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DOES INDUSTRIALISATION INCREASE ECONOMIC GROWTH? EVIDENCE FROM UPPER-MIDDLE INCOME COUNTRIES AND THE IMPLICATIONS FOR SOUTH AFRICA

A Research Report submitted in partial fulfilment to the Degree of

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PROJECT: **DOES INDUSTRIALISATION INCREASE ECONOMIC GROWTH? EVIDENCE FROM UPPER-MIDDLE INCOME COUNTRIES AND THE IMPLICATIONS FOR SOUTH AFRICA**

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DATE CONSIDERED: 20 October 2017

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Abstract

In a world that is rapidly changing through massive improvements in technology and innovation, many developing countries find themselves with a trade-off as to whether to pursue industrialisation or not. Industrialisation and de-industrialisation are referred to as changes in the share of the manufacturing sector in GDP and/or employment (Tregenna, 2011). In the past, many countries have successfully integrated various industrialisation policies into their policy frameworks, which saw their economies grow, increasing the standard of living of the population. Industrialisation is typically in the form of either export-led or import-substitution policy, with each having contrasting ways of achieving the same goal – economic growth and development. The current paper employs both statistical and case study analyses in attempting isolate the effect manufacturing has on economic growth at both the aggregate and individual country level. The results would suggest that increases in manufacturing no longer have the significant growth-enhancing effects as detailed throughout history. However, through a detailed analysis of different factors and policies which contributed to the successes or failures of other upper-middle income economies such as Brazil, Malaysia, and Turkey, we argue that South Africa has a lot to potentially gain from the re-industrialisation of the economy.

I. Introduction

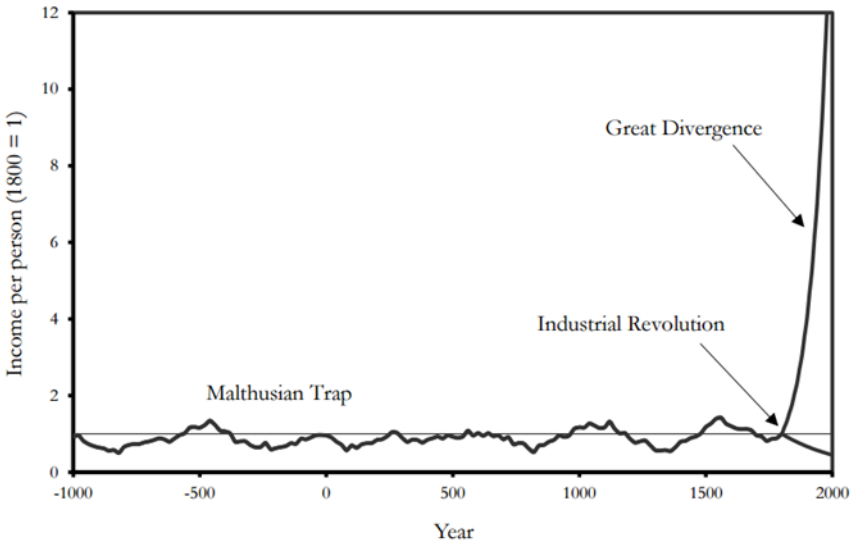
In a world that is rapidly changing through massive improvements in technology and innovation, many developing countries find themselves at a crossroads as to whether to pursue industrialisation or not. Industrialisation, and the converse de-industrialisation, is referred to as changes in the share of the manufacturing sector in GDP and/or employment (Tregenna, 2011). It further describes the process of developing the manufacturing sector through an upgrading of productive capabilities and improvements in technology and innovative capacity.

In the past, many countries have successfully integrated various industrialisation policies into their policy frameworks, which saw their economies grow, increasing the standard of living of the population. Industrialisation typically can come in the form of either export-led or import-substitution. Each having different ways of achieving the same goal – economic growth and development.

The Industrial Revolution marked a significant change in production where before many goods were produced on a small scale by master craftsmen in the confines of their homes or workshops. It wasn't before the harnessing of steam as a means of propulsion that the expansion of industries such as iron, steel, and textiles arose. This new force propelled Britain, and other economies subsequently, upward as recognized leaders of industry and trade resulting in increases in the volume and variety of mass-produced manufactured goods throughout the twentieth-century. This brought about increases in the average living standards for many people in these economies, while poorer and less-developed nations lagged well behind.

Prior to 1800, per capita incomes around the world fluctuated with periods of prosperity and hardship, but with no definitive upward trend (Clark, 2014). Owing to the exponential growth in incomes around 1780 (Figure 1), Clark argues that the Industrial Revolution represents the "single great event of world economic history" (Clark, 2014, p 2). Andreoni and Scazzieri (2014, p. 1391) write that the "transformation of production structures has been at the centre of the historical dynamics of capitalist economies since the Industrial Revolution."

Figure 1: A Schematic History of World Economic Growth



Source: Clark (2007, p. 2)

Yet, Szirmai (2009, p. 3) argues that, in most respects, the use of the term "industrial revolution" is ambiguous because it does not take into account the "incremental nature of increases in productive capacity." Szirmai further believes there are no examples of success stories in economic development where industrialisation was not at the forefront of development. With the possible exception of India (until recently), all Asian successes in this regard have involved aggressive policies for sustained industrialisation.

To date, shifting into services, as seenin many developed economies, has lessened the emphasis on manufacturing and industrialisation as a means to grow an economy. Since around 1975, the global economy has experienced a significant decline in the proportion of manufacturing as a share of GDP, as well as a rapid decline in employment within the sector – especially in more developed economies (Tregenna, 2011).

At various stages throughout history, many nations have attempted to grow their economies through industrialisation policies, with varying levels of success. Very often, as history shows, poor countries that were colonised by the early-industrialised economies of the West find it difficult to build a strong manufacturing base with which to propel their economies forward and experience the type of growth experienced by many of now-developed economies. Africa's economic growth in the 1960s was similar to that of South Asia's (Collier & Gunning, 1999a). Harrison et al. (2013) confirm this writing that, during the period 1970 – 2000, growth within the African region was only 0.5 percent per annum.

According to Andreoni and Gregory (2013), most European countries (the likes of Belgium, France, and Switzerland to name a few) had begun the process of industrialisation at around the same time as the United States. These countries were soon followed by Germany, Russia, and Japan. Throughout the Second World War, this basket of newly industrialising economies remained largely unchanged, with the exceptions of Argentina, Brazil, and South Africa who all pushed for import-substitution style policies in reaction to the depressed levels of international trade that occurred during the Great Depression.

Was this aggressive shift into manufacturing by these governments the *cause* of their success or failure today? As will be seen, the answer is not as straightforward as one would hope. The current paper employs both statistical and case study analyses in attempting to answer this question. By employing panel regression estimation techniques, we hope to see the effect of manufacturing on economic growth. We admit this is a difficult question to answer due to the sheer number of variables that can affect GDP. Case studies will also be conducted using four countries – Brazil, Malaysia, South Africa, and Turkey – to identify strengths and weaknesses experienced during the period 1994-2016. This is done with the view of determining what can be learned about their policy successes and failures with a view to applying them to South Africa.

Various authors have investigated the above-mentioned question. Macroni, et al. (2013), for instance, examine the role that manufacturing plays in the development process through Kaldor's first two laws. Kaldor's first law states that growth of manufacturing output is directly positively related to the growth rate of the economy. Kaldor's second law describes the relationship between increases in manufacturing productivity and growth of manufacturing output (Macroni, et al., 2016). Macroni, et al. (2013) find that growth in output in the manufacturing sector is associated with economic growth and productivity gains, proving Kaldor's first law. The results seemingly confirm the relevance of having a strong manufacturing sector for the process of development in developing nations.

Su and Yao (2016) further find that developing manufacturing capabilities can bring about enhanced technological accumulation, as well as create better incentives for saving. They further argue that manufacturing can also enhance human capital utilisation resulting in better economic institutions. For developing economies, especially middle-income economies, the process of technology accumulation is plagued with difficulties. Focusing specifically on the middle-income trap (which describes a situation where countries fail to grow their income

above the level previously achieved given certain advantages) and what policies are available to countries in order to break out of the trap, Lee (2015) states that countries need to bridge the divide between themselves and high-income economies through innovation. The policy recommendations provided in the paper are in accordance with a new set of policies called "evolutionary industrial policy" (Teubal & Avnimelech, 2008). Any engagement with this new field of industrial policy is unfortunately beyond the scope of the current paper.

Industrial policy in South Africa, whether through poor coordination, weak government planning, or both, was not able to effectively utilize its manufacturing sector, which resulted in the economy prematurely de-industrialising (Rodrik, 2015). That is to decrease manufacturing activities before any significant benefits are realised. Therefore, a subset of questions that the current paper seeks to answer are: "can a reprioritisation on manufacturing bring about a positive impact on South Africa's growth prospects and future prosperity?" and "what South Africa can learn from other upper-middle income countries' experiences with industrialisation?"

This current paper seeks to fill a gap in the literature through in-depth reviews of various countries' experiences with industrialisation policies as well as what South African policymakers can hope to learn from the experiences of Brazil, Malaysia, and Turkey. Lastly, this paper aims to stimulate the debate around the current industrial policy framework employed in South Africa in arguing for the re-industrialisation of the South African economy.

This paper will then proceed as follows: Section II will illustrate a historical perspective by describing the role of the State in development before outlining evidence on industrialisation and de-industrialisation experiences in various countries. Section III then looks at the manufacturing as the engine of growth hypothesis, focusing specifically on the period 1994-2016. Section IV provides a high-level look at the manufacturing and growth trends experienced in upper-middle income nations, and outlines the method through which the countries that form part of the case study analysis were selected. Section V presents case study analysis looking at the dos and don'ts of industrialisation policies. Lastly, section VI will conclude tying in everything learned and arguing for the re-industrialisation of the South African economy.

II. Historical Perspective

The Role of the State in Development

Throughout history, the role of the State in development has had proponents and opponents arguing for greater or lesser state intervention. In a presentation on the State and economic development, Khan (2006) points out that development policy can be segmented into three broad "phases." The first phase describes the policies during the post-WWII period in which many states focused on increasing investment in new infrastructure in order to rebuild after the devastation of the war. The State encouraged the rapid transfers of assets which led to the creation of new capitalists, as well as aggressively protecting these new capitalists through subsidies and tariffs, in what is known as infant industry protection.

The second of these phases focused on neoliberal policies through which the State turned its attention to laying the groundwork for growth led by the free market. The extreme accounts of deregulation recorded during this phase resulted in a shift in thinking away from localized production in many developed economies. This simultaneously lead to a greater emphasis on outsourcing. As a result, most Multinational Corporations (MNCs) exported their operations to cheap labour havens such as Asia. This had both positive consequences (in terms of growth in these Asian economies) as well as negative consequences (for example the poor working conditions many have been subjected to).

The third and final phase mentioned by Khan featured an increased focus on market-led growth but to a greater degree culminating in the rise of the neoliberal doctrine. This period of extreme liberalization formed the basis for the economic development model that many external agencies such as the IMF and World Bank imposed on developing states, with little success. The current development framework argues for State-led reforms of property rights, the rule of law and democratization alike (Khan, 2006). All of these are evidenced as being positively associated with higher levels of growth.

For the process of development, there are two main roles of the State at a basic level. The first of these involves a relatively heavy-handed approach (also referred to as the direct interventionist role of the State). The second approach relates to a facilitative role of the State (see Onis, 1991). This is similar to Adam Smith's notion of the invisible hand in that the State does not directly intervene in the development process but instead lays the foundations for the private sector to drive economic growth in the economy.

Kerstenetzky and Kerstenetzky (2016) suggest that the growth experienced by State-led capital accumulation has not translated into sustained, long-term economic growth. They cite the experiences of Latin American, African and South Asian countries, where periods of rapid growth were accompanied by increases in inequality and poverty. This was coupled with slow improvements in social indicators and, in some cases, was also followed by economic or financial crises. The Japanese economy is one such example of State-led expansion, where Japan, as well as Germany, providing the best examples of anti-neoliberal ideas of development like those posited by Friedrich List (Breslin 2009, p. 13).

Furthermore, there exists the notion that Japanese political economic thought is a direct descendant of the German Historical School (see Johnson, 1982), where it is argued that economic progress was fostered through the State transforming from an agrarian economy to an industrial economy. The heavy-handed view of State-driven economic development is a feature in the work of Gerschenkron (1962) and Myrdal (1968), who have argued that the phenomenon of underdevelopment, which plagued many developing nations at the time, was because of an absence of a direct approach toward economic transformation on behalf of the State. Developmental, or heavy-handed, States are often thought of as autonomous bureaucracies capable of driving an agenda of structural economic transformation. This heavy-handed approach to growth is synonymous with both import-substitution and export-led policies being pursued by developing States with varying success.

The aforementioned heavy-handed approach was successfully implemented by most East Asian countries, where the government played a significant role in "planning and implementing development strategies," "providing subsidies and incentives to complement private investment", as well as initiating industrialisation and economic growth (Kyle, 2017). In many developmental, State-led economies, however, the State was not the only force in growing the economy. Very often the *visible* hand of the state worked in tandem with Adam Smith's idea of the *invisible* hand. One that worked to set the institutional framework that ensured the efficient running of the market economy.

While there is some evidence in favour of the theory of a heavy-handed view of the Developmental State (due to the rapid growth they are able to achieve through carefully directed and well-orchestrated plans by committed leaders), there is the opposite view that this growth catch-up that occurred was in fact due to liberalization policies as these economies grew from a low base. The goal neoliberal policy frameworks was to allow increased freedom for

private business through switching to a market-based economy where the State is still a significant player through its provision of essential infrastructure for both the agricultural and industrial sectors. This is sometimes the argument posited as the explanation for the ability for the East Asian States' remarkable catch-up. Wade (2005), however, argues that the liberal explanation of the catch-up by the East Asian States is wrong instead favouring the former explanation.

Mainstream economic literature views the phenomenon of catch-up as being a by-product of "a steady liberalization of markets" (Wade, 2005, p. 100). The typical liberalization paradigm focuses on reducing regulation, barriers to trade, and the flow of capital both into and out of the economy. These are often combined with calls for, and a move, toward "deregulation and privatization of the hand of the [S]tate" (Wade, 2005, p. 101). This least-government approach, popularized by Jefferson (as discussed by Douglas North in 2008), is often combined with a strong drive towards boosting the economy's manufacturing sector. In this sense, the government sets the *rules of the game* with the intention of allowing the private sector to go about its business unhindered. This reduction of the scope of government rests primarily on the assumption that the government has the necessary capacity with which to provide basic goods, services, and maintain its institutions (see Fukuyama, 2017 for a detailed discussion on State building).

As we will see, there exists a contrast in the degree of policy-heavy-handedness presented for countries seeking to boost their economies and start the push towards economic growth and development. This section will describe the experiences of different States and their attempts to industrialise and grow their economies through either export-led policies, or import-substitution policies. It will also briefly touch on experiences of States who pursued policies of de-industrialisation and what the results of these policies were in terms of economic development.

Industrialisation: A Retrospective

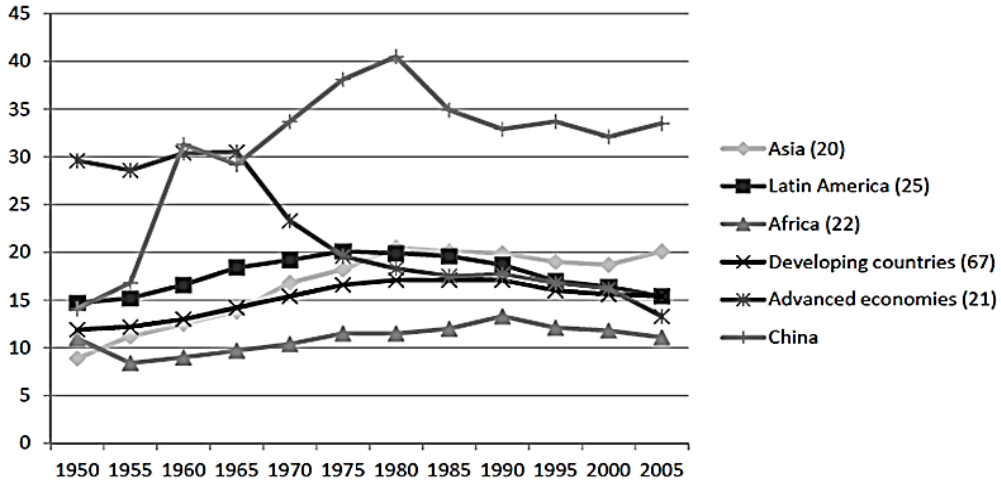
During the 1950s, a time when many colonised countries were gaining their independence due to the ever-increasing costs of administering colonies. The processes of development formed part of the global vision towards growth and prosperity. For more developed countries, manufacturing output accounted for close to 30 percent of GDP while accounting for only

around 12 percent in developing countries (see Figure 2 from Andreoni and Gregory, 2013, p. 4).

