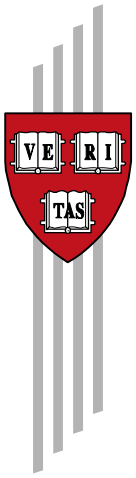
A Roadmap for Investment Promotion and Export Diversification: The Case of Jordan

Ricardo Hausmann, Patricio Goldstein, Ana Grisanti, Tim O'Brien, Jorge Tapia, and Miguel Angel Santos

CID Faculty Working Paper No. 374
December 2019



Working Papers
Center for International Development at Harvard University

A Roadmap for Investment Promotion and Export Diversification: The Case of Jordan

Ricardo Hausmann, Patricio Goldstein, Ana Grisanti, Tim O'Brien,
Jorge Tapia, and Miguel Angel Santos

Harvard CID Working Paper

December 2019

Working Papers

Center for International Development
at Harvard University

GROWTH LAB
Center for International Development
at Harvard University

Table of Contents

Financial support for this research came from the Open Society Foundations, through a grant to the Center for International Development at Harvard University to provide research support to the Government of Jordan.

List of Figures

Introduction

Jordan faces a number of pressing economic challenges: low growth, high unemployment, rising debt levels, and continued vulnerability to regional shocks. After a decade of fast economic growth, the economy decelerated with the Global Financial Crisis of 2008-09. From then onwards, various external shocks have thrown its economy out of balance and prolonged the slowdown for over a decade now. Conflicts in neighboring countries have led to reduced demand from key export markets and cut off important trade routes. Foreign direct investment, which averaged 12.7% of gross domestic product (GDP) between 2003-2009, fell to 5.1% of GDP over the 2010-2017. Regional conflicts have interrupted the supply of gas from Egypt – forcing Jordan to import oil at a time of record prices, had a negative impact on tourism, and also provoked a massive influx of migrants and refugees. Failure to cope with 50.4% population growth between led to nine consecutive years (2008-2017) of negative growth rates in GDP per capita, resulting in a cumulative loss of 14.0% over the past decade (2009-2018). Debt to GDP ratios, which were at 55% by the end of 2009, have skyrocketed to 94%.

Over the previous five years Jordan has undertaken a significant process of fiscal consolidation. The resulting reduction in fiscal impulse is among the largest registered in the aftermath of the Financial Crises, third only to Greece and Jamaica, and above Portugal and Spain. Higher taxes, lower subsidies, and sharp reductions in public investment have in turn furthered the recession. Within a context of lower aggregate demand, more consolidation is needed to bring debt-to-GDP ratios back to normal.

The only way to break that vicious cycle and restart inclusive growth is by leveraging on foreign markets, developing new exports and attracting investments aimed at increasing competitiveness and strengthening the external sector.[1] The theory of economic complexity provides a solid base to identify opportunities with high potential for export diversification. It allows to identify the existing set of knowhow, skills and capacities as signaled by the products and services that Jordan is able to make, and to define existing and latent areas of comparative advantage that can be developed by redeploying them. Service sectors have been growing in importance within the Jordanian economy and will surely play an important role in export diversification. In order to account for that, we have developed an adjusted framework that allows to identify the most attractive export sectors including services.

Based on that adjusted framework, this report identifies export themes with a high potential to drive growth in Jordan while supporting increasing wage levels and delivering positive spillovers to the non-tradable economy. The general goal is to provide a roadmap with key elements of a strategy for Jordan to return to a high economic growth path that is consistent with its emerging comparative advantages.

[1] A full analysis of the recent growth trajectory in Jordan and the main challenges that the economy faces moving forward can be found in (Hausmann et al. 2019).

The report is organized in four sections. Section 1 explains the methodology of economic complexity, including its basic intuition and main concepts, as well as the adjustments that were required to incorporate the service sector to the analysis. Section 2 describes the structure of the Jordanian economy, identifying its productive capacities and exploring its complexity profile. The third section identifies the industries with the highest export potential and groups into themes to facilitate investment promotion efforts. In the last section, we develop a system to further filter these sectors by viability and attractiveness, in order to prioritize investment promotion and export diversification efforts.

1. Conceptual Framework

a. Theory of Economic Complexity

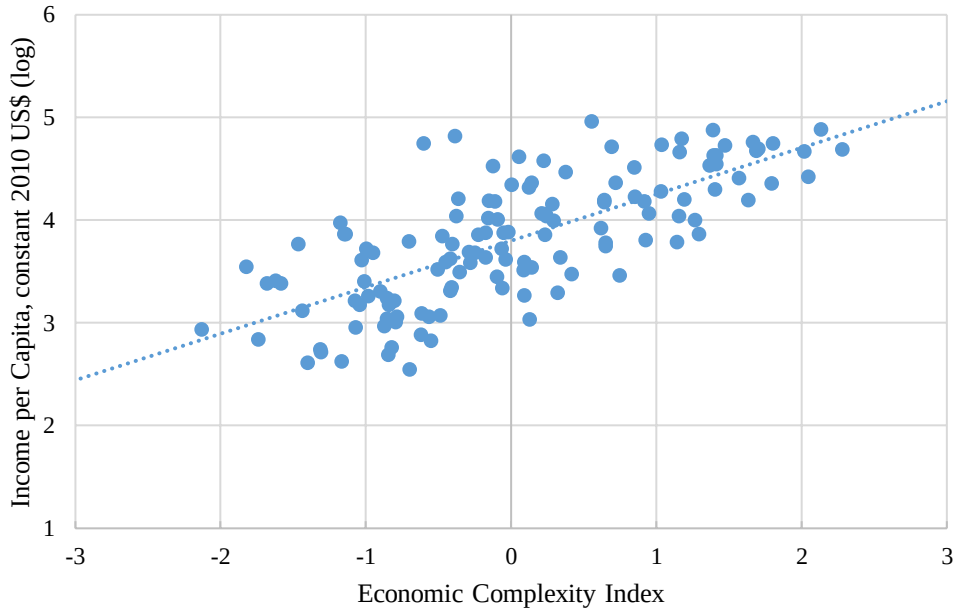
The theory of economic complexity, introduced by Hausmann, Hidalgo et al. (2014), is based on the realization that the development of products and services not only requires raw materials, labor and machinery, but also tacit knowledge of how to put inputs together to produce things and run business operations. Tacit knowledge (or knowhow) tends to be the limiting factor for diversifying economic activities in a country, because it is the component that is most difficult to transfer. Not only is knowhow acquired slowly by individuals through experience, but modern products and services also require shared knowhow across teams and organizations. Since complex economic activities need a diverse set of skills, modern economies require that individuals know different things and that markets function in a way that allows firms to organize human capital for production. As a result, the process of economic development is slow because the accumulation of diversified private sector knowhow is necessarily difficult and gradual.

Some products and services incorporate large amounts of tacit knowhow and are the result of complicated interaction networks. In contrast, others incorporate much less knowhow and require simpler networks. In this sense, different products and services can be thought of like “words” whose production requires “letters” (knowhow-based capabilities). The production of long and sophisticated words requires many letters, while few are needed to generate short and simple words. Places differ in both the quantity and quality of agglomerated knowhow. While some places have many and very diverse letters, which they can easily combine to make long words; others have very few, which limits the possibility of creating new words. Moreover, the differences in productive capacities brought by uneven “endowments” of letters are further amplified by the fact that the number of words that can be constructed increases exponentially as new letters are acquired. Thus, for example, in the English language, with 1 letter, "a", one word can be formed of up to 1 letter ("a"); with 3 letters, "a", "c" and "t", you can form up to 4 words of up to 3 letters ("a", "at", "cat" and "act"); with 4 letters, "a", "c", "t" and "r", you can form 9 words of up to 4 letters ("a", "at", "cat", "act", "rat", "car", "art", "tar" and "cart"); and with 10 letters, "a", "c", "t", "r", "o," l "," g "," s "," n "and" i ", you can form 595 words of up to 10 letters.

Ultimately, places develop the products and services (words) that their agglomeration of knowhow (variety of letters) can support. Therefore, by observing patterns of production across places and time, we can infer and mathematically construct quantitative measures that captures how much knowhow a place possesses (Economic Complexity Index, ECI), and how much knowhow particular goods and services require (Productivity Complexity Index, PCI). High ECI places support a diverse set of economic activities, including activities that are not common across places, while low ECI places support a low diversity of activities and those activities tend to be ubiquitous across places. This inverse relationship between diversity and ubiquity is observed empirically across countries, states and cities.

Given that economic complexity reflects the amount of knowhow that is embedded in the productive structure of an economy, it is not surprising to find a strong correlation between measures of complexity and income. Figure 1 shows the relationship between per capita income and economic complexity across all countries of the world.

Figure 1: Income per Capita and Economic Complexity by Country (2017)



Source: Own calculations based on World Bank WDI and the Atlas of Economic Complexity

Additionally, Hausmann, Hidalgo et al. (2014) found that the prediction errors in Figure 1– between the coordinates of income-complexity of a country and their predicted location on the regression line – are informative of future growth rates. Countries with an economic complexity greater than expected by their level of income, tend to grow faster than countries with higher income than expected by their current level of economic complexity. Thus, they argue that

economic complexity is not just a symptom or an expression of prosperity: it is a driver. In short, economic complexity matters because it helps to explain differences in the level of income of countries, and more importantly, because it predicts future economic growth.

It follows from the above that the process of economic development involves countries diversifying from the production of simple goods and services to more sophisticated ones, in a sequence often referred to as "structural transformation". Conventional economic theory suggests that a country's fundamentals – namely its endowments of physical and human capital, labor, and natural resources along with the overall quality of its institutions – determine its pattern of specialization. If this were true, the process of structural transformation would be a passive consequence of changing factor endowments.

However, in reality, historical examples of structural transformation have tended to be far from passive. Hausmann and Klinger (2006) show that producing new goods and services is different from producing more of those already produced. Specifically, assets and capabilities needed to produce one good or service are imperfect substitutes for those needed to produce others, and the degree of substitutability varies. Correspondingly, the probability that a country develops a new industry is related to its existing capabilities in the production of other similar industries. New capabilities will be more easily accumulated if they can be combined with others that already exist. An implication of this is that a country will diversify by moving from the products and services they already produce to others that require a similar set of assets and knowhow.

Based on this idea, Hausmann and Klinger (2006) proposed a measure of similarity between products. In essence, they measure the distance between each pair of products through the probability that countries export both. The collection of all proximities is a network connecting pairs of products based on their tendency to be co-exported by many countries. They refer to this network as the Product Space and use it to study the productive structure of countries.[2] The location of a country's production in the Product Space captures information regarding both the productive knowhow that it possesses and the capacity to expand that knowledge by moving into other nearby products. The analysis of a country's position in and movement through the Product Space has become a common and powerful tool for formulating economic growth strategies.[3]

[2] Based on these arguments, the structure of the Product Space is crucial because it affects the ability of countries to move into new products. A highly connected position in the Product Space reflects relatively easier paths to diversification than a sparse position. Hausmann and Klinger (2006) find that the Product Space is highly heterogeneous: some sections are composed of densely connected groups of products whereas others are more loosely connected. This heterogeneity has significant implications for the speed and patterns of structural transformation: the ability of countries to diversify and to move into products that are more complex is crucially dependent on their initial location in the Product Space.

[3] Harvard CID's Growth Lab developed a free, online tool for Product Space analysis of any country in the world: See http://atlas.cid.harvard.edu/

b. Methodological Adjustments

The complexity metrics described in the previous section have traditionally been calculated using data on international trade. Given the lack of standardized export data for services with sufficient industrial disaggregation at an international level, these have focused exclusively on goods and, therefore, have excluded the service sector. Such analyses have shown that Jordan has lost economic complexity over the last two decades, resulting in limited and problematic "nearby" diversification opportunities moving forward.[4]

However, services are of great importance for Jordanian economy and require a significant agglomeration of knowhow. Many service exports are also non-intensive on factors that are expensive and scarce in Jordan such as electricity and water usage, and can potentially be less vulnerable to trade disruptions in the region than goods exports. From 1995 to 2008, Jordanian service exports grew steadily from US$ 1.7 billion to US$ 4.8 billion. Despite the strong impacts of the 2008-2009 Global Financial Crisis on the global economy, service exports only experienced a minor hiccup thereafter, and eventually grew to US$ 7.1 billion in 2014 (Figure 2). Service exports continued to expand from 2009 to 2014 while exports of goods stagnated. By 2016, services accounted for nearly 45% of total Jordanian exports, relatively higher than benchmark countries (Figure 3).

In order to account for that reality, the Growth Lab at Harvard University developed a tool to perform complexity analysis inclusive of services and applied this tool to the context of Jordan. Previous efforts to incorporate the service sector within the complexity framework were made by Hausmann, Morales and Santos (2017) in Panama, taking advantage of the comprehensive nature of the population census in that country. Other attempts at representing the product space including services are to be found in the Colombian Atlas of Economic Complexity[5] and the Mexican Atlas of Economic Complexity.[6] In turn, these online tools have supported numerous efforts to identify productive capabilities at the sub-national level and the most attractive opportunities for structural transformation including goods and services.

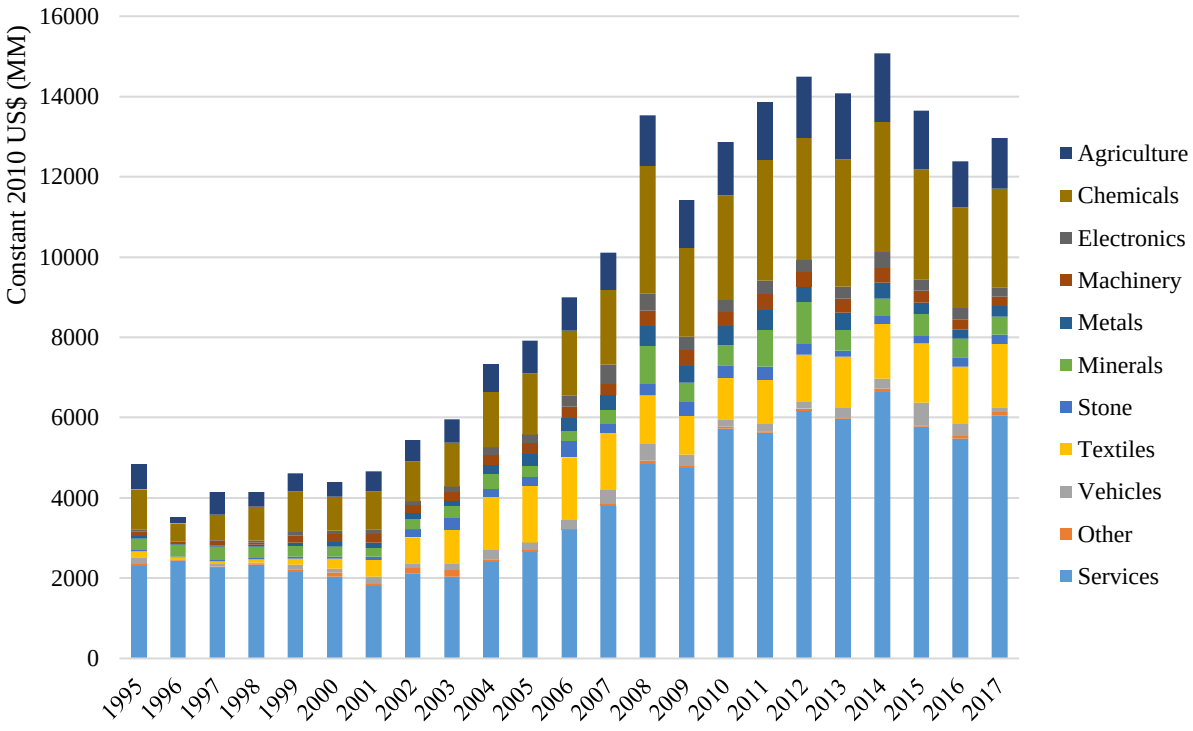
Given that in Jordan there are no publicly available databases with the granularity required to deploy the economic complexity algorithms, we have used the Dun & Bradstreet (D&B) database (2015). In doing so, some significant adjustments and adaptations to the original Product Space methodology were required.

