

Mechanisms for Changing the Structure of Mpumalanga Economy through Industrialization

Nkosinathi Senzo Nkonyane, Pfano Mashau
University of KwaZulu-Natal, Graduate School of Business and Leadership, Durban, South Africa
mashaup@ukzn.ac.za, Nkonyanen@gmail.com

Abstract: Industrialization is still viewed by many countries as a tool for achieving economic growth and development (Sampath, 2016). Almost all countries that have attained growth have followed an industrialization trajectory (Xu & van Leeuwen, 2016; Szirmai, 2012). Britain— with the introduction of the industrial revolution— and other countries that followed suit experienced unprecedented economic growth. This research explored the structure of Mpumalanga, a South African provincial economy, which was found to be inhibiting growth. Its aim was to suggest mechanisms for industrializing the province in order to attain growth and economic development. The methodology employed in this study involved interviews with members of the Mpumalanga Industry Sector Forum, representatives from big industry, business chambers, all three spheres of government, including State Owned Entities and Development Funding Institutions (FDIs). A total of 20 respondents were selected for the study. The method used was convenient for obtaining first-hand information on the state of industrialization in the province and for soliciting a new set of ideas, resulting in the recommendations of this study. The study discovered a number of factors that inhibited industrialization, including the unavailability of industrial infrastructure, the cost and difficulty of doing business and lack of skills and support for SMMEs. The study proposes the use of an Industrial Centres of Competence model that concentrates on certain industrial sectors with a suite of support services for industry, incubation and supplier development centres for small businesses, research and development, as well as innovation centres for industry.

Keywords: *Industrialization, employment, economic growth, development, industry*

1. Introduction

Industrialization is associated with the attainment of high levels of economic growth and development, and it is often described as an engine of growth (Sampath, 2016). Evidence affirms this, considering countries that have followed earlier industrial development paths, such as Great Britain, in the 18th and 19th centuries (Xu & van Leeuwen, 2016). According to Szirmai (2008), Great Britain was the first country to become industrialized and it has become a technological hub of the world's economy. Other countries that followed their example, such as Belgium, France, Switzerland, the US and even latecomers to industrialization— for example, Germany, Russia, Japan and others—are also associated with high levels of development and are categorized as 'developed' countries today (Maddison, 2008; Szirmai, 2012). There is also evidence of growth prospects for developing countries that have recently embraced an industrialization development trajectory, such as the larger Latin American countries of Mexico, Brazil, Argentina and Chile, and the Asian countries of China and India (Maddison, 2008). The significance of industrialization cannot be ignored; it tends to be a major catalyst for growth and development, and often leads to the creation and reduction of the socio-economic challenges of unemployment, poverty and inequality. Industrialization increases both the skills base of an area and the possibility of a country's participation in global value chains that often propel it to become more competitive (Sampath, 2016). Industrialization also increases the capabilities for advanced technological uptake and usage, as well as innovation that results in increased productivity. Industrialization is underpinned by a high level of manufacturing activity (Sampath, 2016; Xu & van Leeuwen, 2016). Maddison (2008) asserted that manufacturing often results in remarkable changes in the structure of a country's economy, leading to sustained growth and improved general living conditions for its populace. The central objective of this study is to conduct an investigation into factors that characterize the nature of the industrialization process in the Mpumalanga province, with the aim of reviewing the process and recommending mechanisms for accelerating industrialization in the province.

2. Background

The industrialization process of Mpumalanga can be traced from historical events in South Africa's industrialization processes. South African development, according to the Mpumalanga Economic Growth and

Development Path Policy document (2011), occurred in three phases: The first phase is defined as the agriculture phase, taking place around the early 1600s to about 1868; the second phase was known as the era of agricultural mining, dating back from mid-1860s to late 1930s; and the third phase was defined by agricultural mining industries, which occurred around the late 1930s to around the early 1990s. The different stages of development in South Africa occurred during the era of colonization by Afrikaans and English-speaking people in 1652 and 1820 respectively (McMichael, 2016). The two groupings were in control of economic and political power until 1948, the time of Afrikaner nationalism when political power was transferred to a grouping with domestic interests, as opposed to colonizers whose interest lay in developing the countries of their origins and who exploited the resources of colonized countries. The political power transfer to a grouping with domestic interests paved the way for the contemporary industrialization of South Africa (McMichael, 2016). The era of Afrikaner nationalism, which dates back to 1948, promoted an industrial base that largely hinged on mining and related industries (Marks, 2016; Chang, 2002). The South African economy, according to Fine & Rustomjee (1997), is still based on what they refer to as the minerals-energy complex (MEC) approach to industrialization. They pointed out that the MEC approach to industrialization presents a challenge in that policy design assumed an exclusionary posture, tailored to benefit a minority during the apartheid era. The apartheid industrial policies, according to Chang (1997), perpetuated an inefficient industrial structure.