The period from 1950 – 2005, however, saw Latin America gain the title of the most industrialised region up until 1975, before its manufacturing sector declined in the subsequent 30 years (Figure 2). Unsurprisingly, Africa's manufacturing development path was relatively stagnant throughout the same period, in stark contrast to many of the Asian economies who experienced accelerated levels of industrialisation from about 1965 to 1980.

Various countries throughout history have implemented a combination of policies that collectively could be considered as a model of industrialisation. Policies that accompany industrialisation range from trade policy, liberalisation, capital and labour market reforms among others. Within the vast body of evidence emerges a dichotomy between two contrasting views of industrialisation – import-substitution and export-led industrial strategies. Each of these will be discussed in turn.

Figure 2: Worldwide manufacturing development paths (1950 – 2005)



Source: Andreoni and Gregory (2013, p. 4)

Evidence from Import-Substitution Growth Strategies

The strategy of import-substitution, which is often accompanied with some form of exchange and/or capital controls, is designed to promote production in the import sector of the domestic economy typically at the expense of growth in the export sector (Balassa, 1971). In terms of developing economies, this particular type of strategy is referred to as infant industry

protection. Such a strategy may also lead to problems of allocative inefficiency which can result in high costs of production and a loss of competitiveness for the domestic country (Johnson, 1964). Lastly, protectionist policies may also result in restrictions on capital and financial inflows from an inward-looking orientation (Hirschman, 1968).

The hallmark of many developmental state frameworks involves strategies of import substitution as a stepping stone towards a focus on export-led growth at a later stage. One country to which the term *development state* is rightfully attributed is South Korea (Luiz, 1999, p. 94). The South Korean government transformed its economy through strong leadership led in large part by the will and conviction of its president. Focus, dedication, and an ethos of a strong work ethic were all key drivers of the South Korean economy, ensuring everyone exerted maximum effort, from the top-levels of government right down to the bottom.

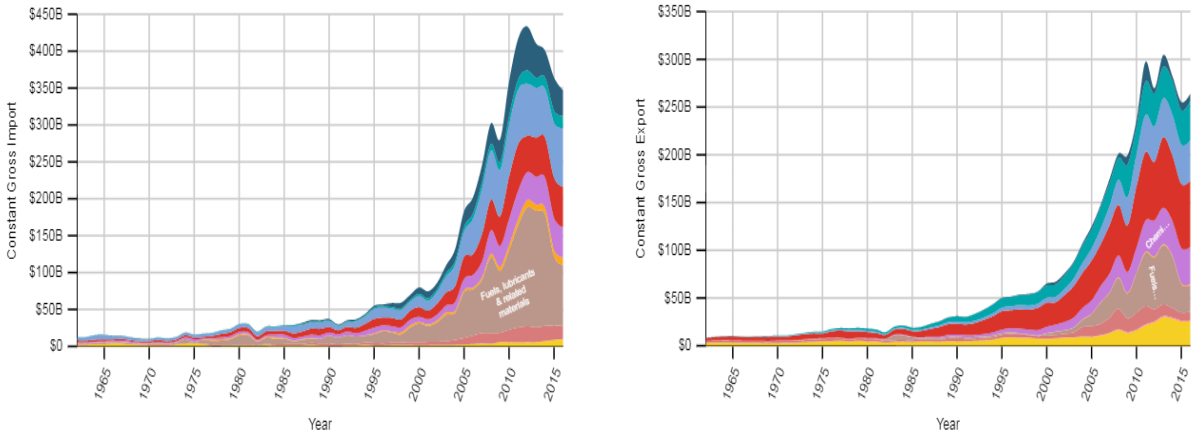
It is sometimes argued, in this vein, that industrialisation takes place when the state achieves enough power and then acts on it (Amsden, 1989). The authoritarian regime which characterised the Korean government was brought about by a myriad of factors. Luiz (1999, p. 94), for instance, argues that "constant military threat from North Korea, a poor natural resource endowment, and the memory of the extreme poverty in the past" all contributed to a tolerance towards the consolidation of socioeconomic power.

Similarly, after India gained independence in 1947, the Indian government embarked on a strategy of industrialisation that relied on heavy government intervention (Kumar, 1995). From this strategy, domestic firms were able to build up considerable productive capacity, which resulted in a significant inflow of investment from abroad as well as leading Indian firms to make investments in other markets. Kumar (1995) then examines the evolution of India's FDI position in the so-called four phases of government policy from the late 1960s to the early 1990s, and their simultaneous impact on levels of both industrialisation and development alike.

The results of the paper indicate that there was a shift in investment towards more technology and skill-intensive industries. The policies pursued by the government were integral in shaping the relative configuration of ownership, internalisation and local advantages. However, Davis (2000) argues that India generally performed poorly in trying to attract foreign investment due to contradictions in government policy as well as widespread criticism of the business practices of multinational companies.

Yet, some dispute India's industrialisation story arguing that at the time of independence, India was "already a semi-industrialised nation with a range of industrial activities, including steel and textiles, which had grown out of domestic investment and largely in response to market forces" (Davis, 2000, p. 64). India also had a dynamic entrepreneurial class, assimilation into the world economy, a democratically elected government which all contributed to its sustained growth for three decades. Other key factors attributable to India's economic performance, suggests Davis (2000), were a strong orientation towards exporting. Also, certain macroeconomic objectives such as economic stability, trade liberalisation, and, in most cases, a deliberately undervalued exchange rate resulted in boosts to the export sector.

Figure 3: India's Gross Imports and Exports, 1965-2016



Source: Atlas of Economic Complexity

Figure 3 highlights India's failure to properly execute its strategy of import substitution as its exports did not expand significantly in comparison to other Asian economies during the same period. While the results were positive in most instances, the Indian Government admitted that there was a need for a re-examination of its policies. This was due to the fact that the Indian economy was plagued with inefficiencies, specifically at the State level, where the government's own enterprises were worsened by continual nationalising of 'sick industries' (Davis, 2000, p. 66).

These problems regarding industrialisation were not only endemic to India. Ireland, for instance, experienced its first phase of industrial growth in the 1930s and 1940s with the adoption of protectionist policies that led to growth for a while until a difficulty with obtaining the much-needed materials and fuel arose during the Second World War. From 1931-1951 Ireland's employment in the manufacturing sector doubled (O'Malley, 1992). The emphasis of

Ireland's industrial expansion was focused on consumer goods and intermediate products which had limited application.

However, little or no progress was achieved in the development of goods that were more technologically demanding or shifting to activities that were highly skill-intensive. Ireland's experience with the "inward-looking" import-substitution policy, argues O'Malley (1992, p. 48), "culminated in almost a decade of virtual stagnation." No focus was given to the development of the export sector due to the protectionist strategy that was followed, which "did not result in [the] development of internationally competitive industries."

Evidence from Export-Led Growth Strategies

The apparent failure of import-substituting as a framework for export expansion and growth and development led many to question its validity as a bonafide policy choice. Palley (2011) writes that the ushering in of the export-led growth paradigm in the 1970s sought to replace the import-substitution paradigm as the favoured model of industrialisation. The export-led growth paradigm arose from a new consensus among economists that can be characterised by three elements.

Firstly, that there are gains from trade that can arise with economies having different capital-labour ratios. This logic follows from the Heckscher-Ohlin-Samuelson theory of comparative advantage. Secondly, Krueger (1974) among others criticised the import-substitution paradigm in that it did not mitigate the incentive for rent seeking. The Washington Consensus used this as the basis for the call to greater openness among economies. Thirdly, were the apparent benefits that openness would have on growth and development. This claim was based on the idea that trade would lead to a diffusion of technology and knowledge that a developing country can import or copy, which will result in a boost to that nation's productivity (Grossman & Helpman, 1991).

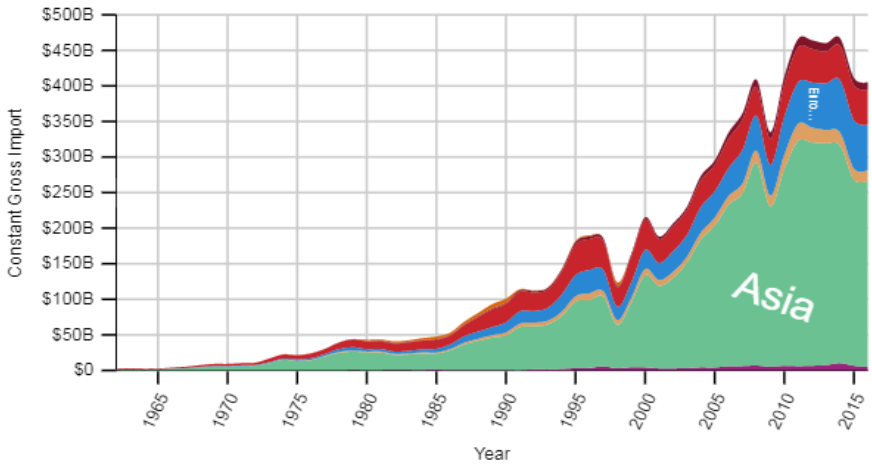
Okodua and Ewetan (2013, p. 2) instead outline that the objective of an export-led growth strategy is to "create a mechanism of export incentives driven by modern technology to assist producers to access and compete in the world market." The neoclassical perspective suggests that exports have the potential of increasing intra-industry trade, as well as insulating the domestic economy from external shocks and integrating the domestic economy with the world economy.

After the devastation of the Korea War which resulted in South Korea becoming one of the poorest countries in the world, the South Korean economy experienced slow economic recovery and was dependent on aid from the United States (Harvie & Lee, 2003). The country focused its attention on massive investments in education, as well as following an import-substitution strategy (mentioned above) that paid little in the way of economic development and progress.

Thereafter, a significant transformation of the structure of the economy occured, which saw Korea's GDP increase from US$2.3 billion to US$220.7 billion over the period 1962 – 1989. The Korean government put in place strict financial and fiscal reforms in order to stabilise the economy and supplied materials for the Vietnam War and the Middle East construction boom of the 1970s. These, along with low oil prices, a depreciated US Dollar, and low-interest rates, writes Song (1990, p. 1), all contributed to Korea's rise.

The swift transformation of the South Korean economy was primarily boosted by the expansion of exports that was driven by the sustained growth of its exports industries as well as the active role played by the government in the market. Harvie and Lee (2003) write that the South Korean government incentivised many of the larger firms to meet their export targets. Furthermore, during the 1980s, a wave of trade liberalisation policies swept through South Korea which saw domestic markets being opened up to the international stage and a reduction in trade tariffs. This led to a period of rapid growth in South Korea's exports to its main trading partners (Figure 4: Asia (Green), Europe (Blue), North America (Red), and Oceania (Orange)).

Figure 4: South Korea's Exports to Trade Partners, 1965-2016



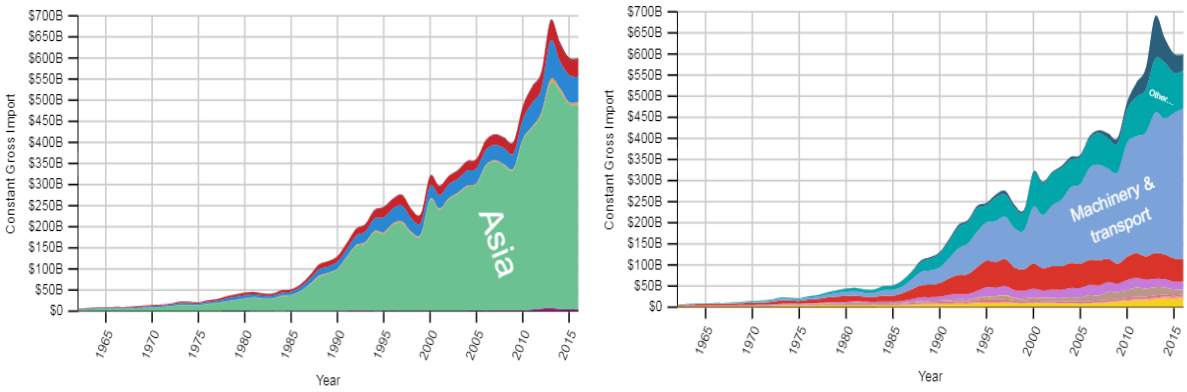
Source: Atlas of Economic Complexity

South Korea also experienced large and volatile periods of economic activity owing to strategic investment projects, the economy's sensitivity to changing oil prices and other exogenous shocks. The rapid growth was achieved through a stringent adherence to the export first principle. The share of manufacturing in GDP was greater than other countries at this point due to the way in which many industries in Korea were forced to grow.

During *its* period of rapid industrialisation, Hong Kong followed what could be considered as the textbook model, one centred around free-market activity. Its process of industrialisation could be considered as one of the more successful cases (Riedel, 1973). There are various features of Hong Kong's industrialisation that stand out. Initially, in order to realize its domestic demand. Hong Kong relied heavily on imports which were financed through that manufacture and exporting of consumer goods to higher income countries in the West. This was due to the greater relative incomes of Western consumers as well as the fact that Hong Kong remained a British colony till 1997.

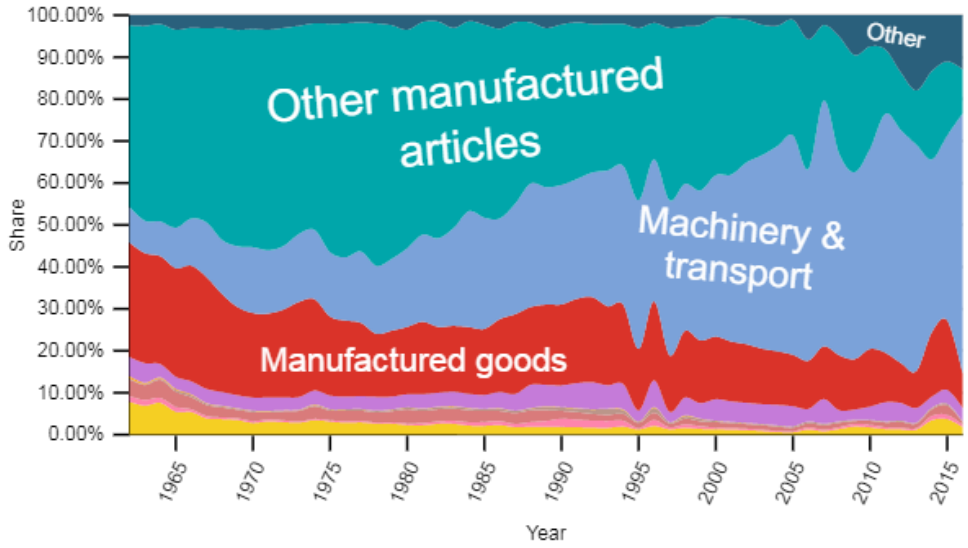
Since then the majority of its exports have moved to China and other Asian countries. The former British Colony heavily relied on Eastern countries for the provision of raw materials while relying on Western countries for capital goods. In recent times, Hong Kong's imports from Asian economies have grown substantially faster than its other trading partners, with the import of machinery and transport being the most imported product (See Figure 5). Most of Hong Kong's trade is conducted directly with China, which allows it to adopt and adapt the technology and expand their export basket focusing primarily on machinery and transportation products (Figure 6).

Figure 5: Hong Kong's Composition of Imports by Partner and Product, 1965-2016



Source: Atlas of Economic Complexity

Figure 6: Hong Kong's Composition of Exports, 1965-2016



Source: Atlas of Economic Complexity

One can argue that the success stories which resulted in the rapid development of Hong Kong, Korea, Singapore, and Taiwan (as some pertinent examples) can be described as both import-substitution as well as export-led. The policies followed in many of these East Asian economies gave rise to extremely high rates of GDP growth, high rates of exports, and promted structural changes in specific sectors. The South Korean, Singaporean and Taiwanese economies saw growth in their respective manufacturing sectors, while Hong Kong's finance sector grew relative to other sectors (Fields, 1985).

Fields (1985) finds that there were a number of improvements in these countries due to the policies that were implemented. Firstly, the countries experienced increases in total employment commensurate with reductions in unemployment as well as a rise in employment-to-population ratios. Secondly, there was a transformation and migration of employment from the low-productivity agriculture sector to the higher-productivity, *and* higher-paying, manufacturing sector. Thirdly, there was an improvement of the employment compositions. Fourthly, real wages rose for many sectors. Lastly, relative income inequality was constant or falling for all the economies while absolute poverty diminished for all the economies.

A question then arises: can an export-led growth strategy have similarly favourable outcomes for other developing countries? It is suggested that the success experienced by developing economies depends on the ability of other developing countries to penetrate the global market under the current regulatory framework, given that many developing nations had turned to

protectionist strategies in reaction to difficulties in their domestic economies; the distribution of assets and infrastructure within those economies; the important role of the private sector and free market mechanisms; and finally wage-setting behaviour.