The adjusted methodology estimates the productive capacities of places according to their relative intensity of employment in different industries. The employment absorption capacity varies

4 See Jordan's Country Profile on the Atlas of Economic Complexity and the Jordan Strategy Forum's two-part study: Part I and Part II
5 http://datlascolombia.com
6 https://datos.gob.mx/complejidad/

significantly between industries, so absolute employment by industry may reveal little information regarding the competitive advantages of places. Therefore, rather than assuming that places possess the knowledge required by those industries in which they exhibit a large number of employees, the methodology assumes that places possess those in which they have a higher employment share (of total employment) than the same industry's employment share at the world level (or an alternative reference).[7]

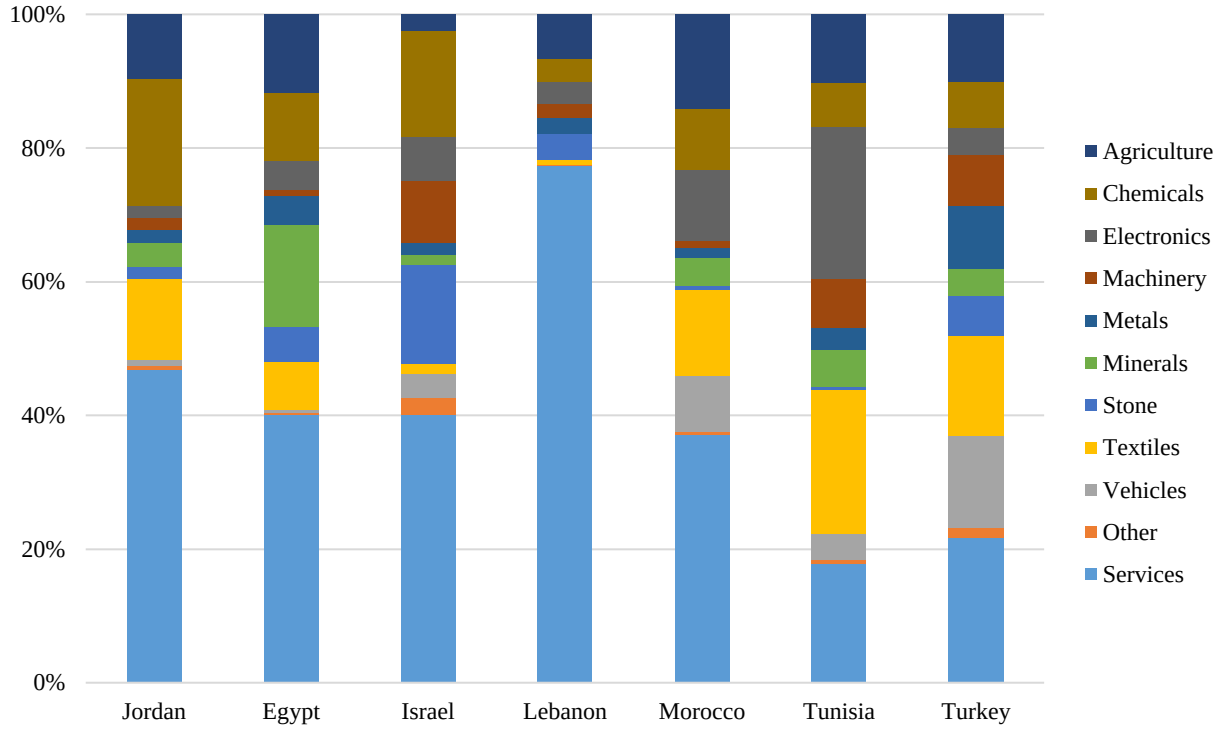
Figure 2: Jordan's Exports by Category (1995-2017)



Source: Own calculations based on the Atlas of Economic Complexity

[7] Therefore, it implicitly assumes that the combination of capital and labor used to develop a certain industry is relatively similar in all countries.

Figure 3: Composition of Exports by Category - Jordan and Benchmark Countries (2017)



Source: Own calculations based on the Atlas of Economic Complexity

More precisely, the complexity methodologies utilize the concept of revealed comparative advantage (RCA), which measures the relative importance of a sector in a place. Following the methodology of Balassa (1964), it is usually calculated as the ratio between the proportion of the sector in the exports of the place and the proportion of the sector in world trade. If this relationship is greater than 1, it is said that the place has a "revealed comparative advantage" or RCA in that sector, which is equivalent to saying that the sector in the place has developed more intensively than in the rest of the world.

In order to accommodate services within this context we have based the calculation on employment data by industries. Specifically, the calculation formula is as follows:

$$RCA_{i,c} = \frac{E_{i,c}/\sum_i E_{i,c}}{E_{i,w}/\sum_i E_{i,w}}$$

where $E_{i,c}$ is employment in industry i in country c, and $E_{i,w}$ is employment in industry i in the world (sum of all countries for which information is available).

Therefore, complexity metrics of industries, as in the original methodology, are estimated at an international level according to their ubiquity and the diversity of the places that are intensive in them. The only difference is that in our modified approach RCAs are based on employment shares

instead of export values. In this way, complex industries are those in which relatively few places, and places that are highly diversified, show a high relative intensity of employment ($RCA \geq 1$).[8]

Likewise, methodological adjustments were necessary to adapt the concept of the Product Space to include services. As described above, the original indicator proposed by Hausmann and Klinger (2006) measures proximity between pairs of products through the probability that countries export both. The network defined in this way has been used to study the productive structure of countries and their abilities to move into new products. For all its benefits, this methodology has a great disadvantage: it does not include the service sector. In order to address this, we developed an alternative way to measure proximity that allows for the inclusion of goods and services and called the resulting network space the "Industry Space". Our methodology computes the relation between pairs of industries through the probability of co-production (as expressed by RCA$\geq$ 1). Given the high granularity of the data in the D&B database, proximity can be calculated at various levels of aggregation, providing complementary indicators.

At one level of aggregation, proximity can be measured at the establishment level, as the available database provides establishment-level data. Proximity at this level of aggregation is estimated through the Noise-Corrected approach developed by Coscia and Neffke (2017).[9] The advantage of an establishment-level measure of proximity is that it is highly demanding, as it requires that each pair of industries identified as close to each other effectively involves similar capabilities comprised in the same firm. However, it is usually not in our interest to understand how establishments diversify, but rather how places (countries, states, cities) do. In this sense, we can allow for our metric – as described above – to allow for the possibility that goods and services require similar capacities (letters) even if they are produced in different establishments.

Measuring proximity at the country-level (the broadest level of aggregation), can accommodate that reality, although the indicator might be subject to spurious relations, including co-location based purely on demand factors. In order to identify co-production patterns at a country level, the productive capacities of the different countries in the world need to be estimated. In other words, the methodology needs to assess in which industries each country "participates". As previously noted, this is estimated according to their relative intensity of employment.[10] The database allows

[8] A more detailed explanation of how to calculate the complexity of different products (industries) can be found in Hausmann, Hidalgo et al. (2014), Technical Box 2.1.

[9] The occasions in which an establishment participates in two industries – i and j – at the same time are added to obtain N_{ij}. If this number were divided by the total number of occasions in which industry i (or j) is co-produced with another industry within the same establishment, a conditional probability similar to the one that underlies the product space would be obtained. However, certain industries may be so prevalent that they are co-produced by many other industries, leading to spurious connections. In order to eliminate these, N_{ij} is divided by an estimation of the expected number of co-occurrences between industries i and j. The ratio shows how unexpectedly high the observed number of co-occurrences is. When it equals one, it means that industries i and j are co-produced in the same establishment as frequently as expected.

[10] A country is said to participate in a certain industry if it employs more than its "fair share" in it. In other words, when it shows an RCA equal or greater than 1. Once RCAs have been calculated and the industries in which each country "participates" have been identified, proximity can be measured through the minimum conditional probability that a country that participates in industry i also participates in industry j. In other words, that both activities are

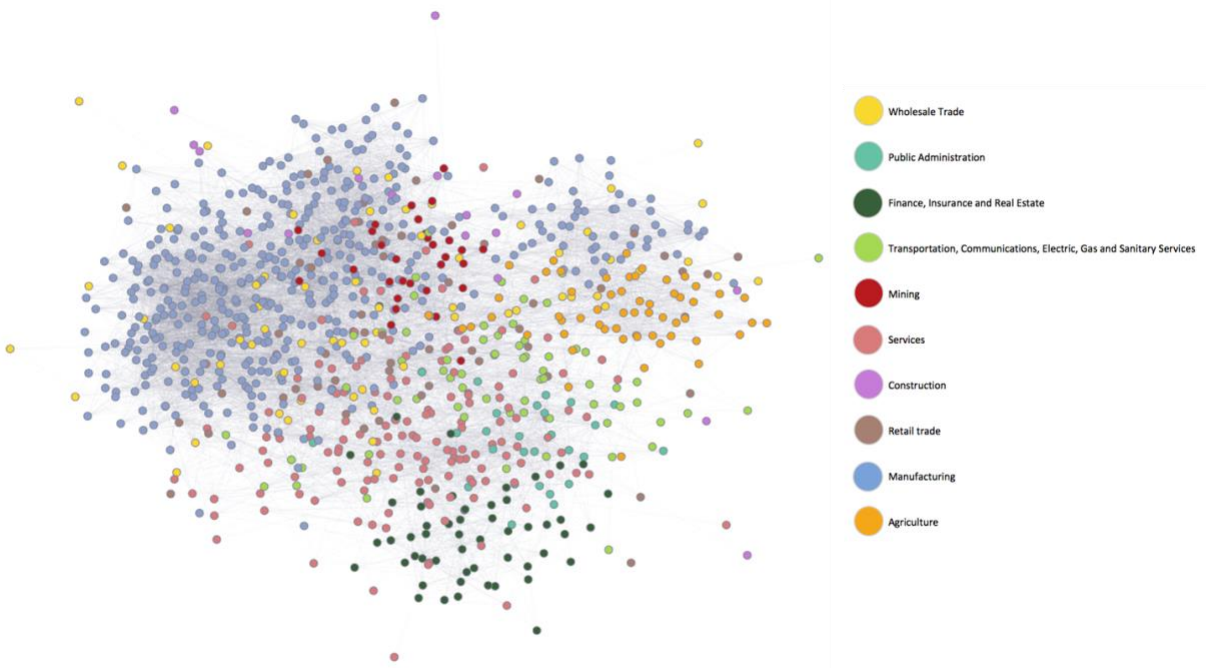
this calculation because it includes information about the geographic location of establishments and the number of employees they have, so it is possible to aggregate and calculate total employment for every industry at a country level.

Regardless of the level at which the co-production patterns are measured, the logic behind these indicators is consistent with the one underlying the Product Space. Two industries are "nearby" in the Industry Space if evidence shows that they are manufactured (or rendered, in the case of services) within the same physical space (be it a country, state, city, firm, or establishment) with a relatively high frequency. As with the original Product Space, the methodology does not directly identify all "letters" required by each industry. This would require having a comprehensive understanding of the productive process of all of them. Instead, it uses an indirect approach that assumes that if two industries tend to be co-produced very often, this must mean that they require similar capabilities.

Figure 4 shows the Industry Space calculated using proximities measured at an establishment level. Here, nodes represent individual industries and edges connect those that are relatively similar. The different colors indicate the broad sector to which each industry belongs, which tend to cluster. It is important to note that despite the adjustments, this methodology shares with the original two important characteristics. The first is that the economic complexity of a place is predictive of its level of income. Second, the initial positioning in the Industry Space of a place is informative of its future diversification opportunities.

carried out intensively in the same country. Since conditional probabilities are not symmetric, the minimum probability of industry i, given industry j, and vice versa, is taken to reduce the likelihood of the relationship is false. It is worth mentioning that we implicitly assume that countries do not participate in those industries in which they show an RCA lower than 1, which also helps alleviate the problem of potential spurious connections between industries.

Figure 4: Industry Space (2015)



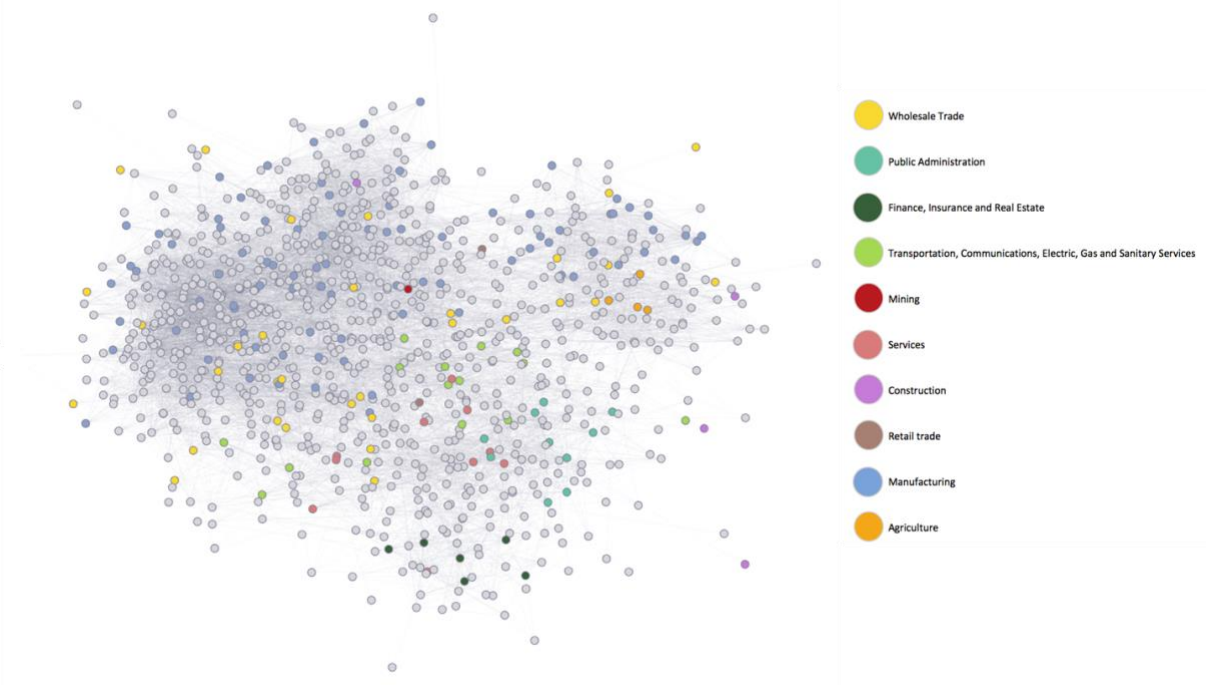
Source: Own calculations based on Dun & Bradstreet (2015)

2. Analysis of Current Capabilities

a. Jordan's Position in the Industry Space

The Industry Space for Jordan is shown in Figure 5, where colored circles represent the industries in which Jordan has a revealed comparative advantage (has an RCA≥ 1), and uncolored circles represent other industries absent in Jordan (RCA< 1). In general, it is possible to conclude that Jordan's Industry Space is somewhat sparsely populated and concentrated in manufacturing and wholesale trade. Although the country's presence in the Industry Space is largely represented by these categories, in relative terms, Jordan also exhibits a high presence in other industries such as public administration; transportation, communications and public utilities; and finance, insurance and real estate.

