2016-17. One of the HS4 categories (8605) had exports of more than $100 million in 2016-17. Within this decade, HS 8606 and 8607 registered higher exports than HS 8605 for several years, with a high of $88 million for 8607 and $34 million for 8606. Given the sharp increase in export value under HS 86, and the potential for a selected number of categories, we will consider HS 8605, 8606 and 8607 for special emphasis.[66]

Comparison with products identified by Rajat Kathuria, et. al: This study has identified major HS4 categories amongst high value products, based on four criteria: density, PRODY, RCA and share in India's total exports. The densities of the selected products ranged from 0.287 to 0.349. In this paper, we considered a much higher threshold for density. Other relevant criteria from our framework would be opportunity gain and RCA between 0.8 and 1.

The highest opportunity gain for the top density products identified by Rajat Kathuria et. al. is 0.38188 for "disodium tetraborate (refined borax) anhydrous", much below the threshold we have worked with. There are two products, however, which have RCA between 0.8 and 1. These are "fertilizer mixes in tablets etc. or in packs <10 kg" and "pre-shave, shaving and after shaving preparations". Both these categories do not qualify on either the density or the

[65] *At two-digit level, HS88 was ranked 19th largest export category for India in 2016-17.*

[66] *Though HS 8606 has had lower exports in comparison to the other two, there is an overlap between HS 8605 and 8606 in terms of the nature of activities. HS 8605 is "Railways/Tramway goods van and wagon, not self-propelled" and HS 8606 is "Parts of railway/tramway locomotives/rolling-stock"*

opportunity-gain threshold that we are using. However, India's exports for "pre-shaving etc." was $185 million in 2016-17, up from $42 million in 2000-01. The corresponding exports for the other category were $37.7 million and $1.98 million. Given this export momentum and potential, we could consider "pre-shave, shaving and after shaving preparations" as qualifying for specific emphasis among HS4 level products.

Regarding the products identified based on PRODY, there is only one HS4 category which meets our criterion of density above 0.41 (i.e., "zinc oxide and peroxide"). This category which is already part of the group identified for emphasis at HS4 level (see e.g., Table 5).

Taking opportunity gain as the relevant criterion, three HS4 categories identified by the study meet the threshold level used in this paper for opportunity gain, i.e. 0.75 or above. These are "hydrides, nitrides, azides, silicides and borides", "rosin and resin acids", and "cameras for preparing printing plates or cylinders". The latter two categories are covered by HS 38 and 90, which have been identified for emphasis at the sectoral level. The first one of these three has very low export levels (between $3 million to $5 million annually). We do not consider this category as relevant for policy action.

The products identified under two other selection criteria used by Rajat Kathuria et. al., i.e. high RCA and export share are to a significant extent covered by those identified by our paper on the basis of high export levels, and untapped export possibilities. The exception is "printing ink, black" for RCA. It does not meet any selection criterion, except that its exports have been above $100 million most of this decade, i.e. above the export threshold we have been using. The export level seems to be stagnating for the past few years. The RCA for this category is 6.88 and density is 0.367. We do not suggest a policy emphasis for this category.

9.E.I Summarising the main results: non-agriculture categories

This paper has identified a number of criteria to focus on HS2 product categories as a major emphasis on the sector as a whole, and HS4 categories that need policy support even if the corresponding sector as a whole is not a priority at the aggregate level. It is noteworthy that the categories selected based on these Tables are part of the top 25 export categories of India at two-digit HS level.[67]

[67] *Ranked for exports in USD for 2016-17.*

In addition, it would be appropriate to support sectors which are among India's largest exports. For identifying such sectors at HS2 level, we consider products whose untapped exports are at least $1 billion in Table 6 above, and those categories which are in the top 10 HS2 level export items for 2016-17. Based on these criteria, the additional categories we get for non-agricultural sectoral emphasis are HS 27, 52, 61, 62, 71 and 74. These categories cover mineral fuels, oils and products; cotton, yarn and fabric; clothing; jewellery; and copper and its products. Some of these, such as textiles and clothing, are employment intensive sectors and thus would help meet the important objective of job creation.

The sectors to emphasise at HS two-digit level for export diversification and promotion are shown in Table 18 below.

Table 18. Non-agriculture: HS 2-Digit Categories For Promoting And Diversifying Exports

HS 2-Digit Category	Product name
27	Mineral Fuels, mineral oils and products of their distillation,; bituminous substances; mineral waxes
29	Organic chemicals
30	Pharmaceutical products
38	Plastics and articles thereof
39	Chemical products n.e.s.
52	Cotton (yarn and fabric)
61	Apparel and clothing accessories; knitted or crocheted
62	Apparel and clothing accessories; not knitted or crocheted
71	Natural, cultured pearls; precious, semi-precious stones; precious metals, metals clad with precious metal, and articles thereof; imitation jewellery; coin
72	Iron and steel
74	Copper and articles thereof
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers; television image and sound recorders and reproducers, parts and accessories of such articles
87	Vehicles: other than railway or tramway rolling stock, and parts and accessories thereof
90	Optical, photographic, cinematographic, measuring, checking, medical or surgical instruments and apparatus; parts and accessories

In Table 19 below, we have also identified some non-agriculture products at HS4 or HS6 level for policy support based on the following criteria:

- The HS4 or HS6 level category selected is not covered by the major sectors already identified in Table 18 above.
- They have been identified in Tables 5, 6, 16, 17, and Annex Table 5.
- Product categories from the two studies that are identified for policy emphasis.

Table 19. Non-agriculture: Product Categories at HS4 or HS6 level For Policy Emphasis

2516	Granite, crude or roughly trimmed
2817	Zinc oxide and peroxide
3307	Pre-shave, shaving and after shaving preparations
5406	Yarn of synthetic filament not sewing thread, retail
5503	Staple fibres of nylon, polyamides, not carded, combed
5512	Woven fabric >85% polyester staple fibre unbl/bleached
5515	Woven fabric polyester + viscose rayon, nes
6301	Electric blankets of textile material
6403	Ski footwear, with uppers of leather
6802	Stone mosaic tiles, artificial coloured chips etc
6906	Ceramic pipes, conduits, guttering and fittings
7202	Ferro-manganese, >2% carbon
730511	Line pipe of a kind used for oil or gas pipelines, having circular cross-sections and an external diameter of > 406,4 mm, of iron or steel, longitudinally submerged arc welded
7318	Screws, coach, iron or steel
7322	Radiators and parts thereof, cast iron
8214	Paper knives, letter openers, pencil sharpeners etc
8605	Railway passenger and special purpose coaches
8606	Railway tank cars
8607	Railway & tramway rolling stocks and parts thereof
8802	Helicopters of an unladen weight < 2,000 kg
8803	Aircraft propellers, rotors and parts thereof
9203	Harmoniums, pipe organs, etc

9.E.II Summarising the main results: agriculture categories

For agriculture too, we use similar criteria as in the case of non-agriculture products. We first determine the sectors at HS2 level which will be high emphasis area. For this, we consider those untapped exports which have a potential for at least $1 billion of additional exports, mentioned in Table 6 above. None of the agricultural products are among India's top ten exports in terms of HS2 categories.[68]

Table 20. Agriculture: HS 2-Digit Categories For Promoting And Diversifying Exports

HS 2-Digit Category	Product name
02	Meat and edible meat offal
03	Fish and crustaceans, molluscs and other aquatic invertebrates
10	Cereals
23	Food industries, residues and wastes thereof; prepared animal fodder
52*	Cotton

Note: * 52 is already identified as a sector for emphasis in the case of non-agriculture products. It is additionally relevant for agriculture as well.

The HS four-digit product categories for agriculture are shown in Table 21 below.

Table 21. Agriculture: Important Product Categories at HS4 level

0703	Onions and shallots, fresh or chilled
0801	Coconuts, fresh or dried
0902	Tea, green (unfermented) in packages < 3 kg
0904	Pepper of the genus Piper, whole
0908	Numeg
1806	Cocoa powder, sweetened

Note: 3501 and 3508 have been excluded because of low exports ($16 million in 2017-18 for the former, and $39 million for the latter).

[68] *At the HS two-digit level, the highest agriculture export category in 2016-17 was HS10 (cereals). Its exports were $6 billion in 2016 17, and this category ranked 12th amongst various HS two-digit categories in terms of exports.*

10.
Policy Approach and Suggestions

10.A
The Policy Approach

Developments in international trade have shown that trade policy is a combination of border measures and internal measures which focus on improving quality and cost-effectiveness of domestic products in an increasingly competitive global market where technologies and skills play a major role to determine competitiveness, linking up with value chains and increasing export market shares.[69] The policy steps include those at the border (e.g. tariffs, quotas, customs procedures), or those inside the border (e.g. regulations, standards related policies, improving operational procedures to make them transparent, inclusive and predictable). Experience has shown that in the context of both these categories of policies, greater emphasis should be on facilitating policies rather than restrictive policies. The latter tend to result in inefficiency in domestic production and create obstacles in connecting with global value chains. This reduces the competitive position of exporters compared to exporters from other nations. In this background, to the extent that there is any felt need for restrictive border measures they should be based on a detailed transparent evaluation and justification of the measure, taking account of the impact on final consumers or the user-industry which imports the product as an input for its value chain.[70] Further, such policies should be implemented with an announced time limit for termination, with a phase-down each year towards removing the increased border restriction.

Regarding facilitating policies, an increased significance of trade in services and global value chains in international trade implies a need for easing/improving domestic regulatory conditions and capabilities, modernising legal/regulatory systems to reduce the number of

[69] *The wide reach and scope of present-day trade policy can be seen for example from the subject matter covered by trade agreements such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP).*

[70] *This analysis would include the expectations of generating domestic capabilities, as well as actions taken for strategic reasons. It is interesting to note that even with the inward-looking, protection stance of President Trump, the US Administration conducts an analysis of the adverse impact of the trade measures on domestic producers.*

policy-imposed requirements for production and trade, creating the requisite infrastructure for use of new technologies, supporting skill creation and ability to meet the standards relevant for global value chains, and enhance the capabilities of domestic producers to link with global value chains, including bilateral, regional or multilateral initiatives for addressing concerns related to non-tariff measures, and creating a basis for regulatory coherence or co-operation.[71] An important part of the effort is to improve the governance process through system-oriented changes based on good regulatory principles, including those which simplify governance procedures.[72]

In this background, it is useful to keep in mind a seven-part approach which is important for the relevant policy initiatives to improve export potential and opportunities. The Government of India has already begun implementing a number of these ideas. It is nonetheless useful to have them together within an integrated framework.

1. The aim of policy should be to facilitate operations in order to reduce costs, time delays in policy response and the number of policy or procedural requirements.

2. A "supply or value chain approach" for policy-making and implementation, taking account of the backward and forward linkages.

3. Improve operational conditions by addressing obstacle to exports within the domestic markets as well as in major markets abroad.

4. The primary focus should be on getting early results, with special priority for sectors and policy actions that bring the largest impact on major national objectives such as job creation and enhancement of technological capacities of domestic industry.

5. The trade policy decided by the government should be owned not only by the Department of Commerce but by all parts of the government.

[71] *For examples of good governance or good regulatory principles, see CPTPP Chapter on Regulatory Coherence (in particular Article 25.5), and the Code of Good Practice for the Preparation, Adoption and Application of Standards in Annex 3 of the WTO's Agreement on Technical Barriers to Trade.*

[72] *See, Harsha Vardhana Singh, 2017, "TPP and India: Lessons for Future Gains", Brookings India Working Paper 03, June 2017.*

6. Monitor performance and consider corrective or additional steps to improve policy, based on a feedback mechanism both at the stage of policy formulation and for monitoring of its implementation based on periodic assessment of policy performance.

7. A database should be developed based on the feedback to generate "alert" mechanisms that can identify the major areas that require more immediate attention. This mechanism could include both experience-based data as well as forecasts using artificial intelligence and big data.

The facilitation policies to improve export potential and opportunities should be considered under three categories.

- Improvements in domestic policy-imposed conditions specifying the processes and procedures.
- Addressing domestic logistical constraints due to infrastructure facilities. The former is easier to address by the government.
- Interacting with governments in major markets to address non-tariff measures faced by India's exports and initiate efforts for regulatory coherence and collaboration.

10.B
The Policy Suggestions

When devising the relevant policy response, it is easier to specify "horizontal" policy approaches compared to more product-specific or sector-specific policies. The latter would require a closer interaction and discussion with the domestic producers/exporters to ascertain issues particularly significant to them. Our conversations with industry suggest that horizontal and facilitating policies are considered extremely important by all sectors, including several among those short-listed in the previous section.

The government has already begun a number of initiatives to facilitate domestic operations and improve cost-efficiency of exports.[73] Some additional policy steps could be developed to give greater effect to such initiatives, keeping in mind the seven-part approach mentioned above.