The brunt of South Africa's industrial policies under the apartheid period and the country's isolation by the international world continued to be felt in the post-apartheid era (Roberts, 2007). According to Roberts (2000), the isolation of South Africa through imposed sanctions meant that South African firms could not participate in the global economy, which resulted in a thriving manufacturing sector purely for domestic markets. Chabane, Goldstein and Roberts (2007) asserted that apartheid industrial policies created the dominance of big business and they have, to a great extent, shaped the industrial structure. The dominance of large firms, which received subsidies from the state, resulted in the demise of small- to medium-sized enterprises (Marks, 2016). According to Joffe et al. (2005), the industrial environment under the apartheid regime was highly uncompetitive, owing to high import tariffs, a lack of incentive dispensation for improving productivity, minimal investment in human capital, due to government policy to disempower the majority, and a lack of investment in modern technology. Chang (1997) held that the apartheid industrial dispensation would not have survived long, had it not been for South Africa's endowment of natural resources. Roberts (2007) further pointed to the success of the apartheid state in meeting skewed objectives at the back of interventionist policies, in as far as its establishment of an industrial base in targeted sectors, which were in the main linked to mining and energy. The state-owned enterprises were an important vehicle to achieving those objectives.

The current phase is referred to as the global agriculture-mining industrial-technological phase, which began in the mid-1990s. According to the *Socio-Economic Review and Outlook of Mpumalanga* (SERO) (2014), South Africa experienced an economic crisis in the 1990s, which saw the GDP falling, investments rates dwindling and negative export growth of goods and services. Exports were heavily based on mining and mineral products, with an overvalued exchange rate. The external capital account had long displayed signs of distress and was in deficit for a decade. Tariffs and incentives were tailor-made to suit the protection of domestic industry. All of the above resulted in poverty, inequality, high unemployment and low productivity, which necessitated the shifting away by South Africa, during this fourth phase, from its stance of promoting an inward, domestic-protected economy, and a move instead towards integration with the global economy. This required diversification and opening up. The move to integrate into the global economy saved South Africa from the imminent de-industrialization that was already looming by the early 1990s. The performance of the South African economy since 1994 has been mixed. According to SERO (2013), GDP growth rates accounted for around 3 percent in 2003 and 4.5 percent in 2004, with GDP per capita growth rising from only 1 percent to about 3 percent. The performance reflecting growth took place in the context of critical structural changes in the economy of South Africa. The restructuring took place at a time when the traditional tradable sectors of agriculture, mining and manufacturing were undergoing a decline. Kusi (2002) pointed out that the participation of South Africa in the global economy was carefully planned, with trade liberalization taking place in phases, aided by a variety of industrial measures and policies that were designed to stimulate productivity and increase exports. The country managed to take advantage of the opportunities in global markets, because of well-planned policies.

According to Loots (2001) and Bernstein (2016), South Africa had hoped to receive high levels of foreign direct investments (FDI) when it entered the global economic stage but this did not occur because political instability at the time created uncertainty among potential investors. The transition period also saw a decline in fixed investment as a percentage of GDP but this improved significantly to about 20 percent of GDP between 1994 and 1996 (Bernstein, 2016). The transition period also witnessed a decline in important manufacturing subsectors. Trade was the main driver in the globalization process of the country's economy, despite the decline of the manufacturing sector, which was already manifesting in the years that preceded the democratic era (Chang, 2002). Industrialization of the economy started to gain momentum in the early 1990s and even though there were low investment levels, the export of manufactured goods 'increased by an annual average of 6.7% between 1990 and 2005, up from 2.9% in the preceding two decades' (Manuel, 2007: 12). Evidence shows that, post-1994, there has been diversification in South African exports, which reflect a departure from over-reliance on the mineral-energy complex. Fine and Rustomjee (1997) held a different view, asserting that the MEC is still a feature of the South African economy. Their assertion is also backed by the fact that resource oriented sectors continue to dominate manufacturing exports, even though, according to the MEGDP (2011), the share of manufacturing exports of resource based sectors declined from over 75 percent in 1994 to 61 percent in 2006. The State took the decision to promote the automotive industry and it has been the most important source of manufacturing export growth and diversification in South Africa, post-1994. This was achieved through an industrial policy strategy instrument, called the Motor Industry Development Program (MIDP), in 1995. While the new government has been pursuing industrialization since 1994 and put in place policy instruments that were sector focused, such as the Integrated Manufacturing Strategy (IMS) and Advanced Manufacturing Technology Strategy (AMTS), it did not have a comprehensive approach to industrialization. A National Industrial Policy Framework (NIPF), however, was introduced in 2007.

