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A Case in the ICT sector

Tengetile G Hlophe*[1] and Thula Sizwe Dlamini[1]

*Correspondence: hlophetengetile@separc.co.sz

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Harnessing the Demographic Dividend to Fast-Track Industrialisation: A Case in the ICT sector

Tengetile G Hlophe[*1] and Thula Sizwe Dlamini[1]

[1]Eswatini Economic Policy Analysis and Research Centre, Mbabane, Eswatini

[*]Correspondence: hlophetengetile@separc.co.sz

Abstract

Eswatini ranks very low in the Global Competitiveness Index (GCI). Conceivably, this draws from the fact that Eswatini is a consumer of goods and services produced from outside the economy. In this paper, we use data from the GCI, International Telecommunications Union (ITU), and Global Innovation Index (GII) to argue that Eswatini should focus its industrial policy towards the creation of tacit productive capacities amongst SMEs in the manufacturing sector to drive large-scale industrialisation. The paper shows that by doing this, Eswatini will position herself to be a leader in the manufacture of industrial goods in the region and in the long-term be able to attract foreign investors to the country. In particular, the study analyses panel data of 5 African countries to illustrate that manufacturing in the ICT sector could contribute to increased economic growth, particularly if targeted towards technologies that are in high demand among the youth- such as smartphones, laptops, and other similar gadgets. The paper juxtaposes its main treatise with Africa's youth bulge and shows that with every 1% increase in the youth population there will be a 4.79% increase in the adoption and usage of ICTs by the youth. This suggests that there is an opportunity for the country to anchor its industrial policy on the production of those technologies that are in high demand amongst the youth. The key message in the paper is that building tacit knowledge and skills in the manufacturing of high technology products could reduce youth unemployment, attract foreign investments, and create opportunities for industrial development and industrialisation. The paper concludes with some considerations for industrial policy in Eswatini.

Keywords: ICTs, Industrial Policy, Manufacturing, Industrialisation, Tacit Knowledge, Productive Capacity.

1.0 Background

Eswatini like other countries in the region is increasingly recognising the need for robust industrialisation strategies to drive development. The country has launched a number of strategies including the recent Kingdom of Eswatini Strategic Roadmap 2019-2022 which emphasises economic recovery. The strategy realises that investment in the manufacturing sector and information communication technology are necessary to ignite growth in Eswatini. At the heart of the strategy is the need to provide an enabling environment for the private sector to thrive and for SMEs to drive industrial growth (GoE, 2019). However economic recovery has been rather slow in the country, with gross domestic product (GDP) recording marginal growth rates of 1.3% in 2016 (CBE, 2017). Not surprisingly, then, youth unemployment is also high at 47.4% (LFS, 2016). This has given rise to the need to find fresh ideas on how the country could benefit the youth and get all the dividends that come with a youth bulge. Indeed, as Ponelis & Holmner (2015: 164) emphasize, "the youth bulge in

Africa can result in a demographic dividend only if the majority of young, working age adults can find productive employment."

With a growing literature on information communication technology (ICT) and its role in economic growth (Vu, 2011; Jin & Cho, 2015; Jorgenson & Vu, 2016), this study considers the underlying benefits of a growing ICT sector to industrial development and a potential for locally manufactured goods and services. In this paper, we juxtapose trade and the adoption of information communication technologies (ICTs) and internet usage statistics to argue that there is a growing demand for ICTs in Africa. Instead of increasing the imports of ICT technologies, we argue that African countries including Eswatini are better off focusing efforts on creating ICTs manufacturing enterprises, to create the tacit productive capacities needed to fuel industrialisation, provide employment opportunities to the youth, and improve economic competitiveness.

Given that Eswatini has a high youth unemployment, alongside low economic development, manufacturing presents an opportunity for economic growth and job creation. However, very few studies have shown empirically, the potential gains from harnessing Africa's demographic dividend. Moreover, whereas other countries are expanding manufactured export based on cheap labour developing countries are still struggling to compete in innovation and technological development (Lall, 2000); which has contributed to low growth. Therefore, the study seeks to understand the potential for innovation and industrial development in Africa and determine the contribution of a growing youth population to the development of an ICT manufacturing industry. The overall objective of the paper is to demonstrate opportunities for the development of effective industrial policy.