[73] *See for example, India's "National Trade Facilitation Action Plan 2017-2020". See http://www.wcoomd.org/-/media/wco/public/global/pdf/topics/wto-atf/national-committees-on-trade-facilitation/india-national-trade-facilitation-action-plan.pdf?la=en*

10.B.I Combining horizontal policy initiatives with a product or sector-specific focus

(I.a) Begin implementation of facilitation with priority sectors: While the aim of facilitating steps is to have a general impact, a beginning in their implementation could be made with a specific focus on the products which have been chosen for export promotion emphasis. Even within these products, greater priority could be given to those especially relevant for generating important national objectives like employment (e.g. textiles and clothing, selected agriculture products including food processing) and those which lead to higher domestic technological capabilities (e.g. electronics, chemicals). This focus would also provide learning opportunities to both the exporters of products identified for emphasis as well as the policy authorities to improve the overall implementation of the facilitation schemes for all products.

(I.b) Develop a Discussion Platform for Learning From the Experience of Others: The roadmap for facilitation established to improve cost-effectiveness could be given a momentum by establishing an institution or a discussion platform to interact with selected *countries that are better performers than* India, to learn from them and identify ways of improving the processes more rapidly by seeking solutions to specific policy related concerns faced by Indian policy-makers. A step-wise approach could be devised to transition towards global "best practices" in facilitation policy. This discussion too could combine the general system-wide orientation with insights on whether any specific products or sectors require additional steps.

Similar to the interaction with good performers abroad, the discussion platform should be used to develop *partnership and interaction with different states in India*, to share their experiences and identify steps that are likely to improve cost-effective production in different states.

Likewise, the discussion platform could be used for interaction *with "lead firms"*[74] *in global value chains* to benefit from their international experience with global best practices. In addition, the discussions with lead firms in global value chains could also help identify the policy improvements that would aim to develop export hubs within India. A beginning in both these contexts could be made by interacting with large FDI firms in India. By definition, we cannot select "lead firms" which span the entire range of export products. They are involved with particular product areas, and thus are relevant for specific products or sub-sectors.

[74] *Lead firms are those which manage the operations within global value chains. For some more details see https://globalvaluechains.org/concept-tools*

(I.c) Develop policy frameworks which will promote establishment of export hubs in India: In discussions with "lead firms" in global value chains, another important aspect to clarify would be the policy steps required to help promote export hubs in India. This discussion could begin with large FDI firms in India, as well as large Indian firms.

The policy steps should be classified in two groups. One, the set of policies that are already a focus within India's major flagship programmes such as Make in India, Trade Facilitation, and Promotion of e-markets and systems. Second, would be those policies that are not at present a policy focus in India but need to be emphasised. Within both these groups, a priority ordering could be determined among the various policies based on their impact. In this context, a concept such as "opportunity gain" specified in product space analysis may be considered as a starting point to determine the aggregate impact of the policy.

The actions to be taken for developing export hubs could be fast-tracked in certain parts of the country, focused on developing a group of extensive clusters (or even a township) based on hub and spoke linkages for the specific export-oriented sector being supported. In certain instances, the policy could overlap with the steps conceptualised for developing "smart greenfield cities" which are part of the new cities planned along some of the freight corridors established by the Government of India.

(I.d) Establish training support for improving quality and skills, including for standards required to be met for specific products exported to major markets: This would combine four types of initiatives. One, creating a facilitative legal framework which simplifies the process for certification and conformity assessment of the standards to be met in export markets. Two, establishing institutions and provide financial support for training, improving skills and quality, and improving risk management systems[75] relevant for trade transactions in general and for specific industries. Three, further enabling industry associations to expand the reach of training and certification. Four, preparing the basis for specific product or export-market oriented training through interaction with the "lead firms" in global value chains.

[75] *For specific experience with customs related risk management systems, see Christian Volpe Martincus, 2016, "Out of the Border Labyrinth. An Assessment of Trade Facilitation Initiatives in Latin America and the Caribbean", Inter-American Development Bank, USA. The risk management systems coverage a large number of issues, which include ensuring that health and safety conditions, technical requirements, and that requisite regulatory requirements are met.*

(I.e) Identify products whose exports to major markets could be further increased and based on this initiate discussions to reduce constraints faced by them in the markets abroad: Taking the example of Indian exports to the South Korean market, this paper has discussed identifying products whose exports could be increased to specific major markets and based on this shortlist, begin discussions in relevant market to address non-tariff barriers or regulatory constraints faced by their exports. Usually non-tariff measures can be best addressed through discussions with the trading partner. The process established for this purpose may be ad hoc in nature[76], or one which involves regular periodic interaction to address existing and emerging non-tariff barriers (NTBs).[77]

Importantly, these discussions could also pave the way for greater regulatory coherence or co-operation, an aspect that becomes important especially due to the rising significance of services trade and standards in international trade.

(I.f) Improve coordination between trade policy officials and Indian diplomats stationed abroad: Any dialogue or export expansion effort relating to major markets abroad would benefit from substantive coordinated efforts between trade and foreign ministry officials stationed in the targeted markets. The existing coordination needs to be improved by infusing substantive expertise for foreign affairs personnel to serve in a manner similar to trade diplomats or private sector representatives stationed in foreign markets.

We now consider some policy initiatives that are more general or horizontal in their orientation.

[76] *Like Article 2.9.2 of the CPTPP signed recently between 11 countries.*
[77] *This could be similar to the understanding in Article 8.9 in CPTPP's chapter on Technical Barriers to Trade.*

10.B.II Horizontal policy initiatives

(II.a) Remove Duplication of Effort by Exporters and Streamline or Remove Redundant Requirements: Another initiative could develop a system that helps avoid duplication of processes and information required for getting various policy approvals for exports. A single window with a single form for relevant information could be prepared to collect the information required for various approval processes. This information provided in this comprehensive form could be organised in the sequence or chain of approvals required for activities which the exporter has to carry out for exporting the product. The form could be combined with software solutions so that while the information is filled-in only once, the separate relevant government agencies receive the information that pertains to the approvals that they have to grant. Such a comprehensive approach would provide a basis for identifying and addressing:

- Inconsistencies or duplication of the information required by different agencies.
- Information (or policies based on them) that could be phased out if discussion with good performers shows that certain information may not be necessary for trade policy and procedures.
- Identifying particular constraints or difficulties faced by exporters that need urgent attention.

(II.b) Make E-Processes Effective: With regard to electronic submissions, an important issue that has emerged in our discussions with Indian exporters is that they face multiple problems and delays in getting the approvals, but if they seek the assistance of some consultant, the task is completed quickly. Similarly, delays are caused due to requirements which seek physical validation of the information submitted electronically in each case, thus creating both delays and increased costs. Mechanisms should be developed based on the practices of "best performers" in facilitation policies, to address these delays. Some efforts of the government have begun in this regard, but the issue needs to be dealt at a much more general level. One possibility could be to have a short time-limit beyond which the exporter would be deemed to have the relevant approval, combined with random verification of facts.

(II.c) Introduce Good Regulatory Practices: Good regulatory practices are important because they give predictability and stability to the policy regime and anticipate concerns that need to be addressed in order to improve the policy framework. Such practices are significant for the domestic producers and investors while providing confidence to trade partners that arbitrary

action would not be taken against their products. This paves the way for more constructive bilateral or regional dialogue to address concerns and create market opportunities through trade. Good regulatory practice includes:

- A timely response to queries and for processing documents submitted for decision or further action;
- Providing reasonable time for comments to all stakeholders affected by a policy change, and then taking the policy decision after consideration of those comments.
- Providing timely response and making policy procedures simpler, more transparent and predictable.
- Implementing ways of achieving better co-ordination among the major domestic stakeholders (centre, state, business)

11. Conclusions

This paper has explained the basic concepts of product space analysis and worked with the data provided by the Atlas of Economic Complexity that reflect these concepts, i.e. ease of moving into production and export of another "nearby product", the consecutive chain of domestic capabilities that could be developed by moving into a nearby product and the linkages between products and capabilities that will help sustain export diversification. This paper has combined these concepts and data based on product space analysis with several policy objectives to identify sectors or product categories whose exports could be emphasised to achieve the largest impact in terms of the objectives concerned.

These products are identified in terms of improving both exports in general as well as exports to specific major markets. In this context, a simple method is discussed in this paper to identify products whose exports could potentially increase if non-tariff barriers faced by them are addressed in major markets. This effort provides a basis to develop a bilateral dialogue with selected countries to improve the operational conditions faced by Indian export when they seek market access abroad and to develop a basis for regulatory coherence and cooperation.

Trade policy for promoting exports includes both policies at the border (tariffs, quotas and customs procedures) and policies within the border (standards, regulatory regimes, policy procedures for getting approvals, subsidies and other forms of support, skill enhancement). The policies under both these categories can be broadly identified as either restrictive policies or facilitating policies. With an increase in global value chains and trade in services, facilitating rather than restrictive policies have been found to be better for improving cost-efficient quality production and competitiveness. There may, however, be a need for restrictive policies in certain instances. In that context, it is suggested that the decision be based on transparent and objective analysis of the impact of such policies, and if a restrictive policy is to be implemented then it should be done on a temporary basis, reducing the restrictiveness of the measure over time, with the restrictive policy being removed in a time-bound manner. The above conclusion is *inter alia* based on insights from industrial policy which have shown that system-building and facilitating horizontal policies have a larger impact than vertical policies, though in certain instances vertical or sector specific policies are also relevant, *inter alia* for strategic reasons.

The content of both horizontal (generic) and specific policies need not be the same for each sector. Identifying sector-specific policies would require an interaction with the domestic producers and exporters, while horizontal policies are easier to specify based on wide-ranging trade policy experience in various countries, as well as the domestic emphasis in India on addressing the difficulties faced by exporters due to inefficient or cumbersome domestic policies and logistical facilities. Horizontal policies are thus recognised by all as being very important for improving competitiveness and cost-effective production.

Interestingly, horizontal policies can be combined with a sector-specific approach. A further specificity could be introduced in this process by prioritising the focus of horizontal and sector-specific policies on sectors which help achieve major national objectives such as creating job opportunities or improving technological capabilities. This paper has discussed horizontal policies in generic terms as well as implementing them with a sector-specific focus. In this context, some sector-specific initiatives are also identified.

While relatively more detailed analysis has been carried out in terms of HS classification, the discussion develops the framework of analysis that can equally be applied to SITC categories. The Tables, particularly Annex Tables, provide several detailed calculations for SITC products, which could be used to carry out further analysis, if required.

Annex Table 1. SITC Categories With Opportunity Space of 0.75 or More

SITC Category	Product Name	RCA	PCI	Opportunity Gain	Distance
7493	Mechanical tools for building	0.911531	3.729927	1.290992	0.722553
6940	Nails, nuts & bolts	0.883226	3.500655	1.259038	0.698556
5826	Epoxide resins	0.656489	4.062246	1.249467	0.719983
7439	Centrifuges machinery parts N.E.S.	0.746512	3.456635	1.236993	0.7227
7132	Internal combustion engines for motor vehicles	0.221321	3.340801	1.213448	0.716803
6954	Interchangeable hand and machine tools	0.620205	3.971669	1.209803	0.716093
7284	Specialized industry machinery & parts N.E.S	0.322545	4.265732	1.194496	0.719604
7368	Dividing heads for machine-tools	0.77145	3.566435	1.190904	0.716798
7373	Welding, brazing & cutting machines & appliances N.E.S.	0.241125	4.012944	1.173496	0.723236
5824	Polyamides	0.36265	3.27223	1.172664	0.700253
7413	Furnaces, ovens & parts N.E.S.	0.811563	3.036489	1.164485	0.698936
7431	Air pumps, vacuum pumps & compressors	0.543732	3.174369	1.156236	0.695727
7421	Reciprocating pumps	0.443663	3.802406	1.153282	0.729533
8744	Nonmechanical or electrical instruments for physical analysis	0.14562	3.857507	1.152772	0.73369
7849	Other vehicles parts	0.579473	3.047392	1.14734	0.701716
7499	Non-electric parts of machinery N.E.S.	0.529321	3.460437	1.146952	0.712331
7492	Valves	0.830862	3.127833	1.142458	0.707581
6632	Abrasive powder	0.072711	3.232855	1.142088	0.709296
7234	Construction & mining machinery	0.577472	2.880089	1.1384	0.711321
5827	Silicones	0.507721	3.827954	1.133222	0.716463
7451	Non-electric powertools	0.425386	3.566527	1.131462	0.718026
7732	Electrical insulators	0.953308	3.257328	1.11713	0.698075
7441	Work trucks	0.112872	3.07405	1.116529	0.718976
7264	Printing presses	0.382833	3.569559	1.114375	0.707722
7361	Metal cutting machine-tools	0.238254	3.597322	1.114219	0.696779
7259	Parts of paper making machines	0.345679	3.466794	1.112246	0.726117
7133	Internal combustion piston engines for ships & boats	0.179731	4.577717	1.111113	0.736056
7442	Lifting & loading machinery	0.355833	2.867582	1.108217	0.703988
7161	DC motors & generators	0.274038	3.430947	1.107965	0.712974
7369	Metalworking machine-tools parts	0.442066	3.018106	1.100529	0.712973
7434	Fans & parts N.E.S.	0.18713	3.063976	1.096152	0.705669
8742	Drawing & mathematical calculating instruments	0.23839	2.948852	1.092422	0.701609
7913	Mechanically propelled railway	0.009361	3.529621	1.091947	0.689985
7783	Auto parts	0.425632	2.926593	1.076371	0.708774