The Mpumalanga Provincial Government developed the PGDS and the SDF as a Constitutional requirement, with a five-year horizon, and these documents were reviewed in 2008. While the PGDS had a chapter focusing on economic growth and development, it also concentrated on other elements, such as governance, social development, justice and sustainable development in general. The recession that hit South Africa during the last quarter of 2008 and most of 2009, saw the national government introducing the New Growth Path (NGP) policy document in 2010, providing a plan on how to mitigate the effects of the recession, by building on existing policies such as the National Industrial Policy Framework. The NGP focuses on economic growth in general but reinforces the NIPF in that it spells out priority industries for achieving growth in South Africa. The Mpumalanga government customized the NGP and developed a provincial, dedicated economic policy document called the Mpumalanga Economic Growth and Development Path (MEGDP) in 2011. Like the NGP, the MEGDP defined the industries that could grow the economy of the province. The pillars of the MEGDP are Human Capital Development, Rural Development, Infrastructure Development and Production/Beneficiation. The MEGDP further outlined plans to be realized to support these pillars, which are the Human Development Strategy for human capital development, the Comprehensive Rural Development Plan, the Infrastructure Master Plan, for infrastructure development, and the Industrial Plan for Production/Beneficiation. The support plans are all at different stages of development. What is important to note is that the province will have a dedicated policy framework for industrialization and this research is intended to enrich Mpumalanga's industrialization process.

Industrialization: According to Kuznets (1973), the term refers to the economic structural changes in an underdeveloped country in its development process, through its shifting from an agrarian to industrial economy, with manifest improvement to society's standard of living. Warmington and Wells (1962) defined industrialization as the exchange of power-driven machinery for handicraft methods of production. This definition is narrow, in that it only focuses on mechanization, while the concept of industrialization extends beyond this. A definition by Yesuf (1996) also reflects a narrow view, defining industrialization as the process of accelerated institutionalization of manufacturing techniques in a predominantly rural and technologically backward economy. While industrialization largely involves manufacturing industries, it goes beyond manufacturing and even covers service sectors. Adrian (2000) asserted that industrialization is often characterized by the substitution of farming with the extraction of resources by manufacturing and service activity.

The MEGDP (2011) defines industrialization as the process of transforming socio-economic conditions of a society from a pre-industrial to a pro-industrial society. It is further defined as part of a broader modernization dispensation that links social transformation to economic development, through the deployment of technology and innovation, resulting in high-tech industries with economies of scale. Rodan (2016) defines industrialization as the process of building up a country's capacity to process raw materials and manufacture goods, either for consumption or for further production. Uwubanmwun (2002) defined the industrialization process as the act of developing a nation's capacity, within its borders, to produce products that are ready for the end user. The industrial process would involve the capacity of a nation to produce raw materials; its capacity and expertise pertaining to producing intermediate products required in further production; its ability to fabricate machines and tools essential for the manufacture of desired products; and its development of requisite skills to operate, maintain and reconstruct machines and tools. The scholar further asserted that the industrialization process involves the use of appropriate skills to manage production factories as well as organize the production process.

Industrialization as an economic growth strategy: According to Pitelis and Teece (2016), most developing nations view industrialization as an economic strategy that is vital for achieving economic growth and transforming the structure of an economy. They further outlined some of the factors that would enable industrialization to thrive. These include abundance of resources, logistics, availability of skills and adaptable labour at a reasonable cost, favorable political and legal environment and general ease of doing business (Pitelis& Teece, 2016, Szirmai, 2012). The economic growth and development of any country hinges upon the industries established within that particular state (Rodan, 2016; Sheng, 2016). Literature reveals that industrialized countries are associated with a high level of development and this aspect was confirmed by Rodrik (2000), when he asserted that countries with a larger manufacturing base were more economically advanced than those without. According to Rodan (2016), industrialization is an important strategy to attain faster rates of economic growth. He further asserted that countries that are highly industrialized tend to be better equipped to address socio-economic conditions, such as unemployment. The benefits and contribution of industrialization in a pursuant region to economic growth and development are well documented as an increase in income, wealth creation, output and employment (Sheng, 2016). Rodan (2016) asserted that industry has a profound influence on almost all economic sectors, including agriculture, which explains the tendency to consider industrialization as a key economic indicator for growth; underdeveloped nations consider it a top priority. While industrialization is desirable, it must also be noted that difficulties arise with its introduction, although in many cases these are outweighed by its benefits (Pitelis& Teece, 2016). The industrialization process in some parts of the country has led to serious degradation of environmental assets, with South Africa cited among the leading nations regarding environmental pollution. Mpumalanga contributes significantly to this, due to its mining activities and further processing of minerals. It is imperative that industrialization takes place in a way that promotes sustainable development (Rodan, 2016).