The paper has five sections. The following section presents existing literature on innovation and industrial development. The purpose of the section is to show the link between skills and economic competitiveness. Section 3 presents the method of analysis. Section 4 presents the results and discussion and the last section is the conclusion and recommendations.

2.0 Literature Review

2.1 Innovation and Industrial Development

The ratification of a variety of economic strategies by African Union member states bares testimony to the urgency African leaders have placed on the need to industrialise and improve the wellbeing of the people, especially the youth. The African Continental Free Trade Agreement (AfCFTA), promises to support greater industrial development on the continent, whereas the SADC industrialisation strategy 2015-2063 emphasises the creation of pockets of industrial activities in the region. However, the continent still faces many challenges, which are making it difficult for member states to kick-start industrialisation. To be clear, institutional, regulatory, and legal constraints coupled with infrastructural deficiencies, *inadequate professional skills*, and *limited access to financing* is hindering the industrialisation agenda (Amusa, Monkam, and Viegi, 2016).

In particular, funding constraints have led African states – Eswatini included - to rely heavily on foreign direct investment (FDI) and foreign aid for development (Amusa *et al*., 2016: 1). Consequently, most African countries have invested heavily on FDIs friendly policies to the detriment of domestic firms. Confounding the skills development ambitions of the continent is that a significant share of research on FDIs in Africa suggests that most local firms are having difficulties in developing backward and forward linkages with multinational corporations (MNCs). The studies show that a general challenge is that usually the products that MNCs produce have no demand locally (Narula & Pineli, 2016; Hansen, Buur, Kjaer, &

Therkildsen, 2015), which tends to affect the dynamicity of the private sector in these countries. Hence, local industrialisation efforts in many countries have been faulted and resulted to minimal benefit.

Although globalisation offers a potential for industrial development, the sharing and transfer of knowledge across organisational and national borders is inherently difficult (Lam, 2006:2). This is because knowledge transfer is not innate in industry or diplomatic partnerships but also relies on the availability of indigenous innovative potential, modern institutions and governance structures, and conducive innovation systems (Fu, Pietrobelli, & Soete, 2010) to implement the technical properties connected to the new knowledge. Lam (2006: 2) argues that a large part of the emerging scientific knowledge and technological capabilities is tacit and embedded in local innovation networks and scientific human resource. Fu, Pietrobelli, & Soete, (2010) posit that the increased use of external sources of knowledge correlates with a decrease in internal research and development, which affects the potential for innovative industrial development in a country. This is mainly because knowledge is a foundational component of the innovation process (Hana, 2013) as it enables the acquisition and diffusion of technology.

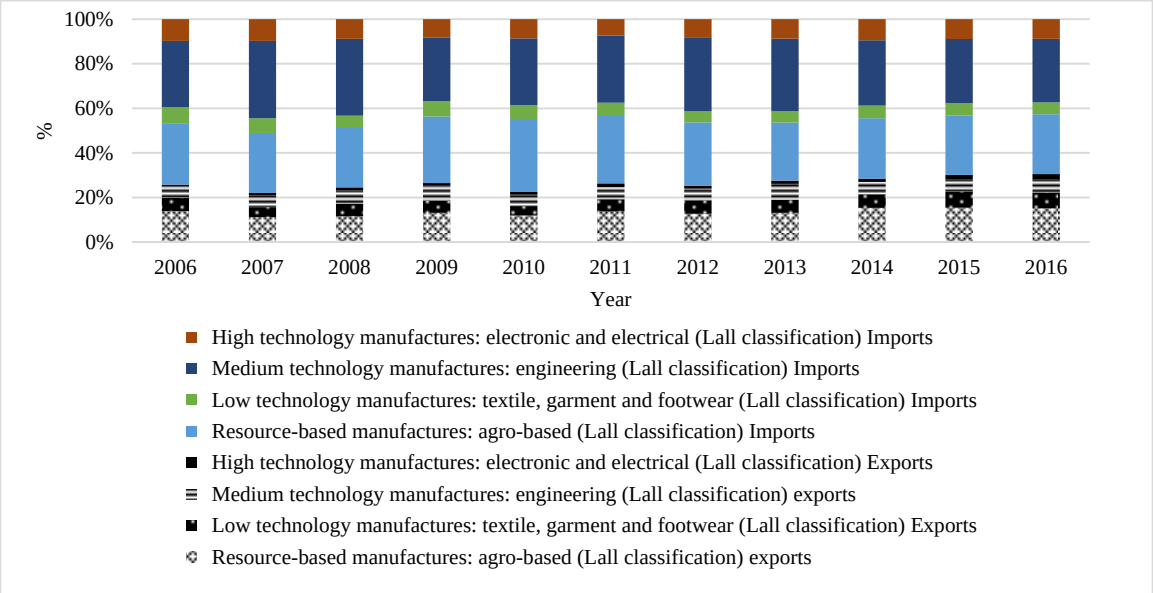
2.2 Manufacturing and Tacit Knowledge Creation