Figure 5: Jordan's Position in the Industry Space (2015)



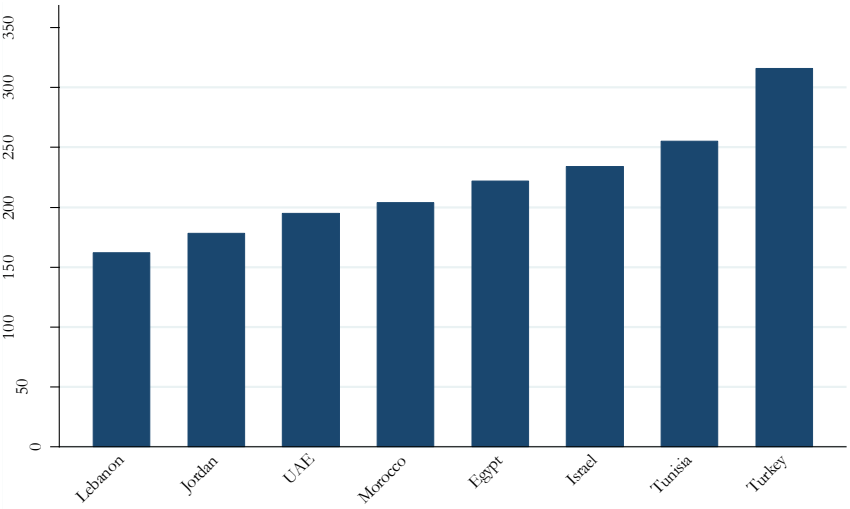
Source: Own calculations based on Dun & Bradstreet (2015)

Further evidence in this regard is provided in Figure 6 and Figure 7.[11] Figure 6 shows the industry diversity – that is, the number of industries in which a country exhibits a high relative intensity of employment – for Jordan and a group of benchmark countries. Jordan, with a diversity of 178, ranks second to last among the benchmark countries and is at a fair distance from countries like Tunisia and Turkey, whose diversity is greater than 250.[12]

[11] The results shown in these figures should be taken with caution. The correlation between the sectoral composition of employment from the census data and that from the Dun & Bradstreet database is relatively low for all the benchmark countries, with the exception of Tunisia (for the UAE it could not be calculated). This raises some doubts regarding the representativeness of Dun & Bradstreet for these countries.

[12] If, instead, the diversity of exported goods is measured using the goods-based measure, the results are very similar. Jordan is among the least diverse countries of the comparison group and far behind the most diverse.

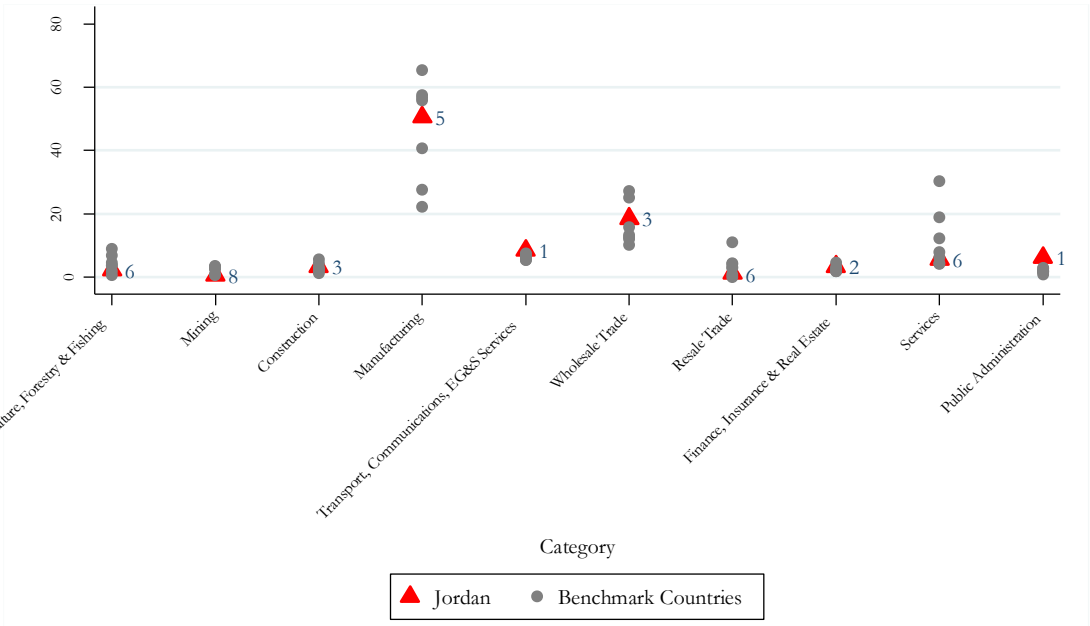
Figure 6: Industry Diversity (2015) – Jordan and Benchmark Countries



Source: Own calculations based on Dun & Bradstreet (2015)

Meanwhile, Figure 7 shows the percentage that each sector represents of the diversity of the benchmark countries, highlighting Jordan's position in red. The number shown in the figure corresponds to Jordan's ranking among this group of countries in each sector. The results indicate that even though roughly half of Jordan's diversity is contributed by manufacturing, the country's diversity in manufacturing is not particularly high in comparison to benchmark economies. Jordan does stand out in public administration; transportation, communications and public utilities; and finance, insurance and real estate. In these sectors, Jordan ranks first or second among the group.

Figure 7: Contribution to Diversity by Category (2015) – Jordan and Benchmark Countries



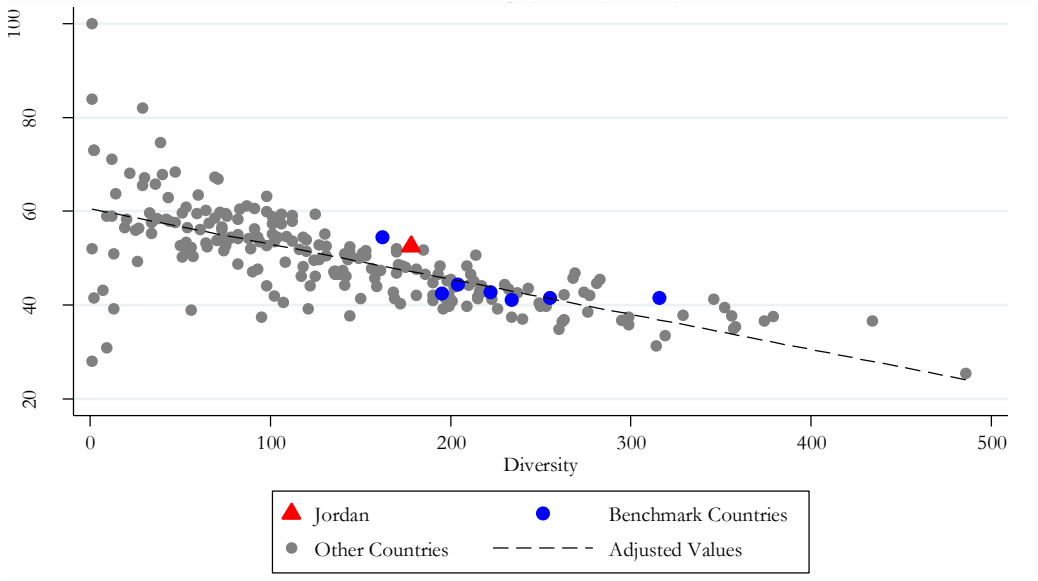
Source: Own calculations based on Dun & Bradstreet (2015)

b. Jordan's Economic Complexity

The ECI index captures more than just the diversity of economic activity; it also captures a broad measure of the sophistication of economic activity, which reflects the total supply and diversity of knowhow and productive capabilities in a place. The notion of "sophistication" used here does not derive from a direct evaluation of the production processes of the different industries. Rather, it is an indirect measure that infers that a product requires significant variety of knowhow if few places produce it (the product has low ubiquity), and if the places that produce it tend to produce a lot of different things (high diversity). For this analysis, we continue to use the term Product Complexity Index (PCI) to refer to the inferred sophistication of individual goods and services. The ECI measure is calculated as the average complexity of all the products and industries in which a place displays an RCA greater than or equal to one, and therefore captures an overall measure of sophistication of the economy.

Figure 8 plots the diversity and average ubiquity of the industries produced (with RCA≥ 1) in different countries, highlighting Jordan (in red) and its benchmark countries (in blue). In line with what is observed in Figure 6, Jordan shows a low diversity in relation to the comparison group. Figure 8 also shows that the industries present in Jordan are more ubiquitous than the benchmark countries (a higher average ubiquity for the industries present), with the exception of Lebanon. Additionally, the industries present in Jordan are slightly more ubiquitous than would be expected based on Jordan's diversity – that is, Jordan is positioned above the regression line.

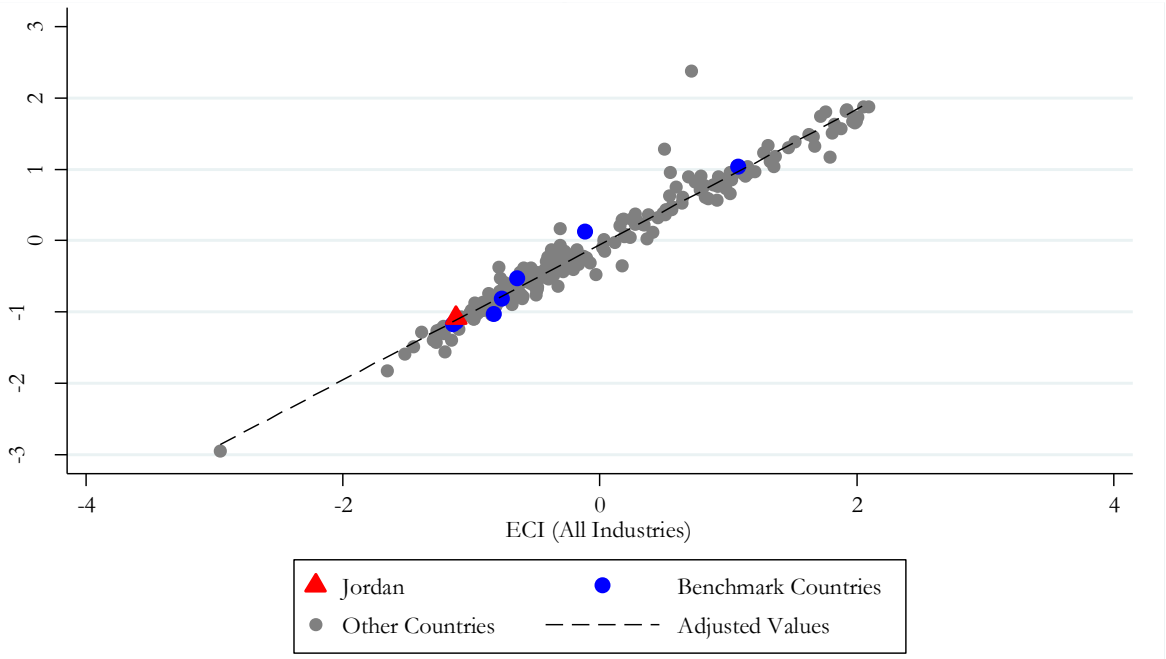
Figure 8: Average Ubiquity Versus Diversity (2015) - Based on Employment by Industry



Source: Own calculations based on Dun & Bradstreet (2015)

Based on the above findings, it is not surprising to find that Jordan exhibits a low ECI. Figure 9 displays two versions of the ECI for all countries – one that includes all possible industries and another that only considers those that are relatively tradable.[13] In both cases, Jordan is poorly ranked in relation to its comparable countries and, more broadly, the rest of the world. Moreover, as shown by Figure 10, Jordan shows an ECI index that is lower than what can be expected for its income per capita level. Unfortunately, given data limitations, this exercise could not be duplicated for various points in time. Therefore, we cannot evaluate if Jordan has become more or less complex over time when services are included in the ECI measure.

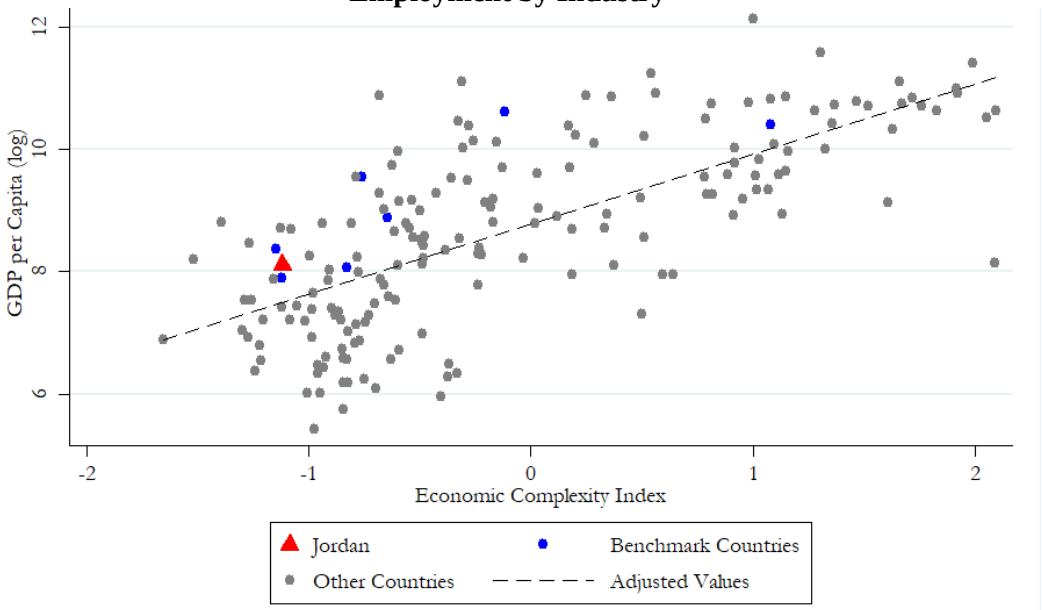
Figure 9: Two Measures of Economic Complexity Index (2015) - Based on Employment by Industry



Source: Own calculations based on Dun & Bradstreet (2015)

[13] This adjustment is provided in order to address the concern that the relative intensity of employment may not be an adequate measure of the competitive advantages of countries in the case of non-tradable industries. For these purposes, when calculating the second version of the Economic Complexity Index, some industries are excluded from the analysis, such as the ones belonging to wholesale trade, resale trade and public administration.