3. Methodology

This is a qualitative study that employed a semi-structured interview schedule, which encouraged informal conversation and enabled researchers to cover certain themes and questions that might not have been covered in structured interviews. The researchers selected a sample size that was representative of the population, which assisted him in drawing conclusions. The sample consisted of 20 divisional and operational managers, drawn from a population of eight large firms, five government departments, five state-owned entities, three district municipalities and three chambers. The researchers undertook thematic content analysis to examine the data that was collected and the work was segmented into different themes with objectives. The researcher transcribed the recorded material and read the transcripts repeatedly, then summarized transcripts and developed matrices.

4. Analysis and findings —the role of government and industry in industrializing the province

The main theme of the data is the role of government and industry in industrializing the province. The following were the sub-themes:

- The cost and ease of doing business;
- Sustainable resource utilization;

- Environmental assessment;
- Critical industrialization enablers; and
- Rural and township industries.

Government is fundamental in creating a platform for industrialization to take place in the province. Interviews conducted reveal that there is much that needs to be done in order to create a platform for attracting investment to Mpumalanga. This entails putting in place certain fundamentals, which are discussed in detail in this section.

The cost and ease of doing business: The study discovered that the cost of doing business in the Province of Mpumalanga is quite high, due to inefficiencies in business regulation on the part of government. An interviewee from one of the major forestry companies had this to say:

Acquiring business rights in the province is such a cumbersome process, as you have to go to different government offices, across spheres of government, which may even deter investors. There is a need to have a one-stop shop, where one can get everything under one roof.

Most of the interviewees from industry and the business formations in the province cited this aspect as a major challenge and recommended the idea of a business help-desk or a one-stop shop centre to mitigate this challenge. One interviewee mentioned that obtaining a business license took too long in Mpumalanga and other business rights, such as EIAs and water use licenses, could even take up to two years. The issue of municipal by-laws was cited as another challenge, particularly for industries that have cross-boundary operations. The by-laws were not standardized, resulting in different requirements for doing business, which can affect production output and further industrialization opportunities. Industry proposed a situation where there was a process to streamline and standardize the by-laws of municipalities. On the aspect of the cost of doing business, the study discovered that it is generally expensive in the province; the major challenge cited was energy costs, which raise the cost of production. The reality of high-energy costs brought another aspect to the fore — that of assessing the ability of the green economy sector to relieve this challenge in the future. It was discovered that the initiatives linked to the Green Economy were dispersed across the province, which does not bode well for the development of the critical mass necessary for capability development and competitiveness. On the high cost of electricity, one interviewee had this to say:

The advocated increase in tempo of mining coal and its consumption for electricity generation for short-term economic development should be viewed with circumspection.

There are opportunities to promote renewable energy initiatives, such as solar geysers, biogas digesters and other biofuels, which could promote local work opportunities. This also promotes the creation of industries in the green economy space, which can contribute to further industrializing Mpumalanga. The predominant industrial subsector of focus appears to be biofuels-based renewable energy (including biomass conversion). The rationale for this is based on the competitive advantage of agricultural production in the province. There is no clear rationale for the proposal of non-biofuels-based renewable energy initiatives, such as wind and solar energy. The province has relatively low levels of annual solar radiation and wind power potential. Certain localized biofuel projects have been set up, with the possibility of involving cooperatives in rural areas. However, there is no vision for the development of a biofuels industry, based on innovation capability. Another issue, mentioned by industry that makes it difficult to do business in the province, is land availability for business purposes. It has been discovered that municipalities in the province are disposing of suitable business land by selling it to private developers, who are mostly in real estate and developing for residential purposes. Industry has registered concern about this aspect and pointed out that municipalities need to ring-fence and acquire more land for business purposes. Industry has suggested that government introduce incentives in the form of reducing tariffs (energy, water and rates costs), as incentives play a major role in attracting investments. The study also discovered that government was perceived by industry as over regulating and it was mentioned that it prohibits industry from increasing production, thereby limiting prospects for further industrialization. The researcher posed the question to an interviewee: 'What is your view on compliance monitoring and enforcement by authorities?' The answer was:

We are concerned, as industry, about the compliance costs; we spend a lot of money on compliance and this can be directed at expanding production, which will create more jobs for the people of the province. Government has

to regulate and monitor compliance, particularly on environmental matters; the challenge is with over regulating. Government needs to create a conjunctive environment for industry to thrive and not the opposite.