Banga and te Velde, (2018) contend that over the years Africa's development has been largely characterised by a de-industrialisation, with the share of manufacturing in GDP hovering around 10% or lower for most countries. Moreover, the export of goods and services from the continent is still very low with manufacturing value add even lower. This suggests that the continent needs to engage in productive transformation to be able to use the manufacturing sector as an engine for growth. Productive transformation literature highlights the important role of productive capabilities in determining the products and technologies that firms and countries can produce - with ease ((Hausmann, et al., 2011). In addition, development is increasingly seen as a country's ability to use industrial policy to harness the scientific enterprise and use it to eliminate basic social challenges. Indeed, as Khan (2010) observes "development is fundamentally about learning to use modern technologies to create jobs and prosperity." In this sense, manufacturing companies matter because they help in the acquisition of new technologies; facilitate the process of learning how to use them; and enhance their diffusion in different sectors. Moreover, manufacturing presents an opportunity for countries to produce technology for domestic consumption, export and also provide new technologies to other sector of the economy. However, since learning involves the absorption of tacit knowledge – 'the learning that cannot be learnt in manuals but has to be acquired through learning-by-doing' - it can only be achieved by doing (Khan, 2010).

Moreover, Mowery & Oxley, (1995) concurr that countries benefit from inward technology transfer only through strengthening their absorptive capacities. Empirical studies have shown that local technological capabilities have been critical in industrial innovation and competitiveness for many countries (Sun & Du, 2010). Firm's absorptive capacities and technological acumen leads to better performance, improved product development and profitability (Tzokas, Kim, Akbar, & Al-Dajani, 2015). Amakom (2012) illustrates that export driven manufacturing could be one way of stimulating economic development in developing countries through the "learning by exporting hypothesis". This puts emphasis on the argument made by Fu, Pietrobelli, & Soete, (2010), and Sun & Du, (2010) that the path of importation–imitation–absorption–assimilation–original innovation is a valid one for developing countries, especially in Africa.

However, while Africa's demand for high value manufactured goods doubled over the past years (represented by imports) the continent's capacity for manufacturing (represented by its level of exports) stayed pretty much the same (see Fig. 2.2.1). In addition, Figure 2.2.1 shows that the export of high technology goods is the least growing against low intra-regional trade. Using panel data from 34 countries Demir, (2018) has shown that high technology exports have a positive impact on economic growth, while medium technology exports have a limited impact and low technology exports have a negative impact. But what is obesrved in most african countries is the opposite as Figure 2.2.1 shows that there is a high export of low technology and resource based products, which does not have a significant contibution to economic growth. Therefore, even if labour intensive manufacturing creates more opportunities for employment; high technology and skill intensive manufacturing continues to be on demand and contributes to industrial competitiveness.