Figure 10: Income per Capita and Economic Complexity by Country (2015) - Based on Employment by Industry



Source: Own calculations based on Dun & Bradstreet (2015)

3. Identification of Diversification Opportunities

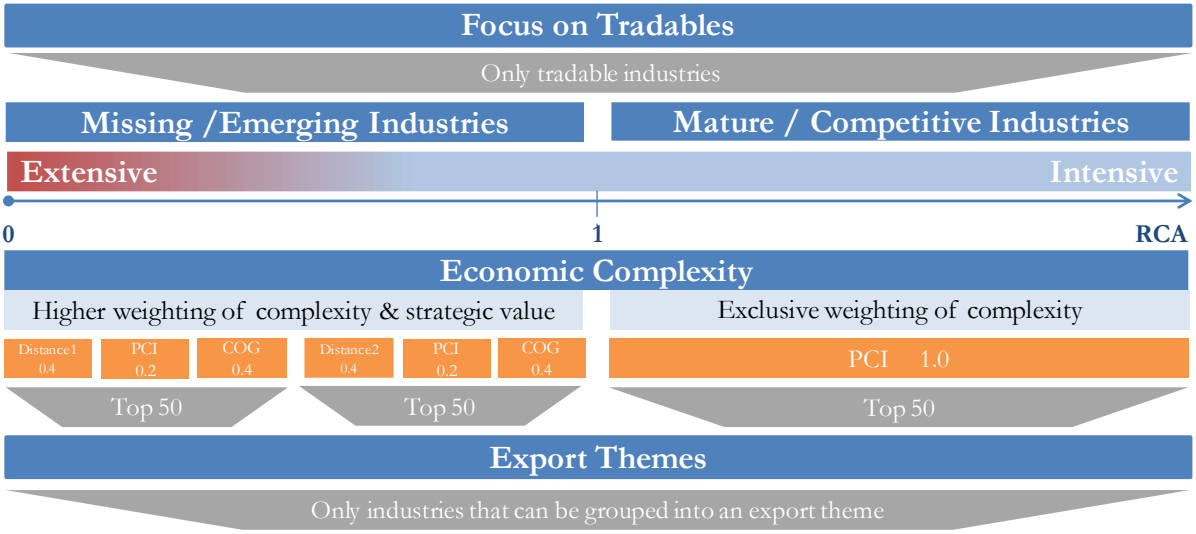
a. Main Objective

Regardless of a country's ECI, its position in the Industry Space is informative of what potential new industries are most related to its current capabilities and knowhow, just as is the case with the Product Space. Given Jordan's low ECI, it is especially important that policymakers be strategic in exploring what economic activities they target for development through its investment promotion efforts. The main goal of this section is to outline a roadmap for export growth and diversification that builds on Industry Space information. Ultimately, policymakers should use an iterative and dynamic process to target investment promotion and export development efforts, and should interact with many stakeholders – especially with the private sector – to incorporate a variety of perspectives and to implement shared strategies. This exercise is meant to serve as a starting point for building such a process by rigorously identifying key opportunities for export growth on both the intensive and extensive margins, based on Jordan's position in the Industry Space. The following section of this paper further builds on this analysis by introducing a scheme and applied tool that the Government of Jordan can use to further prioritize its actions.

b. Sector Identification Process

Jordan's position in the Industry Space reveals existing and latent areas of comparative advantage that could be developed by redeploying the knowhow, skills and capacities that are already available in the country. This section systematically filters industries based on complexity variables to identify export themes that have the highest potential to drive growth in Jordan while supporting increasing wage levels and delivering positive spillovers to the non-tradable economy. The specific process that was followed to identify and prioritize high potential industries is summarized in Figure 11 and explained in detail below. It relies on the tenets of economic complexity, which offers analytical rigor and impartiality. It reduces over 1,000 industries in the Industry Space down to 119 that are most strategic. We then group these strategic industries into eight strategic export themes.

Figure 11: Sector Identification / Validation Process



First, the process filters out those industries that can be regarded as primarily non-tradable.[14] The focus is far from arbitrary. Jordan faces a structural shortfall in its balance of payments, which results in a non-tradable economy that is demand-constrained and where growth in demand for non-tradable goods and services is limited by the pace of export growth. Within a context of fiscal consolidation, the only way to resume growth and employment creation is by growing and

[14] The identification of which industries are primarily non-tradable is rough. For the purposes of this work, the industries belonging to the Wholesale Trade, Resale Trade, and Public Administration divisions (1-digit SIC classifications) are considered as non-tradable. So are the ones belonging to the following major groups (2-digit SIC classifications): Personal Services, Local & Interurban Passenger Transit, Real Estate, Membership Organizations, Social Services, Private Households, and Postal Service. All other industries (apart from Federal Reserve Banks) are regarded as tradable.

diversifying exports. An increase in exports would help to relax balance of payments constraints and lead to higher domestic demand for non-tradable industries, where most jobs can be found.

Once the "tradable" pool of industries is identified, the process applies separate rules to identify two sets of promising industries: those that already have a strong presence in the country that can support wage growth (the intensive margin), and those that are absent or exist with a low intensity but which build on the knowhow and productive capabilities that Jordan already has (the extensive margin). In terms of the conceptual and methodological framework used here, the first type of industries are a subset of those in which Jordan has a high relative employment intensity (RCA equal or greater than 1), while the second type is a subset of industries in which Jordan has a low or non-existing employment intensity (RCA less than 1).

Strategic industries are selected based on economic complexity metrics – Distance, Product Complexity Index (PCI), and Complexity Outlook Gain (PCI) – in different ways for the intensive and extensive margins. The Distance measure indicates how close a "nearby" industry is to industries already present in the country.[15] As discussed previously, the Product Complexity Index (PCI) indicates how complex or sophisticated a certain industry is. Finally, the Complexity Opportunity Gain (COG) index measures the extent to which a particular industry would pave the way to other, more complex industries by improving Jordan's position in the Industry Space. COG effectively captures how much closer that industry would bring Jordan to other complex industries.[16] All other things equal, out of two industries with the same Distance and PCI, the one with a higher COG would be more strategic. While PCI and COG tend to be positively correlated, there tends to be negative correlation between Distance and each of these indicators in developing economies. This reflects an important trade-off: the most complex industries and those with the best strategic positioning tend to be further away from existing capabilities, while less complex industries tend to be closer.[17]

In view of this tradeoff, the process aims at balancing these different considerations by assigning positive weights to three different metrics. On the intensive margin, only the PCI variable is needed because distance and COG are effectively zero for industries where Jordan already has an intensive presence. The process simply selects the 50 industries with the highest PCI values among those that Jordan already has a presence. On the extensive margin, positive weights are given to all three complexity variables. A weight of 0.4 is applied on Distance, while the remaining 0.6 weight is

[15] Specifically, the distance of an industry is the sum of the proximities connecting that industry to all the industries in which the location is not currently intensive. Formally, for industry i and country c, the distance is: $d_{ci} = \sum_j (1 - M_{cj})\,\theta_{ij} / \sum_j \theta_{ij}$, where $M_{cj} = \begin{cases} 0 \; if \; RCA_{cj} < 1 \\ 1 \; if \; RCA_{cj} \geq 1 \end{cases}$ and θ_{ij} is the proximity between industries i and j.

[16] In particular, opportunity outlook gain is defined as: $COG_{ci} = \sum_j {\theta_{ij}} \Big/ {\sum_k \theta_{kj}} (1 - M_{cj}) PCI_j$, where i, j and k are industries.

[17] This negative relationship can be thought of as a risk-return curve. That is, the country may have less chance of success when trying to promote the development of more sophisticated industries, because it requires capabilities that are further away from its initial stock. However, if the country's efforts are successful, rewards are greater because it will have gained greater complexity and/or improved its long-term strategic positioning.

applied on PCI (0.2) and COG (0.4). This selection of weights gives greater combined relevance to PCI and COG because of Jordan's relatively low economic complexity and need to diversify fast in order to support income growth.

Given the granularity of the data coming from D&B, proximity between industries, and ultimately Distance, can be measured based on co-production patterns the establishment – or country-level – as discussed previously.[18] For this reason, the methodology uses each construction of the Distance measure. On the extensive margin, 50 industries are selected using establishment-level distance and 50 industries are selected using country-level distance.

At this point, the 146 industries that emerged as strategic, regardless of whether on the intensive or extensive margin, were classified into groups of related industries.[19] It turned out that eight groups captured 119 of the strategic industries. These eight groups were therefore considered to represent strategic "export themes" and any strategic industries that were not mapped to one of the themes are dropped from the process at this point (the industries that were dropped from the process are detailed in Annex 7). The logic of this step was government resources would be more effectively used if targeted toward collections of industries as opposed to very specific industries.

c. Export Themes

The 119 strategic industries that emerged from this analysis, grouped into eight themes, provide a basic roadmap for structural transformation and export diversification for Jordan over the next several years. These strategic export themes, shown in Figure 12, are the following: Business, IT and Professional services; Education Services; Healthcare Services; Tourism; Creative Industries; Transport; Construction; and Agriculture and Food. Annex 1 shows the different industries that make up each of these themes, grouped into narrower thematic sub-areas. A description of these thematic sub-areas is included in Annex 2.

[18] Pending further research to determine which construction has more explanatory power over subsequent diversification. This would require a panel dataset, which is currently unavailable.
[19] Note that this is lower than 150 because of 4 products appearing in the top 50 on the external margin regardless of which distance measure was used.

Figure 12: Export Themes in Jordan

It is important to note that most of these export themes were also identified in a previous government vision document ("Jordan 2025", 2014) and a previous Investment Promotion Strategy for the Jordan Investment Commission (JIC) from 2016. The most noteworthy exceptions are creative industries and some specific opportunities we identified in the agriculture sector. Meanwhile, our complexity analysis does not reveal chemicals or life sciences as a theme.[20] Side-by-side comparisons between strategic industries are shown in Figure 13.

Figure 13: Export Themes in Comparison with Previous Studies

JIC (2016)			Jordan 2025 (2014)	Harvard CID (2019)
Sector / Priority	High	Med	Sector	Sector
Business Services	✔		Digital / Business Services	Business, IT and Professional Services
Chemicals	✔			
IT	✔			Business, IT and Professional Services
Leisure and tourism	✔		Tourism and Events	Tourism Services
Infrastructure	✔		Transport and Logistics	Transport Services
Advanced Engineering		✔	Construction / Engineering	Construction
Consumer Products		✔		
Financial Services		✔	Financial Services	Business, IT and Professional Services
Healthcare Services		✔	Healthcare Services	Healthcare Services
Life Sciences		✔	Life sciences	
				Agriculture
				Creative industries
			Education Services	Education Services

Source: Own construction based on JIC Investment Promotion (2016) and Jordan 2025 (2014)

[20] We presume that this is because employment in major pharmaceutical companies in Jordan is less focused in manufacturing and product development and more in business services and logistics.

4. Prioritization of Diversification Opportunities

a. General Considerations

The process described above aims to identify nearby industries that can leverage on the knowhow already in place in Jordan, are relatively complex and strategically positioned to lead the way to other, more complex industries. In other words, these strategic industries, and the broader export themes in which they are grouped, prioritize opportunities-based complexity measures of their viability and attractiveness. It is up to policymakers to determine if and how to organize state resources to support growth across these export themes. For industries along the extensive margin, the Government of Jordan may choose to target its investment promotion efforts, recognizing that foreign companies will be likely to take interest in these opportunities in Jordan if they are made aware of them, and that these companies will expand private sector capabilities in Jordan in a positive way. For industries along the intensive margin, there is often much scope for cooperation between the public and private sector to identify and resolve sector-specific bottlenecks to more rapid growth of these industries. The identification of export themes can help governments to target resources and leadership toward such efforts.

As the Government of Jordan pursues these export themes, it may want to leverage more indicators of viability and attractiveness not explicitly captured by Economic Complexity indicators, in order to further prioritize and focus its efforts within the eight export themes. For example, the Government of Jordan may find industries more attractive if they demand relatively more youth or female labor, since unemployment rates for these segments of the population are very high. Stakeholders may also identify additional factors that affect the viability of industries, such as vulnerability to border closures and water intensity. The export themes outlined in the previous section are therefore more of a starting point for iterative prioritization efforts by the Government of Jordan with other stakeholders.

While recognizing the importance of Jordanian ownership, this section proceeds to outline what a further prioritization exercise could look like in the Jordanian context. In addition to the complexity measures already incorporated, it considers other relevant viability and attractiveness factors. The objective is to suggest a guide for policymakers regarding the type of elements to evaluate and how to weigh them to sequence efforts. The factors that considered here are specific to the Jordanian context, as the scheme attempts to exploit to the fullest the country's competitive advantages and avoid, whenever possible, the most binding constraints it faces.

b. Viability and Attractiveness Factors

Diversification opportunities could be further prioritized according to indicators of viability and attractiveness. As an example, we choose five viability factors and five attractiveness factors to illustrate the process of further targeting strategic industries. Measuring these factors is not always

straightforward. In many cases we use global data or data from the U.S. economy in particular to provide industry-level measurements.[21] The reason for this is that the U.S. has accessible and reliable databases and, at the same time, the U.S. economy reflects industry patterns within an advanced productive structure similar to what Jordan would hope to eventually develop.

The viability factors utilized are the following:

- *Current Presence in Jordan:* The greater the presence of an industry in the country, the greater the likelihood that the challenges it faces for its development will be manageable (since it has already achieved a greater presence for a reason). Likewise, the greater the industry, the more local actors there are with deep knowledge of the challenges facing the sector that could be coordinated to reveal and jointly address sector-specific constraints. The level of presence of an industry in Jordan can be approximated through the RCA measure already calculated during the country's complexity analysis. For industries with an RCA well above one, government actions can be exclusively focused on helping existing actors to thrive. For industries with an RCA below one but well above zero, investment promotion efforts may be needed, but there will also be existing actors whose struggles can reveal key issues need to be addressed for Jordan to be competitive in the industry.
- *Current Presence in Peer Countries[22]:* The underlying logic of including this variable is that if an industry is developed successfully in similar environments, then it should be relatively easier for Jordan to develop it as well. A high level of presence in peer countries does not guarantee the success of the industry in Jordan, but is a useful signal that Jordan may be especially poised to succeed in the industry. The average RCA across a group of peer countries is used to measure this factor.
- *Water Intensity:* Promotion efforts should avoid (at least initially) sectors that are intensive in the factors that represent binding constraints for business activities in Jordan. The growth diagnostic analysis carried out by the Growth Lab identified water scarcity as one of the country's main competitive disadvantages (Hausmann et al. 2019). Therefore, industries that are not intensive in water could be prioritized. To measure this factor, we use the percentage of input costs that are spent on water in the industry in the United States, based on U.S. Input-Output tables.
- *Electricity Intensity:* The growth diagnostic analysis also identified the high cost of electricity as one of the most relevant constraints to growth in Jordan (Hausmann et al. 2019). Therefore, industries that are not intensive in electricity could be prioritized. In the same way as water intensity, this factor is calculated as the percentage of input costs spent on electricity, again using data from U.S. Input-Output tables.

[21] In particular, dependency on water and electricity, ability to access intermediate inputs, and ability to incorporate high-skill labor and female.
[22] The countries Egypt, Israel, Lebanon, Morocco, Tunisia and Turkey were selected as comparators for the purpose of the analysis.