SITC Category	Product Name	RCA	PCI	Opportunity Gain	Distance
6891	Waste of unwrought tungsten and related metals	0.081547	3.015268	1.063996	0.713144
7491	Roller bearings	0.802834	2.883668	1.063571	0.697045
8935	Plastic lamps	0.083709	3.413487	1.061535	0.726151
5822	Aminoplasts	0.121734	2.989623	1.058615	0.7051
2331	Synthetic rubber & latex	0.215266	3.243351	1.055254	0.716653
6994	Metal springs	0.469815	2.747615	1.054344	0.704905
5839	Other polymerization & copolymarization products	0.26486	2.544259	1.053843	0.713943
7139	Piston engines parts N.E.S.	0.84322	2.823845	1.050694	0.694698
7149	Parts of gas & reaction engines	0.128039	3.406246	1.046213	0.711358
8981	Pianos & string instruments	0.107532	3.002604	1.044655	0.705553
7362	Metal forming machine-tools	0.470984	3.63039	1.043864	0.695556
6832	Worked nickel & nickel alloys	0.546196	3.21585	1.038825	0.732197
6579	Special products of textile	0.614304	2.778624	1.03795	0.701236
8748	Electrical measuring & controlling instruments N.E.S.	0.176806	3.227188	1.037516	0.721969
8989	Musical instrument parts	0.379093	2.823941	1.034819	0.708886
5829	Other condensation products	0.113636	3.295202	1.034343	0.711598
6992	Metal chains	0.483844	2.654421	1.032937	0.700822
5983	Organic chemical products	0.750033	2.975152	1.030882	0.702494
6631	Polishing stones	0.741843	2.960159	1.030515	0.687809
7742	X-ray apparatus	0.761756	3.919698	1.015979	0.72872
5825	Polyurethanes	0.306828	2.647695	1.008402	0.705309
7281	Specialized industry machinery tools & parts N.E.S	0.271699	3.223707	1.007147	0.701253
7436	Liquid & gas filters & purifiers	0.445748	2.624698	1.006306	0.704575
7842	Vehicle bodies	0.088338	2.974014	1.006024	0.72556
7412	Furnace burners, mechanical stokers & parts	0.241365	2.930359	1.00561	0.720662
7367	Working metal & metal carbides machines N.E.S.	0.176237	4.749872	1.004467	0.704095
7269	Parts of printing press machines	0.215994	2.788898	1.003567	0.712296
8743	Gas, liquid & electric control instruments	0.495438	2.84942	1.002348	0.721197
5836	Acrylic & methaacrylic polymers & copolymers	0.288994	2.781803	1.001576	0.694314
6745	Iron/steel 3 - 4.75mm tick sheets	0.612899	2.723713	1.000362	0.707787
5849	Derivates of cellulose	0.6594	3.35167	0.996973	0.708827
6649	Glass N.E.S.	0.376681	2.541541	0.995402	0.698721
7919	Railway track & vehicle parts N.E.S.	0.345756	2.694612	0.99411	0.704307
7252	Paper making machines	0.747421	2.798532	0.9936	0.689132
8732	Non-electrical counting devices	0.137866	3.19775	0.990835	0.725994
7741	Electro-medical equipment	0.394158	2.664274	0.981263	0.72226
7753	Dishwashers	0.002057	2.786033	0.981211	0.694842
7712	Parts of electric power machinery N.E.S.	0.688036	2.804633	0.978789	0.709111

SITC Category	Product Name	RCA	PCI	Opportunity Gain	Distance
5416	Glycosides & vaccines	0.349968	2.819195	0.977562	0.719224
7423	Rotary pumps	0.279634	2.776983	0.977144	0.70679
8959	Other office supplies	0.18343	2.450097	0.974257	0.712182
7371	Metal foundry equipment & parts N.E.S.	0.685449	3.488503	0.968687	0.701338
7263	Type-setting machines	0.519017	2.852228	0.968652	0.707125
5419	Not medicaments pharmaceutical goods	0.251475	2.608675	0.967616	0.703526
8745	Scientific instruments N.E.S.	0.544954	2.890023	0.965249	0.715444
6210	Materials of rubber	0.576223	2.446306	0.96518	0.693393
7762	Electronic valves & tubes	0.214322	3.015796	0.963723	0.730395
5833	Polystyrene	0.392812	2.673341	0.954907	0.707393
7868	Not mechanically propelled vehicles N.E.S.	0.371724	2.603276	0.9531	0.707174
5335	Glazes, driers, putty	0.258813	2.404474	0.949893	0.694565
7911	Electric trains	0.000131	2.808641	0.949309	0.689301
7721	Switchboards, relays & fuses	0.570544	2.39834	0.946369	0.694442
7449	Centrifugal pumps parts N.E.S.	0.582983	2.676883	0.945204	0.704643
6289	Other articles of rubber	0.862416	2.419557	0.944799	0.696176
6572	Not coated bonded fibre fabrics	0.508809	2.257104	0.940436	0.676192
8813	Photo & movie equipment	0.191998	3.464435	0.939718	0.70679
7452	Non-electrical machines parts N.E.S.	0.362543	3.217425	0.938856	0.708922
6546	Glass fibre fabrics	0.313204	2.479868	0.936598	0.695903
7428	Other pumps for liquids & liquid elevators	0.653401	2.214607	0.935076	0.700605
8924	Postcards & stickers	0.165571	2.595715	0.93115	0.699209
7268	Bookbinding machines	0.793977	3.163286	0.92923	0.701993
7267	Other printing machines	0.410133	3.520872	0.92794	0.693323
5989	Chemical products	0.417994	2.209607	0.927519	0.697584
7599	Parts of cash registers & calculating machines	0.066871	2.780896	0.925952	0.708765
7188	Engines & motors	0.684941	2.45803	0.922274	0.710042
6635	Mineral wool N.E.S.	0.356703	2.479161	0.920503	0.718149
6648	Mirrors	0.388312	2.973602	0.917752	0.707682
7754	Shavers & hair clippers	0.027799	3.209042	0.916531	0.70846
6782	Seamless tubes, pipes of iron or steel	0.943142	2.169778	0.916259	0.696775
7169	Parts of rotating electric plants N.E.S.	0.704773	2.416365	0.913475	0.691004
7272	Food processing machinery & parts N.E.S.	0.705634	2.543346	0.910886	0.693002
7782	Incandescent & fluorescent bulbs	0.465934	2.605118	0.90773	0.690402
6647	Safety glass	0.153895	2.408562	0.906517	0.690592
7212	Harvesting & threshing machines	0.179893	2.267721	0.903199	0.713842
913	Pig and poultry lard and fat	0	2.143463	0.897777	0.706414
6553	Elastic knitted fibres	0.32914	2.160708	0.896846	0.684155

SITC Category	Product Name	RCA	PCI	Opportunity Gain	Distance
8841	Lenses	0.549294	2.843837	0.890257	0.702127
7416	Heating & cooling equipment N.E.S.	0.88415	2.215962	0.888068	0.702307
7621	Vehicles radio receivers	0.080885	2.462968	0.88612	0.685661
7784	Powertools & parts	0.028644	2.561422	0.877435	0.718751
8822	Photographic film, plates & paper	0.032224	3.370116	0.877414	0.73321
7219	Agricultural machinery, appliances, & parts	0.217106	2.337674	0.87458	0.71324
8982	Musical instruments N.E.S.	0.164646	2.734804	0.874231	0.694978
6573	Coated textile fabrics N.E.S.	0.656098	2.115209	0.872274	0.67586
7768	Parts N.E.S. of electronic circuits	0.048593	2.969498	0.862606	0.726391
5835	Copolymers of vinyl chloride & vinyl acetate	0.038892	3.167011	0.861155	0.715455
8121	Parts of not electrical heating equipment N.E.S.	0.078364	2.359647	0.861008	0.704043
7810	Cars	0.480647	2.366179	0.859309	0.701328
8812	Movie cameras, projectors & parts	0.440492	2.154196	0.857717	0.706796
8749	Parts & accessories for meters & counters	0.545979	2.491608	0.855601	0.703079
6747	Steel tinned sheets	0.352176	2.415244	0.851519	0.690773
5851	Derivatives of natural rubber	0.211195	2.142797	0.850614	0.69286
6991	Base metal locksmiths wares N.E.S.	0.478789	2.034568	0.848942	0.686703
8996	Orthopaedic appliances	0.095151	2.772783	0.848401	0.718094
8922	Newspapers & journals	0.050836	2.189876	0.847107	0.705496
7251	Cellulose pulp making machines	0.495275	2.555121	0.845199	0.694234
7247	Cleaning & cutting textile machinery N.E.S.	0.347005	1.741433	0.844115	0.675102
8928	Printed matter N.E.S.	0.288138	1.839556	0.837196	0.699
6997	Articles of iron or steel N.E.S.	0.81512	2.274937	0.835828	0.689288
7821	Trucks & vans	0.357558	1.928083	0.83372	0.684544
6639	Ceramic materials articles N.E.S.	0.323146	2.424112	0.831606	0.692371
6731	Iron/steel wire rod	0.605026	1.896946	0.831558	0.666144
7723	Electrical resistors	0.207193	2.245021	0.829581	0.695471
7239	Bulldozers, angledozers & levellers parts N.E.S.	0.671724	2.078622	0.827187	0.694021
6633	Non ceramic mineral materials N.E.S.	0.423257	2.033443	0.826927	0.698092
113	Swine meat	0.000757	2.321198	0.821861	0.713719
7414	Non-domestic refrigerators & parts N.E.S.	0.32837	2.143868	0.818306	0.683529
7162	AC electric motors & generators	0.829684	2.115379	0.815943	0.683536
8741	Non-electrical navigating devices, compasses	0.384275	2.234179	0.815563	0.711732
6993	Pins and needles	0.380047	1.973455	0.809439	0.669462
7528	Data processing equipment N.E.S.	0.082321	2.785277	0.809046	0.71499
5841	Regenerated cellulose	0.161686	2.267731	0.804797	0.708534
6591	Linoleum	0.052537	2.159147	0.80214	0.710476
6999	Other base metal manufactures N.E.S.	0.18902	1.89307	0.801371	0.709828

SITC Category	Product Name	RCA	PCI	Opportunity Gain	Distance
5922	Glues	0.541002	1.712344	0.801278	0.69062
6419	Converted paper N.E.S.	0.406902	2.244699	0.789567	0.712326
7822	Special purpose trucks & vans	0.243894	1.607354	0.787736	0.706202
7245	Weaving, knitting & yarn preparing machines	0.460483	2.604887	0.784725	0.660763
5239	Inorganic chemical products	0.325536	1.905342	0.783085	0.703746
121	Other animal entrails	7.58E-05	2.217294	0.782267	0.699386
8932	Plastic sanitary & toilet articles	0.12266	1.821822	0.776902	0.686546
6975	Base metal indoors sanitary ware N.E.S.	0.868824	1.703579	0.7767	0.658318
8939	Miscellaneous articles of plastic	0.479181	1.908662	0.774519	0.681086
451	Unmilled rye	0.010234	2.40833	0.774263	0.736602
6641	Nonoptical balls, rods or tubes of glass	0.214704	2.405679	0.772685	0.695303
6412	Printing & writing paper in rolls or sheets	0.060757	2.413151	0.77209	0.697425
7781	Batteries	0.28652	1.993142	0.767252	0.680722
6253	Tires & pneumatic for aircraft	0.352884	2.089175	0.762793	0.689537
7722	Printed circuits & parts N.E.S.	0.216545	2.125023	0.75727	0.67866
6996	Miscellaneous articles of base metal	0.788288	1.870484	0.756645	0.684703
7415	Air conditioning machines	0.18563	2.719969	0.753162	0.706489
7861	Containers for transportation	0.033447	1.821896	0.752782	0.70505
6571	Not coated articles of felt N.E.S.	0.321191	1.620583	0.750175	0.692988

Annex Table 2. SITC Categories With Opportunity Space of 0.75 or More Ranked According to Distance