In attempting to identify whether there is a causal link between export growth and industrial development, Chow (1987) finds evidence of bidirectional causality in Hong Kong, Israel, Korea, Singapore, and Taiwan while Mexico displayed unidirectional causality. Argentina, on the other hand, showed a weak link between export growth and the process of industrialisation. Chow (1987) suggests that the results confirm the notion that small open economies can achieve growth by pursuing an export-led growth strategy. However, this does not discount the possible growth-boosting effects that the correct execution of import-substitution policies may bring.

Likewise, it is suggested that countries, similar to the Asian Newly Industrialised Countries of the period, can expand their constrained domestic markets through exporting manufactured output to international markets due to the relative complementary nature between the two. Tyler (1980) similarly presents evidence showing a strong cross-country association between export performance and GNP growth. The results suggest that countries who pursue policies that neglect their exporting sectors will be faced with lower rates of economic growth in the future.

In terms of African development, McCormick (1999) suggests that in most cases, development is linked to a small-scale industry where surplus labour in the agricultural sector seek informal employment. There is an abundance of international literature suggesting that economies which operate in clusters are in a strong position to assist small-scale businesses to grow their capacities into more durable, large-scale industries (see Zhang & Hu, 2011; Newman & Page, 2017).

This stream of literature discusses three ways in which the use of clustering can be advantageous to firms. Firstly, clustering leads to an enhancement of firms' competitive advantages. Secondly, firms that engage in clustering achieve growth but in relatively small steps. Finally, the use of clustering reduces the response time for local governments to crises and opportunities.

How, then, do African countries compare to other countries? A paper by Harrison et al. (2013) finds that formal manufacturing firms in Africa have a disadvantage in labour productivity

possibly owing to lower rates of capital formation, but a slim advantage in total factor productivity levels when individual firm characteristics are controlled for. Based on these findings, African manufacturing firms should be able to perform better in the global market in terms of competitiveness but Harrison et al. (2013) contest this arguing that the longer a political party remains in power, the lower the productivity levels and growth rates of the firms - a feature attributed to many African countries.

Lall and Wangwe (1998) also look into industrial policy and industrialisation in sub-Saharan Africa, writing that it has been an important part of development in Africa throughout the post-Independence era. An integral part of a successful industrialisation strategy, write Lall and Wangwe (1998), is improving supply-side support as well as more economic liberalisation. Liberalisation should be gradual, similar to East Asian countries, rather than what is often recommended to African countries which takes the form of sweeping and rapid liberalisation. The East Asian model of liberalisation forced domestic industries to invest in building up new capabilities. In stark contrast, Szirmai (2009) notes that sub-Saharan African countries have often performed poorly when attempting to industrialise their economies.

The idea that many developing nations should be able to successfully devise and implement an industrialisation strategy rests on the evidence of arguably the most successful example of industrialisation to date. In the last 40 years, no country has been as successful from the implementation of an export-led industrialisation strategy than China. Yu (2010) writes that an export-led industrialisation, with aspects of import-substitution, is the main reason for China growing at an average annual rate of 9.8% over the past three decades. Using pooled regressions Yu (2010) shows that the experience of China's export-led industrialisation is not the "norm" in the global context.

Shan and Sun (1998) ask whether China's growth was led by a focus on exports or vice versa. They divide this question into three hypotheses that examine this relationship. Firstly, is the classic export-led hypothesis. Secondly, is the growth-driven exports hypothesis. Finally, there is the hypothesis that combines the first two called the two-way causal hypothesis. Using time series analysis, Shan and Sun (1998) find a bidirectional causality between exports and real industrial output, emphasising the difficulty in proving causality between the two.

Murphy et al. (1989) argue that, despite the obvious gains for countries that have implemented industrialisation policies, many countries that did not industrialise have remained poor and

have struggled to produce sustainable growth. The authors then ask what allows some countries industrialise while other countries seemingly do not have such ability. Specifically, they suggest that governments should be promoting and encouraging industrialisation across as many sectors as possible. This they argue is the foremost way to increase national income and societal welfare.

In terms of the government's role in facilitating the process, there is a lot of evidence of countries employing a process of industrialisation resulting in long-run benefits to that country's development and growth. Industrialisation, however, is only one side of the story here. Many countries have also experienced a sharp decline in their industrial capabilities, either through domestic policies or global economic events. This may have led to a fall in either employment in the sector, value addition of goods produced, or the proportion of Gross Domestic Product attributable to the industrial sector. The next section then looks at some cases of countries that have de-industrialised.

De-Industrialisation: A Retrospective

Palma (2014) writes that the rapid decline in manufacturing employment that industrialised countries have experienced is "one of the most notable stylised facts of the last third of the 20th century." Most OECD countries began a process of de-industrialisation in the late 1960s while East Asian countries, in contrast, began industrialising in the late 1980s. Palma (2014) argues that South Africa and some Latin American countries pushed through radical economic policies prior to de-industrialising their economies. This led to these countries' growth rates being significantly lower than other countries which de-industrialised at an earlier stage.

The phenomenon where a healthy manufacturing-based economy transitions into a services-based economy as part of the normal process of economic development is well-known in development economics. In the 1980s, many previously industrialised countries switched to a less industrialised and more services-based economy. The switch was from the post-World War II Keynesian paradigm to monetarism that effectively constrained demand (see Singh, 1987). On the other hand, Pérez (2002) alludes to the technological revolution that characterised the 1980s as playing a significant role.

De-industrialisation can be broken down into three scenarios (Cairncross, 1982; Lever, 1991). Firstly, a decrease in the manufacturing sector's output or its employment share. Secondly, there may be a shift away from the manufacturing sector into the tertiary sector. This often

results in a decrease in the share of total employment for the manufacturing sector. Thirdly, the share of manufactured products comprising the export basket may also be declining.

De-industrialisation can arise due to changing income per capita that relates to the turning point of the inverted U-curve. While there was a high degree of de-industrialisation amongst high-income countries in the 1980s and during the 1990s, de-industrialisation had affected many middle-income economies (Palma, 2014). The Dutch-Disease is another common reason given for de-industrialisation. Traditionally, the Dutch-Disease explanation explained a phenomenon where one sector in an economy is booming, which leads to the rest of the economy suffering due to a loss in its competitiveness. This loss of competitiveness can either arise from the appreciation of the currency relative to other currencies or a rise in the average wage level, or both. The policy shift towards import-substitution in South Africa and some of the Latin American countries resulted in the Dutch-Disease because of significant changes in relative prices and the ending of support for manufacturing from the government.

In the case of the United Kingdom, Kitson and Michie (2014) write that although manufacturing played a key role in the development of the United Kingdom's economy from 1870-1960, in the 50 years after 1960, the manufacturing sector has faced a decline relative to other sectors in the domestic economy. Kitson and Michie (2014) examine whether the phenomenon of a decline in manufacturing is an outcome of the advanced economies' development rather than a sign of economic weakness and imbalances in the structure of the economy. In the United Kingdom for example, the decline in manufacturing is argued to be caused by deep-rooted structural problems (IPPR, 2017).

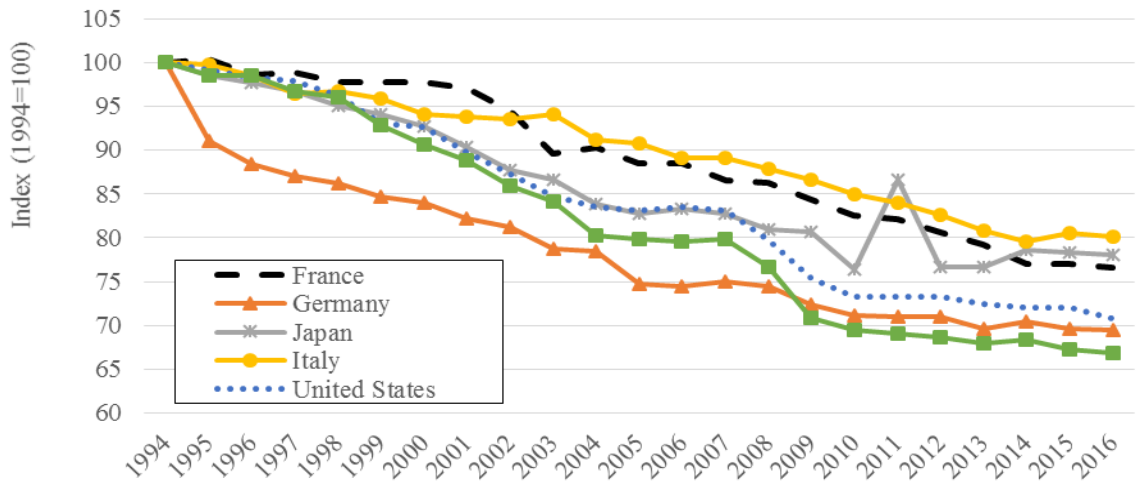
However, de-industrialisation can be considered positive in some cases as Kitson and Michie (2014) argue. They outline four cases when this is true. Firstly, they write that the de-industrialisation could reflect a shift in comparative advantage. Second, is the suggestion that as countries grow and develop from a rural to a services orientated economy, the composition of consumption also changes away from manufactured goods and into services. Third, de-industrialisation may reflect faster growth in the productivity of labour in the manufacturing sector compared to productivity in services. Lastly, industrial restructuring may be a possible explanation for the decline in manufacturing.

The question of whether de-industrialisation has positive effects rests on the type of model that is employed in the analysis. Advocates of the "growth-camp" (such as Kitson and Michie

above) regard de-industrialisation as not being a significant growth-issue. The second camp suggests that if de-industrialisation is to have an impact on growth, it would depend on the specific characteristics of individual economies. The third camp argues that both de-industrialisation and the Dutch-Disease have overwhelmingly negative effects on the growth rate of the economy (Palma, 2014).

Debande (2006) notes two characteristics that are associated with the concept of de-industrialisation. Firstly is the observation that labour-intensive production of manufactured goods is moving from high-income economies to middle- and low-income economies. Secondly, the impact of increased liberalisation of trade and capital flows has also been cited as a cause of the apparent decline.

Figure 7: Industry Employment as a Share of Total Employment (%), 1994=100



Source: World Bank Indicators

Figure 7 shows a consistent and marked decrease in industrial employment which according to one of the definitions would imply that these countries have been de-industrialising over the period. However, value added, states Debande (2006), had been growing rapidly which could be due to the changing composition of these countries' industrial sectors. For example, European countries have a comparative advantage in goods that require intermediate human capital and technology. Whereas in higher income countries such as Japan and the United States, the comparative advantage goods rely heavily on high human capital and technology.

The process of de-industrialisation, also, may not be a choice for many countries, however. Mickiewicz and Zalewska (2002) the transition of an economy from a communist state can

harm the long-run prospects of development for the country, as well as poor and inconsistent market reform implementation, can set a transitioning economy on a path toward low-growth and de-industrialisation.

Rowthorn and Ramaswamy (1997) comment on the trend of de-industrialisation that has become apparent in the United States, Japan, and, more recently, in the Asian Tigers. All of these countries experienced a marked decline in the employment share of their manufacturing sector. De-industrialisation can be thought of as the result of significantly higher productivity in the manufacturing sector when compared to the services sector (Rowthorn & Ramaswamy, 1997). All of these countries were able to fully utilise their manufacturing phase in order to boost their incomes and restructure their economies for a smooth transition into the tertiary sector.

Therefore, de-industrialisation may not be a negative experience if it comes as part of a nation's natural development process. However, de-industrialisation does become a problem when, as Rodrik (2015) writes, countries de-industrialise prematurely. Rodrik (2015) argues that there are two scenarios where a decline in manufacturing in low- and middle-income economies can be seen as premature. The first is the observation that these economies have been undergoing de-industrialisation earlier than what history would suggest. Secondly, because many low-income countries are unable to build the capabilities and capacity required to successfully maintain their industrialisation stage forces them to de-industrialise at much lower levels of income compared to developed countries.

Having discussed instances where both industrialisation and de-industrialisation policies have occurred with varying success, the next section will re-examine the association between manufacturing and economic growth.

III. Is Manufacturing Still Associated with Economic Growth?

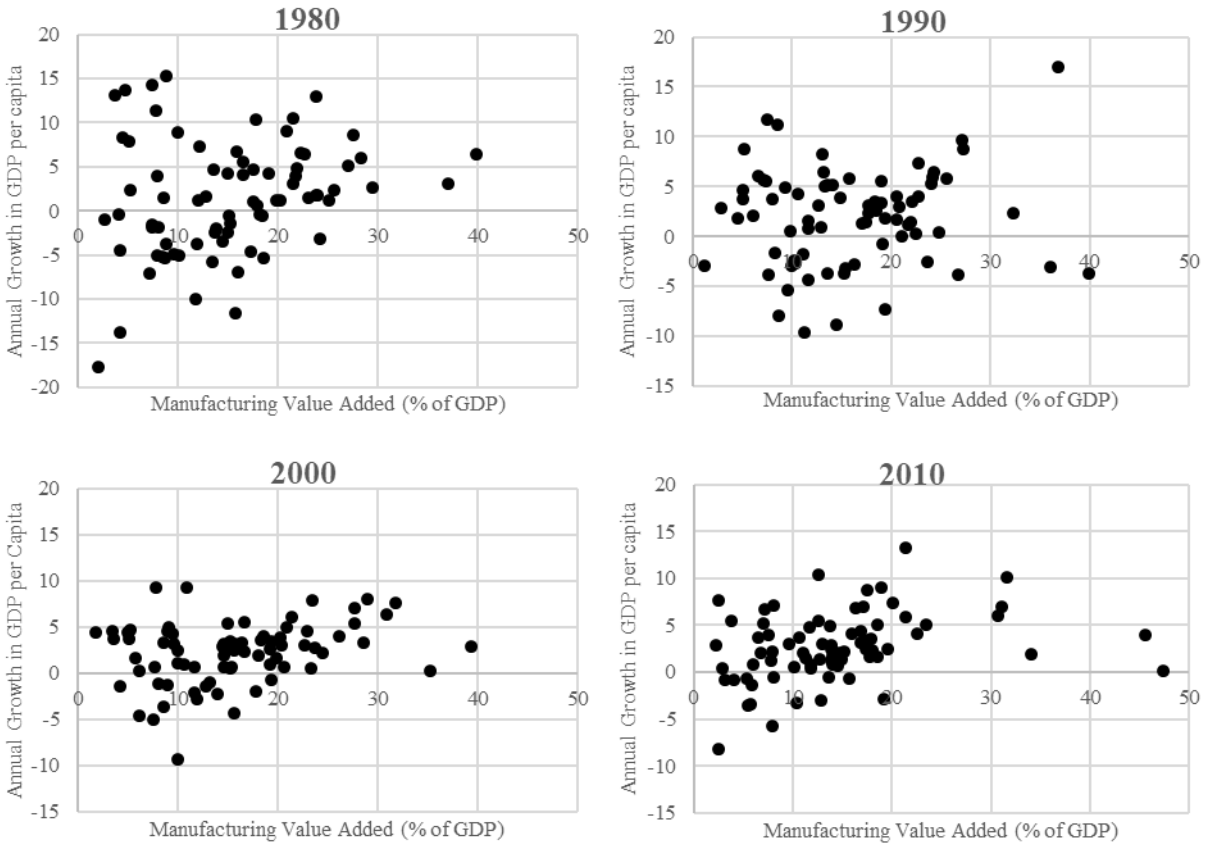
Andreoni and Gregory (2013) state that manufacturing should still be considered as the engine of dynamism and a main source of the wealth of nations. They argue that manufacturing is vital for economic development given its labour absorptive capacity, the ever-present demand for manufactured tradable products which assists in maintaining a healthy trade balance, and above all, fosters productivity gains as well as the increased scope for technological innovation (see also Kaldor, 1966 and UN, 2016).

Economic theory suggests that industrialisation through increases in manufacturing is a means to rapidly grow an economy's capacity and increase the welfare of its people through the migration of labour to the higher productivity manufacturing sector from the lower productivity agricultural sector. Wages in the higher-productivity manufacturing sector should be greater than what a labourer is able to earn in the rural sector in order to induce the migration. The problem that comes with rising wages in the manufacturing sector is the risk of a loss of competitiveness of the goods that are earmarked to be exported. Therefore, for example, countries that are labelled as de-industrialisers should see their GDP per capita declining along with declines in their manufacturing sector.

Used here as the measure of the size of an economy's manufacturing sector, manufacturing value-added is an estimate of all outputs minus intermediate inputs. This would suggest that any change to this value added implies changes in the labour and capital employed in producing output. Both of imply a boost to the manufacturing sector's productivity is associated with higher levels of manufacturing value added as a percentage of GDP.

The figures below appear to support the narrative that higher levels of manufacturing value added are correlated with higher rates of economic growth, and this relationship appears stbale over time. This would indicate that there are possibilties for growth for many of the nations in the study that are still under-developed and do not have the resources with which to boost their manufacturing sectors due to the capital-intensive nature that the process of industrialisation demands. Furthermore, some of the relatively underdeveloped nations have poor means of capturing statistics with some developing nations having unreliable sources of data. Also, and most importantly, the wave of neoliberal policies which swept through many nations after 1970 is a possible reason for the poor association between GDP per capita growth and manufacturing value added as a share of GDP during this time.