Sustainable resource utilization: The government respondents interviewed pointed out that it was important for industry to exploit natural resources in the province in a sustainable way that was not harmful to the environment. It was found that industry, in the quest to maximize profits, tended to neglect the aspect of conducting their activities in a sustainable way. The study also discovered that, while Mpumalanga was one of the leading provinces for natural resources, it was losing its dominance in some mineral deposits, including coal. An interviewee asserted that Limpopo's coal production was now ahead of that of Mpumalanga. It must be noted that, as mentioned earlier, most of the power stations are in Mpumalanga, which means that coal will flow from Limpopo to Mpumalanga, confirming that there will still be opportunities for beneficiation in coal related industries, thus presenting an opportunity for further industrialization in Mpumalanga. An interviewee said, when asked if there were opportunities for further industries leveraging on the petro-chemical industrial activities, looking at the resource profile of Mpumalanga:

Of course, there are further opportunities. We have done our studies and they show us that we can still operate for another 40 years with the coal available in the province, hence we have taken a view to rejuvenate our technologies and create a smart city in the town we operate in, so we will attract all expertise from all over the world to reside here.

The researcher was struck by this statement, which confirmed an earlier assertion by another interviewee that some mineral deposits were dwindling in the province. In economic terms, 40 years is not a very long time, therefore there is a need to start thinking critically about alternative industries when these deposits are depleted. Structural change in the economy can occur over a period of at least 15 to 20 years and, therefore, aggressive industrialization needs to begin now. The study further discovered that coal is not the only mineral deposit that is dwindling in the province, but gold and other minerals, including nickel, diamonds and precious stone, are suffering from depletion. Gold mining has substantially decreased in the province, with several mines having closed down in the Barberton, Lydenburg and Pilgrim's Rest areas. This has resulted in job losses and the gradual demise of the towns that used to host these activities. Mpumalanga recently witnessed the shutdown of the only manganese company in the Lowveld, and a Highveld steel business. The shutdown of the two giant companies may not be solely attributed to dwindling deposits but to difficult global economic conditions. The slowdown brought about a balancing act that resulted in a shift of focus from manufacturing and investment to consumption and services. There was also a decline in prices for oil and other commodities, as well as a negative effect on emerging market economies, due to a fiscal tightening by the US.

The industrialization process of the province will have to bear in mind the difficulties experienced by global financial markets. The closure of the companies mentioned builds a strong case for diversification and further industrialization, in order to mitigate the challenges wrought by job losses and joblessness. Government will need to play an important role in protecting the natural assets of the province from being over-exploited. An interviewee emphasized the need to curb illegal mining, which deprives government of valuable taxes. The study discovered that illegal mining is a common practice and results in raw materials being taken out to the country and being of benefit elsewhere. According to a few interviewees, about one third of the trucks on the roads in the platinum belt, north of Mpumalanga, are transporting minerals that have been illegally mined. These practices result in overexploitation of resources.

Environmental management: A situational analysis of the natural resources of the province already indicates that they are stressed, with water of gravest concern, followed by loss of biodiversity and soil. Water is not only essential for all forms of life but also for industrial development. The study further found that industry players as being one of the most significant global challenges recognized climate change. One interviewee mentioned that industrial activities in the province release carbon emissions into the atmosphere. Representatives from industry indicated that they were shifting towards cleaner technologies to mitigate environmental impact. Other industry players around the Highveld, where there is a concentration of industrial activities, also emphasized that they were shifting to cleaner technologies. It is therefore essential that correct and appropriate land use planning and environmental sustainability appraisals are undertaken at different levels, both strategically and at the project level, by means of Strategic Environmental and

Environmental Impact Assessments. The development and gazettement of environmental frameworks must continue and it should be encouraged that all municipalities instigate Integrated Development Plans. Biodiversity is irreplaceable and is a cornerstone of tourism. It must be considered a key element in future land-use practices. Total cost accounting could be considered when comparing industrial development options.