- *Ability to Access Inputs:* A crucial element for the development of any productive activity is the ability to access the raw and intermediate material inputs it requires. To measure this variable, we estimate the number of inputs (i) intensively required by the industry in question, and (ii) those that are currently missing or not accessible in the country. The methodology employed to perform these estimations is explained in detail in Annex 5. Estimates assume that if other activities that demand the same inputs have a significant presence in Jordan, then it is likely that the industry in question will also be able to access these inputs easier, making its development more viable.

The attractiveness factors utilized are the following:

- *Ability to Incorporate High-Skill Labor:* As stated above, diversification efforts should attempt to exploit the country's competitive advantages to the fullest. One of Jordan's biggest competitive advantages today is its high-skill human capital endowment (Hausmann et al. 2019), especially considering the relative wages paid to skilled professionals in Jordan versus nearby in the Gulf. Accordingly, we prioritize industries that tend to employ a higher proportion of educated individuals. We measure this as the percentage of the jobs in the industry that are filled by high-skill workers (defined as those that have more than a high school degree, and calculated using data from the U.S. Bureau of Labor Statistics (BLS)).
- *Ability to Incorporate Female Labor:* As the Jordanian labor force has become more highly educated, the long-term increase of female education levels has been particularly noteworthy (Hausmann et al. 2019) and this pool of underutilized labor reflects another comparative advantage. The supply of female labor currently is largely wasted, as high-skill women face unemployment rates that are between two and three times higher than those faced by men with equivalent education levels and low-skill women barely participate in the labor force at all (Kasoolu et al. 2019). If diversification opportunities employ more women, they could serve as an engine for growth and inclusion and drive a positive shift in hiring practices across the private sector. This factor is represented by the share of jobs held by women in the United States, again measured using BLS data.
- *Ability to Translate into Export Activity:* For the reasons already noted, Jordan's growth strategy must be driven by exports (Hausmann et al. 2019). If an industry is more prone to be organized around exporting firms, then it is more likely that it will be able to contribute to strengthening the country's export profile. To measure this factor, the methodology considers the percentage of employment worldwide that in each industry is concentrated in firms that report exporting activity, which can be calculated using information from the Dun & Bradstreet database.
- *Ability to Attract Foreign Direct Investment Globally:* Foreign Direct Investment (FDI) can have multiple benefits, which include contributing to the strengthening of the country's knowledge base. This factor is measured as the total value of the FDI capital expenditure worldwide over a recent period (2003-15). For the purposes of constructing this indicator,

information from fDi Markets is used.[23] The methodology employed to perform this estimation is explained in detail in Annex 6.

– *Ability to Attract Foreign Direct Investment Regionally:* Industries that have attracted investments in the Middle East and North Africa are further prioritized with the logic that these industries are attracted to the region's market or for other reasons. This makes them strategic for Jordan to attract to build its base of activities that serve as regional headquarters. We also calculate this factor using fDi Markets data but restrict the dataset to foreign investment targeted to the region[24].

c. Prioritization Scheme

After evaluating the performance of the different diversification opportunities across the factors described above, it is possible to aggregate this information into a single score in order to assess their general viability and attractiveness. For this purpose, the estimated values must first be normalized, which is done according to the following formula:

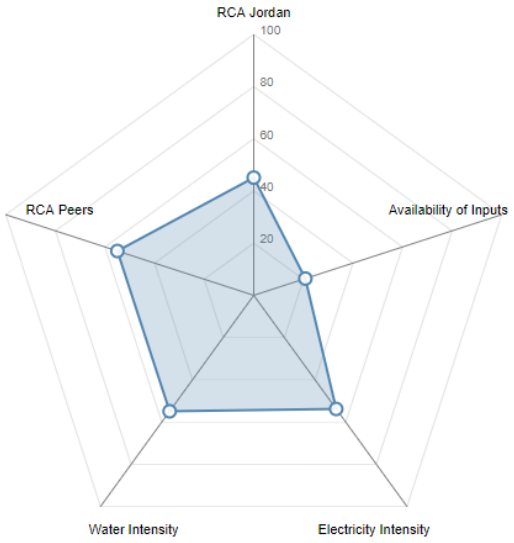
$$NV_{ij} = 5 + 2 * \left[\frac{V_{ij} - mean_j(V_{ij})}{sd_j(V_{ij})}\right]$$

where NV_{ij} is the (normalized) value of industry i in factor j, and $mean_j(V_{ij})$ and $sd_j(V_{ij})$ are the mean and standard deviation, respectively, of all values for factor j. Normalized values that turn out to be less than 0 and greater than 10 are adjusted upward or downward until these limit values are reached. Consequently, the maximum normalized value for any factor is 10, the minimum is 0 and the average is close to 5.[25] The similarity of their distribution enables the comparison and aggregation of the normalized values, despite the differences in terms of their levels and any existence of outliers of the original values.

This normalization also facilitates the visualization of the factors that improve and worsen the viability and attractiveness of the different opportunities for diversification. As an example, Figure 14 and Figure 15 show the performance of the industry "Engineering Services" in the different viability and attractiveness factors, respectively. From the first of these figures, it is we can conclude that the industry is close to average across almost all viability factors, with the exception of missing inputs, which potentially reflects a viability risk. Meanwhile, the second figure highlights that the greatest driver of its attractiveness is its ability to employ high-skill workers, but that this is somewhat offset by its relatively low capacity to hire women.

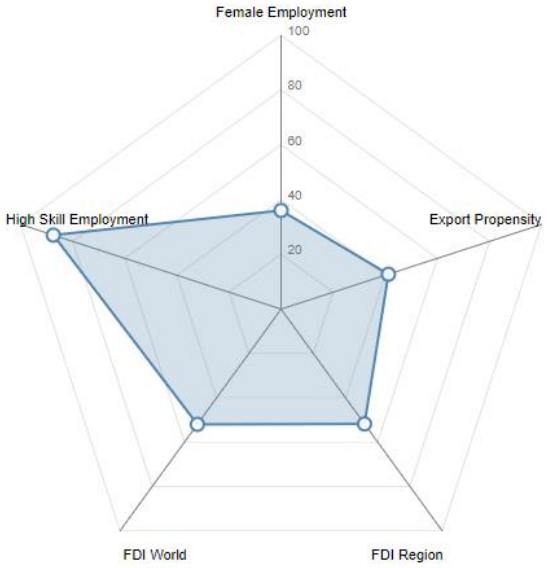
[23] Although this information is available for a classification system different from the one used elsewhere in this analysis (SIC) and is available a less granular aggregation level, we develop a process that allows us to match FDI flows to the industries of interest. The methodology is explained in detail in Annex 5.
[24] The reference region was defined as the countries in the Middle East and North Africa, with the addition of Turkey.
[25] It is exactly 5 if no upward or downward adjustments are necessary.

Figure 14: Viability Factors Performance, Normalized Values – Engineering Services



Source: Own construction based on Dun & Bradstreet and US Input-Output Table

Figure 15: Attractiveness Factors Performance, Normalized Value – Engineering Services



Source: Own construction based on Dun & Bradstreet, US BLS and fDi Markets

At the same time, the normalization of values allows the calculation of total viability and attractiveness scores based on the sum of the normalized values across factors. We consider an industry to be "highly viable" if its total viability score is greater than the median for all the diversification opportunities, and as "highly attractive" if the total attractiveness score is greater than the median of all diversification opportunities. Although we calculate total scores for diversification opportunities on both the extensive and intensive margins, we consider all intensive margin opportunities to be "highly viable," regardless of the total viability score that they get. We do this because the high RCA value reflects the fact that these industries have survived in the country despite any viability weaknesses on the explicit factors.

d. Using the Prioritization Scheme

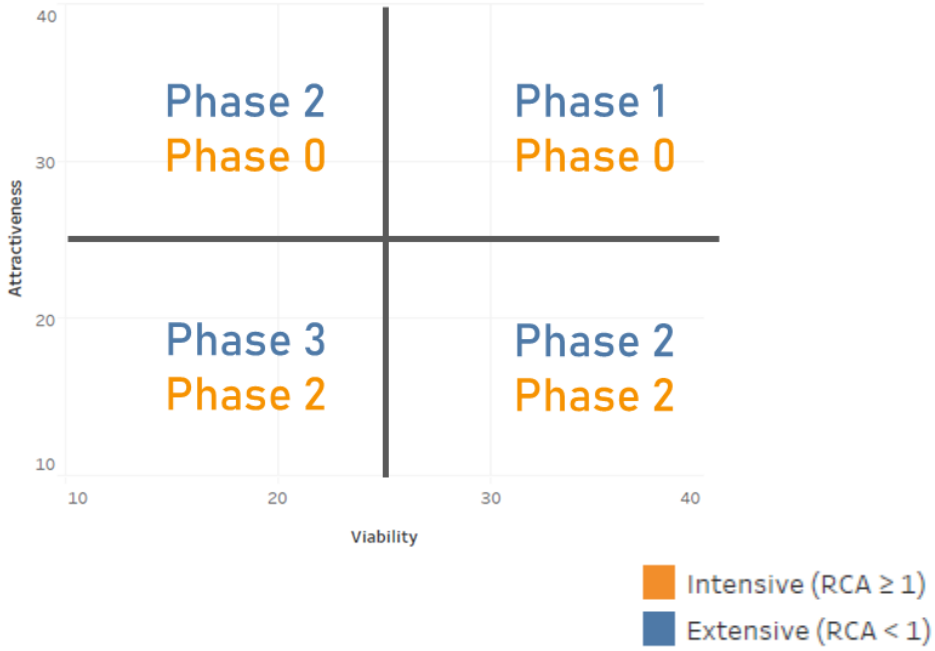
Based on the total scores obtained in terms of viability and attractiveness, government stakeholders can prioritize their use of scarce resources. One possible way of operationalizing this prioritization scheme would be to group industry opportunities into phases is as follows:

- Phase 0: Industries on the intensive margin that are "highly attractive"
- Phase 1: Industries on the extensive margin that are "highly viable" and "highly attractive"
- Phase 2: Industries on the intensive margin that are not "highly attractive" AND industries on the extensive margin and either not "highly viable" or not "highly attractive" (but not both)
- Phase 3: Industries on the extensive margin that are neither "highly viable" nor "highly attractive"

Figure 16 shows how industries on the extensive margin are distributed in these different phases. Although both phase 0 and phase 1 industries are highly viable and highly attractive, the scheme prioritizes those belonging to the intensive margin, assigning them to an earlier phase. While these industries may face complex challenges, they have the advantage of already having a significant number of firms in the country, with which authorities can collaborate to more effectively identify resolve industry-specific constraints. Placing these industries in phase 0 reflects that little stands in the way of expanding government efforts today, whereas even the most promising extensive margin opportunities (in phase 1) will require attracting new investors, which could be domestic or foreign.

Figure 17 displays the position of all the strategic industries in a Prioritization Phases map and highlights the position of "Engineering Services" as an example. With an RCA lower than 1, the industry does not have a revealed comparative advantage in the country, while its above median attractiveness and below median viability lead to a Phase 2 categorization.

Figure 16: Prioritization Phases of Diversification Opportunities



Source: Own construction

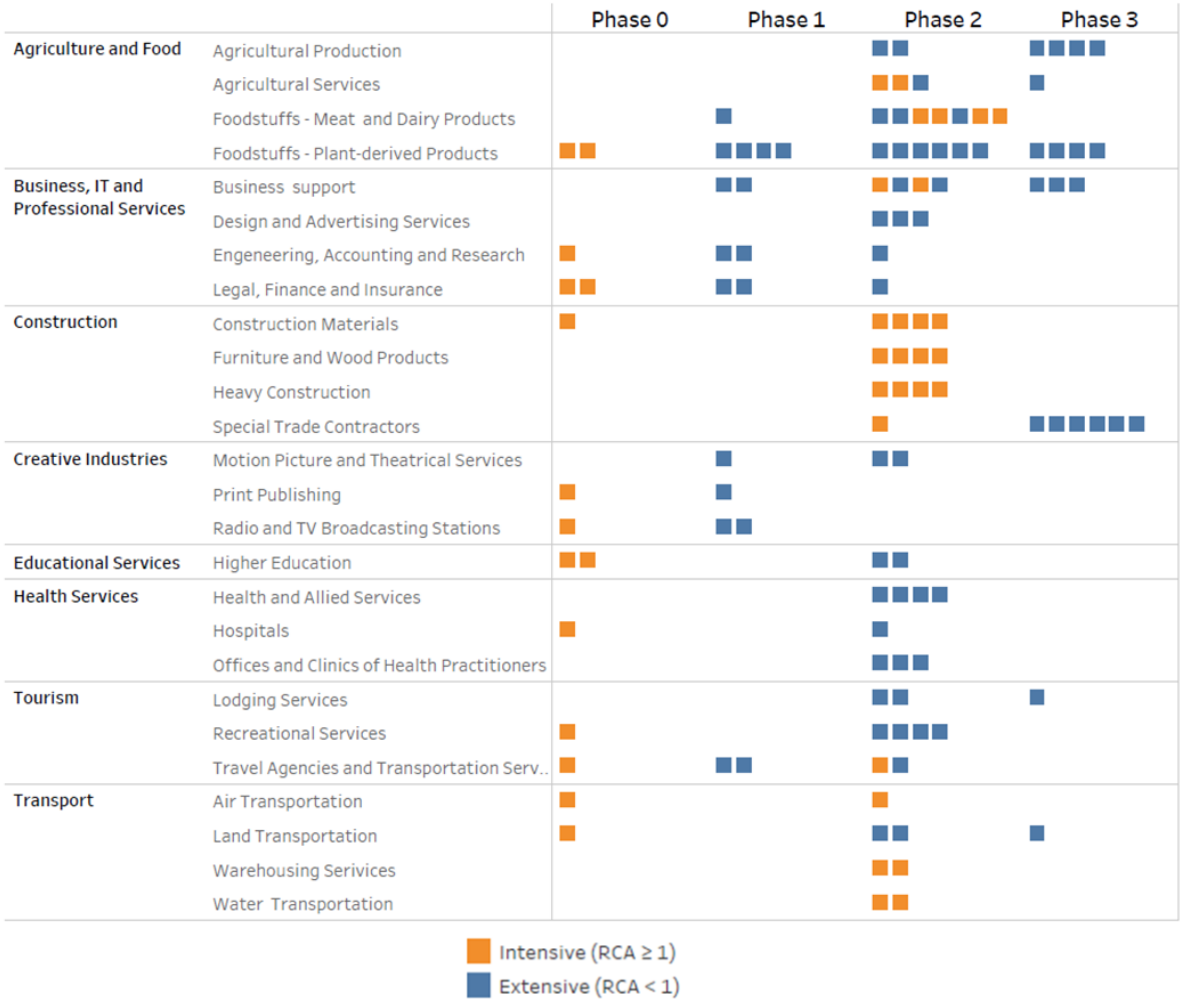
Figure 17: Prioritization Phases of Diversification Opportunities – Engineering Services

Sources: Own construction based on Dun & Bradstreet, U.S. Input-Output tables, U.S. BLS, and fDi Markets

Finally, it is possible to aggregate this information further and consolidate it at the level of themes and subthemes in order to assess which of them concentrate the greatest proportion of the industries assigned to the earliest phases. This is an important step because it is more efficient and effective to implement efforts to promote exports and attract investments at the level of themes or sectors than of individual industries. Figure 18 s**Error! Reference source not found.**hows the total number of Phase 0 and 1 industries by theme and subtheme.