Figure 8: Association between manufacturing value-added and GDP per capita (1980-2010)[1]



Source: World Bank Indicators

Previous empirical studies into the relationship between growth and manufacturing have tended to find that it is the presence of a higher share of "promising industries" that is associated with higher levels of GDP growth. However, some literature (see Aiginger, 2001 for example) argues that the relationship between manufacturing and growth is tenuous due to there being many interlinking variables that presents the problem of two-way causality.

[1] Countries included had data for all four periods. These countries include: Antigua and Barbuda Argentina, Austria, Bangladesh, Belize, Benin, Bolivia, Botswana, Brunei Darussalam, Burkina Faso, Burundi, Cameroon, Central African Republic, Chile, China, Colombia, Democratic Republic of Congo, Republic of Congo, Cuba, Cyprus, Denmark, Dominica, Dominican Republic, Ecuador, Egypt, Fiji, Finland, France, Ghana, Grenada, Guyana, Honduras, India, Jordan, Kenya, Kiribati, Korea Republic, Lesotho, Malawi, Malaysia, Malta, Mauritius, Mexico, Morocco, Nepal, Netherlands, New Zealand, Norway, Pakistan, Panama, Papua New Guinea, Philippines, Puerto Rico, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Singapore, South Africa, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sudan, Suriname, Swaziland, Sweden, Thailand, Togo, Tunisia, Turkey, United Arab Emirates, Vanuatu, Venezuela, Zambia, Zimbabwe

"Manufacturing as the Engine of Growth" Hypothesis

The question of whether manufacturing can still be called upon as the engine of growth is one of fierce debate amongst development economists. Classical development economists see manufacturing as the "engine of economic growth" (Andreoni & Gregory, 2013). However, Szirmai and Verspagen (2015) argue that the engine of growth hypothesis assumes the correlation between levels of GDP per capita and shares of manufacturing arises as a result of the characteristics specific to the manufacturing related-sector.

The hypothesis argues that productivity in the manufacturing sector is higher than the agricultural sector. It further suggests that the manufacturing sector is assumed to more easily facilitate capital accumulation and offer economies of scale, which are not necessarily present in the agricultural or services sectors. Lastly, manufacturing is assumed to create stronger linkages (both backward and forward) as well as generating positive spillover effects to the other sectors.[2]

Cantore, et al. (2017) seek to provide insight into the above hypothesis by using pooled OLS, fixed effects, and random effects approaches. The results suggest that when growth in manufacturing value added remains constant, economic growth increases, on average, between 1.8-2.1%.[3] The authors suggest that the structural transformation components of pursuing industrialisation produces increases in manufacturing productivity and manufacturing's share of employment. For if this was not the case, growth in manufacturing value added would not have growth-enhancing effects.

McCausland and Theodossiou (2012) likewise find that growth of manufacturing output is an important determinant of economic and productivity growth. The results further indicate that the services sector does not play a similar growth-enhancing role despite its size. Furthermore, for the period 1965-2012, Mercan, et al. (2015) use a panel cointegration method to test the validity of Kaldor's first law for newly industrialising economies, which include South Africa, Mexico, Brazil, China, India, Malaysia, Philippines, Thailand, and Turkey. The paper finds that increases in manufacturing production had a positive effect on economic growth. More specifically, a 1% increase in manufacturing production is associated with a 4.5% increase in

[2] This is not to ignore the negative externalities that are typically generated through aggressive, often coal-driven, industrialisation strategies that have tended to be dominant given the relative abundance of coal as a means of generating electricity.
[3] The paper uses data from 80 countries covering the period 1980-2010.

economic growth. This, Mercan, et al. (2015) concluded, validates Kaldor's first law and proves the engine of growth hypothesis for the countries selected given the time period.

Methodology

Given the above discussion, this section will re-test the *manufacturing as the engine of growth hypothesis*, using a dynamic panel regression, to test the validity of Kaldor's first law, for the period 1994-2015. The reasons for such an approach is the nature of dynamic panel regressions, in that they contain lagged values of the dependent variable and provide an "adequate characterisation of many economic dynamic adjustment processes" (Bun & Sarafidis, 2013). A problem that may arise when testing for directional causality is the endogeneity problem, which poses a problem of inconsistency in the estimation of parameters (Antonakis, et al., 2014). An estimate is considered as being consistent if it converges to the true population parameter as the sample converges to infinity.

To begin the analysis, we test Kaldor's first law using a specification found in Mercan, et al. (2015, p. 144) using data sourced from the World Bank Development Indicators database for the period 1994-2017,

$$GDP_{lt} = \beta_{0i} + \beta_{1i} GShareM_{it-1} + \epsilon_i \quad (1)$$

where,

$GDP_{lt} =$ growth of GDP per capita in period t

$GShareM_{it-1} =$ growth of manufacturing's share of value added as a percentage of GDP in period t-1

Regarding the signs of the coefficient, β_{1i}, we would expect the sign to be positive implying a direct association with the variable, GDP_{lt}. This would be in line with the classic Kaldorian reasoning given the apparent growth- and productivity-boosting properties associated with a growing manufacturing sector. One possible mechanism through which manufacturing can boost economic growth is via its labour absorptive capacity. Also, wages paid to manufacturing employees are typically greater than those paid to often lower-skilled workers in the agricultural sector. Hence, following the classic Keynesian perspective, the ability of employees in the manufacturing sector to exploit their relatively larger incomes to increase their consumption spending, which in turn results in increases in the national income. Another mechanism may be through the increases in exports that typical industrial policies focusing on

manufacturing seek to achieve. This last point inherently assumes that the economy is running a trade surplus and is not reducing a trade deficit, all else equal.

Empirical Results

In order to attain the results of this empirical analysis, regressions were conducted by employing Ordinary Least Squares (OLS), Fixed Effects (FE), and difference GMM methods. In an attempt to avoid biases attributed to fixed effects modelling as first discussed in Nickell (1981), regressions were run with both a lagged-dependent variable and without. This method of running both standard and lagged-dependent variable models tested the robustness of the results (see discussions by Achen, 2001; Keele & Kelly, 2005). The results of this exercise are presented in Table 1.

Table 1: Results of OLS and Fixed Effects Regressions for Equation (1)

Variable	OLS (No LDV)	OLS (With LDV)	FE (No LDV)	FE (With LDV)
Lagged Manufacturing Value Added	-0.0063	-0.0076	0.016	0.0179
	(0.0120)	(0.0124)	(0.0460)	(0.0482)
Lagged GDP Per Capita Growth		0.3234**		0.1718
		(0.1165)		(0.0150)
Constant	0.0049	0.0092	-0.1485	-0.1457
	(0.0269)	(0.0281)	(0.1594)	(0.1748)
Number of Observations	3356	3216	3356	3216
Number of Countries	-	-	181	181
R-Squared (Overall)	0.7317	0.7316	0.5356	0.5166
R-Squared (Within)	-	-	0.7398	0.7401
R-Squared (Between)	-	-	0.1013	0.0871
Root MSE	0.543	0.5545		

Notes:

* p<0.1; ** p<0.05; *** p<0.01
All models control for population and years fixed effects
Standard errors in parentheses

From the table, there appears to be no statistically significant association between manufacturing value added as a share of GDP and growth of GDP per capita. In the OLS specifications, the coefficient of manufacturing value added variable was of the incorrect sign before and after the lagged autoregressive component was included. On the other hand, when fixed effects models were used, the sign of the manufacturing value added variable was more in line with the predictions of Kaldor's first law. However, these results were not significant at any level. These results are similar to other papers on this subject, such as (Mamgain, 1999, Wells and Thirlwall, 2004, and Mercan et al., 2015). These three papers all found Kaldor's First Law positively significant in contrasts to the findings here. However, the difference in

results may be due to inherent issues related to the data collected and aggregated time frame of only yearly data which may overlook nuances within the year.

In anticipation of the aforementioned problem of endogeneity which may arise when using dynamic panel regressions, we employ an instrument variables approach as outlined by Arellano and Bond (1991).[4] The reason for the use of the instruments is due to the poor performance of a difference Generalised Methods of Moments (GMM) specification to convey predictions about changes from past levels. Arellano-Bond difference GMM takes the first difference in order to eliminate any individual effects as well as use all previous information of the dependent variable as instruments. Roodman (2007) suggests the advantage of difference GMM modelling over tradition fixed effects modelling is its avoidance of trading off instrument lag depth with sample depth (as commonly found two-stage least-squares models) through the inclusion of time independent instruments. The results of the difference GMM model are presented in Table 2 below.

Table 2: Results of Difference GMM Regressions of Equation (1)

Variable	Difference GMM (No LDV)	Difference GMM (With LDV)
Lagged Manufacturing Value Added	0.019	0.02867
	(0.0602)	(0.0677)
Lagged GDP Per Capita Growth		-0.2039
		(0.6462)
Number of Observations	3356	3216
Number of Countries	181	181
Number of Instruments	84	103
Hansen test p-value	0.137	0.251

Notes:

* p<0.1; ** p<0.05; *** p<0.01
All models control for population and years fixed effects
Standard errors in parentheses

As in the OLS and fixed effects regressions above, there appears to be no significant association between manufacturing value added and GDP per capita growth after controlling for year and population fixed effects. Overall the results presented here show no association between changes in the level of manufacturing value added and economic growth. Thus, from this analysis, we can conclude that increases in manufacturing value added does not have a *significant* positive association with economic growth at a highly aggregate level given the countries for which reliable data was available and specifically for the period 1994-2016.

[4] A similar approach was employed in Cantore, et al. (2017).

One must not place too much emphasis on these results, however, due to limitations of the methodology in explaining complicated phenomena, as well as the exclusion of other variables which may have an effect on the dependent variable. Likewise, it should be noted that the coefficients are generally of a small size and therefore our results are not due only to the absence of statistical power.

As such, future research could be directed toward using greater levels of disaggregation in the data (where applicable and guided by theory) by including the interaction between the various sub-sectors which make up a functioning economy. For the purposes of this study, however, the results motivate the need for a nuanced understanding of industrialisation on a country-by-country basis. For example, studies such as Dorner (1964) used data from nine industries in ten countries, finding a weak statistical relationship between manufacturing and economic growth at this disaggregated level. On the other hand, Görgens (1975) finds a significant influence of inter-industry change on manufacturing growth and the economy as a whole when employing a disaggregated dataset.

The next section discusses the trends of upper-middle income countries in terms of their levels of manufacturing value added as a share of GDP and their GDP per capita over the period 1994-2016. This is an important step toward answering our over-arching question by looking at both the aggregate level and country level before going deeper into the specific policies that have been at the forefront of some countries' industrialisation strategies in the past.

IV. Upper-Middle Income Economies

The object of this paper is to determine the trends that accompany a country that sets out, or is forced, on a path of industrialisation or de-industrialisation. Using data from the World Bank, we restrict our analysis to focus specifically on manufacturing value-added as a percentage of gross domestic product (GDP) within the period 1994 – 2016. As a starting point, we grouped countries based on a range of manufacturing value-added as a percentage of GDP and in terms of GDP per capita in 1994 (Appendix A).

Based on the available data, we classify countries as "High-Level Industrialisers", "Medium-Level Industrialisers", and "Low-Level Industrialisers" as well as High-, Upper-Middle,

Lower-Middle, and Low-Income economies based on the World Bank's classifications.[5] The classifications which group the countries in terms of their level of industrialisation and income level are presented in table 3 and 4, respectively.

Table 3: Classification of Levels of Industrialisation[6]

Type of Industrialiser	Manufacturing value added (as % of GDP)
High-Level	≥ 25
Medium-Level	≥ 15 and < 25
Low-Level	< 15

Table 4: Classification of Type of Economy[7]

Type of Economy	GDP per capita (constant 2010 US$)
High-Income	≥ 12 476
Upper-Middle Income	≥ 4 036 and ≤ 12 475
Lower-Middle Income	≥ 1 026 and ≤ 4 035
Low-Income	≤ 1 025

For the purposes of this analysis, we will restrict our focus to countries that are similar to South Africa in terms of their manufacturing value added and GDP per capita in 1994. That is, countries that are considered as High- and Medium-Level Industrialisers as well as classified as upper-middle income economies (see Table 5). This is because of the specific interest in South Africa as well as countries that are considered similar to gain an understanding as to the industrialisation policies that were undertaken during the period; and whether South Africa can learn from these other countries as its policymakers debate the possibilities for the re-industrialisation of the economy.

[5] See Appendix A for the full list of countries in 1994.
[6] Data collected from the World Bank Indicators
[7] The official World Bank country income grouping methodology uses GNI per capita but for consistency throughout we have chosen to use the broader GDP per capita (constant 2010 US$) with the same levels of income.

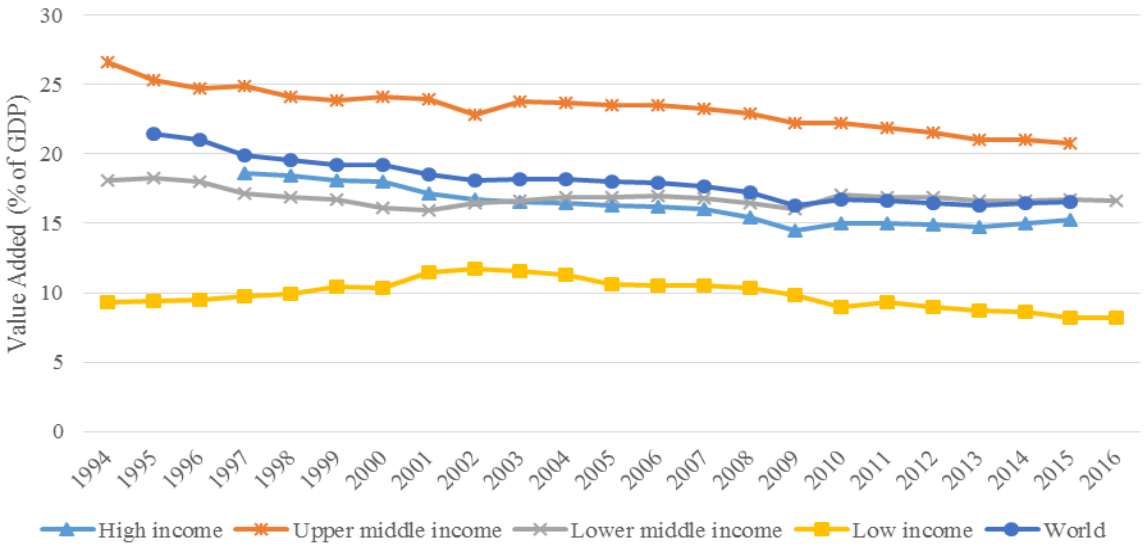
Table 5: Upper Middle-Income Economies, 1994

		Manufacturing value added (as % of GDP)	GDP per capita (constant 2010 US$)
High-Level Industrialiser	Korea, Rep.	27.32	11 113.51
	Brazil	26.79	8 319.21
	Malaysia	26.64	5 858.95
Medium-Level Industrialiser	Turkey	22.87	6 889.60
	Mauritius	22.63	4 294.09
	Chile	21.46	7 498.85
	South Africa	21.05	5 564.09
	Costa Rica	20.90	5 563.02

Source: World Bank Indicators

The performance of the upper-middle income country group during the period 1994 -2016 has been suggestive of de-industrialisation with the economies as an income-group reducing their levels of manufacturing value added as a percentage of GDP. The upper-middle income-group has seen a shift away from manufacturing in line with global trends although its levels of manufacturing value added are well above those of other income groups (see Figure 9). The decline in the manufacturing value added for the upper-middle income country group, while not extreme over the period, 1994-2015, has been evident. The compound annual growth rate (CAGR) was -1.54% with the sharpest declines experienced during 1994-1996 and 2004-2009, where growth during these two standout periods was -3.98% and 3.43%, respectively.