The issue of water quantity and water quality was raised by industry players as being a major concern with regard to the expansion of industrial activities throughout the province. It was discovered that agriculture, mining and manufacturing were the largest water users in the Mpumalanga. The mining industry does not only utilize vast quantities but also affects the quality of water. The most significant impacts on water quality are as a result of mining, malfunctioning sewage treatment works and soil erosion from various practices, especially agriculture and urban and rural development projects. Effluent quality from sewage works can be managed and rehabilitation technologies for mining must prevent acid mine drainage. The study further found that some mining houses and other related industries are committed to taking measures to ameliorate the effects of mine acid drainage, by purifying this water for industrial use. An interviewee from a big mining company with a global footprint had this to say about purifying groundwater for re-use and mitigating the effects of acid mine drainage:

We understand that water is a scarce resource in this area and we purify the ground water for re-use, and we are negotiating with municipalities around the area, so we can sell them the excess water at a minimum cost to recover our expenses. We use membrane technologies to deal with the effects of acid mine drainage and the technology is expensive, but we do it because we are a responsible corporate citizen.

It was also discovered that there is much uncontrolled construction activity over the wetlands, which interfere with the water system, and industry players pointed out that government needs to manage this aspect, as the EIA process is a responsibility of the State. The preservation of wetlands is critical for the industrialization process of Mpumalanga, as they are crucial water sources.

Critical industrialization enablers: During interviews, industry players stressed that the role of government was critical in industrializing the province. The government of Mpumalanga is aware of this and is signing partnership agreements with industry and business chambers. The provincial government has signed agreements with most of the big industry players, including Sasol, some mining houses, South African breweries and business chambers, and more agreements are to be made in due course. These partnership agreements require all spheres of government and private sector to work collaboratively for maximum impact, with joint planning and collaboration on resources. These formalized agreements require parties to commit resources in order to attain results in four targeted development areas, namely human capital, infrastructure, rural and increased production/business. A forum comprising industry, government, associations, chambers and labour oversees this work. This partnership is expected to address the question that the researcher posed to respondents from industry about the role government is expected to play in order to unlock further industrialization. The question generated many answers, including that government needs to fix road and rail networks, sort out the issue of land claims, relax regulatory burdens, build supplier parks and light industrial hubs, and maintain and install new bulk infrastructure, among others. It was interesting to note that most industry respondents revealed that they were willing to expand production and this holds prospects for increasing employment. The drawback was that certain fundamentals that were not in place in Mpumalanga. This partnership claims that industry needs to work with government and contribute in all the areas cited, to limit the prospects on further industrialization. Industry needs to participate in skills development, infrastructure and rural development, among other aspects. This will assist the province to industrialize at a faster pace.

Rural and township industries: The study established that a large percentage of the population in Mpumalanga is rural and industrialization of the rural nodes will be critical to both socio-economic development and rural-to-urban migration. Rural industrialization involves measures and initiatives that encourage new and existing enterprises to locate to rural nodes, away from urban areas. This requires efficient logistics links with urban nodes and the development of rural corridors is therefore crucial. In general, the proposed strategy for rural industrialization in the province involves the development of active links between priority rural nodes, with industrial centres of competence for business flows, technology transfer and capacity development. Previous investigations revealed weak institutional capacity in rural

nodes, resulting in limited success for rural development programs. This was attributed to a dearth of clearly defined investment opportunities, targeted labour force development programs and technology transfer and business support mechanisms. Urban nodes provided the only realistic, short-term institutional support.

4. Mechanisms for industrializing the province

A number of mechanisms for industrializing Mpumalanga emerged during the study and are summarized in this section. There is a need to implement the centres of competency model, which will see the establishment of three technology parks in the three regions of Mpumalanga. This form of industrialization will provide targeted support for particular regions, which leads to leveraging of government investment in key technology drivers for the diversification of the industrial base. The proposed Technology Parks will need to have embedded R&D and technology transfer capabilities, modeled around similar developments in other developing economies. These Centres of Competence would be further enhanced through targeted industry-university partnerships to establish advanced training and technology transfer facilities, development of skills infrastructure in the FET-network to support infrastructure expansion projects and the leveraging of National Skills Fund and SETA funding to build dedicated technology training centres. One particular opportunity for such a dedicated technology-training centre is linked to the gasification of the province, both for retrofitting of aging power plants and for energy supply for domestic and industrial use. The Rovuma and other gas fields of Mozambique provide a major industrial opportunity for developing an industry sector aligned to manufacture, installation and the maintenance of gas distribution infrastructure.