SITC Code	Product Name	RCA	PCI	Opportunity Gain	Distance
6975	Base metal indoors sanitary ware N.E.S.	0.868824	1.703579	0.7767	0.658318
7245	Weaving, knitting & yarn preparing machines	0.460483	2.604887	0.784725	0.660763
6731	Iron/steel wire rod	0.605026	1.896946	0.831558	0.666144
6993	Pins and needles	0.380047	1.973455	0.809439	0.669462
7247	Cleaning & cutting textile machinery N.E.S.	0.347005	1.741433	0.844115	0.675102
6573	Coated textile fabrics N.E.S.	0.656098	2.115209	0.872274	0.67586
6572	Not coated bonded fibre fabrics	0.508809	2.257104	0.940436	0.676192
7722	Printed circuits & parts N.E.S.	0.216545	2.125023	0.75727	0.67866
7781	Batteries	0.28652	1.993142	0.767252	0.680722
8939	Miscellaneous articles of plastic	0.479181	1.908662	0.774519	0.681086
7414	Non-domestic refrigerators & parts N.E.S.	0.32837	2.143868	0.818306	0.683529
7162	AC electric motors & generators	0.829684	2.115379	0.815943	0.683536
6553	Elastic knitted fibres	0.32914	2.160708	0.896846	0.684155
7821	Trucks & vans	0.357558	1.928083	0.83372	0.684544
6996	Miscellaneous articles of base metal	0.788288	1.870484	0.756645	0.684703
7621	Vehicles radio receivers	0.080885	2.462968	0.88612	0.685661
8932	Plastic sanitary & toilet articles	0.12266	1.821822	0.776902	0.686546
6991	Base metal locksmiths wares N.E.S.	0.478789	2.034568	0.848942	0.686703
6631	Polishing stones	0.741843	2.960159	1.030515	0.687809
7252	Paper making machines	0.747421	2.798532	0.9936	0.689132
6997	Articles of iron or steel N.E.S.	0.81512	2.274937	0.835828	0.689288
7911	Electric trains	0.000131	2.808641	0.949309	0.689301
6253	Tires & pneumatic for aircraft	0.352884	2.089175	0.762793	0.689537
7913	Mechanically propelled railway	0.009361	3.529621	1.091947	0.689985
7782	Incandescent & fluorescent bulbs	0.465934	2.605118	0.90773	0.690402
6647	Safety glass	0.153895	2.408562	0.906517	0.690592
5922	Glues	0.541002	1.712344	0.801278	0.69062
6747	Steel tinned sheets	0.352176	2.415244	0.851519	0.690773
7169	Parts of rotating electric plants N.E.S.	0.704773	2.416365	0.913475	0.691004
6639	Ceramic materials articles N.E.S.	0.323146	2.424112	0.831606	0.692371
5851	Derivatives of natural rubber	0.211195	2.142797	0.850614	0.69286
6571	Not coated articles of felt N.E.S.	0.321191	1.620583	0.750175	0.692988
7272	Food processing machinery & parts N.E.S.	0.705634	2.543346	0.910886	0.693002
7267	Other printing machines	0.410133	3.520872	0.92794	0.693323
6210	Materials of rubber	0.576223	2.446306	0.96518	0.693393
7239	Bulldozers, angledozers & levellers parts N.E.S.	0.671724	2.078622	0.827187	0.694021

SITC Code	Product Name	RCA	PCI	Opportunity Gain	Distance
7251	Cellulose pulp making machines	0.495275	2.555121	0.845199	0.694234
5836	Acrylic & methaacrylic polymers & copolymers	0.288994	2.781803	1.001576	0.694314
7721	Switchboards, relays & fuses	0.570544	2.39834	0.946369	0.694442
5335	Glazes, driers, putty	0.258813	2.404474	0.949893	0.694565
7139	Piston engines parts N.E.S.	0.84322	2.823845	1.050694	0.694698
7753	Dishwashers	0.002057	2.786033	0.981211	0.694842
8982	Musical instruments N.E.S.	0.164646	2.734804	0.874231	0.694978
6641	Nonoptical balls, rods or tubes of glass	0.214704	2.405679	0.772685	0.695303
7723	Electrical resistors	0.207193	2.245021	0.829581	0.695471
7362	Metal forming machine-tools	0.470984	3.63039	1.043864	0.695556
7431	Air pumps, vacuum pumps & compressors	0.543732	3.174369	1.156236	0.695727
6546	Glass fibre fabrics	0.313204	2.479868	0.936598	0.695903
6289	Other articles of rubber	0.862416	2.419557	0.944799	0.696176
6782	Seamless tubes, pipes of iron or steel	0.943142	2.169778	0.916259	0.696775
7361	Metal cutting machine-tools	0.238254	3.597322	1.114219	0.696779
7491	Roller bearings	0.802834	2.883668	1.063571	0.697045
6412	Printing & writing paper in rolls or seets	0.060757	2.413151	0.77209	0.697425
5989	Chemical products	0.417994	2.209607	0.927519	0.697584
7732	Electrical insulators	0.953308	3.257328	1.11713	0.698075
6633	Non ceramic mineral materials N.E.S.	0.423257	2.033443	0.826927	0.698092
6940	Nails, nuts & bolts	0.883226	3.500655	1.259038	0.698556
6649	Glass N.E.S.	0.376681	2.541541	0.995402	0.698721
7413	Furnaces, ovens & parts N.E.S.	0.811563	3.036489	1.164485	0.698936
8928	Printed matter N.E.S.	0.288138	1.839556	0.837196	0.699
8924	Postcards & stickers	0.165571	2.595715	0.93115	0.699209
121	Other animal entrails	7.58E-05	2.217294	0.782267	0.699386
5824	Polyamides	0.36265	3.27223	1.172664	0.700253
7428	Other pumps for liquids & liquid elevators	0.653401	2.214607	0.935076	0.700605
6992	Metal chains	0.483844	2.654421	1.032937	0.700822
6579	Special products of textile	0.614304	2.778624	1.03795	0.701236
7281	Specialized industry machinery tools & parts N.E.S	0.271699	3.223707	1.007147	0.701253
7810	Cars	0.480647	2.366179	0.859309	0.701328
7371	Metal foundry equipment & parts N.E.S.	0.685449	3.488503	0.968687	0.701338
8742	Drawing & mathematical calculating instruments	0.23839	2.948852	1.092422	0.701609
7849	Other vehicles parts	0.579473	3.047392	1.14734	0.701716
7268	Bookbinding machines	0.793977	3.163286	0.92923	0.701993
8841	Lenses	0.549294	2.843837	0.890257	0.702127
7416	Heating & cooling equipment N.E.S.	0.88415	2.215962	0.888068	0.702307
5983	Organic chemical products	0.750033	2.975152	1.030882	0.702494

SITC Code	Product Name	RCA	PCI	Opportunity Gain	Distance
8749	Parts & accessories for meters & counters	0.545979	2.491608	0.855601	0.703079
5419	Not medicaments pharmaceutical goods	0.251475	2.608675	0.967616	0.703526
5239	Inorganic chemical products	0.325536	1.905342	0.783085	0.703746
7442	Lifting & loading machinery	0.355833	2.867582	1.108217	0.703988
8121	Parts of not electrical heating equipment N.E.S.	0.078364	2.359647	0.861008	0.704043
7367	Working metal & metal carbides machines N.E.S.	0.176237	4.749872	1.004467	0.704095
7919	Railway track & vehicle parts N.E.S.	0.345756	2.694612	0.99411	0.704307
7436	Liquid & gas filters & purifiers	0.445748	2.624698	1.006306	0.704575
7449	Centrifugal pumps parts N.E.S.	0.582983	2.676883	0.945204	0.704643
6994	Metal springs	0.469815	2.747615	1.054344	0.704905
7861	Containers for transportation	0.033447	1.821896	0.752782	0.70505
5822	Aminoplasts	0.121734	2.989623	1.058615	0.7051
5825	Polyurethanes	0.306828	2.647695	1.008402	0.705309
8922	Newspapers & journals	0.050836	2.189876	0.847107	0.705496
8981	Pianos & string instruments	0.107532	3.002604	1.044655	0.705553
7434	Fans & parts N.E.S.	0.18713	3.063976	1.096152	0.705669
7822	Special purpose trucks & vans	0.243894	1.607354	0.787736	0.706202
913	Pig and poultry lard and fat	0	2.143463	0.897777	0.706414
7415	Air conditioning machines	0.18563	2.719969	0.753162	0.706489
8813	Photo & movie equipment	0.191998	3.464435	0.939718	0.70679
7423	Rotary pumps	0.279634	2.776983	0.977144	0.70679
8812	Movie cameras, projectors & parts	0.440492	2.154196	0.857717	0.706796
7263	Type-setting machines	0.519017	2.852228	0.968652	0.707125
7868	Not mechanically propelled vehicles N.E.S.	0.371724	2.603276	0.9531	0.707174
5833	Polystyrene	0.392812	2.673341	0.954907	0.707393
7492	Valves	0.830862	3.127833	1.142458	0.707581
6648	Mirrors	0.388312	2.973602	0.917752	0.707682
7264	Printing presses	0.382833	3.569559	1.114375	0.707722
6745	Iron/steel 3 - 4.75mm tick sheets	0.612899	2.723713	1.000362	0.707787
7754	Shavers & hair clippers	0.027799	3.209042	0.916531	0.70846
5841	Regenerated cellulose	0.161686	2.267731	0.804797	0.708534
7599	Parts of cash registers & calculating machines	0.066871	2.780896	0.925952	0.708765
7783	Auto parts	0.425632	2.926593	1.076371	0.708774
5849	Derivates of cellulose	0.6594	3.35167	0.996973	0.708827
8989	Musical instrument parts	0.379093	2.823941	1.034819	0.708886
7452	Non-electrical machines parts N.E.S.	0.362543	3.217425	0.938856	0.708922
7712	Parts of electric power machinery N.E.S.	0.688036	2.804633	0.978789	0.709111
6632	Abrasive powder	0.072711	3.232855	1.142088	0.709296
6999	Other base metal manufactures N.E.S.	0.18902	1.89307	0.801371	0.709828

SITC Code	Product Name	RCA	PCI	Opportunity Gain	Distance
7188	Engines & motors	0.684941	2.45803	0.922274	0.710042
6591	Linoleum	0.052537	2.159147	0.80214	0.710476
7234	Construction & mining machinery	0.577472	2.880089	1.1384	0.711321
7149	Parts of gas & reaction engines	0.128039	3.406246	1.046213	0.711358
5829	Other condensation products	0.113636	3.295202	1.034343	0.711598
8741	Non-electrical navigating devices, compasses	0.384275	2.234179	0.815563	0.711732
8959	Other office supplies	0.18343	2.450097	0.974257	0.712182
7269	Parts of printing press machines	0.215994	2.788898	1.003567	0.712296
6419	Converted paper N.E.S.	0.406902	2.244699	0.789567	0.712326
7499	Non-electric parts of machinery N.E.S.	0.529321	3.460437	1.146952	0.712331
7369	Metalworking machine-tools parts	0.442066	3.018106	1.100529	0.712973
7161	DC motors & generators	0.274038	3.430947	1.107965	0.712974
6891	Waste of unwrought tungsten and related metals	0.081547	3.015268	1.063996	0.713144
7219	Agricultural machinery, appliances, & parts	0.217106	2.337674	0.87458	0.71324
113	Swine meat	0.000757	2.321198	0.821861	0.713719
7212	Harvesting & threshing machines	0.179893	2.267721	0.903199	0.713842
5839	Other polymerization & copolymarization products	0.26486	2.544259	1.053843	0.713943
7528	Data processing equipment N.E.S.	0.082321	2.785277	0.809046	0.71499
8745	Scientific instruments N.E.S.	0.544954	2.890023	0.965249	0.715444
5835	Copolymers of vinyl chloride & vinyl acetate	0.038892	3.167011	0.861155	0.715455
6954	Interchangeable hand and machine tools	0.620205	3.971669	1.209803	0.716093
5827	Silicones	0.507721	3.827954	1.133222	0.716463
2331	Synthetic rubber & latex	0.215266	3.243351	1.055254	0.716653
7368	Dividing heads for machine-tools	0.77145	3.566435	1.190904	0.716798
7132	Internal combustion engines for motor vehicles	0.221321	3.340801	1.213448	0.716803
7451	Non-electric powertools	0.425386	3.566527	1.131462	0.718026
8996	Orthopaedic appliances	0.095151	2.772783	0.848401	0.718094
6635	Mineral wool N.E.S.	0.356703	2.479161	0.920503	0.718149
7784	Powertools & parts	0.028644	2.561422	0.877435	0.718751
7441	Work trucks	0.112872	3.07405	1.116529	0.718976
5416	Glycosides & vaccines	0.349968	2.819195	0.977562	0.719224
7284	Specialized industry machinery & parts N.E.S	0.322545	4.265732	1.194496	0.719604
5826	Epoxide resins	0.656489	4.062246	1.249467	0.719983
7412	Furnace burners, mechanical stokers & parts	0.241365	2.930359	1.00561	0.720662
8743	Gas, liquid & electric control instruments	0.495438	2.84942	1.002348	0.721197
8748	Electrical measuring & controlling instruments N.E.S.	0.176806	3.227188	1.037516	0.721969
7741	Electro-medical equipment	0.394158	2.664274	0.981263	0.72226
7493	Mechanical tools for building	0.911531	3.729927	1.290992	0.722553
7439	Centrifuges machinery parts N.E.S.	0.746512	3.456635	1.236993	0.7227

SITC Code	Product Name	RCA	PCI	Opportunity Gain	Distance
7373	Welding, brazing & cutting machines & appliances N.E.S.	0.241125	4.012944	1.173496	0.723236
7842	Vehicle bodies	0.088338	2.974014	1.006024	0.72556
8732	Non-electrical counting devices	0.137866	3.19775	0.990835	0.725994
7259	Parts of paper making machines	0.345679	3.466794	1.112246	0.726117
8935	Plastic lamps	0.083709	3.413487	1.061535	0.726151
7768	Parts N.E.S. of electronic circuits	0.048593	2.969498	0.862606	0.726391
7742	X-ray apparatus	0.761756	3.919698	1.015979	0.72872
7421	Reciprocating pumps	0.443663	3.802406	1.153282	0.729533
7762	Electronic valves & tubes	0.214322	3.015796	0.963723	0.730395
6832	Worked nickel & nickel alloys	0.546196	3.21585	1.038825	0.732197
8822	Photographic film, plates & paper	0.032224	3.370116	0.877414	0.73321
8744	Nonmechanical or electrical instruments for physical analysis	0.14562	3.857507	1.152772	0.73369
7133	Internal combustion piston engines for ships & boats	0.179731	4.577717	1.111113	0.736056
451	Unmilled rye	0.010234	2.40833	0.774263	0.736602