Figure 9: Manufacturing Value Added Trends, 1994-2016



Source: World Bank Indicators

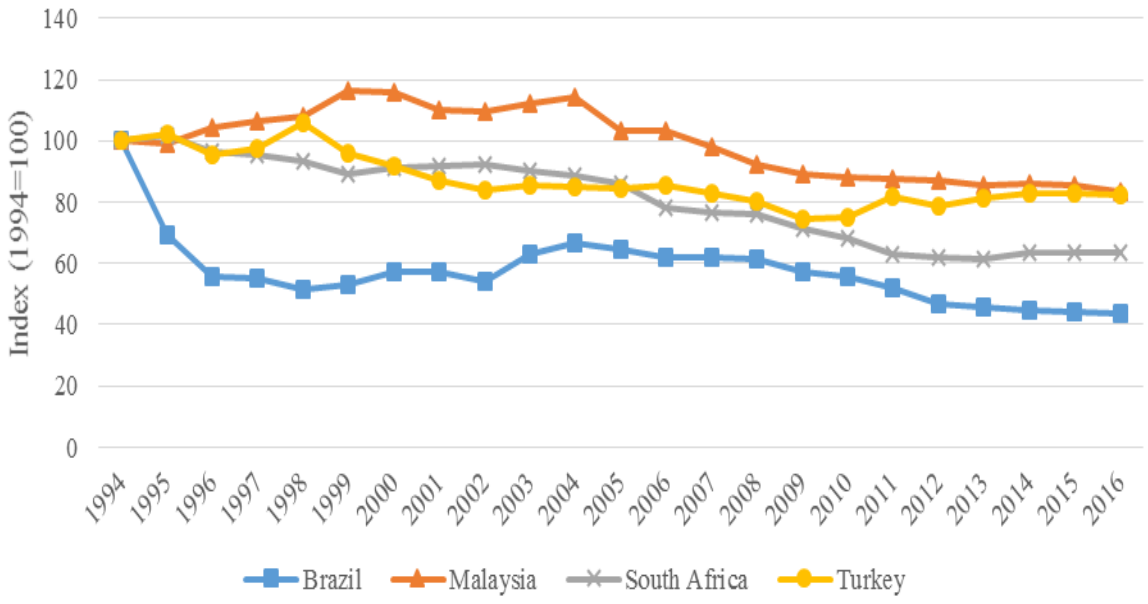
We restrict the upper-middle income economies in table 5 by eliminating any countries that do not fall into a specific range (between 20 and 30 percent of GDP) for their manufacturing value added as well as dropping them if the size of their populations is too small (such as Chile, Mauritius, and Costa Rica). As is shown in table 6, South Africa's manufacturing value added as a percentage of GDP was 21.05 and its GDP per capita was $5 564.09. All the remaining countries have manufacturing value added percentages of around 20-27% of GDP, with the values for GDP per capita varying among the countries with Brazil having the highest of $8 319.21. In 1994, Brazil and Malaysia are classed as high-level industrialisers while South Africa and Turkey are low-level industrialisers.

Table 6: Selected Upper-Middle Income Countries, 1994

		Manufacturing value added (as % of GDP)	GDP per capita (constant 2010 US$)
High-Level Industrialiser	Brazil	26.79	8 319.21
	Malaysia	26.64	5 858.95
Medium-Level Industrialiser	Turkey	22.87	6 889.60
	South Africa	21.05	5 564.09

Source: World Bank Indicators

Figure 10: Manufacturing Value Added (as % of GDP) Index, 1994-2016

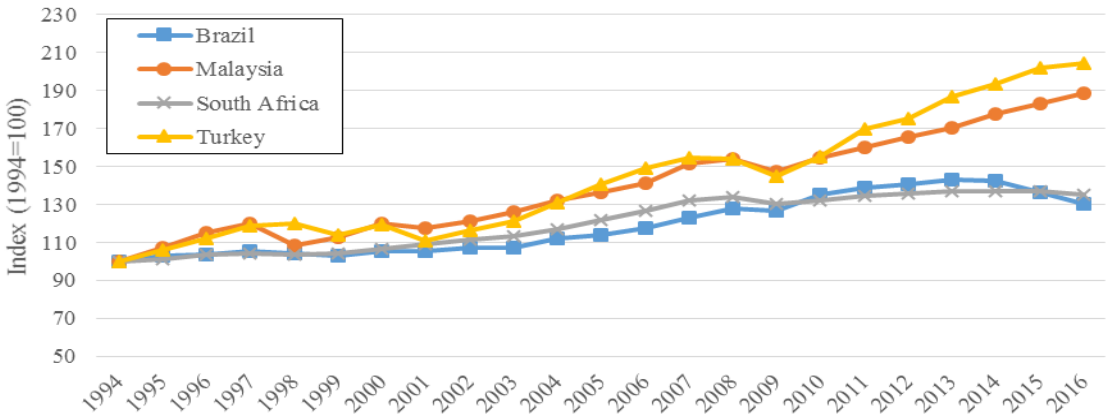


Source: World Bank Indicators

Figure 10 shows the GDP per capita for the upper-middle income group as an index with 1994 as the base year. All the countries in the upper-middle income group have experienced significant declines in their manufacturing as a percentage of GDP from their starting points in 1994. Brazil, for example, suffered a massive decline in manufacturing within two years from 1994-1996, falling from 26.79% in 1994 to 11.76% in 1996 as the Brazilian economy was shocked by a significant number of changes at various levels of the economy (Baumann, 2001). During this time Malaysia experienced steady growth in its manufacturing value added. Although, Malaysia's manufacturing value added would eventually decline to below its 1994 level.

The figures for growth of GDP per capita for the selected upper-middle income countries (Figure 11) shows positive growth for all the countries over the entire period. At face value, this may indicate that theory is incorrect in assigning a strong positive relationship between GDP per capita growth and increases in the level of industrialisation. This would suggest that Dorner's (1964) conclusion is sounder. Yet, the risk with this conclusion is that is does not rule out the possibility for the use of manufacturing at different levels of the economy to achieve growth.

Figure 11: Average GDP per Capita for the Upper-Middle Income, 1994-2016



Source: World Bank Indicators

The table below shows that since 1994, Turkey has been able to grow its GDP per capita by 2016 to nearly double its 1994 value, while its manufacturing value added has declined by around 4 percentage points. Malaysia's GDP per capita has doubled since 1994 while its manufacturing value added has, like Turkey, fallen by around 4 percentage points. In contrast, Brazil and South Africa's manufacturing valued added values have declined by 15.03 and 7.66

percentage points, respectively. Unlike the other countries, South Africa's GDP per capita has not grown as rapidly only growing at a rate of 1.42% for the period 1994-2016, below the average for the other economies.

Table 7: Selected Countries Levels of Manufacturing and Income, 2016

			Manufacturing value added (as % of GDP)	GDP per capita (constant 2010 US$)
Medium-Level Industrialiser	High Income Economy	Turkey	18.83	14116.98
	Upper-Middle Income Economy	Malaysia	22.27	11031.82
Low-Level Industrialiser	Upper-Middle Income Economy	Brazil	11.71	10826.27
		South Africa	13.34	7488.99

Source: World Bank Indicators

In the next section, we will employ a more country-policy-specific analysis by delving deeper into the industrialisation experiences of the four upper-middle income countries selected in the preceding discussion. Specifically, we hope to understand what about these countries' experiences South African policymakers can hope to learn from in order to adapt the current policy framework to ensure the successful and immediate re-industrialisation of the economy.

V. The Dos and Don'ts of Industrialisation Policies: Lessons from other Countries

The results of section III would suggest that there is no significantly positive association between higher levels of manufacturing value added and economic growth. Because of this, it becomes necessary to take a more nuanced approach by focusing on the specifics of individual countries. The following discussion will highlight specific policies that characterized each of the four comparator countries' experiences with industrialisation since 1994.

This section will employ visualisations from The Atlas of Economic Complexity[8] of the product space for the period 1995-2016 in order to get a descriptive understanding of the products exported by each country. The product space[9] represents the network of products

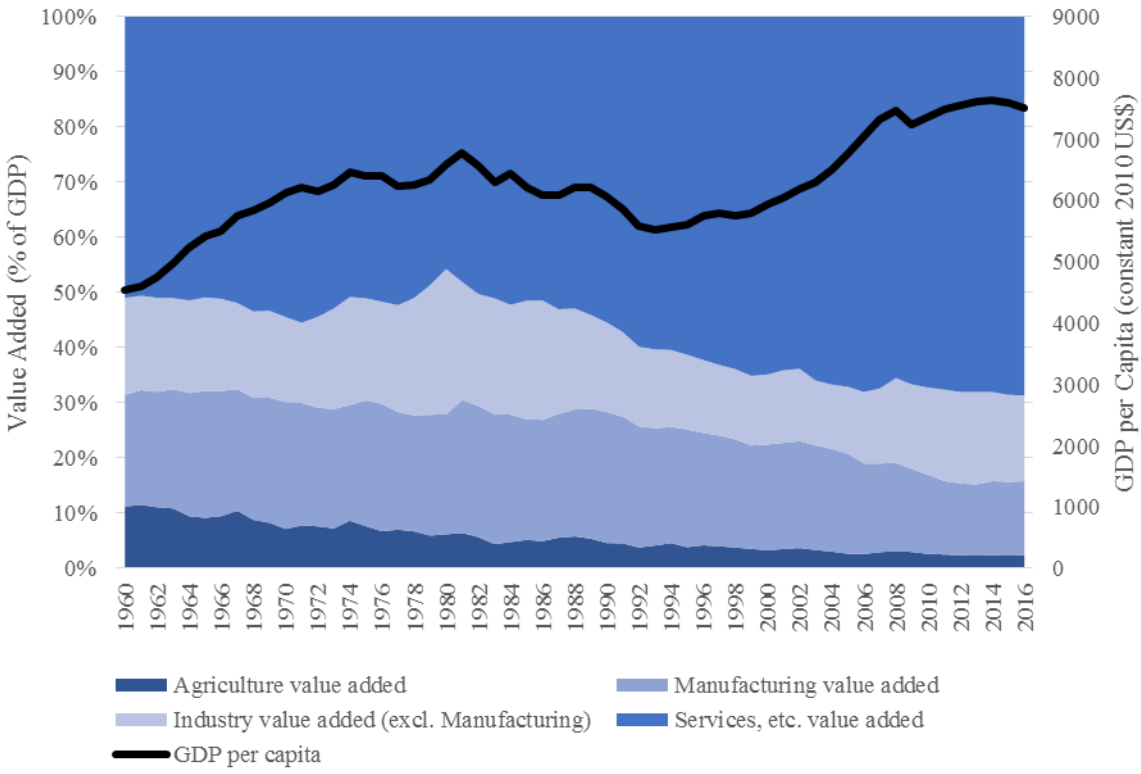
[8] "The Atlas of Economic Complexity," Centre for International Development at Harvard University, http://www.atlas.cid.harvard.edu

[9] The product space describes the evolution of the export basket of a certain country (Hidalgo, et al., 2007; OEC, 2017).

which are likely to be exported together and which have linkages to other products within various groupings. The export shares of a country's products can vary in complexity in relation to per capita GDP implying that the share of products exported with higher levels of complexity tends to be produced by countries with higher levels of per capita income. Nevertheless, the complexity of a country's productive structure may have an impact on development as a more complex product space allow economies to pursue activities which have higher levels of productivity leading to faster rates of development (Abdon, et al., 2010).

From South Africa's perspective, the discovery of minerals and precious metals in the late-1800s triggered an industrialisation boom heavily skewed towards the extraction of mineral resources through the process of mining and mining-linked industrialisation (TIPS, 2016). The industrialisation strategy was uniquely aimed at solving the tragedy of poorer white families with the goal being to build industries that could absorb white workers who were migrating from rural areas into more urbanized centres. For many years South Africa relied on its resource endowment to drive its growth (and in most respects has still does). Since 1960, mining's value-added reached a peak of around 25% of GDP in 1979 (Figure 12).

Figure 12: South Africa's Sectoral Value Added & GDP per Capita (1960-2016)



Source: World Bank Indicators

The long-term success of the industrial policies conducted under the Apartheid regime was hampered by its focus on the promotion of Afrikaner interests and nationalism in an attempt to imitate advanced economies of the time. This was done to satisfy the aspirations of elite consumers who were trying to imitate the consumption patterns of consumers from the most advanced economies at the time. This dependence on resource-extraction as the means to grow naturally led to an emphasis on directing capital towards increasingly capital-intensive sectors in what became known as the Minerals-Energy Complex (MEC). Fine and Rustomjee (1997) suggest that the MEC was a system of accumulation centred on a beneficiating a few core sectors. The MEC was driven by the State under the Apartheid regime but eventually came to represent a Dutch-Disease scenario. Fine (2008) argues that the failure to take advantage of economies of scale and scope in industries other than those which formed the core of the MEC was ultimately the cause of the Dutch-Disease in the South African economy.

While the MEC was extremely protected and isolated by the Apartheid regime, it was not the only sector to receive protection. Other sectors such as the automobile sector formed part of the government's import-substitution strategy, whereby high barriers to trade were imposed in an effort to nurture infant domestic industries. However, the domestic economy was not suited to this type of aggressive industrialisation because of its relatively small size[10] (TIPS, 2016), and by 1960, the framework of import substitution was found to be unsustainable, which resulted in shift in policy framework to be more in line with the emerging neoliberal paradigm that argued for a reduction in so-called barriers to trade and the opening up of the economy.

The final blow to South Africa's import substitution strategy came in the late 1970s when an array of external shocks[11] hit South Africa's commodity-dependent economy. This resulted in the prioritization of diversification away from the MEC with more focus on expanding the manufacturing sector as the policy framework shifted away from primary commodity extraction and into exporting of manufactured goods. The new export-led growth strategy was ultimately cut short due to the political instability and effects of sanctions imposed on the Apartheid regime in the 1980s.

Post-1994, however, the new ANC-led government looked to correct the wrongs of the past with various policy strategies which aimed to incorporate the majority of the population who

[10] Local aggregate demand was not able to sustain the industries promoted under the Apartheid regime because most of the population was too poor to afford the goods that were being produced.
[11] These included oil-price shocks, a dramatic decline in commodity prices, and growing sovereign debt.

were wrongfully excluded from the opportunities previously reserved for the white Afrikaner population. Ambitious policies such as the Reconstruction Development Programme and GEAR ultimately failed to achieve their goals due to poor planning and limited State capacity. What was needed was a structured strategy led by a *strong* State with the capacity to properly implement its policies with conviction.

The South African government laid out a vision of the economy as one being described as a developmental state. Poor execution, policy incoherence, rampant clientelism (specifically in the last decade) has marred its progress and often resulted in backtracking of policy strategies. Luiz (2002) argues that the government's adoption of the prevailing neoliberal paradigm reflected the state's growing incapacity.

Another example of the failure to implement the developmental state model is the experience of Brazil. Perissinotto (2012), for instance, notes the importance of the building of ties between the elites and institutions in terms of the State's development goals. This affirms the notion that the absence of a "developmental elite" places a major obstacle to the success of industrial policy (Perissinotto, 2012, p. 17). From the mid-1970s onwards, Brazil's growth in labour productivity was also slower than other industrialising, and developed countries and the advancement in technology was skewed across sectors due to a general lack of technical knowledge which resulted in the production of low-quality goods (Colistete, 2010).

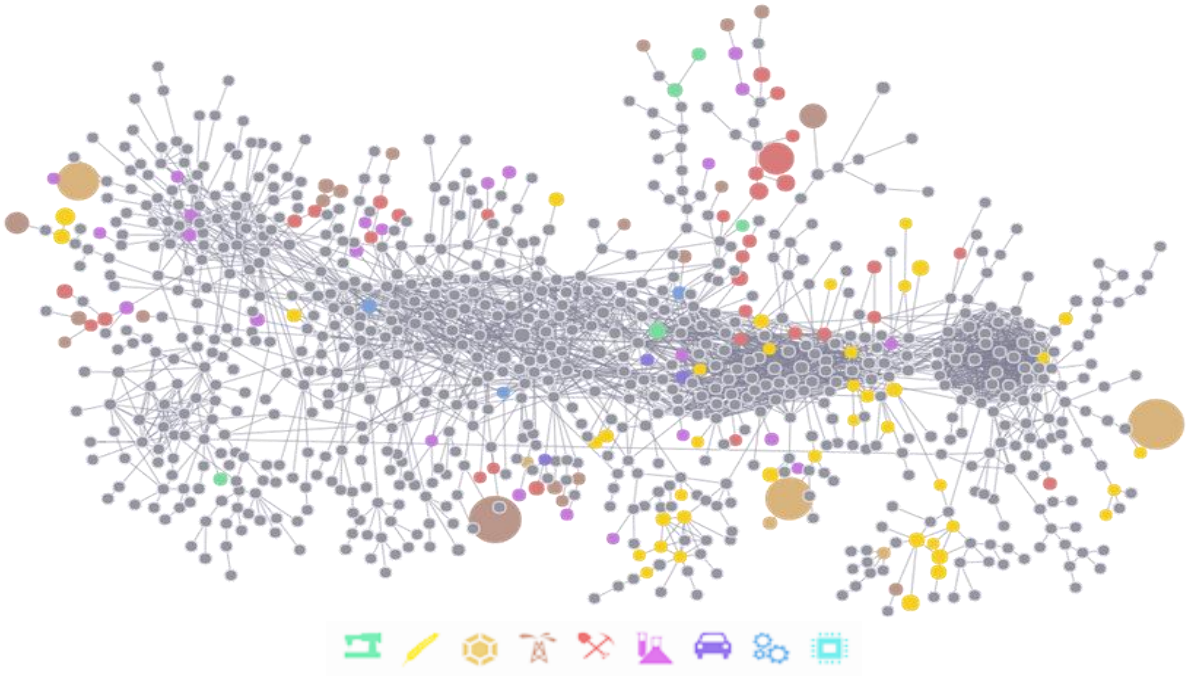
Brazil's failure to sustain its growth-path has been due to the vulnerability of the State. This instability was spurred on by changes between "authoritarianism and democracy, between populism and neoliberalism, and between strong and weak states" (Luiz, 1999, p. 98), which led to the end of the import-substituting industrialisation framework and brought about an economic crisis that resulted in austerity and a widening income gap. Furthermore, the Brazilian State was also constrained in terms of its capacity meaning it was unable to replicate the results of other economies such as South Korea (Guimarães, 2003).