After restricting the focus to Phase 0 and Phase 1 opportunities, themes and subthemes that represent more than 10% of the industries in these phases could be prioritized. When a subtheme represents more than 10% of industries in Phase 0 and 1 by itself (or more than 8%, but industries in Phase 0 and 1 represent more than 75% of the subtheme), it would be recommended to work at a subtheme level. Otherwise, it is advised to work at the theme level. As a result of this process, themes such as Tourism and Creative Sectors, and subthemes such as Foodstuffs (Plant-derived products), Legal, Finance and Insurance services and Engineering, Accounting and Research would emerge as initial target sectors. This is of course just one way of operationalizing the prioritization process. Ultimately, sector prioritization should arise not only from analytical work, but also from a dynamic process carried out jointly by the public and private sectors.

Figure 18: Industries by Prioritization Phases



Sources: Own construction based on Dun & Bradstreet, U.S. Input-Output tables, U.S. BLS, and fDi Markets

Conclusions

This paper has summarized Growth Lab analysis using Economic Complexity theory in Jordan, which was one component of the lab's overall research on growth strategy in collaboration with the Government of Jordan. This paper charts the development of a new set of complexity measures and an Industry Space that is inclusive of services, and proceeds to apply these resources to identify diversification opportunities in Jordan. The paper further develops a prioritization scheme that government and other stakeholders can use to help operationalize efforts toward realizing strategic diversification opportunities.

As a result of regional trade and market shocks, increasing electricity prices, and a long-term shift in Jordan's human capital advantages, Jordan has lost competitiveness in manufactured and agricultural exports over the last two decades. Accelerating economic growth, expanding job opportunities and establishing macroeconomic stability in Jordan in the short-to-medium term will depend on the country's ability to expand and diversify its export base to better match the country's factor endowments and comparative advantages. Jordan's current comparative advantages present clear opportunities for more rapid development of high-skill tradable services that serve the region and beyond, as well as narrower opportunities in certain manufactured and agricultural goods. In the longer-term, Jordan must also address major constraints to manufacturing and agriculture on the whole, specifically by expanding water availability and achieving system-wide reductions in the cost of electricity.

Applying newly developed complexity measures and the Industry Space reveals the following strategic export themes for Jordan: (1) Business, IT and Professional Services, (2) Education Services, (3) Healthcare Services, (4) Creative Industries, (5) Tourism, (6) Transportation and Logistics, (7) Construction Materials and Services, and (8) Agriculture and Food Processing. Each of these export themes includes a number of specific industries, which either already have a strong presence in Jordan and could continue to support export and wage growth (the "intensive margin") or would be likely to succeed in Jordan given their relatedness to existing capabilities and knowhow (the "intensive margin). The strategic opportunities that emerged from complexity analysis show a striking similarity on the export theme-level to several past strategic exercises that utilized different methodologies. Creative industries and some specific opportunities in agriculture and food processing are two areas of great opportunity that show up in our work and have not been mentioned in previous strategic document, while the complexity analysis suggests fewer opportunities in chemicals. For the rest of the themes, our work provides an added level of specificity within themes to help the government to focus its limited state capacity and efforts. Given administrative and budgetary challenges in implementing past strategies, this analysis proceeded to introduce a prioritization scheme that government and other stakeholders could use or further adapt in order to act on these opportunities.

Jordan's ability to achieve sustainable and inclusive growth will depend on its ability to capitalize on opportunities on both the intensive and extensive margins. This cannot be a passive process.

Rather, it requires government ownership of strategies, openness to iteration and experimentation in the implementation of strategies, and active leadership from the highest level of government to fully resource efforts and drive change. For opportunities on the intensive margin, it is critical that the government works jointly with the private sector in order to understand and iteratively solve industry-specific constraints. Without improved public-public and public-private coordination, solvable problems will linger, keeping promising industries small and costing the country many good jobs. One example of this is Jordan's historically restrictive immigration policies for high-skill labor, which is has constrained the full emergence of many high-skill tradable industries. For opportunities on the extensive margin, the Government of Jordan must treat targeted investment promotion and facilitation of foreign direct investment as a national priority, scaling up efforts to address bottlenecks in the system. Attracting and facilitating FDI is also an area where donor support and collaboration can be powerful, as donors can support government efforts in reaching and coordinating with companies in their countries and regions.

Beyond the context of Jordan, further research is needed to deepen understanding of the Industry Space, in particular its capacity to explain and inform future growth and the appearance and disappearance of specific industries over time. Further applications of the Industry Space and service-inclusive complexity measures to other country contexts will also serve to improve the applicability of these tools.

References

Balassa, Bela. 1964. “The Purchasing-Power Parity Doctrine: A Reappraisal.” *Journal of Political Economy* 72 6: 584–596.

Coscia, Michele, and Frank Neffke. 2017. “Network Backboning with Noisy Data.” In *2017 IEEE 33rd International Conference on Data Engineering (ICDE)*, 425–436. IEEE.

Hausmann, Ricardo, Jose Ramon Morales Arilla, and Miguel Angel Santos. 2017. “Panama beyond the Canal: Using Technological Proximities to Identify Opportunities for Productive Diversification,” CID Working Paper 324..

Hausmann, Ricardo, César A. Hidalgo, Sebastián Bustos, Michele Coscia, Alexander Simoes, and Muhammed A. Yildirim. 2014. *The Atlas of Economic Complexity*. MIT Press.

Hausmann, Ricardo, and Bailey Klinger. 2006. “Structural Transformation and Patterns of Comparative Advantage in the Product Space.” Harvard Center for International Development, Faculty Working Paper Series, No. 128.

Hausmann, Ricardo, Tim O’Brien, Miguel Angel Santos, Ana Grisanti, and Jorge Tapia. 2019. “Jordan: The Elements of a Growth Strategy.” Harvard Center for International Development, Faculty Working Paper Series, No. 346.

Kasoolu, Semiray, Ricardo Hausmann, Tim O’Brien, and Miguel Angel Santos. 2019. “Female Labor in Jordan: A Systematic Approach to the Exclusion Puzzle.” Harvard Center for International Development, Faculty Working Paper Series, No. 346.

Annex 1: Export Themes and Industries, Jordan

Theme	*Subtheme*	*Intensive Margin*	*Extensive Margin*
Agriculture and Food	Agricultural Production		Vegetables and Melons, Sheep and Goats, Dairy Farms, Chicken Eggs, Poultry and Eggs, Not Elsewhere Classified, General Farms, Primarily Livestock and Animal Specialties
	Agricultural Services	Crop Harvesting, Primarily by Machine, Livestock Services, Except Veterinary	Crop Planting, Cultivating, and Protecting, Veterinary Services for Livestock
	Foodstuffs - Meat and Dairy Products	Meat Packing Plants, Sausages and Other Prepared Meat Products, Poultry Slaughtering and Processing, Ice Cream and Frozen Desserts	Creamery Butter, Natural, Processed, and Imitation Cheese, Frozen Specialties, Not Elsewhere Classified, Prepared Fresh or Frozen Fish and Seafoods
	Foodstuffs - Plant-derived Products	Dried and Dehydrated Fruits, Vegetables, and Soup Mixes, Chocolate and Cocoa Products	Flour and Other Grain Mill Products, Cereal Breakfast Foods, Rice Milling, Prepared Flour Mixes and Doughs, Bread and Other Bakery Products, Except Cookies and Crackers, Frozen Bakery Products, Except Bread, Cane Sugar, Except Refining, Cane Sugar Refining, Beet Sugar, Salted and Roasted Nuts and Seeds, Cottonseed Oil Mills, Soybean Oil Mills, Flavoring Extracts and Flavoring Syrups, Not Elsewhere Classified, Manufactured Ice
Business, IT and Professional Services	Business support	Commercial Printing, Not Elsewhere Classified, Manifold Business Forms	Building Cleaning and Maintenance Services, Not Elsewhere, Detective, Guard, and Armored Car Services, Security Systems Services, Facilities Support Management Services, Equipment Rental and Leasing, Not Elsewhere Classified, Employment Agencies, Help Supply Services
	Design and Advertising Services		Advertising Agencies, Commercial Photography, Commercial Art and Graphic Design
	Engineering, Accounting and Research	Commercial Economic, Sociological, and Educational Research	Engineering Services, Accounting, Auditing, and Bookkeeping Services, Management Consulting Services
	Legal, Finance and Insurance	Insurance Carriers, Not Elsewhere Classified, Credit Reporting Services	Insurance Agents, Brokers, and Service, Offices of Holding Companies, Not Elsewhere Classified, Legal Services
Construction	Construction Materials	Flat Glass, Ready-Mixed Concrete, Mineral Wool, Cold-Rolled Steel Sheet, Strip, and Bars, Miscellaneous Structural Metal Work	
	Furniture and Wood Products	Wood Kitchen Cabinets, Prefabricated Wood Buildings and Components, Wood Office Furniture, Public Building and Related Furniture	
	Heavy Construction	Highway and Street Construction, Except Elevated Highways, Water, Sewer, Pipeline, and Communications and Power Line Construction, Heavy Construction, Not Elsewhere Classified, Elevators and Moving Stairways	
	Special Trade Contractors	Special Trade Contractors, Not Elsewhere Classified	Plumbing, Heating and Air-Conditioning, Painting and Paper Hanging, Electrical Work, Plastering, Drywall, Acoustical, and Insulation Work, Carpentry Work, Roofing, Siding, and Sheet Metal Work
Creative Industries	Motion Picture and Theatrical Services		Services Allied to Motion Picture Production, Motion Picture and Video Tape Production, Theatrical Producers (Except Motion Picture) and Miscellaneous Theatrical Services
	Print Publishing	Newspapers: Publishing, or Publishing and Printing	Periodicals: Publishing, or Publishing and Printing
	Radio and TV Broadcasting Stations	Radio Broadcasting Stations	Television Broadcasting Stations, Radio, Television, and Publishers' Advertising Representatives
Educational Services	Higher Education	Colleges, Universities, and Professional Schools, Schools and Educational Services, Not Elsewhere Classified	Junior Colleges and Technical Institutes, Vocational Schools, Not Elsewhere Classified

Health Services	Health and Allied Services		Hospital and Medical Service Plans, Medical Laboratories, Home Health Care Services, Health and Allied Services, Not Elsewhere Classified
	Hospitals	Specialty Hospitals, Except Psychiatric	General Medical and Surgical Hospitals
	Offices and Clinics of Health Practitioners		Offices and Clinics of Dentists, Offices and Clinics of Health Practitioners, Not Elsewhere Classified, Specialty Outpatient Facilities, Not Elsewhere Classified
Tourism	Lodging Services		Hotels and Motels, Rooming and Boarding Houses, Organization Hotels and Lodging Houses, on Membership Basis
	Recreational Services	Amusement and Recreation Services, Not Elsewhere Classified	Sporting and Recreational Camps, Amusement Parks, Museums and Art Galleries, Arboreta and Botanical or Zoological Gardens
	Travel Agencies and Transportation Services	Passenger Car Rental, Travel Agencies	Water Transportation of Passengers, Not Elsewhere Classified, Arrangement of Passenger Transportation, Not Elsewhere Classified, Tour Operators
Transport	Air Transportation	Air Transportation, Nonscheduled, Airports, Flying Fields, and Airport Terminal Services	
	Land Transportation	Truck Trailers	Trucking, Except Local, Courier Services, Except by Air, Rental of Railroad Cars
	Warehousing Services	Refrigerated Warehousing and Storage, Packing and Crating	
	Water Transportation	Marine Cargo Handling, Water Transportation Services, Not Elsewhere Classified	

Source: Own construction based on Dun & Bradstreet and fDi Markets

Annex 2: Description of Export Subthemes

Theme	*Subtheme*	*Description*
Agriculture and Food	Agricultural Production	Establishments primarily engaged in the production of crops, plants, vines, and trees (excluding forestry operations), and primarily engaged in the keeping, grazing, or feeding of livestock for the sale of livestock or livestock products (e.g., farms, orchards, greenhouses, nurseries, ranches, dairies, feedlots, egg production facilities, broiler facilities, poultry hatcheries, apiaries).
	Agricultural Services	Establishments primarily engaged in performing soil preparation services, crop services, veterinary services, other animal services, farm labor and management services, and landscape and horticultural services, for others on a contract or fee basis.
	Foodstuffs - Meat and Dairy Products	Establishments manufacturing or processing foods and beverages with mainly animal origin for human consumption (e.g., processed meats and processed products derived from milk).
	Foodstuffs - Plant-derived Products	Establishments manufacturing or processing foods and beverages with mainly plant-based origin for human consumption (e.g., grains, cereals, nuts, and all its derivatives at different processing stages).
Business, IT and Professional Services	Business support	Establishments primarily engaged in performing a range of services in support of the operations of other establishments or in providing a number of different continuing services, on a contract or fee basis, within another establishment; includes establishments providing personnel and monitoring security systems, commercial printing by one or more common processes, and other building cleaning and maintenance services such as window cleaning, janitorial service, floor waxing, and office cleaning.
	Business support	Establishments primarily engaged in renting or leasing (except finance leasing) equipment of various types (including electrical and appliances, furniture, and even trucks and airplanes), an/or providing personnel and employment services, both on a short-term and long-term basis.
	Design and Advertising Services	Establishments primarily engaged in rendering various business services with artistic and designing purposes on a contract or fee basis; includes establishments providing full advertising services (preparing and placing on media outlets), and general commercial photography services and/or commercial art or graphic design services for other advertising agencies, publishers, and other business and industrial users.
	Engineering, Accounting and Research	Establishments primarily engaged in providing engineering, and surveying services; accounting, auditing, and bookkeeping services; research, development, and testing services; and management services.
	Legal, Finance and Insurance	Establishments including carriers of insurance of all types, except health insurance; investment trusts, investment companies, holding companies, and miscellaneous investment offices; establishments which are headed by members of the bar and are engaged in offering legal advice or legal services; and consumer Credit Reporting Agencies.
Construction	Construction Materials	Establishments engaged in manufacturing products taken principally from stone, clay, sand and metal, which are generally used as construction materials. Includes establishments that manufacture flat glass and other glass products; cement; structural clay products; concrete and gypsum products; cut stone; abrasive and asbestos products; in addition to establishments engaged in smelting and refining ferrous and nonferrous metals from ore, pig, or scrap; in rolling, drawing, and alloying metals; and in manufacturing castings and other basic metal products.
	Furniture and Wood Products	Establishments engaged in cutting timber and pulpwood; merchant sawmills, lath mills, shingle mills, cooperage stock mills, planning mills, and plywood mills and veneer mills engaged in producing lumber and wood basic materials; and establishments engaged in manufacturing finished articles made mainly of wood such as various types of furniture.
	Heavy Construction	General contractors primarily engaged in heavy construction, such as highways and streets, bridges, sewers, railroads, irrigation projects, and special trade contractors primarily engaged in activities of a type that are clearly specialized to such heavy construction, including some activity related to building construction.
	Special Trade Contractors	Special trade contractors who undertake activities of a type that are specialized either to building construction, or to both building and nonbuilding projects. These activities include painting (including bridge painting and traffic lane painting), electrical work (including work on bridges, power lines, and power plants), carpentry work, plumbing, heating, air-conditioning, roofing, and sheet metal work.