Annex Table 3. SITC Categories With Opportunity Space of 0.75 or More Ranked According to RCA

SITC Code	Product Name	RCA	PCI	Opportunity Gain	Distance
7732	Electrical insulators	0.953308	3.257328	1.11713	0.698075
6782	Seamless tubes, pipes of iron or steel	0.943142	2.169778	0.916259	0.696775
7493	Mechanical tools for building	0.911531	3.729927	1.290992	0.722553
7416	Heating & cooling equipment N.E.S.	0.88415	2.215962	0.888068	0.702307
6940	Nails, nuts & bolts	0.883226	3.500655	1.259038	0.698556
6975	Base metal indoors sanitary ware N.E.S.	0.868824	1.703579	0.7767	0.658318
6289	Other articles of rubber	0.862416	2.419557	0.944799	0.696176
7139	Piston engines parts N.E.S.	0.84322	2.823845	1.050694	0.694698
7492	Valves	0.830862	3.127833	1.142458	0.707581
7162	AC electric motors & generators	0.829684	2.115379	0.815943	0.683536
6997	Articles of iron or steel N.E.S.	0.81512	2.274937	0.835828	0.689288
7413	Furnaces, ovens & parts N.E.S.	0.811563	3.036489	1.164485	0.698936
7491	Roller bearings	0.802834	2.883668	1.063571	0.697045
7268	Bookbinding machines	0.793977	3.163286	0.92923	0.701993
6996	Miscellaneous articles of base metal	0.788288	1.870484	0.756645	0.684703
7368	Dividing heads for machine-tools	0.77145	3.566435	1.190904	0.716798
7742	X-ray apparatus	0.761756	3.919698	1.015979	0.72872
5983	Organic chemical products	0.750033	2.975152	1.030882	0.702494
7252	Paper making machines	0.747421	2.798532	0.9936	0.689132
7439	Centrifuges machinery parts N.E.S.	0.746512	3.456635	1.236993	0.7227
6631	Polishing stones	0.741843	2.960159	1.030515	0.687809
7272	Food processing machinery & parts N.E.S.	0.705634	2.543346	0.910886	0.693002
7169	Parts of rotating electric plants N.E.S.	0.704773	2.416365	0.913475	0.691004
7712	Parts of electric power machinery N.E.S.	0.688036	2.804633	0.978789	0.709111
7371	Metal foundry equipment & parts N.E.S.	0.685449	3.488503	0.968687	0.701338
7188	Engines & motors	0.684941	2.45803	0.922274	0.710042
7239	Bulldozers, angledozers & levellers parts N.E.S.	0.671724	2.078622	0.827187	0.694021
5849	Derivates of cellulose	0.6594	3.35167	0.996973	0.708827
5826	Epoxide resins	0.656489	4.062246	1.249467	0.719983
6573	Coated textile fabrics N.E.S.	0.656098	2.115209	0.872274	0.67586
7428	Other pumps for liquids & liquid elevators	0.653401	2.214607	0.935076	0.700605
6954	Interchangeable hand and machine tools	0.620205	3.971669	1.209803	0.716093
6579	Special products of textile	0.614304	2.778624	1.03795	0.701236
6745	Iron/steel 3 - 4.75mm tick sheets	0.612899	2.723713	1.000362	0.707787
6731	Iron/steel wire rod	0.605026	1.896946	0.831558	0.666144
7449	Centrifugal pumps parts N.E.S.	0.582983	2.676883	0.945204	0.704643
7849	Other vehicles parts	0.579473	3.047392	1.14734	0.701716

SITC Code	Product Name	RCA	PCI	Opportunity Gain	Distance
7234	Construction & mining machinery	0.577472	2.880089	1.1384	0.711321
6210	Materials of rubber	0.576223	2.446306	0.96518	0.693393
7721	Switchboards, relays & fuses	0.570544	2.39834	0.946369	0.694442
8841	Lenses	0.549294	2.843837	0.890257	0.702127
6832	Worked nickel & nickel alloys	0.546196	3.21585	1.038825	0.732197
8749	Parts & accessories for meters & counters	0.545979	2.491608	0.855601	0.703079
8745	Scientific instruments N.E.S.	0.544954	2.890023	0.965249	0.715444
7431	Air pumps, vacuum pumps & compressors	0.543732	3.174369	1.156236	0.695727
5922	Glues	0.541002	1.712344	0.801278	0.69062
7499	Non-electric parts of machinery N.E.S.	0.529321	3.460437	1.146952	0.712331
7263	Type-setting machines	0.519017	2.852228	0.968652	0.707125
6572	Not coated bonded fibre fabrics	0.508809	2.257104	0.940436	0.676192
5827	Silicones	0.507721	3.827954	1.133222	0.716463
8743	Gas, liquid & electric control instruments	0.495438	2.84942	1.002348	0.721197
7251	Cellulose pulp making machines	0.495275	2.555121	0.845199	0.694234
6992	Metal chains	0.483844	2.654421	1.032937	0.700822
7810	Cars	0.480647	2.366179	0.859309	0.701328
8939	Miscellaneous articles of plastic	0.479181	1.908662	0.774519	0.681086
6991	Base metal locksmiths wares N.E.S.	0.478789	2.034568	0.848942	0.686703
7362	Metal forming machine-tools	0.470984	3.63039	1.043864	0.695556
6994	Metal springs	0.469815	2.747615	1.054344	0.704905
7782	Incandescent & fluorescent bulbs	0.465934	2.605118	0.90773	0.690402
7245	Weaving, knitting & yarn preparing machines	0.460483	2.604887	0.784725	0.660763
7436	Liquid & gas filters & purifiers	0.445748	2.624698	1.006306	0.704575
7421	Reciprocating pumps	0.443663	3.802406	1.153282	0.729533
7369	Metalworking machine-tools parts	0.442066	3.018106	1.100529	0.712973
8812	Movie cameras, projectors & parts	0.440492	2.154196	0.857717	0.706796
7783	Auto parts	0.425632	2.926593	1.076371	0.708774
7451	Non-electric powertools	0.425386	3.566527	1.131462	0.718026
6633	Non ceramic mineral materials N.E.S.	0.423257	2.033443	0.826927	0.698092
5989	Chemical products	0.417994	2.209607	0.927519	0.697584
7267	Other printing machines	0.410133	3.520872	0.92794	0.693323
6419	Converted paper N.E.S.	0.406902	2.244699	0.789567	0.712326
7741	Electro-medical equipment	0.394158	2.664274	0.981263	0.72226
5833	Polystyrene	0.392812	2.673341	0.954907	0.707393
6648	Mirrors	0.388312	2.973602	0.917752	0.707682
8741	Non-electrical navigating devices, compasses	0.384275	2.234179	0.815563	0.711732
7264	Printing presses	0.382833	3.569559	1.114375	0.707722
6993	Pins and needles	0.380047	1.973455	0.809439	0.669462

SITC Code	Product Name	RCA	PCI	Opportunity Gain	Distance
8989	Musical instrument parts	0.379093	2.823941	1.034819	0.708886
6649	Glass N.E.S.	0.376681	2.541541	0.995402	0.698721
7868	Not mechanically propelled vehicles N.E.S.	0.371724	2.603276	0.9531	0.707174
5824	Polyamides	0.36265	3.27223	1.172664	0.700253
7452	Non-electrical machines parts N.E.S.	0.362543	3.217425	0.938856	0.708922
7821	Trucks & vans	0.357558	1.928083	0.83372	0.684544
6635	Mineral wool N.E.S.	0.356703	2.479161	0.920503	0.718149
7442	Lifting & loading machinery	0.355833	2.867582	1.108217	0.703988
6253	Tires & pneumatic for aircraft	0.352884	2.089175	0.762793	0.689537
6747	Steel tinned sheets	0.352176	2.415244	0.851519	0.690773
5416	Glycosides & vaccines	0.349968	2.819195	0.977562	0.719224
7247	Cleaning & cutting textile machinery N.E.S.	0.347005	1.741433	0.844115	0.675102
7919	Railway track & vehicle parts N.E.S.	0.345756	2.694612	0.99411	0.704307
7259	Parts of paper making machines	0.345679	3.466794	1.112246	0.726117
6553	Elastic knitted fibres	0.32914	2.160708	0.896846	0.684155
7414	Non-domestic refrigerators & parts N.E.S.	0.32837	2.143868	0.818306	0.683529
5239	Inorganic chemical products	0.325536	1.905342	0.783085	0.703746
6639	Ceramic materials articles N.E.S.	0.323146	2.424112	0.831606	0.692371
7284	Specialized industry machinery & parts N.E.S	0.322545	4.265732	1.194496	0.719604
6571	Not coated articles of felt N.E.S.	0.321191	1.620583	0.750175	0.692988
6546	Glass fibre fabrics	0.313204	2.479868	0.936598	0.695903
5825	Polyurethanes	0.306828	2.647695	1.008402	0.705309
5836	Acrylic & methaacrylic polymers & copolymers	0.288994	2.781803	1.001576	0.694314
8928	Printed matter N.E.S.	0.288138	1.839556	0.837196	0.699
7781	Batteries	0.28652	1.993142	0.767252	0.680722
7423	Rotary pumps	0.279634	2.776983	0.977144	0.70679
7161	DC motors & generators	0.274038	3.430947	1.107965	0.712974
7281	Specialized industry machinery tools & parts N.E.S	0.271699	3.223707	1.007147	0.701253
5839	Other polymerization & copolymarization products	0.26486	2.544259	1.053843	0.713943
5335	Glazes, driers, putty	0.258813	2.404474	0.949893	0.694565
5419	Not medicaments pharmaceutical goods	0.251475	2.608675	0.967616	0.703526
7822	Special purpose trucks & vans	0.243894	1.607354	0.787736	0.706202
7412	Furnace burners, mechanical stokers & parts	0.241365	2.930359	1.00561	0.720662
7373	Welding, brazing & cutting machines & appliances N.E.S.	0.241125	4.012944	1.173496	0.723236
8742	Drawing & mathematical calculating instruments	0.23839	2.948852	1.092422	0.701609
7361	Metal cutting machine-tools	0.238254	3.597322	1.114219	0.696779
7132	Internal combustion engines for motor vehicles	0.221321	3.340801	1.213448	0.716803
7219	Agricultural machinery, appliances, & parts	0.217106	2.337674	0.87458	0.71324
7722	Printed circuits & parts N.E.S.	0.216545	2.125023	0.75727	0.67866

SITC Code	Product Name	RCA	PCI	Opportunity Gain	Distance
7269	Parts of printing press machines	0.215994	2.788898	1.003567	0.712296
2331	Synthetic rubber & latex	0.215266	3.243351	1.055254	0.716653
6641	Nonoptical balls, rods or tubes of glass	0.214704	2.405679	0.772685	0.695303
7762	Electronic valves & tubes	0.214322	3.015796	0.963723	0.730395
5851	Derivatives of natural rubber	0.211195	2.142797	0.850614	0.69286
7723	Electrical resistors	0.207193	2.245021	0.829581	0.695471
8813	Photo & movie equipment	0.191998	3.464435	0.939718	0.70679
6999	Other base metal manufactures N.E.S.	0.18902	1.89307	0.801371	0.709828
7434	Fans & parts N.E.S.	0.18713	3.063976	1.096152	0.705669
7415	Air conditioning machines	0.18563	2.719969	0.753162	0.706489
8959	Other office supplies	0.18343	2.450097	0.974257	0.712182
7212	Harvesting & threshing machines	0.179893	2.267721	0.903199	0.713842
7133	Internal combustion piston engines for ships & boats	0.179731	4.577717	1.111113	0.736056
8748	Electrical measuring & controlling instruments N.E.S.	0.176806	3.227188	1.037516	0.721969
7367	Working metal & metal carbides machines N.E.S.	0.176237	4.749872	1.004467	0.704095
8924	Postcards & stickers	0.165571	2.595715	0.93115	0.699209
8982	Musical instruments N.E.S.	0.164646	2.734804	0.874231	0.694978
5841	Regenerated cellulose	0.161686	2.267731	0.804797	0.708534
6647	Safety glass	0.153895	2.408562	0.906517	0.690592
8744	Nonmechanical or electrical instruments for physical analysis	0.14562	3.857507	1.152772	0.73369
8732	Non-electrical counting devices	0.137866	3.19775	0.990835	0.725994
7149	Parts of gas & reaction engines	0.128039	3.406246	1.046213	0.711358
8932	Plastic sanitary & toilet articles	0.12266	1.821822	0.776902	0.686546
5822	Aminoplasts	0.121734	2.989623	1.058615	0.7051
5829	Other condensation products	0.113636	3.295202	1.034343	0.711598
7441	Work trucks	0.112872	3.07405	1.116529	0.718976
8981	Pianos & string instruments	0.107532	3.002604	1.044655	0.705553
8996	Orthopaedic appliances	0.095151	2.772783	0.848401	0.718094
7842	Vehicle bodies	0.088338	2.974014	1.006024	0.72556
8935	Plastic lamps	0.083709	3.413487	1.061535	0.726151
7528	Data processing equipment N.E.S.	0.082321	2.785277	0.809046	0.71499
6891	Waste of unwrought tungsten and related metals	0.081547	3.015268	1.063996	0.713144
7621	Vehicles radio receivers	0.080885	2.462968	0.88612	0.685661
8121	Parts of not electrical heating equipment N.E.S.	0.078364	2.359647	0.861008	0.704043
6632	Abrasive powder	0.072711	3.232855	1.142088	0.709296
7599	Parts of cash registers & calculating machines	0.066871	2.780896	0.925952	0.708765
6412	Printing & writing paper in rolls or sheets	0.060757	2.413151	0.77209	0.697425
6591	Linoleum	0.052537	2.159147	0.80214	0.710476
8922	Newspapers & journals	0.050836	2.189876	0.847107	0.705496