An examination of the trends within the Brazilian economy since 1960 in terms of its growth in GDP per capita as well as the various sectoral shares of value added (see Appendix D) illustrates the above discussions quite starkly. From Appendix D, Brazil's manufacturing sector pre-1994 saw steady increases in its value-added reaching a peak around 1984 before falling sharply until 1994. After 1994 however, the Brazilian economy experienced a major structural shift away from industry-led growth to one more characterised by a services-based economy.

Appendix B illustrates this fact as in the period 1994-2016, Brazil's services value added was the only sector to show positive growth while the agricultural and manufacturing sectors experienced drops of 2.78% and 3.86%, respectively.

Brazil's level of industrialisation, as highlighted by its product space (Appendix E) and its manufacturing value added, shows significant regression since 1994. South Africa's product space in 1995 and 2016 (Figures 13 and 14, respectively) show the persistent reliance on specific industries, specifically in the case of minerals and precious metals, as well as a general stagnation in productive capabilities. While there has been some evidence of diversification in the export basket through targeted policies of cluster development, such as the case of the motor vehicles (purple dots) and other isolated sectors,[12] South Africa has, however, continued to rely heavily on the exportation of metal products (red dots), mineral products (brown dots), precious minerals (gold dots, such as diamonds, platinum and gold), and foodstuffs (yellow dots).

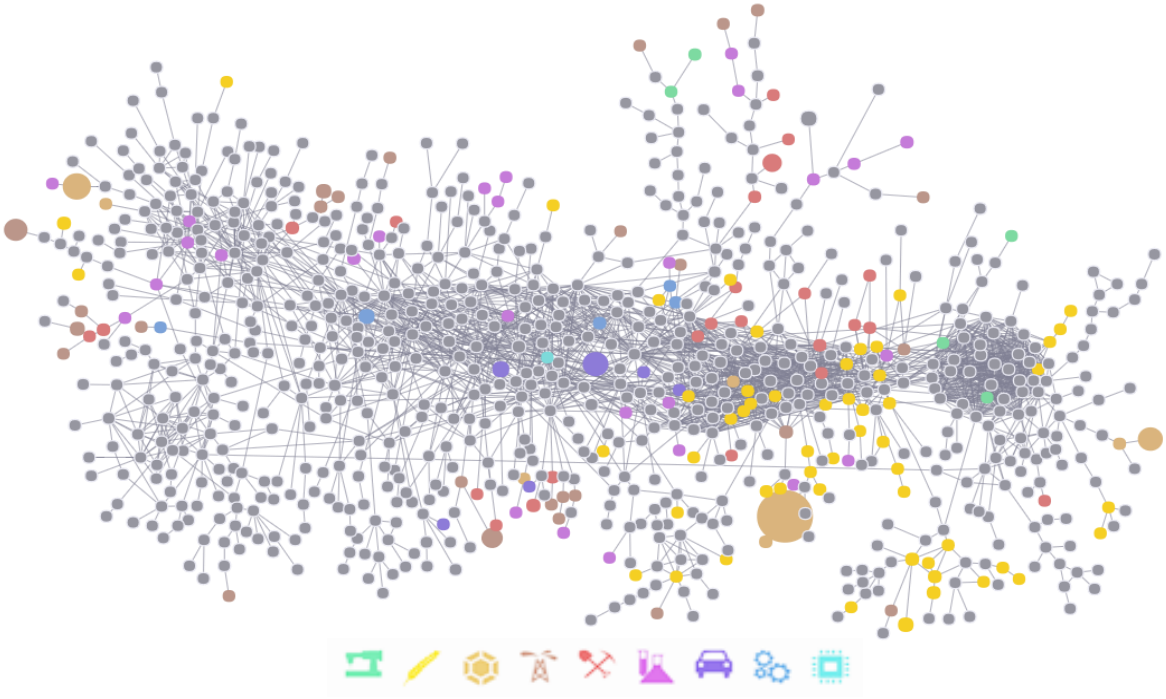
Figure 13: South Africa's Export Basket (1995)



Source: Atlas of Economic Complexity

[12] Other products in South Africa's product space are chemical and plastic products (pink dots), machinery (dark blue dots), electrical products (light blue), and textiles (green dots).

Figure 14: South Africa's Export Basket (2016)



Source: Atlas of Economic Complexity

The argument of Dutch Disease seems apt here when describing the failings of South Africa's previous industrialisation strategies. One could, instead, look to Malaysia, which was once also a heavily mineral-orientated exporter. The main difference between South Africa and Malaysia is that Malaysia was able to successfully engineer diversification of its export basket (see Appendix G) into one characterised by more complex manufactured products. The Malaysian State was able to accomplish this by using the income generated from its natural resources to drastically increase the incomes for all its ethnic groups (Yusof & Bhattasali, 2008).

The case of structural transformation in Malaysia was driven by movements into more niched and complex value chains. An issue that can arise with such a strategy, however, is the costs and difficulties of moving into areas in which the economy has no comparative advantages (Yusof & Bhattasali, 2008). In terms of Malaysia's export capabilities, their relative specialization in exporting machinery and electronic products, which has become a feature of many of the East Asian economies, has improved their economic outcomes.

Yet, the Malaysian state has been able to achieve such great levels of focused-industrialisation, which in terms of their manufacturing and industry value added (Appendix C), has grown significantly at a compounded rate of 1.23% over the period 1960-2016 along with growth in its GDP per capita of 3.81% that is stark contrast to South Africa's growth of 0.92%. Chik, et

al. (2013) write that the Malaysian State played an instrumental role in the promotion and transformation of the economy into one which arguably industrialised through the creation of Free Trade Zones that fostered employment opportunities for relatively low-skilled workers. The Malaysian State further helped its industrialisation strategy by ensuring political stability (Yusof & Bhattasali, 2008).

Malaysia's experiences with industrialisation highlight the benefits that an aggressive process of capital accumulation and development of capabilities can result in rapid employment creation along with a rise in general wages. However, a warning that should be heeded is that a persistent lack of technological improvements in manufacturing could lead to a plateau in economic performance. This could be because of poor policy coordination and an inability to enforce production standards that can continually sustain high levels of productivity growth. This may allow for further shifts towards higher value-added activities instead (Rasiah, et al., 2014).

The industrial framework of Turkey perhaps illustrates the way in which South Africa should have approached its process of industrialisation, specifically post-1994. In 1980, the Turkish State shifted its growth strategy from one of import-substitution towards export-orientated policy. As part of this shift, Turkey adopted the right mix of policies at the macroeconomic and sectoral levels. Turkey was able to develop industries with close, as well as strong, forward and backward linkages to low, medium and high tech sectors (Taymaz & Yilmaz, 2016). Turkey's export basket in 1995 (Appendix I) shows its specialization in basic products like agriculture and labour-intensive industries such as textiles and clothing.

By 2016, it is clear that Turkey successfully diversified into more high technology industries such as the production of motor vehicles and chemicals with close linkages to Turkey's existing export basket (see Appendix I). Atiyas and Bakış (2013) argue that although Turkey's composition of exports has changed significantly, the degree of sophistication of its export basket is still low relative to other economies such as China, Mexico, Romania, and Thailand. Turkey's export-led strategy led to large growth in real wages, although growth in employment was not as responsive over the period, 1974-2001. The currency crisis in 1994 impacted Turkish production negatively which, in turn, resulted in both real wages and employment in the manufacturing sector declining before rebounding after 1996 (Aydiner-Avsar & Onaran, 2010). Since 2005, both Turkey's manufacturing wages and employment have risen sharply.

From the above analysis, South Africa's record of industrialisation can be described as poor. In relation to each of the countries aforementioned, different aspects were discussed which were instrumental in the selected upper-middle income economies' industrialisation successes or failures (such as a weak state and political uncertainty in the case of Brazil.) The next section will build on the preceding discussion and outline possible avenues and policy choices for the successful and sustainable re-industrialisation of the South African economy.

VI. Towards the Re-Industrialisation of the South African Economy

The central thesis which this paper set out to study was whether there is a definitive association between higher levels of manufacturing value added and economic growth. A detailed historical discussion outlined the major successes and failures of both import-substitution and export-led policies before briefly touching on economies who are in the process of de-industrialising. There have been some examples of developing countries attempting to industrialise their economies but most have not been able to achieve the rates of growth experienced by the now-industrialised economies immediately post-WWII. Many have put this down to poor policy choice and coordination by these states.

There have, however, been some success stories. As discussed previously, many of the Asian economies have been able to focus their efforts on building a competitive and strong manufacturing sector through an aggressive use of policy coordination and, in most instances, unwavering political will and conviction. Malaysia and South Korea represent two of the most pertinent examples of this approach. These economies have developed capabilities through extreme versions of the export-led model of industrialisation. Other economies, such as Brazil and South Africa, chose instead to first close their borders to trade in favour of attempting to create industries which could compete in the global economy. However, Fine and Rustomjee's (1996) analysis shows that state support to specific sectors has done more than restrain South Africa to a core of capital-intensive sectors. It has reduced the potential, and some may argue incentive, for diversification without heavy-handed state intervention. Furthermore, it has skewed the country's capital base into the hands of the Afrikaner and White population.

The record of both export-led and import-substituting economies could not have been starker when examining the evidence of middle-income economies. Moreover, historical evidence shows that, more often than not, countries who pursued policy frameworks centred on import-substitution often produce competitive industries but failed to diversify their product spaces as

a result. South Africa's experiences with such a policy led to a Dutch Disease situation where economic activity was, and still is, concentrated on its natural resource endowment. Further, since 1994 the South African economy has not seen diversification of its product space to the point of lessening its dependence on primary products such as mineral resources.

Brazil on the other hand quite successfully implemented the import-substitution strategy in the 1960s before shifting the economy towards being more export-led. However, due to political upheaval and subsequent economic instability, the Brazilian economy has seen a regression in its basket of export goods. Yet, the Brazilian state, through concentrated government intervention, was able to create entire markets from which its future development could build.

In contrast to this, the archetypes of the export-led growth strategy for upper-middle income economies are Malaysia and Turkey. While Malaysia's industrialisation strategy saw it develop at high rates since the 1980s, its over-reliance on the exportation of specialized products should be cause for concern as its export basket has not seen much diversification since 1994.[13] Turkey's product space, however, has been one of continued diversification from low-complexity products, such as foodstuffs and minerals, into higher productivity products such as textiles and other light manufacturing items, as well as motor vehicles and some machinery and equipment.

Given the low base at which many African economies are starting from, the question posed by this paper was whether strategies of industrialisation could result in economic growth. Put differently, is industrialisation positively associated with economic growth. To answer this a simple econometric analysis was conducted employing data from the World Bank using a parsimonious specification of Kaldor's first law as found in Mercan et al. (2015). The results of the analysis did not show a significantly positive association between increases in manufacturing value added and economic performance, but a positive association as found in other research. However, one should not place too great an emphasis on these results as there were issues which could be attributed to low statistical power and the small sample of available data.

The prevailing policy space in the 1980s created through the Washington Consensus saw many developed countries transition their economies from a greater dependence on manufacturing to

[13] This could be beneficial in the current and future technological landscape but a failure to diversify into other related product groupings may result in economic stagnation.

a greater emphasis on the service sector. These economies, unlike many developing economies, were in a position to successfully implement such a policy switch to their advantage given the strong manufacturing base with which they were able to grow their economies. It is our view, however, that a given the many noted benefits associated with having a strong manufacturing sector a targeted policy framework of re-industrialising the South African economy is still beneficial if implemented correctly.

For example, South Africa's Department of Trade and Industry's Industrial Policy Action Plan (IPAP) posits creating a well-balanced, export-led growth strategy to develop greater inclusivity in the economy through addressing structural barriers as well as the historical accumulation of capital. Both of which hamper the benefits of industrialisation. An UNCTAD report details policies that developing economies should employ to boost their manufacturing sector. Some of these policies include the stabilization of financial markets through capital controls in order to limit capital flight and reduce exchange rate volatility. This would signify a major divergence away from the open, neoliberal-centric policy space which the democratic state adopted in 1994. From the perspective of the fiscus, the report suggests that the proper incentives for private investors to invest in many of these developing economies do not exist. Hence, it discusses the potential use of tax breaks as one possible example to create this incentive (UNCTAD, 2016).

In many of the East Asian economies, capital markets play a much greater role in financing investments for private firms, whereas in many other regions - Africa included – there is the tendency to rely more on the banking sector to finance large investment projects. However, the short-sighted nature of the banking sector and in South Africa's case, concentration, as well as the need for a development bank that is programmed with longer-term horizons and a tolerance to risk that allows the freedom to aggressively fund for industrialisation without having to worry about its self-sustainability.[14]

In order to be a lasting success story, South Africa should heed the words of Verhoef (1998) who argues that industrialisation is first and foremost a macroeconomic phenomenon comprising of various microeconomic components. Getting the right policy mix will require experimentation and patience. Therefore, South Africa's process of re-industrialisation will

[14] A detailed investigation into the development finance space in South Africa is in a forthcoming paper by the Centre for Competition, Regulation and Economic Development.

require careful guidance and ushering from policymakers and leaders in government as well as academics. The process will not be a straight-line to success and there will be challenges along the way. Other issues such as policy selection, and coordination and implementation failures (which have plagued policy success in the past) would need to be corrected.

The road will not be easy, but a resolute vision and stronger partnerships between government and the private sector can ensure a virtuous circle of investment and therefore economic growth (UNCTAD, 2016). This will ensure that all South Africans are able to participate in, and contribute to, growing the South African economy into the economic hub of the African continent, which will go a long way to creating a dynamic, innovative and capable economy with the capacity to provide for the basic needs of the entire economy both currently, and in the well into the future.

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VIII. Appendix

Appendix A: Country Groups based on Level of Industrialisation and Income Level, 1994

			Manufacturing value added (as % of GDP)	GDP per capita (constant 2010 US$)
High-Level Industrialiser	Upper-Middle Income Economy	Korea, Rep.	27.32	11113.51
		Brazil	26.79	8319.21
		Malaysia	26.64	5858.95
	Lower-Middle Income Economy	Ukraine	39.03	2166.69
		Swaziland	36.05	2759.14
		Belarus	29.82	2252.78
		Dominican Republic	26.52	2926.54
		Thailand	26.14	3297.87
	Low Income Economy	Armenia	30.08	956.47
Medium-Level Industrialiser	High Income Economy	Finland	23.98	30822.61
		Japan	23.56	39441.57
		Czech Republic	23.55	12630.07
		Germany	23.17	34289.13
		Malta	21.72	13954.89
		Sweden	20.59	36419.46
		Italy	20.43	31909.24
		Switzerland	20.25	61445.12
		Austria	19.55	35535.60
		United Kingdom	17.06	29930.68
		Netherlands	16.85	37461.57
		Denmark	16.66	47928.37
		Bahrain	16.09	21623.02
		France	16.01	33569.33
	Upper-Middle Income Economy	Turkey	22.87	6889.60
		Mauritius	22.63	4294.09
		Chile	21.46	7498.85
		South Africa	21.05	5564.09
		Costa Rica	20.90	5563.02
		Argentina	19.33	7952.71
		Uruguay	18.88	8221.95
		Mexico	17.15	7896.12
		Jamaica	17.01	4880.41
		Colombia	16.13	4679.24
		Macedonia, FYR	23.71	3093.88
		El Salvador	23.48	2591.51

	Lower-Middle Income Economy	Indonesia	23.35	2083.06
		Philippines	23.26	1472.98
		Tunisia	21.25	2418.18
		Zimbabwe	21.17	1229.99
		Ecuador	20.81	3844.78
		Morocco	20.56	1848.78
		West Bank and Gaza	18.98	1895.37
		Bolivia	18.70	1465.80
		Mongolia	17.88	1382.20
		Peru	17.73	2975.98
		Honduras	17.26	1575.27
		Egypt, Arab Rep.	17.20	1618.58
		Jordan	15.88	2623.57
		Nicaragua	15.68	1076.04
		Iran, Islamic Rep.	15.38	3880.49
	Low Income Economy	Cameroon	22.30	994.64
		Kyrgyz Republic	21.83	571.40
		India	19.13	589.71
		Yemen, Rep.	17.43	1018.89
		Malawi	17.39	315.93
		Pakistan	16.78	796.63
Low-Level Industrialiser	High Income Economy	Australia	14.36	37098.80
		Cyprus	12.15	22559.50
		Brunei Darussalam	12.02	37043.18
		Norway	11.88	68019.11
		Saudi Arabia	9.35	19041.06
		Macao SAR, China	8.23	25234.95
		Bahamas, The	4.85	20595.63
	Upper-Middle Income Economy	Panama	14.53	4755.93
		Lebanon	13.98	6416.33
		Suriname	9.95	5642.08
		Trinidad and Tobago	8.13	6588.40
		St. Kitts and Nevis	7.56	10160.25
		Dominica	7.14	4799.97
		Botswana	5.30	4053.44
		St. Lucia	5.14	6345.48
		Grenada	4.94	4632.20
		Antigua and Barbuda	1.94	11199.19
		Palau	0.86	9433.85
	Lower-Middle Income Economy	Fiji	14.90	3085.86
		Sri Lanka	13.90	1418.56
		Cuba	13.02	2790.10
		Azerbaijan	12.92	1394.74