Creative Industries	Motion Picture and Theatrical Services	
	Print Publishing	Establishments engaged in printing by one or more common processes, such as letterpress; lithography (including offset), gravure, or screen; and those establishments which perform services for the printing trade, such as bookbinding and platemaking. This major group also includes establishments engaged in publishing newspapers, books, and periodicals, regardless of whether or not they do their own printing.
	Radio and TV Broadcasting Stations	
Educational Services	Higher Education	Establishments providing academic or technical instruction, past the high school level (e.g. formal four year and two year undergraduate institutions, professional development and training schools, and other schools of more particular instruction)
Health Services	Health and Allied Services	
	Hospitals	Establishments primarily engaged in providing general medical and surgical services and other hospital services such as diagnostic services and treatment for specialized categories of patients, except mental.
	Offices and Clinics of Health Practitioners	)
Tourism	Lodging Services	Commercial establishments, known to the public as hotels, motor hotels, motels, or tourist courts, primarily engaged in providing lodging, or lodging and meals, for the general public. Also includes, establishments primarily engaged in renting rooms, with or without board, on a fee basis, and lodging houses and hotels operated by membership organizations for the benefit of their constituents (not open to the general public).
	Recreational Services	
	Travel Agencies and Transportation Services	Establishments primarily engaged in furnishing travel information and acting as agents in arranging or operating tours, transportation, rental of cars, and lodging for travelers. Also includes other passenger transportation services largely dependent of the tourism industry, such as short-term car rental and passenger water transportation services.
Transport	Air Transportation	
	Land Transportation	Establishments furnishing long-distance trucking, transfer services, or other services related to freight transportation by land, including courier services, and railroad car rental.
	Warehousing Services	
	Water Transportation	Establishments engaged in freight transportation on the open seas or inland waters, and establishments furnishing such incidental services as lighterage, towing, and canal operation.

Annex 3: Viability Factors Performance

Sic4	Industry Description	RCA Jordan	Av. RCA Peers	Water Intensity	Electricity Intensity	Missing Inputs
161	Vegetables and Melons	3.88	4.88	0.00	4.97	5.91
214	Sheep and Goats	3.95	3.25	5.25	5.73	4.95
241	Dairy Farms	3.98	4.00	5.33	5.63	4.95
252	Chicken Eggs	3.88	6.91	5.23	6.06	4.95
259	Poultry and Eggs, Not Elsewhere Classified	4.10	5.04	5.23	6.06	4.95
291	General Farms, Primarily Livestock and Animal Specialties	4.01	3.15	5.25	5.73	4.95
722	Crop Harvesting, Primarily by Machine	10.00	3.69	5.32	5.80	5.91
751	Livestock Services, Except Veterinary	7.88	4.22	5.50	5.92	6.55
721	Crop Planting, Cultivating, and Protecting	3.88	3.74	5.32	5.80	5.91
741	Veterinary Services for Livestock	3.88	3.42	5.66	6.01	4.32
2011	Meat Packing Plants	7.16	3.80	5.56	5.96	6.55
2013	Sausages and Other Prepared Meat Products	6.11	6.65	5.56	5.96	6.55
2015	Poultry Slaughtering and Processing	10.00	6.78	5.19	5.42	6.55
2024	Ice Cream and Frozen Desserts	8.47	7.72	5.08	5.00	6.55
2021	Creamery Butter	4.23	5.51	5.21	5.52	6.55
2022	Natural, Processed, and Imitation Cheese	4.11	7.89	5.55	5.84	6.55
2038	Frozen Specialties, Not Elsewhere Classified	3.88	3.18	5.28	4.94	6.55
2092	Prepared Fresh or Frozen Fish and Seafoods	3.88	3.57	5.47	5.86	6.55
2034	Dried and Dehydrated Fruits, Vegetables, and Soup Mixes	6.74	7.12	5.24	4.90	6.55
2066	Chocolate and Cocoa Products	10.00	8.83	5.21	5.36	6.87
2041	Flour and Other Grain Mill Products	4.73	6.76	5.49	3.74	6.87
2043	Cereal Breakfast Foods	3.88	4.02	5.57	5.69	6.55
2044	Rice Milling	3.88	3.09	5.49	3.74	6.87
2045	Prepared Flour Mixes and Doughs	3.88	4.34	5.46	5.27	6.87
2051	Bread and Other Bakery Products, Except Cookies and Crackers	4.28	3.97	5.25	4.75	6.55
2053	Frozen Bakery Products, Except Bread	3.88	7.23	5.25	4.75	6.55
2061	Cane Sugar, Except Refining	3.88	3.97	5.21	5.36	6.87
2062	Cane Sugar Refining	3.88	3.59	5.21	5.36	6.87
2063	Beet Sugar	3.88	10.00	5.21	5.36	6.87
2068	Salted and Roasted Nuts and Seeds	4.23	4.27	5.32	5.66	6.55
2074	Cottonseed Oil Mills	3.88	3.43	5.55	5.92	6.55
2075	Soybean Oil Mills	3.88	3.15	5.55	5.92	6.55
2087	Flavoring Extracts and Flavoring Syrups, Not Elsewhere Classified	4.25	4.23	5.21	5.64	6.55
2097	Manufactured Ice	3.88	3.42	5.08	4.95	6.87
2759	Commercial Printing, Not Elsewhere Classified	5.31	4.79	5.41	3.81	6.23
2761	Manifold Business Forms	6.71	4.49	5.41	3.81	6.23
7349	Building Cleaning and Maintenance Services, Not Elsewhere	4.12	4.44	5.15	5.75	4.32
7381	Detective, Guard, and Armored Car Services	4.51	5.39	5.59	5.93	4.95
7382	Security Systems Services	4.28	8.20	5.59	5.93	4.95

8744	Facilities Support Management Services	4.44	3.59	0.00	4.14	5.91
7359	Equipment Rental and Leasing, Not Elsewhere Classified	4.24	3.85	5.26	5.55	2.40
7361	Employment Agencies	3.92	3.20	5.64	6.17	6.87
7363	Help Supply Services	4.02	4.59	5.65	6.23	6.55
7311	Advertising Agencies	3.98	4.19	5.64	5.62	5.59
7335	Commercial Photography	3.88	3.25	5.66	5.84	5.27
7336	Commercial Art and Graphic Design	3.94	3.78	5.58	4.72	5.59
8732	Commercial Economic, Sociological, and Educational Research	5.68	5.21	5.51	5.36	0.49
8711	Engineering Services	4.51	5.50	5.49	5.38	2.08
8721	Accounting, Auditing, and Bookkeeping Services	4.06	4.60	5.51	5.41	5.91
8742	Management Consulting Services	4.18	3.91	5.63	6.12	6.55
6399	Insurance Carriers, Not Elsewhere Classified	5.67	6.02	5.68	6.34	6.55
7323	Credit Reporting Services	5.90	6.34	4.98	5.45	5.91
6411	Insurance Agents, Brokers, and Service	4.21	4.45	5.69	6.30	6.23
6719	Offices of Holding Companies, Not Elsewhere Classified	4.45	6.17	5.60	2.51	4.64
8111	Legal Services	4.00	4.09	5.55	5.84	6.55
3211	Flat Glass	5.12	4.27	4.86	0.42	6.23
3273	Ready-Mixed Concrete	5.71	5.21	5.32	5.38	6.55
3296	Mineral Wool	10.00	4.13	4.44	0.00	6.55
3316	Cold-Rolled Steel Sheet, Strip, and Bars	5.34	3.20	5.40	4.75	6.23
3449	Miscellaneous Structural Metal Work	5.21	5.61	5.51	5.48	5.59
2434	Wood Kitchen Cabinets	7.04	4.80	5.33	4.82	6.55
2452	Prefabricated Wood Buildings and Components	6.89	4.88	5.42	4.79	3.36
2521	Wood Office Furniture	5.65	4.58	5.40	5.32	6.87
2531	Public Building and Related Furniture	4.99	5.41	5.55	5.83	6.87
1611	Highway and Street Construction, Except Elevated Highways	5.03	7.28	5.32	5.87	0.17
1623	Water, Sewer, Pipeline, and Communications and Power Line Construction	4.89	5.54	5.32	5.87	0.17
1629	Heavy Construction, Not Elsewhere Classified	5.10	5.13	5.32	5.87	0.17
3534	Elevators and Moving Stairways	5.69	7.01	5.71	6.39	0.17
1799	Special Trade Contractors, Not Elsewhere Classified	5.16	4.94	5.32	5.87	0.17
1711	Plumbing, Heating and Air-Conditioning	4.26	4.29	5.32	5.87	0.17
1721	Painting and Paper Hanging	3.88	3.47	5.32	5.87	0.17
1731	Electrical Work	4.66	4.72	5.32	5.87	0.17
1742	Plastering, Drywall, Acoustical, and Insulation Work	3.88	3.87	5.32	5.87	0.17
1751	Carpentry Work	3.88	4.68	5.32	5.87	0.17
1761	Roofing, Siding, and Sheet Metal Work	3.88	3.70	5.32	5.87	0.17
7819	Services Allied to Motion Picture Production	4.16	3.43	5.52	5.86	5.59
7812	Motion Picture and Video Tape Production	4.26	4.16	5.64	5.70	6.23
7922	Theatrical Producers (Except Motion Picture) and Miscellaneous Theatrical Services	3.90	3.82	5.51	5.68	5.91
2711	Newspapers: Publishing, or Publishing and Printing	5.01	4.31	5.56	5.36	5.59
2721	Periodicals: Publishing, or Publishing and Printing	3.95	4.66	5.56	5.81	5.59
4832	Radio Broadcasting Stations	8.24	4.40	5.50	6.12	5.91

4833	Television Broadcasting Stations	4.25	7.53	5.50	6.12	5.91
7313	Radio, Television, and Publishers' Advertising Representatives	4.46	4.40	5.64	5.62	5.59
8221	Colleges, Universities, and Professional Schools	7.07	5.25	0.00	1.43	4.00
8299	Schools and Educational Services, Not Elsewhere Classified	5.19	3.90	5.60	6.09	4.64
8222	Junior Colleges and Technical Institutes	4.12	3.30	0.00	1.43	4.00
8249	Vocational Schools, Not Elsewhere Classified	4.11	3.18	5.60	6.09	4.64
6324	Hospital and Medical Service Plans	3.88	3.87	5.29	6.35	5.91
8071	Medical Laboratories	4.39	3.82	5.55	5.47	4.32
8082	Home Health Care Services	4.03	3.26	5.52	6.03	5.91
8099	Health and Allied Services, Not Elsewhere Classified	4.14	3.36	5.48	5.29	3.36
8069	Specialty Hospitals, Except Psychiatric	4.94	3.57	4.94	4.18	1.76
8062	General Medical and Surgical Hospitals	4.51	3.70	4.94	4.18	1.76
8021	Offices and Clinics of Dentists	3.88	3.72	5.32	4.95	4.32
8049	Offices and Clinics of Health Practitioners, Not Elsewhere Classified	3.88	3.15	5.69	5.29	4.64
8093	Specialty Outpatient Facilities, Not Elsewhere Classified	3.88	3.19	5.38	5.52	4.00
7011	Hotels and Motels	4.66	5.23	3.88	1.12	4.32
7021	Rooming and Boarding Houses	4.16	3.18	3.88	1.12	4.32
7041	Organization Hotels and Lodging Houses, on Membership Basis	4.04	7.88	3.88	1.12	4.32
7999	Amusement and Recreation Services, Not Elsewhere Classified	5.41	3.76	4.60	3.93	1.76
7032	Sporting and Recreational Camps	3.97	3.61	3.88	1.12	4.32
7996	Amusement Parks	3.93	3.71	4.99	2.97	4.32
8412	Museums and Art Galleries	4.18	3.94	5.19	3.15	5.59
8422	Arboreta and Botanical or Zoological Gardens	3.88	3.26	5.19	3.15	5.59
7514	Passenger Car Rental	5.25	5.12	5.46	5.69	6.55
4724	Travel Agencies	4.97	5.36	5.60	5.91	6.55
4489	Water Transportation of Passengers, Not Elsewhere Classified	3.88	7.36	5.66	6.16	3.68
4729	Arrangement of Passenger Transportation, Not Elsewhere Classified	3.99	10.00	5.63	5.82	5.27
4725	Tour Operators	4.61	6.37	5.60	5.91	6.55
4522	Air Transportation, Nonscheduled	7.03	8.54	5.63	5.89	4.64
4581	Airports, Flying Fields, and Airport Terminal Services	7.16	8.18	5.45	5.75	2.72
3715	Truck Trailers	5.43	8.03	5.64	5.97	5.27
4213	Trucking, Except Local	3.88	3.22	5.64	5.85	6.87
4215	Courier Services, Except by Air	4.07	3.20	5.44	5.87	6.23
4741	Rental of Railroad Cars	4.21	10.00	5.61	5.83	5.27
4222	Refrigerated Warehousing and Storage	4.84	4.29	5.24	0.00	6.23
4783	Packing and Crating	5.67	8.08	5.65	5.80	5.27
4491	Marine Cargo Handling	6.10	5.68	5.65	5.80	5.27
4499	Water Transportation Services, Not Elsewhere Classified	5.01	7.52	5.62	5.78	4.95