The need for the development of a higher education institution or faculty in eMalahleni, which is dedicated to mining and minerals engineering, has been identified. This could be achieved through a partnership between the new University of Mpumalanga and the existing Tshwane University of Technology campus, as well as the major industrial companies in the region. Capable business enhancement infrastructure will be critical to the attraction of enterprises and the proliferation of new enterprises. In addition, the marketing and leveraging of supply contracts, based on preferential trade agreements and development obligations, will become a central driver for these centres of competence. The development of a Centre for Entrepreneurship within the proposed eMalahleni Mining Technology Park has been identified as a key driver for SME development to support the mining industry. This development can be achieved in a relatively short time, as part of the Department of SME's program of developing centres of entrepreneurship in several locations across the country. This could be based on successful models implemented within BRICS partner countries. The development of a Metals Manufacturing R&D Centre, as part of the proposed Middelburg Metals Manufacturing Technology Park, would create an enabling environment from which to develop a metals manufacturing industry that can participate in high-technology supply chains. This centre would need to have links with other R&D centres based in Gauteng, including CSIR Materials Science and Manufacturing, to shorten the development trajectory. The proposal will be premised on the number of strategic metals manufacturing projects, such as specialized steel castings for the nuclear build program, in partnership with existing local foundries and new investors linked to the nuclear and oil and gas infrastructure programs. Similarly, the development of a Forestry R&D Centre, linked to the University of Mpumalanga, would create an enabling environment for the expansion of the forestry sector and would further enhance and diversify its beneficiation capabilities.

The aforementioned would provide a number of strategic industrialization platforms for launching technology-intensive industrialization projects. These include biomass conversion plants, downstream chemicals beneficiation for the production of chemical products, development of cold chains for increasing fresh fruit exports, beneficiation of agricultural produce, the manufacture of mining instrumentation and equipment and the expansion of high-value agriculture production, among others. Mpumalanga is a rural province and previous industrialization strategies failed because they ignored the integration of rural economies into the development agenda. The centres of competence model takes cognizance of this aspect and will allow a structured integration with rural development nodes, creating supply chains within which small enterprises can participate. The ongoing massive rural transport network, as espoused in the National Transport Master Plan, will need to be implemented in order to realize this integration. Agro-processing and the gas industries were discovered to present immediate opportunities for further industrialization. Partnerships between the government and private sector are crucial. While the province had signed a few

partnership agreements with four big companies, it was even more important to sign these partnership agreements with all the bigger industry players for accelerated industrialization, as the collaboration of resources will have more impact.

The mechanisms for industrializing the province also include its determination to resolve the challenges discussed in this study, in addition to the skills problem, which has been discussed extensively. The province will need to resolve the challenges of the cost, ease of doing business by establishing a one-stop shop for acquiring business rights, and provide incentives to attract more investments, including a reduction in charges for electricity, water, rates, and taxes. The regulatory function would have to be carried out by government in a manner that does not prejudice business. For example, the timeline for issuing of EIAs should not exceed four months. There is a need to standardize by-laws in municipalities across the province and to regulate the overexploitation of minerals and exports of raw materials, to create local benefits and create employment. The province will need to roll out critical infrastructure in order to unlock the industrialization potential of Mpumalanga and this includes the expansion of the rail and road network, the deployment of industrial facilities and broadband infrastructure. A commitment by the province to resolve these challenges and the implementation of the centre of competency model will accelerate Mpumalanga towards an industrialization trajectory.

Recommendations: Industrialization is aimed at developing globally competitive industries, which continuously improve and innovate to respond to market demands. The development and support of industrial clusters and their capabilities for knowledge flows, innovation and diversification are therefore key pillars of the industrial development process of the province proposed by this research. The State is central in creating a conducive environment for industrial development, yet it is unclear whether it is playing its role; the literature did not reflect an active state, nor did the interviews with industry players. The study determined that the policy role of the State makes it an important institution in development. This study therefore recommends focused research on the role of the State and its relationship with other role-players in development, including industry, labour, social formations and international players, among others. The study on the relationship should focus on the issues outlined in this study, including skills development, industrial financing and regulatory burden.

The study found that there are opportunities to increase production and further industrialize but the extent to which this can happen remains unclear. The study further discovered that the province has a range of natural resources, some of which leave as raw materials and this limits local beneficiation. The study suggested that government introduce a policy to heavily tax the exportation of raw materials, however, it is unclear as to how much production can increase if most raw materials are to be beneficiated in the province and how many more jobs can be created. Ferrochrome is a case in point. It is imported to China and returned to South Africa as finished product, meaning that jobs are created in China. There is a need for a future study that looks at the production capability of the sectors of the provincial economy. The research needs to examine processes for cooperation between government and industry, prerequisite policy instruments (innovation, R&D and incentives) and available business opportunities. Finally, the study findings make an important contribution to the understanding of the structure of the economy of Mpumalanga and the mechanisms for industrialization. The study proposes model of industrialization that takes into account the rural characteristics of the province and all the factors required to make industrial development a success, such as skills development, incubation of SMMEs, innovation and R&D, which all relate to the development of industrial capabilities.