SITC Code	Product Name	RCA	PCI	Opportunity Gain	Distance
7768	Parts N.E.S. of electronic circuits	0.048593	2.969498	0.862606	0.726391
5835	Copolymers of vinyl chloride & vinyl acetate	0.038892	3.167011	0.861155	0.715455
7861	Containers for transportation	0.033447	1.821896	0.752782	0.70505
8822	Photographic film, plates & paper	0.032224	3.370116	0.877414	0.73321
7784	Powertools & parts	0.028644	2.561422	0.877435	0.718751
7754	Shavers & hair clippers	0.027799	3.209042	0.916531	0.70846
451	Unmilled rye	0.010234	2.40833	0.774263	0.736602
7913	Mechanically propelled railway	0.009361	3.529621	1.091947	0.689985
7753	Dishwashers	0.002057	2.786033	0.981211	0.694842
113	Swine meat	0.000757	2.321198	0.821861	0.713719
7911	Electric trains	0.000131	2.808641	0.949309	0.689301
121	Other animal entrails	7.58E-05	2.217294	0.782267	0.699386
913	Pig and poultry lard and fat	0	2.143463	0.897777	0.706414

Annex Table 4. HS4 Categories With Opportunity Space of 0.75 or More

HS4 Code	Product Name	RCA	Opportunity Gain	Distance	Density
8484	Gaskets of metal sheeting, including sandwich type	0.7108	1.3214	0.7469	0.2531
8513	Portable battery and magneto-electric lamps	0.8446	1.3200	0.7535	0.2465
8514	Industrial electric resistance heated furnaces & oven	0.2115	1.2791	0.7538	0.2462
8478	Machinery for preparing or making up tobacco	0.3890	1.2703	0.7469	0.2531
9026	Equipment to measure or check liquid flow or level	0.1444	1.2423	0.7570	0.2430
9025	Thermometers, liquid-filled	0.4071	1.2368	0.7512	0.2488
9016	Balances of a sensitivity of 50 milligram or better	0.4521	1.2365	0.7470	0.2530
8474	Machines to sort, screen, wash stone, ores & minerals	0.6412	1.2358	0.7548	0.2452
3402	Anionic surface-active agents	0.1976	1.2290	0.7374	0.2626
8482	Bearings, ball	0.8850	1.2249	0.7507	0.2493
3907	Polyacetals, in primary forms	0.1973	1.2139	0.7297	0.2703
8413	Pumps dispensing fuel, lubricants in filling stations	0.5789	1.2138	0.7333	0.2667
7317	Nails/staples/etc, iron/steel, not office stationary	0.8480	1.2116	0.7272	0.2728
8426	Gantry and overhead travelling cranes on fixed support	0.0338	1.2113	0.7473	0.2527
8412	Reaction engines other than turbo jets	0.7333	1.2088	0.7430	0.2570
3905	Polyvinyl acetate, in aqueous dispersion, primary for	0.3074	1.2063	0.7387	0.2613
8483	Transmission shafts and cranks, cam and crank shafts	0.8417	1.1966	0.7356	0.2644
9208	Musical boxes	0.3330	1.1927	0.7208	0.2792
3704	Photographic plate, film, paper, exposed, undeveloped	0.0128	1.1920	0.7486	0.2514
8206	Sets of hand tools, retail	0.6451	1.1918	0.7230	0.2770
8465	Multi-purpose machines for wood etc work	0.4959	1.1900	0.7438	0.2562
3809	Finishing agents & dye carriers, amylaceous	0.6448	1.1895	0.7390	0.2610
3814	Organic composite solvents, paint, varnish remover et	0.5235	1.1877	0.7392	0.2608
8208	Blades for metal working machines	0.5672	1.1875	0.7547	0.2453
7506	Plates, sheet, strip and foil, nickel, not alloyed	0.1837	1.1813	0.7473	0.2527
3909	Urea resins, thiourea resins, in primary forms	0.4936	1.1802	0.7492	0.2508
8480	Boxes, moulding, for metal foundry	0.8223	1.1796	0.7313	0.2687
2928	Organic derivatives of hydrazine or of hydroxylamine	0.9140	1.1726	0.7598	0.2402
8457	Machining centres, for working metal	0.2758	1.1677	0.7316	0.2684
8466	Tool holders, self-opening dieheads, for machine tool	0.4288	1.1650	0.7443	0.2557
8201	Spades and shovels	0.1937	1.1556	0.7348	0.2652
8602	Rail locomotives, diesel-electric	0.0089	1.1542	0.7210	0.2790
8456	Laser, light and photon beam process machine tools	0.1046	1.1523	0.7426	0.2574
9021	Artificial joints	0.7648	1.1464	0.7568	0.2432
8523	Unrecorded magnetic tapes, width < 4 mm	0.0348	1.1449	0.7471	0.2529
3820	Anti-freezing preps and prepared de-icing fluids	0.3463	1.1394	0.7449	0.2551
3910	Silicones in primary forms	0.6073	1.1388	0.7437	0.2563

HS4 Code	Product Name	RCA	Opportunity Gain	Distance	Density
6814	Mica plates, sheets and strips	0.4391	1.1190	0.7373	0.2627
9030	Instruments to measure or detect ionising radiations	0.1929	1.1172	0.7425	0.2575
9011	Stereoscopic microscopes	0.1096	1.1136	0.7604	0.2396
8101	Powders, tungsten (wolfram)	0.2636	1.1132	0.7345	0.2655
8407	Aircraft engines, spark-ignition	0.5943	1.1023	0.7380	0.2620
8606	Railway tank cars	0.3703	1.1010	0.7357	0.2643
8461	Metal planing machines	0.4627	1.1005	0.7326	0.2674
9023	Instruments, apparatus and models, for demonstration	0.4093	1.0967	0.7423	0.2577
8453	Machinery to prepare, tan, work hides, skins, leather	0.8679	1.0948	0.7304	0.2696
8504	Ballasts for discharge lamps or tubes	0.2244	1.0903	0.7375	0.2625
8476	Automatic food-vendors with heating or refrigeration	0.6225	1.0895	0.7304	0.2696
7225	Flat rolled silicon-electrical steel, width >600mm	0.8140	1.0766	0.7496	0.2504
8707	Bodies for passenger carrying vehicles	0.5718	1.0762	0.7298	0.2702
9024	Machines for testing mechanical properties of metals	0.3176	1.0758	0.7419	0.2581
6804	Stones for milling, grinding or pulping	0.0737	1.0687	0.7359	0.2641
8460	Num controlled surface grinders, accurate to 0.01mm	0.3159	1.0673	0.7357	0.2643
8419	Instantaneous gas water heaters	0.6223	1.0643	0.7337	0.2663
7106	Silver powder	0.2615	1.0599	0.7424	0.2576
3918	Floor, wall, ceiling cover, roll, tile, vinyl chlorid	0.2543	1.0584	0.7303	0.2697
8459	Way-type unit head machines, metal working	0.2679	1.0484	0.7346	0.2654
5909	Textile hosepiping and similar textile tubing	0.8157	1.0479	0.7322	0.2678
8455	Tube mills, metal rolling	0.0331	1.0451	0.7674	0.2326
8427	Self-propelled works trucks, electric motor	0.2847	1.0405	0.7305	0.2695
8481	Valves, pressure reducing	0.7888	1.0394	0.7247	0.2753
8207	Rock drilling, boring heads of sintered metal, carbide	0.4307	1.0385	0.7523	0.2477
3001	Glands and other organs, dried, for therapeutic uses	0.3291	1.0367	0.7483	0.2517
3908	Polyamide-6, -11, -12, -6,6, -6,9, -6,10 or -6,12	0.4743	1.0347	0.7185	0.2815
8537	Electrical control and distribution boards, < 1kV	0.8060	1.0321	0.7258	0.2742
2929	Isocyanates	0.9942	1.0316	0.7226	0.2774
8428	Lifts and skip hoists	0.5996	1.0300	0.7443	0.2557
8542	Monolithic integrated circuits, digital	0.2594	1.0287	0.7400	0.2600
3606	Lighter refill fuels (pack < 300 cc)	0.0466	1.0285	0.7637	0.2363
8439	Machinery for pulping fibrous cellulosic material	0.7633	1.0268	0.7348	0.2652
8408	Marine propulsion engines, diesel	0.8348	1.0242	0.7251	0.2749
8418	Combined refrigerator-freezers, two door	0.8366	1.0227	0.7339	0.2661
2850	Hydrides, nitrides, azides, silicides and borides	0.1137	1.0222	0.7358	0.2642
8458	Horizontal numerically controlled metal work lathes	0.2541	1.0210	0.7379	0.2621
3811	Anti-knock preparations based on lead compounds	0.9947	1.0203	0.7237	0.2763
8479	Machines for public works, building etc, nes	0.3590	1.0196	0.7189	0.2811

HS4 Code	Product Name	RCA	Opportunity Gain	Distance	Density
7218	Ingots and other primary forms, stainless steel	0.9899	1.0106	0.7152	0.2848
5910	Transmission or conveyor belts or belting of textile	0.3320	1.0069	0.7476	0.2524
4001	Natural rubber latex, including prevulcanised	0.1943	1.0060	0.7401	0.2599
2849	Calcium carbide	0.3628	1.0053	0.7511	0.2489
8423	Personal weighing machines, baby & household scales	0.2686	1.0051	0.7315	0.2685
8420	Calendering or rolling machines, not. for metals/glass	0.5509	1.0040	0.7419	0.2581
7319	Needles, sewing, darning or embroidery, iron or steel	0.4651	1.0031	0.7327	0.2673
8511	Spark plugs	0.2076	1.0027	0.7361	0.2639
7606	Pure aluminium rectangular plate/sheet/strip, t >0.2m	0.3343	0.9995	0.7198	0.2802
8415	Air conditioners window/wall types, self-contained	0.3003	0.9973	0.7511	0.2489
8546	Electrical insulators of glass	0.5345	0.9968	0.7344	0.2656
5501	Filament tow of nylon, polyamides	0.0021	0.9936	0.7542	0.2458
3707	Sensitising emulsions	0.8126	0.9916	0.7197	0.2803
8425	Electric hoists (except skip and vehicle hoists)	0.5774	0.9898	0.7205	0.2795
7224	Ingots, primary forms of alloy steel, except stainless	0.2695	0.9867	0.7267	0.2733
5908	Textile wicks, gas mantles	0.2401	0.9858	0.7294	0.2706
2815	Sodium hydroxide (caustic soda) solid	0.6448	0.9843	0.7386	0.2614
9103	Clocks with watch movements, battery (except vehicle)	0.0570	0.9807	0.7232	0.2768
9031	Machines for balancing mechanical parts, nes	0.4959	0.9776	0.7447	0.2553
8603	Self-propelled railway cars, external electric power	0.0964	0.9776	0.7523	0.2477
3821	Prepared culture media for developing micro-organisms	0.1241	0.9770	0.7503	0.2497
8708	Bumpers and parts thereof for motor vehicles	0.4413	0.9756	0.7419	0.2581
6805	Abrasive powder or grain on woven textile support	0.3431	0.9746	0.7436	0.2564
8462	Machine tools to forge, stamp, hammer or press metals	0.4070	0.9720	0.7219	0.2781
4005	Compounded (carbon black, silica) unvulcanised rubber	0.3988	0.9714	0.7358	0.2642
8112	Beryllium, unwrought, waste or scrap/powders	0.1074	0.9709	0.7537	0.2464
3911	Petroleum resins, coumarone, indene, polyterpenes	0.7241	0.9705	0.7355	0.2645
8501	Electric motors of an output < 37.5 watts	0.9336	0.9703	0.7217	0.2783
9020	Breathing appliances and gas masks	0.0932	0.9696	0.7499	0.2501
6908	Glazed ceramic mosaic tiles, cubes & similar <7cm wid	0.1334	0.9696	0.7422	0.2578
9019	Massage and psychological aptitude-test apparatus	0.0803	0.9665	0.7621	0.2379
2811	Hydrogen fluoride (hydrofluoric acid)	0.7561	0.9635	0.7646	0.2354
8443	Reel fed offset printing machinery	0.6671	0.9609	0.7171	0.2829
8406	Steam and vapour turbines for marine propulsion	0.7471	0.9597	0.7383	0.2617
6803	Worked slate, articles of slate or agglomerated slate	0.7331	0.9587	0.7152	0.2848
4008	Plate, sheet, strip of vulcanised cellular rubber	0.5307	0.9577	0.7285	0.2715
3505	Dextrins and other modified starches	0.3488	0.9564	0.7243	0.2757
8441	Cutting machines for paper pulp, paper or paperboard	0.4390	0.9552	0.7373	0.2627
8463	Draw-benches for bars, tubes, profiles wire etc	0.1071	0.9543	0.7051	0.2949