Annex 4: Attractiveness Factors Performance

Sic4	Industry Description	Female Employment	High Skill Employment	FDI World	FDI Region	Export Propensity
161	Vegetables and Melons	3.36	3.11	4.58	4.70	5.93
214	Sheep and Goats	3.47	3.29	4.48	4.70	3.23
241	Dairy Farms	3.47	3.29	4.58	4.71	3.92
252	Chicken Eggs	3.47	3.29	4.47	4.69	7.09
259	Poultry and Eggs, Not Elsewhere Classified	3.47	3.29	4.48	4.70	4.64
291	General Farms, Primarily Livestock and Animal Specialties	3.47	3.29	4.54	4.70	4.09
722	Crop Harvesting, Primarily by Machine	4.22	3.37	4.47	4.69	3.50
751	Livestock Services, Except Veterinary	4.62	2.54	4.46	4.69	4.66
721	Crop Planting, Cultivating, and Protecting	4.22	3.37	4.50	4.69	3.87
741	Veterinary Services for Livestock	9.63	6.76	4.46	4.69	5.49
2011	Meat Packing Plants	4.76	2.26	5.06	4.73	7.23
2013	Sausages and Other Prepared Meat Products	4.76	2.26	4.78	4.71	6.62
2015	Poultry Slaughtering and Processing	4.76	2.85	4.80	4.71	7.57
2024	Ice Cream and Frozen Desserts	3.66	3.75	4.80	4.73	5.64
2021	Creamery Butter	3.66	3.75	4.55	4.70	5.66
2022	Natural, Processed, and Imitation Cheese	3.66	3.75	4.97	4.75	7.27
2038	Frozen Specialties, Not Elsewhere Classified	4.94	3.28	4.68	4.72	7.79
2092	Prepared Fresh or Frozen Fish and Seafoods	4.76	4.05	4.66	4.72	10.00
2034	Dried and Dehydrated Fruits, Vegetables, and Soup Mixes	4.52	3.97	4.59	4.71	9.22
2066	Chocolate and Cocoa Products	5.36	4.14	4.71	4.78	7.77
2041	Flour and Other Grain Mill Products	3.76	4.57	4.78	4.71	5.22
2043	Cereal Breakfast Foods	4.33	4.27	4.57	4.70	9.67
2044	Rice Milling	3.76	4.57	4.55	4.70	5.19
2045	Prepared Flour Mixes and Doughs	5.21	3.28	4.49	4.69	4.37
2051	Bread and Other Bakery Products, Except Cookies and Crackers	5.21	3.28	5.12	4.74	5.18
2053	Frozen Bakery Products, Except Bread	5.21	3.28	4.50	4.70	5.24
2061	Cane Sugar, Except Refining	5.36	4.14	4.69	4.77	9.94
2062	Cane Sugar Refining	5.36	4.14	5.48	5.06	9.15
2063	Beet Sugar	5.36	4.14	4.48	4.70	8.82
2068	Salted and Roasted Nuts and Seeds	4.76	4.05	4.94	4.80	9.54
2074	Cottonseed Oil Mills	3.76	4.57	4.47	4.69	3.94
2075	Soybean Oil Mills	3.76	4.57	4.49	4.70	6.97
2087	Flavoring Extracts and Flavoring Syrups, Not Elsewhere Classified	4.76	4.05	4.77	4.74	7.67
2097	Manufactured Ice	3.54	5.31	4.55	4.72	3.55
2759	Commercial Printing, Not Elsewhere Classified	4.52	4.12	4.49	4.70	5.60
2761	Manifold Business Forms	4.52	4.12	4.46	4.69	4.45
7349	Building Cleaning and Maintenance Services, Not Elsewhere	6.55	2.57	4.46	4.69	3.45
7381	Detective, Guard, and Armored Car Services	3.72	3.93	4.46	4.69	3.58
7382	Security Systems Services	3.72	3.93	4.46	4.69	3.75

8744	Facilities Support Management Services	6.02	5.77	4.46	4.69	3.31
7359	Equipment Rental and Leasing, Not Elsewhere Classified	3.38	3.94	5.18	4.83	3.87
7361	Employment Agencies	5.93	7.77	4.80	4.78	3.42
7363	Help Supply Services	6.77	5.68	5.03	4.84	3.81
7311	Advertising Agencies	6.45	8.66	5.59	5.00	3.76
7335	Commercial Photography	5.65	6.95	4.46	4.69	3.52
7336	Commercial Art and Graphic Design	7.12	8.79	4.50	4.71	3.78
8732	Commercial Economic, Sociological, and Educational Research	6.18	8.86	4.46	4.69	4.34
8711	Engineering Services	3.60	8.74	5.20	5.18	4.12
8721	Accounting, Auditing, and Bookkeeping Services	7.68	8.36	5.23	4.74	4.59
8742	Management Consulting Services	5.44	8.96	5.10	4.89	4.78
6399	Insurance Carriers, Not Elsewhere Classified	7.37	7.41	4.62	4.74	4.59
7323	Credit Reporting Services	7.84	4.81	4.46	4.69	3.68
6411	Insurance Agents, Brokers, and Service	7.37	7.41	6.75	5.43	5.13
6719	Offices of Holding Companies, Not Elsewhere Classified	6.31	7.93	10.00	6.47	6.72
8111	Legal Services	6.98	8.91	5.50	5.03	3.56
3211	Flat Glass	3.54	3.72	5.16	4.86	10.00
3273	Ready-Mixed Concrete	2.06	3.23	5.82	5.56	3.75
3296	Mineral Wool	2.76	3.95	4.53	4.70	5.15
3316	Cold-Rolled Steel Sheet, Strip, and Bars	2.14	3.40	6.40	5.63	6.51
3449	Miscellaneous Structural Metal Work	2.55	3.50	4.52	4.76	6.23
2434	Wood Kitchen Cabinets	3.57	3.25	4.54	4.70	7.37
2452	Prefabricated Wood Buildings and Components	2.80	2.89	4.50	4.70	7.89
2521	Wood Office Furniture	3.57	3.25	4.52	4.70	8.73
2531	Public Building and Related Furniture	3.86	4.04	4.51	4.70	7.39
1611	Highway and Street Construction, Except Elevated Highways	1.90	2.99	5.45	4.78	4.45
1623	Water, Sewer, Pipeline, and Communications and Power Line Construction	1.90	2.99	4.99	4.74	3.71
1629	Heavy Construction, Not Elsewhere Classified	1.90	2.99	5.78	4.81	4.44
3534	Elevators and Moving Stairways	1.90	2.99	4.56	4.72	8.03
1799	Special Trade Contractors, Not Elsewhere Classified	1.97	2.98	4.48	4.70	3.85
1711	Plumbing, Heating and Air-Conditioning	1.90	2.99	4.48	4.70	3.69
1721	Painting and Paper Hanging	1.90	2.99	4.47	4.70	3.36
1731	Electrical Work	1.90	2.99	4.48	4.70	4.01
1742	Plastering, Drywall, Acoustical, and Insulation Work	1.90	2.99	4.46	4.69	3.42
1751	Carpentry Work	1.90	2.99	4.47	4.70	3.66
1761	Roofing, Siding, and Sheet Metal Work	1.90	2.99	4.47	4.69	3.49
7819	Services Allied to Motion Picture Production	5.72	7.47	4.46	4.69	4.59
7812	Motion Picture and Video Tape Production	4.63	6.73	4.79	4.74	4.40
7922	Theatrical Producers (Except Motion Picture) and Miscellaneous Theatrical Services	5.63	6.70	4.84	4.85	3.55
2711	Newspapers: Publishing, or Publishing and Printing	5.42	7.64	4.50	4.70	3.79
2721	Periodicals: Publishing, or Publishing and Printing	5.99	8.97	4.48	4.70	4.50
4832	Radio Broadcasting Stations	4.63	6.89	4.76	4.86	3.88

4833	Television Broadcasting Stations	4.63	6.89	4.69	4.82	4.30
7313	Radio, Television, and Publishers' Advertising Representatives	6.45	8.66	4.52	4.71	3.75
8221	Colleges, Universities, and Professional Schools	6.86	8.41	5.21	5.26	3.52
8299	Schools and Educational Services, Not Elsewhere Classified	7.83	7.62	4.51	4.73	3.32
8222	Junior Colleges and Technical Institutes	6.86	8.41	4.48	4.71	3.32
8249	Vocational Schools, Not Elsewhere Classified	6.88	7.68	4.48	4.70	3.29
6324	Hospital and Medical Service Plans	7.00	7.72	4.85	4.82	3.35
8071	Medical Laboratories	8.05	6.72	4.53	4.73	3.45
8082	Home Health Care Services	10.00	4.67	4.47	4.69	3.26
8099	Health and Allied Services, Not Elsewhere Classified	8.26	7.40	4.59	4.74	3.29
8069	Specialty Hospitals, Except Psychiatric	8.94	7.98	4.52	4.69	4.15
8062	General Medical and Surgical Hospitals	8.94	7.98	5.59	5.23	3.34
8021	Offices and Clinics of Dentists	9.75	6.76	4.55	4.71	3.28
8049	Offices and Clinics of Health Practitioners, Not Elsewhere Classified	9.43	9.24	4.51	4.70	3.33
8093	Specialty Outpatient Facilities, Not Elsewhere Classified	9.20	8.02	4.56	4.75	3.24
7011	Hotels and Motels	7.14	3.85	10.00	10.00	3.52
7021	Rooming and Boarding Houses	6.68	4.33	5.12	5.40	3.26
7041	Organization Hotels and Lodging Houses, on Membership Basis	7.10	3.88	5.28	5.57	3.37
7999	Amusement and Recreation Services, Not Elsewhere Classified	6.13	5.37	6.11	5.36	3.44
7032	Sporting and Recreational Camps	6.68	4.33	5.10	5.38	3.43
7996	Amusement Parks	6.02	4.57	6.62	5.79	3.93
8412	Museums and Art Galleries	6.49	6.32	4.61	4.69	3.58
8422	Arboreta and Botanical or Zoological Gardens	6.49	6.32	4.61	4.69	3.88
7514	Passenger Car Rental	4.05	5.00	4.77	4.75	3.58
4724	Travel Agencies	7.52	6.52	4.72	5.05	5.48
4489	Water Transportation of Passengers, Not Elsewhere Classified	4.14	5.13	4.86	4.72	4.20
4729	Arrangement of Passenger Transportation, Not Elsewhere Classified	4.65	4.65	4.48	4.72	7.04
4725	Tour Operators	7.52	6.52	4.52	4.78	3.79
4522	Air Transportation, Nonscheduled	6.16	6.53	4.90	4.75	4.45
4581	Airports, Flying Fields, and Airport Terminal Services	4.70	3.52	4.49	4.70	4.40
3715	Truck Trailers	3.74	4.24	4.67	4.70	10.00
4213	Trucking, Except Local	2.26	2.55	4.67	4.70	3.85
4215	Courier Services, Except by Air	3.32	3.75	4.55	4.71	4.02
4741	Rental of Railroad Cars	3.71	4.17	4.47	4.69	3.21
4222	Refrigerated Warehousing and Storage	4.24	2.57	5.20	4.94	3.80
4783	Packing and Crating	3.72	4.05	4.47	4.69	3.65
4491	Marine Cargo Handling	3.72	4.05	4.47	4.70	6.00
4499	Water Transportation Services, Not Elsewhere Classified	4.09	4.57	4.47	4.69	5.65

Annex 5: Methodology for Estimating Missing Inputs

A crucial element for the development of any productive activity is firms' capacity to access the intermediate inputs required in the production process, which are usually supplied by third parties, whether domestic or imported. The ability to access intermediate inputs in a given location is critical to determine the viability of the industry in it. It is important to note that for an intermediate input to be available in a particular location, it is not necessary that the industries that offer the input exist in the same location, as it is sufficient that the input is accessible through imports (to the extent that the input is tradable). In view of its relevance, the Growth Lab developed a methodology to measure a particular country's performance on this factor, based on information from U.S. Input-Output tables. As noted in the report, using data from the U.S. economy is useful not only because the country has accessible and reliable databases but because it also displays an advanced productive structure and a wide collection of industries, which can provide a good approximation of how individual industries would interact with each other if and when they are fully developed in Jordan.

The methodology first identifies which goods and services are intensively required by the industries of interest. To this end, an RCA in the use of the different inputs (RCAI) is calculated for every industry. This indicator is analogous to the one used to measure the intensity to which an industry is developed in the country. In the case of the RCAI, the calculation is as follows: the percentage of the total demand for inputs of the specific industry that is given by a particular input is divided by the percentage of the total demand for inputs in the economy that is given by that same input. If the RCAI is equal or greater than one, the input is demanded intensively by the industry in question, relative to the rest of the economy. Next, to assess whether the inputs intensively required by the diversification opportunities identified are available in the country, a combination of two tests are applied. The first test evaluates if the input, an industry in itself, is present in the country. For this, the traditional RCA measure is used. If the industry shows an RCA equal or greater than one, then the input that it offers is considered to be available. If this is not the case, the second test evaluates if other industries that intensively demand the same input are present in the country (using RCA). If a sufficiently large number (10 or more) of industries meet this criterion, then the input is also considered to be available. In short, the methodology presumes that an input is available in Jordan if it comes from an industry that is intensively present in the Jordan or if a sufficiently large number of industries that intensively demand it are intensively present in the Jordan.

The result of this exercise is a list of the intermediate inputs that are intensively demanded by each diversification opportunity, which can be classified either as available or missing. Performance on this factor is measured by the total number of inputs that are intensively required by the industry in question that are considered to be missing or not accessible in the country.

Annex 6: Methodology for Estimating Foreign Direct Investment

Among the attractiveness factors that are considered in the prioritization exercise, a measure of Foreign Direct Investment (FDI) flows both at a worldwide and regional level is used. To assign a estimate of FDI flows to each SIC4 industry that was selected based on the complexity analysis, a two-part process is employed: (1) matching of the selected SIC4 industries to FDI categories, and (2) assignment of FDI flows based on employment, according to the Dun & Bradstreet (D&B) dataset.

The first step's objective is to overcome the differences in classification codes between the fDi Markets dataset (NAICS 2007) and the D&B dataset (SIC1987) that is used in the complexity analysis. For the industries that match with multiple FDI subsectors, one industry was chosen manually through careful study of the codes' definitions in both classifications. When the match at the SIC4 level became difficult, a match was made at a more aggregated level (for example, SIC2 level matched to an FDI sector, SIC3 level matched to an FDI subsector, etc.). This is considered a partial match. Partial matches are more common because the SIC4 level of disaggregation is generally higher than the typical FDI subsector level of disaggregation. For the partial matches, only a part of the matched FDI category (sector or subsector) is assigned based on weights calculated from D&B. Weights are calculated based on the proportion of employment in the SIC4 industry to the employment in the SIC2 or SIC3 category that matched with the FDI category.

An example may help to illustrate this. The closest match to the SIC4 industry "Radio Broadcasting stations" (SIC 4832) is the FDI subsector "Radio and TV Broadcasting" (NAICS 5151). However, the latter clearly includes a wider range of industries than the former. An assignment of all of the FDI in this subsector to SIC industry 4832 would likely be an overstatement. Therefore, the amount of FDI in "Radio and TV Broadcasting," is weighted by the proportion of employment in SIC 4832 to SIC 483 (namely, "Radio and Television Broadcasting Stations") to get a measure of the FDI spent only on radio broadcasting stations.

This implies an assumption that total employment in an industry is proportional to the total FDI in that industry. As an important caveat, this may not be true across industries that have different levels of capital intensity. However, this approximation leads to higher variability in the assignment of FDI to the SIC4 industries, which is important for the purposes of the analysis. For full matches, a weight of one is used to assign the appropriate FDI flows.

Annex 7: Industries Excluded from the Analysis after Identification of Export Themes

Sic4	Industry Description
851	Forestry Services
912	Finfish
921	Fish Hatcheries and Preserves
1499	Miscellaneous Nonmetallic Minerals, Except Fuels
2121	Cigars
2675	Die-Cut Paper and Paperboard and Cardboard
2789	Bookbinding and Related Work
2796	Platemaking and Related Services
3821	Laboratory Apparatus and Furniture
4789	Transportation Services, Not Elsewhere Classified
4813	Telephone Communications, Except Radiotelephone
4899	Communications Services, Not Elsewhere Classified
4939	Combination Utilities, Not Elsewhere Classified
4941	Water Supply
4953	Refuse Systems
6099	Functions Related to Depository Banking, Not Elsewhere Classified
6726	Unit Investment Trusts, Face-Amount Certificate Offices, and Closed-End Management Investment Offices
6732	Educational, Religious, and Charitable Trusts
7342	Disinfecting and Pest Control Services
7383	News Syndicates
7389	Business Services, Not Elsewhere Classified
7537	Automotive Transmission Repair Shops
7622	Radio and Television Repair Shops
7699	Repair Shops and Related Services, Not Elsewhere Classified
7941	Professional Sports Clubs and Promoters
7948	Racing, Including Track Operation
7997	Membership Sports and Recreation Clubs