References

- Adrian, B. (2000). Industrialization and Economic Development. *Journal of Geography*, 4(4), 44-66.
- Bernstein, H. (2016). Land in South Africa after Apartheid. In Hann, C. M. (Ed.), *When History Accelerates: Essays on Rapid Social Change, Complexity and Creativity*. London: Bloomsbury.
- Chang, H. J. (1997). *Evaluating the Current Industrial Policy of South Africa*. Cambridge: University of Cambridge.
- Chang, H. (2002). Breaking the Mould: An Institutional Political Economy Alternative to the Neo-liberal Theory of the Market and the State. *Journal of Economics*, 5(1), 77- 99.

- Fine, B. & Rustomjee, Z. (1997). South Africa's Political Economy: From Minerals Energy Complex to industrialization. Johannesburg: Wits University Press.
- Joffe, A., Kaplan, D., Kaplinsky, R. & Lewis, D. (2005). Improving Manufacturing Performance in South Africa. Cape Town: University of Cape Town Press.
- Kusi, N. (2002). Trade Liberalization and South Africa's Export Performance: Trade and Industrial Policy Strategies. Retrieved from: <http://www.tips.org.za/files/567.pdf> (Accessed 24 March 2016).
- Kuznets, S. (1973). Modern Economic Growth: Findings and Reflections. *The American Journal of Economics*, 7(5), 99-117.
- Loots, E. (2001). Globalization, Emerging Markets and the South African Economy (1). *South African Journal of Economics*, 70, 123-132.
- Maddison, A. (2008). Contours of the World Economy. Oxford: Oxford University Press.
- Manuel, T. (2007). Economic Policy and South Africa's Growth Strategy. Retrieved from: http://www.treasury.gov.za/comm_media/speeches/2007/2007031901.pdf (Accessed 24 March 2016).
- Marks, S. (2016). 36 Towards a People's History of South Africa? Recent Developments in the Historiography of South Africa. *People's History and Socialist Theory*. Oxford: Routledge Revivals.
- McMichael, P. (2016). Development and Social Change: A Global Perspective. New York: Sage Publications.
- Pitelis, C. N. & Teece, D. (2016). Dynamic Capabilities, Developmental Industrial Strategy and the Strategic SCA of Nations. *Developmental Industrial Strategy and the Strategic SCA of Nations* (March 21, 2016). Retrieved from <http://dx.doi.org/10.2139/ssrn.2749110>
- Roberts, S. (2000). Understanding the Effects of Trade Policy Reforms: The case of South Africa. *South African Journal of Economics*, 68, 607-638.
- Roberts, S. (2007). Patterns of Industrial Performance in South Africa in the First Decade of Democracy: The Continued Influence of Minerals-Based Activities. *Transformation*, 65, 4-34
- Rodan, G. (2016). The Political Economy of Singapore's Industrialization: National State and International Capital. Singapore: Springer.
- Rodrik, D. (2000). Institutions for High Quality Growth: What they are and How to Acquire Them. *Studies in Comparative International Development*, 35, 66-77.
- Sampath, P. G. (2016). Sustainable Industrialization in Africa: Toward a New Development Agenda. Sustainable Industrialization in Africa. London: Palgrave Macmillan.
- Sheng, L. (2016). Explaining US-China Economic Imbalances: A Social Perspective. *Cambridge Review of International Affairs*, 7, 1-15.
- Smith, T. (1985). Requiem or New Agenda for Third World Studies. *World Politics*, 37(4), 550-571.
- Szirmai, A. (2008). Explaining Success and Failure in Development. *UNU-MERIT Working Paper Series*, 20(3), 46-60.
- Szirmai, A. (2012). Industrialization as an Engine of Growth in Developing Countries, 1950-2005. *Structural Change and Economic Dynamics*, 23(4), 406-420.
- Uwubanmwun, A. (2002). Development of industry and manufacturing. In: M.A Iyoha and C.O Itsede, Nigeria economy: Structure growth, and development. Benin, Nigeria: Mindex Publishing.
- Warmington, W. A. & Wells, E. A. (1962). Study in Industrialization in Nigeria and Cameroun. Oxford Press. Retrieved from: www.questia.com (Accessed 24 March 2016).
- Xu, Y. & Van Leeuwen, B. (2016). China in World Industrialization. *China Economist*, 11(6), 98-109.
- Yesuf, M., Mekonnen, A., Kassie, M. & Pender, J. (1996). Cost of Land Degradation in Ethiopia: A Critical Review of Past Studies. *Cambridge Review of International Affairs*, 7, 168-180.