HS4 Code	Product Name	RCA	Opportunity Gain	Distance	Density
5602	Needleloom felt and stitch-bonded fibre fabric	0.4969	0.9532	0.7132	0.2868
8538	Electrical boards, panels, etc, not equipped	0.5414	0.9523	0.7306	0.2694
3902	Polypropylene in primary forms	0.4254	0.9475	0.7289	0.2711
8442	Photo-typesetting and composing machines	0.0803	0.9443	0.7306	0.2694
3815	Supported catalysts, nickel based	0.8408	0.9391	0.7308	0.2692
8706	Motor vehicle chassis fitted with engine	0.0853	0.9379	0.7433	0.2567
7211	Hot box roll iron or non-alloy steel, flat, w 150-600mm, t >4mm, myp>35	0.6739	0.9356	0.7223	0.2777
3506	Glues and adhesives of all kinds, package <1 kg	0.4906	0.9321	0.7449	0.2551
7228	Bar/rod of high speed steel not in coils	0.2349	0.9293	0.7157	0.2843
8421	Cream separators	0.3667	0.9284	0.7322	0.2678
8522	Pick-up cartridges	0.2856	0.9273	0.7345	0.2655
4907	Documents of title (bonds etc), unused stamps etc	0.1170	0.9252	0.7134	0.2866
7504	Nickel powders and flakes	0.4177	0.9250	0.7441	0.2559
9028	Gas supply/production/calibration meters	0.1608	0.9196	0.7400	0.2600
4015	Rubber surgical gloves	0.8391	0.9183	0.7280	0.2720
8525	Transmission apparatus for radio, telephone and TV	0.0251	0.9179	0.7276	0.2724
4903	Childrens picture, drawing or colouring books	0.0051	0.9175	0.7677	0.2323
7314	Woven products of stainless steel	0.4920	0.9168	0.7155	0.2845
7904	Zinc bars, rods, profiles and wire	0.0052	0.9152	0.7296	0.2704
7204	Waste or scrap, of cast iron	0.3925	0.9149	0.7322	0.2678
3005	Medical dressings etc. having an adhesive layer	0.6551	0.9137	0.7337	0.2663
9204	Accordions and similar instruments	0.0852	0.9135	0.7123	0.2877
8102	Molybdenum, powder	0.0589	0.9120	0.7182	0.2818
7001	Glass cullet, waste or scrap, glass in the mass	0.2802	0.9117	0.7364	0.2636
3904	Polyvinyl chloride in primary forms	0.3635	0.9103	0.7170	0.2830
8422	Dish washing machines (domestic)	0.3085	0.9092	0.7179	0.2821
3214	Mastics, painters fillings	0.7445	0.9022	0.7304	0.2696
5904	Linoleum	0.2306	0.8978	0.7448	0.2552
9009	Electrostatic photo-copyers, direct process	0.0108	0.8964	0.7696	0.2304
7008	Multiple-walled insulating units of glass	0.3804	0.8931	0.7392	0.2608
9114	Clock or watch springs, including hair-springs	0.0286	0.8891	0.7524	0.2476
9507	Fishing rods	0.2588	0.8857	0.7414	0.2586
7607	Foil, aluminium, not backed, rolled but nfw, < 0.2mm	0.2246	0.8853	0.7154	0.2846
8432	Ploughs	0.1361	0.8843	0.7418	0.2582
3004	Penicillins and streptomycins, derivs, in dosage	0.3586	0.8829	0.7264	0.2736
5905	Textile wall coverings	0.2872	0.8807	0.7287	0.2713
9017	Drafting tables and machines	0.3176	0.8801	0.7311	0.2689
8437	Machines to clean, sort, grade seed,grain, dry legume	0.5272	0.8797	0.7307	0.2693
9611	Hand printing, dating and numbering devices, etc	0.0566	0.8771	0.7312	0.2688

HS4 Code	Product Name	RCA	Opportunity Gain	Distance	Density
8510	Shavers, with self-contained electric motor	0.7508	0.8768	0.7252	0.2748
9010	Equipment for automatic development of photo film	0.0673	0.8754	0.7714	0.2286
3706	Cinematograph film, exposed and developed, width >35m	0.0646	0.8753	0.7546	0.2454
9503	Electric trains, train sets, etc	0.0534	0.8747	0.7313	0.2687
8411	Turbo-jet engines of a thrust < 25 KN	0.5355	0.8722	0.7327	0.2673
9206	Percussion musical instruments	0.0370	0.8703	0.7319	0.2681
8532	Fixed power capacitors (50/60 herz circuits)	0.2238	0.8686	0.7274	0.2726
9004	Sunglasses	0.1902	0.8654	0.7120	0.2880
9029	Revolution counters/taximeters/mileometers/ pedometers	0.2146	0.8644	0.7477	0.2523
9006	Cameras for preparing printing plates or cylinders	0.4021	0.8636	0.7571	0.2429
3303	Perfumes and toilet waters	0.2474	0.8634	0.7228	0.2772
7108	Gold powder non-monetary	0.0050	0.8625	0.7512	0.2488
8107	Cadmium, unwrought, waste or scrap, powders	0.0345	0.8624	0.7333	0.2667
3822	Composite diagnostic or laboratory reagents, nes	0.4061	0.8621	0.7326	0.2674
8539	Sealed beam lamp units	0.2390	0.8621	0.7208	0.2792
8536	Electrical fuses, for < 1,000 volts	0.5694	0.8611	0.7367	0.2633
8485	Ships or boats propellers and blades thereof	0.5177	0.8607	0.7242	0.2758
8464	Sawing machines for stone, ceramics and glass	0.4638	0.8589	0.7285	0.2715
5703	Carpets of wool or fine animal hair, tufted	0.3576	0.8569	0.7297	0.2703
8502	Generating sets, diesel, output < 75 kVA	0.6928	0.8520	0.7158	0.2842
8505	Metal permanent magnets, articles intended as magnets	0.0867	0.8516	0.7221	0.2779
9001	Optical fibres, except for telecommunications	0.0913	0.8513	0.7173	0.2827
8438	Bakery and pasta making machinery	0.4228	0.8506	0.7391	0.2609
8530	Electric signal, safety & traffic controls, railway	0.1297	0.8483	0.7257	0.2743
7507	Tubes and pipe, nickel, not alloyed	0.2425	0.8482	0.7324	0.2676
8435	Presses, crushers etc for wine, fruit juice, beverage	0.2064	0.8468	0.7416	0.2584
8715	Baby carriages and parts thereof	0.1974	0.8461	0.7376	0.2624
1501	Lard, other pig fat and poultry fat, rendered	0.0000	0.8461	0.7322	0.2678
2939	Opium alkaloids, their derivs, in bulk, salts thereof	0.4607	0.8417	0.7235	0.2765
9109	Clock movements, complete and assembled, battery/alar	0.7417	0.8407	0.7243	0.2757
1105	Potato flour or meal	0.4300	0.8383	0.7329	0.2671
3925	Plastic reservoirs, tanks, vats, etc, capacity <300l	0.4517	0.8370	0.7236	0.2764
7411	Pipes or tubes, refined copper	0.2763	0.8360	0.7101	0.2899
8509	Domestic vacuum cleaners	0.0256	0.8352	0.7307	0.2693
8702	Diesel powered buses	0.4590	0.8345	0.7300	0.2700
8446	Machines for weaving fabric, width < 30 cm	0.0715	0.8321	0.7116	0.2884
9014	Direction finding compasses	0.6277	0.8315	0.7428	0.2572
8548	Electrical parts of machinery and apparatus, nes	0.0001	0.8285	0.7234	0.2766
3403	Lubricant <70% petroleum oil, textile or leather use	0.5677	0.8268	0.7294	0.2706

HS4 Code	Product Name	RCA	Opportunity Gain	Distance	Density
3912	Cellulose acetates, non-plasticised, in primary forms	0.2115	0.8232	0.7253	0.2747
7615	Aluminium table/kitchen/household articles, scourers	0.8767	0.8232	0.7220	0.2780
7006	Cast, drawn or float glass sheet, edge worked or bent	0.1616	0.8211	0.7210	0.2790
1506	Animal fats, oils, fractions not chemically modified ne	0.4076	0.8207	0.7355	0.2645
7605	Wire, aluminium, not alloyed, t > 7mm	0.3890	0.8202	0.7174	0.2826
7321	Cooking appliances for gas fuel, etc, iron or steel	0.0772	0.8189	0.7373	0.2627
4813	Paper, cigarette, in the form of booklets or tubes	0.6279	0.8185	0.7242	0.2758
9101	Wrist-watch, precious metal, battery, with hands	0.0850	0.8185	0.7199	0.2801
3406	Candles, tapers and the like	0.1306	0.8158	0.7298	0.2702
2918	Lactic acid, its salts & esters	0.6903	0.8153	0.7082	0.2918
7223	Wire of stainless steel	0.2585	0.8134	0.7268	0.2732
3817	Mixed alkylbenzenes, nes	0.0035	0.8122	0.7363	0.2637
8541	Diodes, except photosensitive and light emitting	0.0296	0.8115	0.7239	0.2761
8450	Automatic washing machines, of a dry capacity < 10 kg	0.4293	0.8114	0.7249	0.2751
8440	Book-binding machinery including book-sewing machines	0.6706	0.8092	0.7360	0.2640
4004	Waste, parings and scrap (except hard rubber)	0.2374	0.8087	0.7167	0.2833
3507	Rennet and concentrates thereof	0.2126	0.8079	0.7400	0.2600
8416	Furnace burners for liquid fuel	0.8491	0.8078	0.7073	0.2927
7612	Aluminium containers, collapsible tubular	0.7421	0.8061	0.7391	0.2609
5404	Synthetic monofilament, >67 dtex, thickness < 1mm	0.6055	0.8037	0.7200	0.2800
3504	Peptones, proteins and derivatives, nes, hide powder	0.5985	0.8026	0.7294	0.2706
8424	Fire extinguishers, whether or not charged	0.2973	0.8022	0.7247	0.2753
7405	Master alloys of copper	0.2949	0.8014	0.7385	0.2615
8703	Snowmobiles, golf cars, similar vehicles	0.3557	0.8012	0.7156	0.2844
203	Swine carcasses and half carcasses, fresh or chilled	0.0007	0.7994	0.7350	0.2650
8507	Lead-acid electric accumulators (vehicle)	0.0290	0.7993	0.7406	0.2594
7003	Cast glass sheet, coloured absorbent reflect or opaque	0.0672	0.7983	0.7440	0.2560
9302	Revolvers and pistols	0.0162	0.7981	0.7194	0.2806
4901	Brochures, leaflets and similar, in single sheets	0.0540	0.7975	0.7344	0.2656
8210	Hand-operated appliances, food preparation, <10kg	0.0891	0.7968	0.7027	0.2973
8430	Pile-drivers and pile-extractors	0.6467	0.7968	0.7344	0.2656
8704	Dump trucks designed for off-highway use	0.2374	0.7917	0.7375	0.2625
2842	Double or complex silicates of metals	0.2810	0.7906	0.7104	0.2896
3806	Rosin and resin acids	0.0783	0.7899	0.7381	0.2619
7227	Bar/rod, of high speed steel, irregular coils	0.1577	0.7885	0.7323	0.2677
8506	Manganese dioxide primary cell/battery volume < 300 c	0.3206	0.7868	0.7152	0.2848
4811	Paper, tarred, bituminised or asphalted, nes	0.2431	0.7854	0.7518	0.2482
5903	Fabric impregnated, coated, covered with pvc plastic	0.0362	0.7834	0.7346	0.2654
8529	Aerials and aerial reflectors	0.2820	0.7819	0.7378	0.2622