Figure 2.2.1: Import and export of manufactured products in Africa

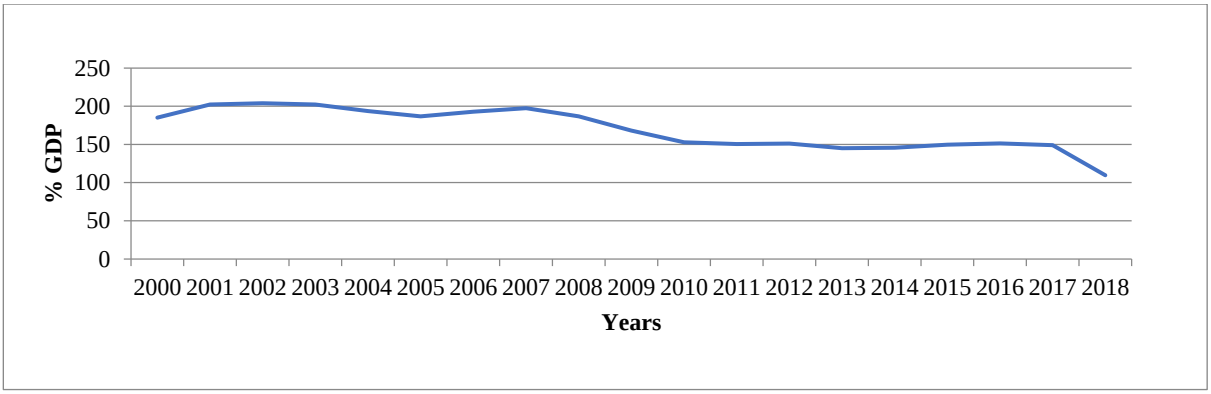


Source: Authors' representation using data from the UNCTAD

Notes: The diagram shows the import and export of manufactured goods in the African continent

Morever, Figure 2.2.2 shows that manufacturing value added in the SADC region is rather declining, even though research has demonstrated that manufactruing value added can largely be a source of poverty reduction through employment creation and income generation especially for developing and emergining economies (UNIDO 2016). This has been shown to result to sustained eocnomic growth.

Figure 2.2.2: Manufacturing value added in the SADC region



Source: Authors' representation using data from the World Development Indicators 2018

Notes: This diagram illustrates manufactruing value added as a % of GDP in for countries in the SADC region

Therefore there is a need to focus on the development of industrial policy that will lead to the deliberate generation of tacit productive capacities within the region. The implication is that African countries would have to be involved in the actual manufacturing of goods and services to develop the most important yet missing ingredient for industrial development in the region: tacit knowledge. This is especially important when one considers that although Africa is growing, the growth has not translated into meaningful improvements in manufacturing and productive capacity.

Considering that "technological progress is not a force of nature but reflects social and economic decisions" (Atkinson, 2015:3). There is a need for African states to make difficult productive choices today to launch an industrialising path. Indeed, the productive choices made today can influence the pace of technical change including the development of tacit productive capacities to kick-start industrialisation in Eswatini. Therefore, there is need to make targeted investment in the development of a strong base of pan-African enterprises and in the funding of research and development (R&D). Moreover, the decision of creating pan-African enterprises has to be forward-looking. Creating pan-African start-ups in manufacturing will not only help in employment creation for the youth; in the long-term, it will enable African states to develop the set of competences required to attract other firms to the region including producing goods that are in high demand on the continent.

2.3 ICTs, Inclusive Development, and the Demographic Dividend

An overabundance of literature (Ning, 2009; Vu, 2011; Luo & Bu, 2015; Hodrab, Maitah & Lubos, 2016) has shown a positive relationship between ICTs and economic growth. ICTs add value to industrial productivity; enhance performance of different economic sectors, enables ease of doing business, information access and sharing, and integration into the global economy. Through a panel data analysis, Jin & Cho (2015) demonstrate that a country's ICT capacity has an effect on its economic development. ICTs are able to help a country attain economic growth through their ability to foster innovation and technology diffusion, enhance the quality and effectiveness of decision making in households and businesses, and reducing production costs which increases demand and investment (Vu, 2011).