		Namibia	11.63	3586.94
		Guyana	11.60	1935.63
		Belize	11.30	3491.40
		Tonga	9.64	2934.12
		St. Vincent and the Grenadines	8.73	3859.17
		Congo, Rep.	7.76	2391.31
		Nigeria	6.99	1277.99
	Low Income Economy	Burkina Faso	14.50	341.16
		Lao PDR	12.91	523.44
		Mozambique	12.86	172.79
		Bosnia and Herzegovina	11.51	698.56
		Burundi	10.74	290.32
		Kenya	10.70	849.70
		Zambia	10.42	903.89
		Ghana	10.12	873.90
		Central African Republic	10.02	413.00
		Sierra Leone	9.90	345.24
		Nepal	9.55	399.42
		Lesotho	9.49	792.33
		Bhutan	9.49	915.41
		Cambodia	9.29	333.26
		Chad	9.22	495.00
		Togo	9.12	461.58
		Mauritania	8.66	972.88
		Benin	8.06	615.12
		Tanzania	7.41	456.89
		Uganda	6.52	333.01
		Guinea	4.67	382.60
		Ethiopia	4.51	177.99

Source: World Bank Indicators

Appendix B: Country Groups based on Level of Industrialisation and Income Level, 2016

			Manufacturing value added (as % of GDP)	GDP per capita (constant 2010 US$)
High-Level Industrialiser	High Income Economy	Korea, Rep.	29.34	25458.89
		Czech Republic	27.08	21894.11
		Ireland	34.69	69974.11
	Upper-Middle Income Economy	Thailand	27.42	5901.88
	Lower-Middle Income Economy	Guyana	43.38	3783.54
		Swaziland	33.23	3906.26
Medium-Level Industrialiser	High Income Economy	Hungary	23.54	14997.20
		Slovenia	23.24	24460.40
		Germany	22.91	45845.53
		Slovak Republic	22.62	19275.09
		Poland	20.42	15065.97
		Singapore	19.62	52600.64
		Lithuania	18.97	15895.23
		Turkey	18.83	14116.98
		Switzerland	18.36	76691.12
		Austria	18.20	47996.58
		Finland	16.91	45823.76
		Italy	16.27	34362.67
		Estonia	15.75	18094.59
		Denmark	15.32	60670.24
		Sweden	15.28	56473.02
	Upper-Middle Income Economy	Belarus	22.75	6221.37
		Malaysia	22.27	11031.82
		Romania	21.44	10065.49
		Mexico	19.11	9707.91
		Serbia	18.97	5852.38
		Tunisia	16.67	4265.37
		Bulgaria	16.64	7967.71
		Argentina	16.43	10154.00
		Ecuador	15.87	5191.10
		Macedonia, FYR	15.32	5222.83
	Lower-Middle Income Economy	Myanmar	22.79	1408.14
		Indonesia	21.27	3974.06
		El Salvador	20.66	3802.86
		Philippines	19.65	2753.35
		Guatemala	19.37	3100.21

		Honduras	18.83	2137.81
		Jordan	18.17	3258.49
		Bangladesh	17.91	1029.58
		Morocco	17.91	3204.86
		Lesotho	17.35	1352.48
		Cambodia	17.24	1079.11
		Egypt, Arab Rep.	17.07	2724.40
		Sri Lanka	16.94	3832.34
		Kyrgyz Republic	16.64	1038.85
		India	16.51	1861.49
		Vietnam	15.86	1735.29
	Low Income Economy	Congo, Dem. Rep.	19.32	388.27
Low-Level Industrialiser	High Income Economy	Croatia	14.87	14452.14
		Uruguay	14.45	14010.00
		Belgium	14.26	45469.71
		Spain	14.19	31505.29
		Portugal	13.92	22426.29
		Israel	13.04	33677.46
		Saudi Arabia	12.87	21395.36
		Latvia	12.27	14724.69
		Netherlands	12.15	52267.73
		Chile	12.01	15019.63
		Brunei Darussalam	11.46	31430.96
		France	11.38	42015.74
		United Kingdom	10.13	41981.39
		Greece	9.87	22699.08
		United Arab Emirates	9.46	40864.25
		Qatar	9.05	66410.76
		Malta	8.76	26577.66
		Norway	7.62	90288.82
		St. Kitts and Nevis	6.85	15657.22
		Kuwait	6.82	35250.91
		Australia	6.57	55478.58
		Trinidad and Tobago	5.94	16259.04
		Luxembourg	5.58	108600.93
		Cyprus	5.03	28448.82
		Bahamas, The	3.09	19991.09
		Antigua and Barbuda	2.79	13315.51
		Hong Kong SAR, China	1.11	36776.21
	Upper-Middle Income Economy	Bosnia and Herzegovina	15.00	5377.84
		Dominican Republic	14.70	6909.13
		Mauritius	13.91	9822.01

		Peru	13.86	6089.40
		Russian Federation	13.72	11279.63
		Suriname	13.35	8108.24
		South Africa	13.34	7488.99
		Costa Rica	13.24	9714.10
		Colombia	12.58	7525.86
		Fiji	12.38	4195.97
		Iran, Islamic Rep.	12.30	6733.91
		Georgia	12.05	4084.00
		Kazakhstan	12.00	10582.50
		Namibia	11.98	6045.22
		Brazil	11.71	10826.27
		Equatorial Guinea	11.62	12278.13
		Jamaica	9.14	4790.04
		Lebanon	9.06	7143.96
		Albania	6.45	4684.97
		Algeria	6.07	4827.72
		Botswana	5.68	7483.17
		Azerbaijan	5.59	5861.51
		St. Vincent and the Grenadines	5.54	6676.62
		Panama	5.47	10982.37
		Montenegro	4.57	7492.86
		Grenada	3.94	8676.34
		Dominica	2.63	6880.63
		St. Lucia	2.60	8151.63
		Maldives	2.33	8416.94
		Iraq	2.09	5695.68
		Palau	1.04	10909.90
	Lower-Middle Income Economy	Nicaragua	14.98	1946.37
		Cote d'Ivoire	14.38	1552.77
		Ukraine	14.19	2905.86
		Moldova	13.89	2062.71
		Bolivia	13.43	2457.63
		Kosovo	12.84	3890.07
		Pakistan	12.80	1178.80
		Paraguay	11.87	3925.56
		Armenia	10.21	3932.55
		Kenya	10.03	1143.07
		Samoa	9.73	3782.40
		Lao PDR	8.78	1642.73
		Nigeria	8.77	2455.92
		Congo, Rep.	8.22	2798.07
		Zambia	8.07	1627.27

		Mongolia	7.91	3906.12
		Bhutan	7.82	2801.28
		Sao Tome and Principe	7.44	1283.89
		Tonga	7.14	3792.29
		Mauritania	6.88	1296.01
		Ghana	5.63	1707.66
	Low Income Economy	Afghanistan	11.82	617.89
		Yemen, Rep.	11.05	679.67
		Burkina Faso	11.01	663.91
		Malawi	10.30	481.45
		Burundi	10.08	218.28
		Zimbabwe	9.55	917.56
		Mozambique	9.53	515.39
		Uganda	9.50	662.43
		Rwanda	6.26	738.64
		Nepal	5.97	685.12
		Tanzania	5.54	867.06
		Gambia, The	4.85	531.92
		Togo	4.69	558.12
		Ethiopia	4.34	511.19
		Chad	3.21	859.65
		Liberia	3.05	352.65
		Sierra Leone	1.98	455.59

Source: World Bank Indicators

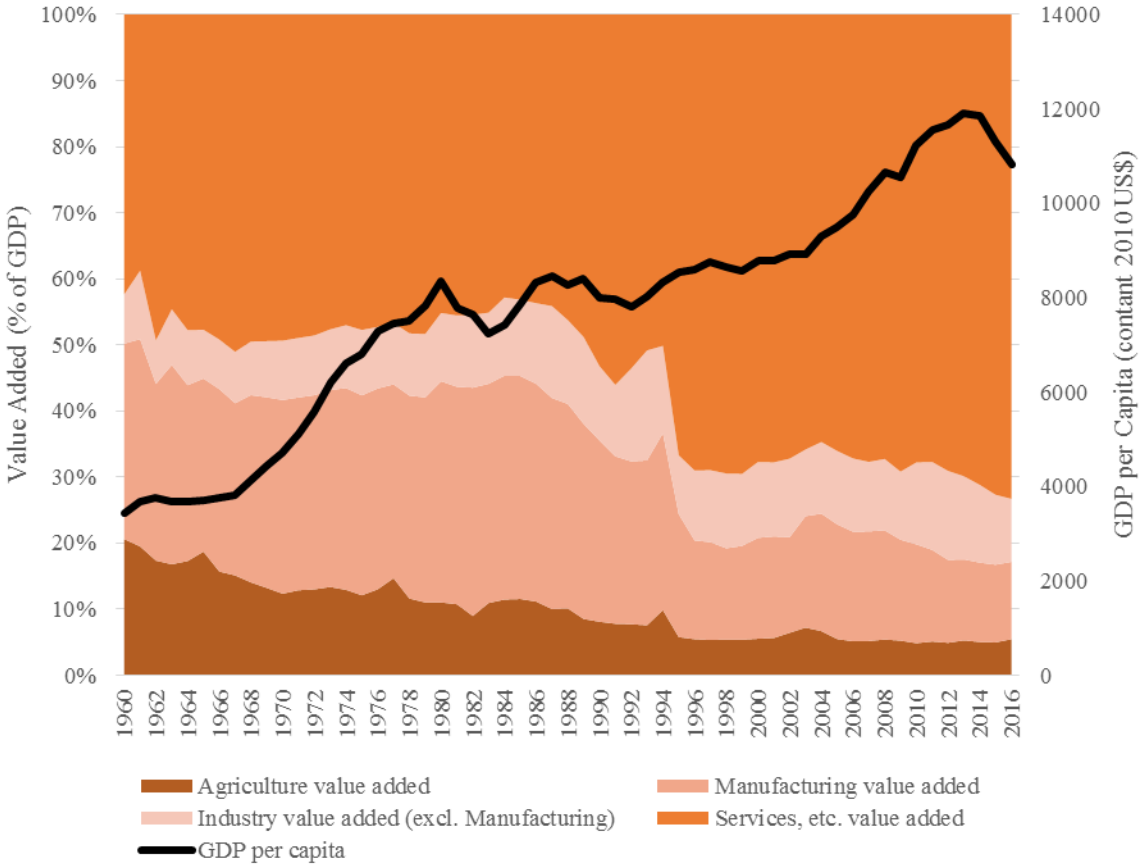
Appendix C: Compound Annual Growth Rates (CAGR)[15] for the Selected Countries

		1960-1994	1994-2016	1960-2016
Brazil	Agriculture Value Added	-2.21%	-2.78%	-2.39%
	Manufacturing Value Added	-0.30%	-3.86%	-1.67%
	Industry Value Added (excl. Manufacturing)	1.75%	-1.54%	0.45%
	Services, etc. Value Added	0.51%	1.82%	1.00%
	GDP per capita	2.73%	1.26%	2.11%
Malaysia	Agriculture Value Added	-3.46%	-2.15%	-2.90%
	Manufacturing Value Added	2.93%	-1.33%	1.23%
	Industry Value Added (excl. Manufacturing)	-0.23%	0.72%	0.14%
	Services, etc. Value Added	1.17%	0.88%	1.04%
	GDP per capita	4.41%	3.06%	3.81%
South Africa	Agriculture Value Added	-2.66%	-2.98%	-2.74%
	Manufacturing Value Added	0.12%	-2.14%	-0.75%
	Industry Value Added (excl. Manufacturing)	-0.70%	0.52%	-0.22%
	Services, etc. Value Added	0.52%	0.61%	0.54%
	GDP per capita	0.62%	1.43%	0.92%
Turkey	Agriculture Value Added	-3.72%	-3.92%	-3.73%
	Manufacturing Value Added	1.72%	-0.90%	0.68%
	Industry Value Added (excl. Manufacturing)	2.47%	1.23%	1.95%
	Services, etc. Value Added	1.99%	0.86%	1.52%
	GDP per capita	2.38%	3.46%	2.74%

Source: World Bank Indicators (Authors' calculations)

[15] $CAGR = \left[\frac{End\ Period}{Beginning\ Period}\right]^{\left(\frac{1}{Number\ of\ Periods-1}\right)} - 1$

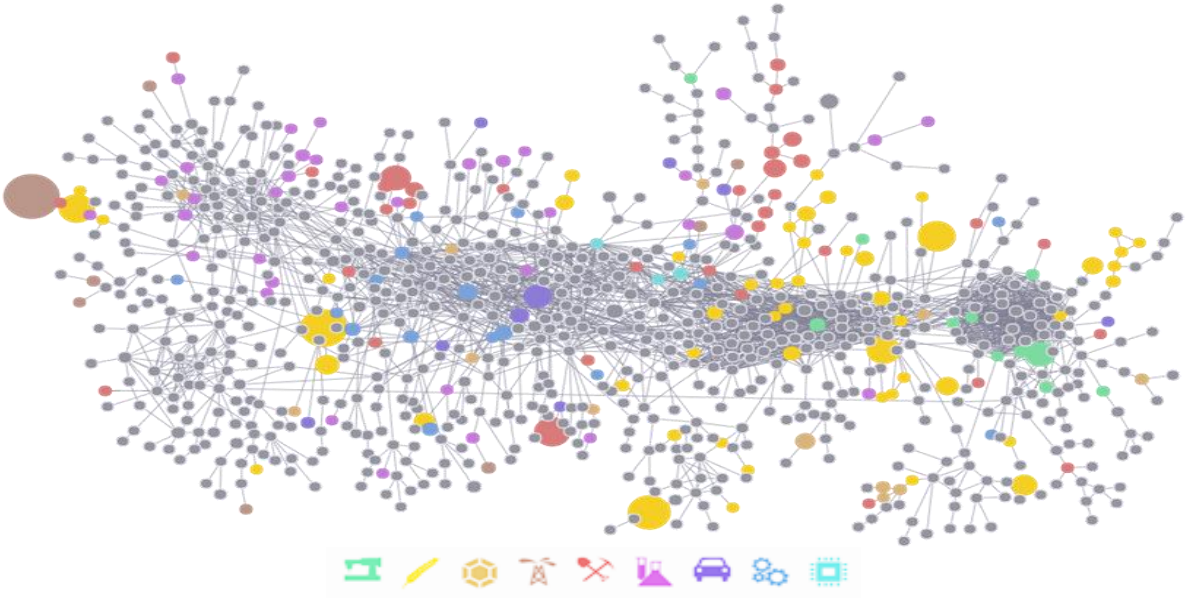
Appendix D: Brazil's Sectoral Value Added & GDP per Capita (1960-2016)



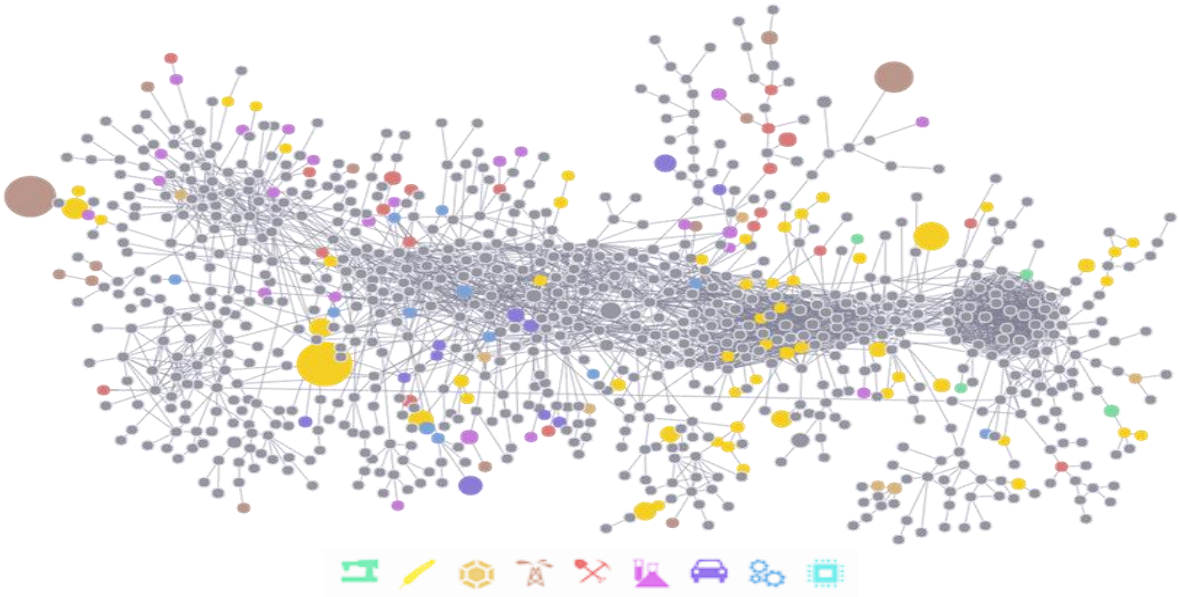
Source: World Bank Indicators

Appendix E: Brazil's Export Capabilities (1995 & 2016)