HS4 Code	Product Name	RCA	Opportunity Gain	Distance	Density
8402	Water tube boilers, steam production < 45T per hour	0.0877	0.7809	0.7248	0.2752
1002	Rye	0.0094	0.7764	0.7603	0.2397
7226	Flat rolled silicon-electrical steel, <600mm wide	0.0251	0.7762	0.7131	0.2869
3501	Casein	0.5766	0.7758	0.7386	0.2614
8215	Cutlery sets plated with precious metal	0.3775	0.7755	0.7189	0.2811
8535	Electrical fuses, for voltage > 1kV	0.4123	0.7751	0.7272	0.2728
7210	Flat rolled iron or non-alloy steel, coated with tin, w >600mm, t >0.5m	0.7358	0.7742	0.7333	0.2667
2825	Hydrazine and hydroxylamine, inorganic salts	0.5577	0.7741	0.7134	0.2866
9610	Slates/boards with writing or drawing surfaces	0.0937	0.7732	0.7274	0.2726
9301	Military weapons, other than hand guns, swords, etc	0.0002	0.7725	0.7354	0.2646
9013	Telescopes for arms/other equipment, periscopes	0.1257	0.7723	0.7346	0.2654
3605	Matches	0.2105	0.7718	0.7304	0.2696
3903	Polystyrene, expansible in primary forms	0.3007	0.7717	0.7048	0.2952
8716	Trailers for housing or camping	0.2051	0.7716	0.7309	0.2691
8712	Bicycles, other cycles, not motorized	0.8513	0.7714	0.7320	0.2680
7002	Glass balls except microspheres < 1mm diameter	0.0455	0.7706	0.7051	0.2949
2925	Saccharin, salts	0.9582	0.7703	0.7334	0.2666
4815	Floor coverings on a base of paper	0.4441	0.7688	0.7016	0.2984
5403	Hi-ten yarn not sewing, viscose rayon, not retail	0.4188	0.7667	0.7148	0.2852
3917	Sausage casings of hardened protein, cellulose	0.9080	0.7627	0.7191	0.2809
3701	X-ray plates and films	0.0058	0.7623	0.7625	0.2375
4703	Chem wood pulp, soda or sulphate, conifer, unbleached	0.1140	0.7618	0.7509	0.2491
8434	Milking machines	0.4084	0.7612	0.7300	0.2700
8301	Padlocks of base metal	0.5204	0.7611	0.7228	0.2772
7409	Plate, sheet, strip, refined copper, coil, t > 0.15mm	0.1712	0.7597	0.7220	0.2780
4807	Paper, laminated with bitumen tar or asphalt, uncoated	0.0675	0.7596	0.7277	0.2723
5506	Staple fibres nylon, polyamides, carded or combed	0.2109	0.7588	0.7077	0.2923
3810	Metal pickling preps, solder and brazing flux, etc.	0.7217	0.7581	0.7412	0.2588
9401	Seats, aircraft	0.3173	0.7557	0.7285	0.2715
8508	Drills, hand-held, with self-contained electric motor	0.1234	0.7534	0.7423	0.2577
5601	Sanitary towels, diapers and similar articles	0.3691	0.7523	0.7242	0.2758
3818	Chemical element/compound wafers doped for electronic	0.6716	0.7500	0.7281	0.2719

Annex Table 5. HS4 Categories Organised in Descending Order of Density, Up To Density 0.41

HS	Product Name	RCA	Opportunity Gain	Density
5306	Flax yarn single	1.11303	0	0.944865
5309	Woven fabric, >85% flax, unbleached or bleached	30.3857	0	0.699865
5302	True hemp fibre, raw or retted	2.77804	0	0.662167
501	Hair, human, unworked, waste of human hair	36.3395	0	0.630222
1203	Copra	9.58757	0	0.577609
9203	Harmoniums, pipe organs, etc	6.39884	0	0.561547
2934	Heterocyclic compounds with an unfused thiazole ring	1.19079	0	0.517177
2605	Cobalt ores and concentrates	1.77318	0	0.510207
2609	Tin ores and concentrates	1.33033	0	0.506286
5512	Woven fabric >85% polyester staple fibre unbl/bleache	1.15136	0	0.488318
7118	Coin (other than gold coin) not being legal tender	1.55404	0	0.48139
5304	Sisal and Agave, raw	19.6062	0	0.471381
6212	Brassieres and parts thereof	1.75316	0	0.466012
6301	Electric blankets of textile material	6.23654	0	0.465723
8305	Office binder/file fittings, of base metal	2.36138	0	0.458468
908	Nutmeg	13.8030	0	0.458205
1508	Ground-nut oil, crude	2.69758	0	0.455726
5207	Cotton yarn (except sewing thread) >85% cotton, retai	4.28204	0	0.453296
2932	Tetrahydrofuran	1.72399	0	0.4522
5208	Plain weave cotton, >85% <100 g/m2, unbleached	3.70756	0	0.450752
2513	Pumice stones, crude or in irregular pieces	17.2564	0	0.450699
5609	Articles of yarn strip, twine, cordage or rope, nes	22.2489	0	0.448353
5205	Cotton yarn >85% single uncombed >714 dtex,not retail	2.69067	0	0.448216
904	Pepper of the genus Piper, whole	10.2339	0	0.447923
2941	Penicillins, derivatives, in bulk, salts	24.6770	0	0.446136
6501	Hat-forms, etc of felt, not shaped, no formed brim	1.62149	0	0.445293
4105	Sheep or lamb skin leather, vegetable pre-tanned	17.2860	0	0.444058
8109	Zirconium, unwrought, waste or scrap, powders	2.28544	0	0.443795
6802	Stone mosaic tiles, artificial coloured chips etc	2.15767	0	0.443381
5204	Cotton sewing thread >85% cotton, not retail	15.4556	0	0.439415
5515	Woven fabric polyester + viscose rayon, nes	1.34690	0	0.438979
1301	Lac	5.87534	0	0.436724
6217	Clothing accessories nes, textile material, not knit	2.19781	0	0.435886
5406	Yarn of synthetic filament not sewing thread, retail	2.39929	0	0.434382
7202	Ferro-manganese, >2% carbon	3.00307	0	0.432143
801	Coconuts, fresh or dried	6.70151	0	0.431164
5807	Label, badge, etc, of woven textile not embroidered	1.10108	0	0.4311

HS	Product Name	RCA	Opportunity Gain	Density
902	Tea, green (unfermented) in packages < 3 kg	5.52038	0	0.430491
2613	Molybdenum concentrates, roasted	2.84020	0	0.429924
5113	Woven fabric of coarse animal hair or horse hair	7.47459	0	0.429758
8214	Paper knives, letter openers, pencil sharpeners etc	1.19803	0	0.428057
1006	Rice in the husk (paddy or rough)	16.0871	0	0.427593
5201	Cotton, not carded or combed	9.11481	0	0.426394
7322	Radiators and parts thereof, cast iron	2.83161	0	0.424821
6110	Pullovers, cardigans etc of wool or hair, knit	6.10782	0	0.424677
4205	Articles of leather and composition leather, nes	1.81737	0	0.424101
4601	Plaits and products of plaiting materials	1.47181	0	0.423457
9613	Pocket lighters, gas-fuelled, non-refillable	2.87888	0	0.421495
6116	Gloves impregnated or coated with plastic, rubber, kni	1.07317	0	0.421045
2923	Choline, salts	2.77164	0	0.419948
5503	Staple fibres of nylon, polyamides, not carded, combe	6.11444	0	0.419491
6102	Womens, girls overcoats, etc, of wool or hair, knit	2.49688	0	0.418464
703	Onions and shallots, fresh or chilled	3.14660	0	0.41751
5809	Woven fabric incorporating metal threads, nes	8.92046	0	0.417391
5803	Cotton gauze > 30 cm wide	1.00381	0	0.417366
5209	Plain weave cotton, >85% >200g/m2, unbleached	1.02342	0	0.417109
5210	Plain weave cotton <85% +manmade fibre <200g unbleach	2.10656	0	0.416689
712	Potatoes, dried, not further prepared	1.77996	0	0.413856
2817	Zinc oxide and peroxide	1.73667	0	0.413226
5002	Raw silk (not thrown)	12.4466	0	0.413078
4012	Retreaded tyres	3.66020	0	0.412998
6906	Ceramic pipes, conduits, guttering and fittings	2.05821	0	0.412924
204	Lamb carcasses and half carcasses, fresh or chilled	1.30876	0	0.411421
6104	Womens, girls suits, of wool or hair, knit	5.37385	0	0.411014
2516	Granite, crude or roughly trimmed	21.1178	0	0.41098
6207	Mens, boys underpants or briefs, of cotton, not knit	6.05443	0	0.410633
2511	Natural barium sulphate (barytes)	10.5156	0	0.410245

Annex Table 6. Agriculture products (including fish) with exports above US$ 100 million in 2016-17

HS4 Code	Product Name	Opportunity Gain	Distance	Density	Exports 2016-17 US$ Million
1006	**Rice in the husk (paddy or rough)**	0	**0.572407**	**0.427593**	**5,733.79**
306	Rock lobster and other sea crawfish, frozen	0	0.606268	0.393732	3,777.04
202	Bovine carcasses and half carcasses, frozen	0	0.59146	0.40854	3,729.40
5201	**Cotton, not carded or combed**	0	**0.573606**	**0.426394**	**1,536.58**
1701	Raw sugar, cane	0	0.624346	0.375654	1,285.06
904	**Pepper of the genus Piper, whole**	**0**	**0.552077**	**0.447923**	**947.69**
801	**Coconuts, fresh or dried**	**0**	**0.568836**	**0.431164**	**883.76**
1202	Ground-nuts in shell not roasted or cooked	0	0.595199	0.404801	809.6
1302	Opium sap	0	0.620141	0.379859	767.4
307	Oysters	0	0.61699	0.38301	726.43
902	Tea, green (unfermented) in packages < 3 kg	0	0.569509	0.430491	686.1
303	Salmon, Pacific, frozen, whole	0	0.626022	0.373978	678.06
1515	Linseed oil, crude	0	0.649693	0.350307	663.95
2401	Tobacco, unmanufactured, not stemmed or stripped	0	0.616726	0.383275	634.37
3301	Essential oils of bergamot	0.298972	0.68709	0.31291	625.11
901	Coffee, not roasted, not decaffeinated	-0.23775	0.647876	0.352124	558.17
2304	Soya-bean oil-cake and other solid residues	0.199268	0.721791	0.278209	554.9
703	**Onions and shallots, fresh or chilled**	**0**	**0.58249**	**0.41751**	**499.28**
1207	Palm nuts and kernels	0	0.615475	0.384525	441.06
910	Ginger	0	0.606499	0.393501	436.05
909	Anise or badian seeds	0	0.599262	0.400738	412.99
2101	Coffee extracts, essences, concentrates, preparations	0	0.656137	0.343863	347.6
1905	Crispbread	0.281819	0.703616	0.296384	343.18
806	Grapes, fresh	0	0.632632	0.367368	309.32
1605	Crab, prepared or preserved	0	0.626027	0.373973	277.14
1211	Liquorice roots	0	0.618065	0.381935	274.07
2905	Methyl alcohol	0	0.642758	0.357242	266.93
2306	Cotton seed oil-cake and other solid residues	0	0.675364	0.324636	247.52
2309	Dog or cat food (retail)	0.436664	0.718798	0.281202	234.84
2403	Cigarette or pipe tobacco and tobacco substitute mixe	0	0.666151	0.333849	224.55
2106	Protein concentrates and textured protein substances	0.290765	0.705696	0.294304	215.71
804	Dates, fresh or dried	-0.28155	0.643039	0.356961	208.33
713	Peas dried, shelled	0	0.604521	0.395479	191.21
3823	Prepared binders for foundry moulds or cores	0.407013	0.710107	0.289893	178.98
304	Fish fillet or meat, fresh or chilled, not liver, roe	-0.05391	0.681127	0.318874	169.78
704	Cauliflowers and headed broccoli, fresh or chilled	0.101877	0.672497	0.327503	158.77
709	Globe artichokes, fresh or chilled	-0.1231	0.665711	0.334289	154.67

HS4 Code	Product Name	Opportunity Gain	Distance	Density	Exports 2016-17 US$ Million
1005	Maize (corn) seed	0.160276	0.701534	0.298466	153.26
2208	Compound alcoholic preps for beverage manufacture	0.203421	0.710621	0.289379	148.7
2001	Cucumbers, gherkins, prepared or preserved by vinegar	0	0.653428	0.346572	138.72
2007	Homogenised jams, jellies, etc	0	0.681039	0.318961	135.67
2008	Ground-nuts otherwise prepared or preserved	-0.10892	0.66509	0.33491	130.14
204	**Lamb carcasses and half carcasses, fresh or chilled**	**0**	**0.588579**	**0.411421**	**129.62**
206	Bovine edible offal, fresh or chilled	0.328191	0.709896	0.290105	119.68
908	**Nutmeg**	**0**	**0.541795**	**0.458205**	**113.26**
1201	Soya beans	0.057	0.701357	0.298643	112.92
1704	Chewing gum containing sugar, except medicinal	0.134075	0.692244	0.307756	108.78
810	Strawberries, fresh	-0.15973	0.667052	0.332948	107.58
1806	Cocoa powder, sweetened	0.536795	0.723325	0.276675	106.68
1901	Infant foods of cereals, flour, starch or milk, retai	0.388481	0.724375	0.275625	102.57
2207	Undenatured ethyl alcohol > 80% by volume	0.138074	0.700682	0.299319	101.31

Notes: The highlighted products in this Table are those with density of 0.41 or above.

About the Impact Series

Brookings India's fundamental objective is to contribute meaningfully to the process of designing solutions for India's policy problems. We aspire to do this in a way which fully reflects the core values of analytical quality and independence of views. We believe that policy recommendations based on these two attributes are most likely to have a positive impact on outcomes.

Since we began our activities in 2013, we have been active in three broad domains: Economic Development, Foreign Policy, and Energy & Sustainability. We have initiated research on several issues within these domains and, simultaneously, organised a regular series of conversations between various stakeholders, who bring their particular perspective to the discussions in a constructive way. These activities have helped us to understand the nature of specific problems in each domain, gauge the priority of the problem in terms of India's broad development and security agenda and develop a network of people who think deeply about these issues.

In this series of policy papers, the authors offer concrete recommendations for action on a variety of policy issues, emerging from succinct problem statements and diagnoses. We believe that these papers will both add value to process of policy formulation and to the broader public debate amongst stakeholders, as opinion converges on practical and effective solutions.

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