1995

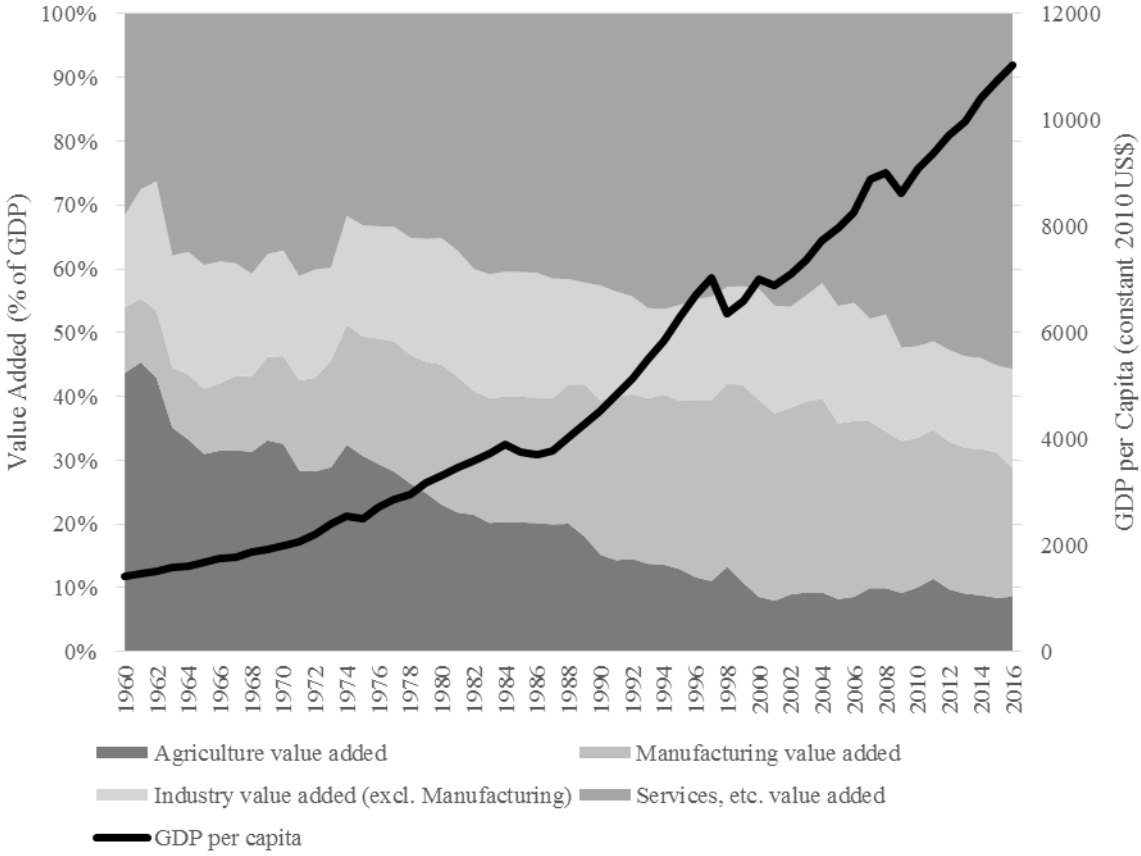


2016



Source: Atlas of Economic Complexity

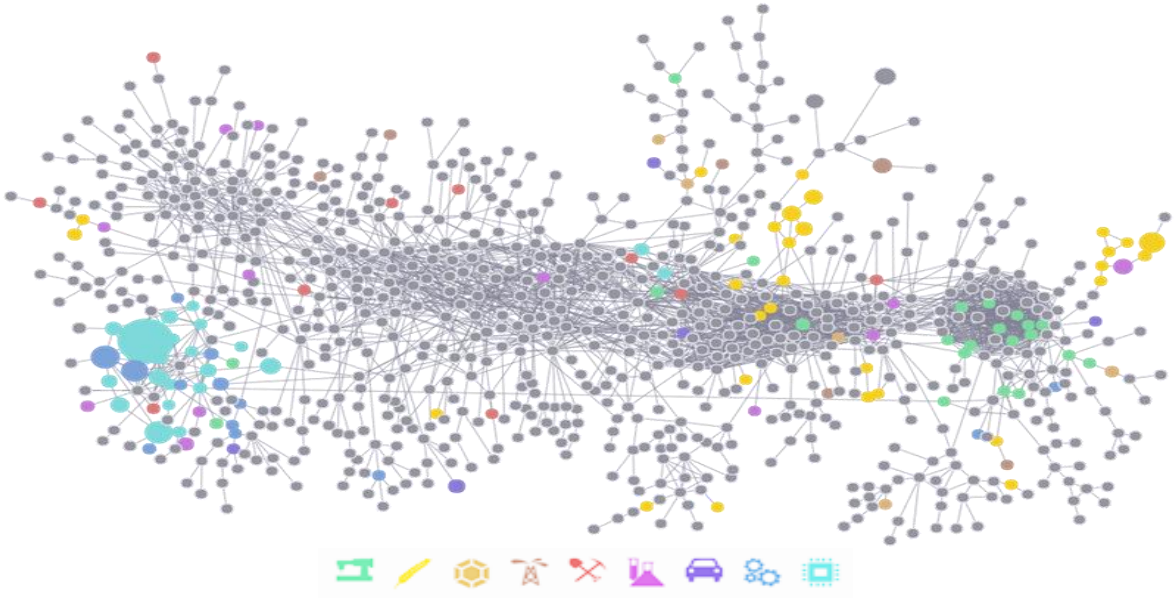
Appendix F: Malaysia's Sectoral Value Added & GDP per Capita (1960-2016)



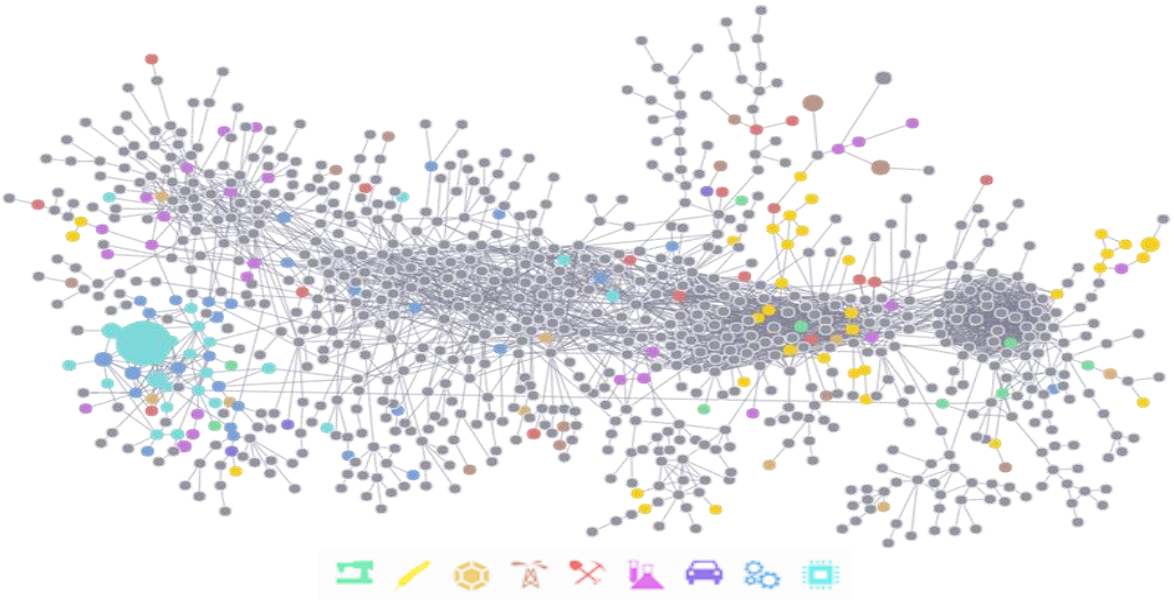
Source: World Bank Indicators

Appendix G: Malaysia's Export Capabilities (1995 & 2016)

1995

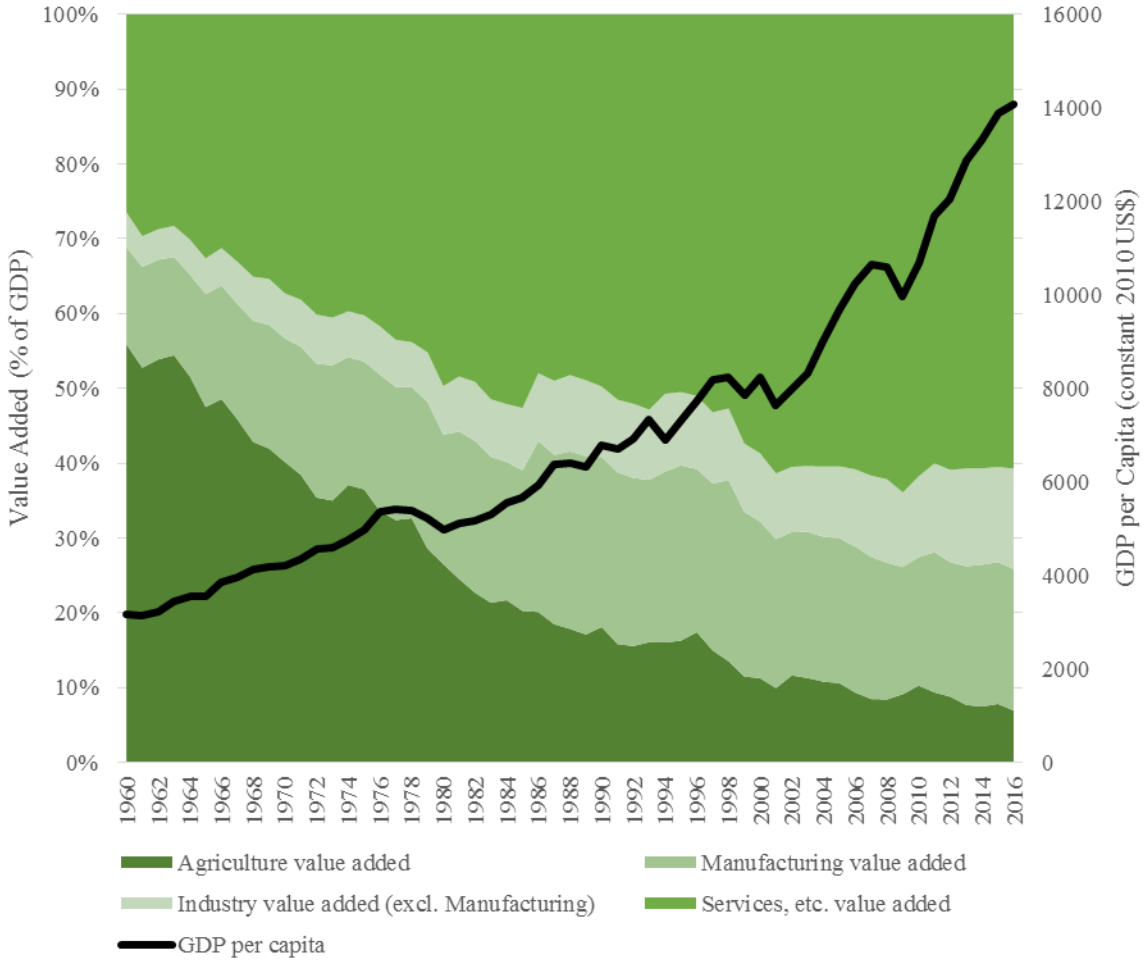


2016



Source: Atlas of Economic Complexity

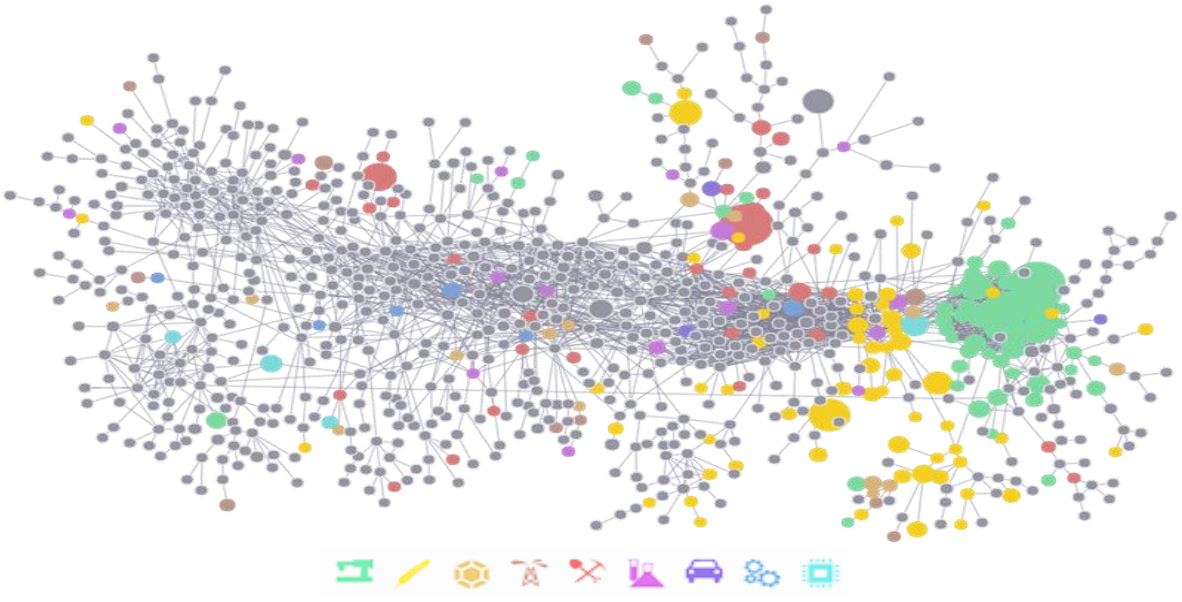
Appendix H: Turkey's Sectoral Value Added & GDP per Capita (1960-2016)



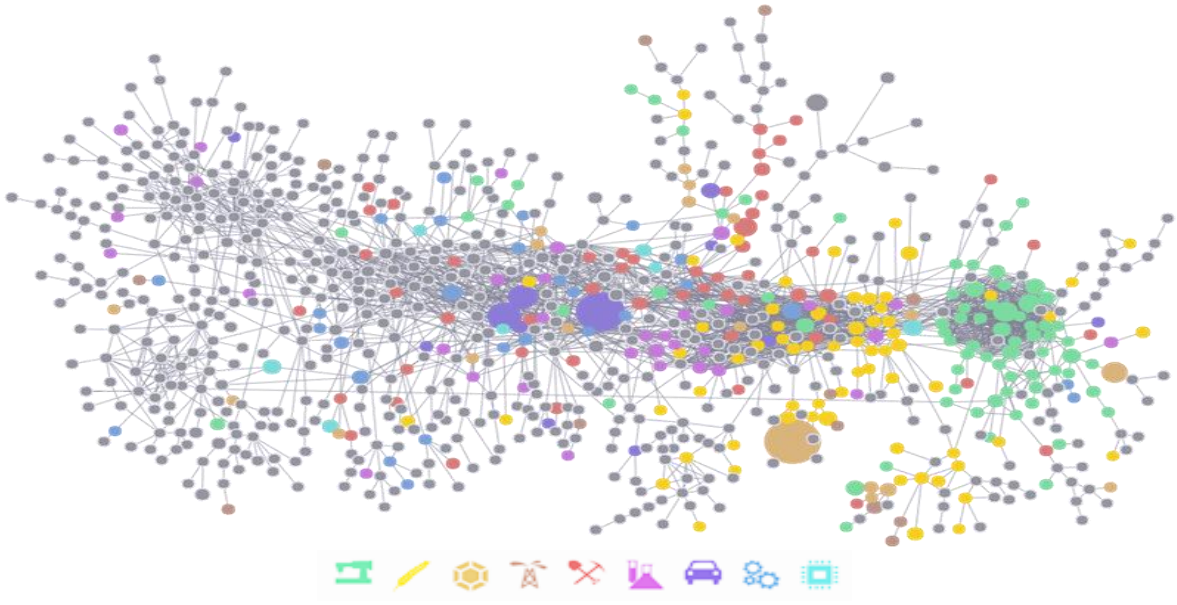
Source: World Bank Indicators

Appendix I: Turkey's Export Capabilities (1995 & 2016)

1995



2016



Source: Atlas of Economic Complexity