To shed light on the impact of ICT on economic growth in Sub-Saharan Africa, Albiman & Sulong (2016) show that mobile phone subscriptions and internet access triggered economic

growth during the period 1990-2014 in 45 Sub-Saharan African countries. The Global System for Mobile Communications Association (GSMA) reports that Sub-Saharan has the fastest growing mobile market, with a penetration rate of 43% in 2016 (GSMA, 2017). The Report also documents that the mobile industry contributes 7.7% to GDP in Africa (GSMA, 2017). With the penetration rate at 43%, there is no doubt that the demand for ICTs in the continent is growing alongside an increase in the adoption of new technologies and ICT devices.

Furthermore, investments in ICT have been proven to have spill over effects to other sectors of the economy such as agriculture, transport and manufacturing of other commodities (UNIDO, 2016). Waema & Miroro (2014) show that ICT in Kenya has led to poverty reduction through increasing incomes as a result of improved efficiency in saving, enhancing people's knowledge of their surroundings, and influencing the adoption of innovative agricultural practices in communities. This signifies that outputs from ICTs have a great potential for inclusive human development, especially when directly addressing the needs of the people.

However, Asongu, Simplice, Roux, & Le, (2016) point out that while ICT penetration is becoming saturated in other countries, in Africa it still has great potential for development. The Eswatini Communication Commission records that whereas mobile subscriptions are increasing in the country, at 74% in 2017, to reach a digital future, the country needs to increase access to digital technologies and the internet (SCCOM, 2017). Then again UNIDO (2016) reported that the manufacture of radio, television and communication equipment were among the top eight manufacturing sectors which registered an increase in the share of manufacturing value add (MVA) worldwide, from 39.7% to 46.6% between 2000 and 2013. This demonstrates a potential for developing countries in the manufacturing of ICTs, yet, not even one African country appears in Statista's list of the world's 100 technology companies (Statista, 2017).

The demographic dividend presents ample opportunities for the development of ICT manufacturing firms in Africa. According to the World Economic Forum the Sub-Saharan Africa (SSA) region is the world's youngest region with more than 60% of its population under the age of 25 (WEF, 2017). Meaning that the future users and consumers of technology in the continent are budding, whereas opportunities in human capital development are also plenty. Subsequently, Meyer (2008), contends that firms with a younger working force have a higher propensity to adopt new technologies. Available scholarly evidence suggests that, like their counterparts in developed countries, the youth in Sub-Saharan Africa is also rapidly adopting new technologies, especially mobile technologies to meet their daily needs (Lesitaokana, 2016; Porter et al., 2012). This is creating an increasing demand and hunger for the use and application of ICT technology products in other areas of an individual's life. The creation of smart applications to ease farming, transport, queuing for services and delivery and access to different utilities and amenities is demonstrating the potential of ICT, and the fourth industrial revolution is also leaving no stone unturned. The growing population of youth in Africa therefore, presents opportunities for growing and expanding industrial activity in Africa's manufacturing sectors.

3.0 Methodology

The purpose of the study is to demonstrate opportunities for the development of effective industrial policy that will foster the creation of tacit productive capacities, create employment, and harness Africa's demographic dividend. This is a policy discussion paper that uses data sourced from various reputable sources.

The study uses data from the 2018 and 2017 Global Competitiveness Index (GCI), 2017 Global Innovation Index (GII), United Nations Conference on Trade and Development (UNCTAD) and the International Telecommunications Union (ITU), to understand innovation and sophistication factors of some African states within the SADC and COMESA regions, to provide an idea of where African countries source the ICTs consumed in the region and understand ICT adoption in Africa. Data is analysed and presented through tables and figures while empirical evidence sourced from various studies and a panel data analysis of 5 African countries (Mauritius, Burundi, Ethiopia, Uganda, Zambia) between 2000 - 2016 is used to anchor the key findings and recommendations of the study. The countries were selected on the availability of time series data for the selected indicators.

The study applied the pooled mean group estimation (PMG)/Auto Regression Distributed Lag (ARDL) model to estimate the following equation for different age groups. The Panel Unit Root Test was conducted to test for stationarity while the Pedroni Residual Co-integration and Kao Residual Co-integration Tests were employed to test for co-integration. The tests showed that there exists a long-run relation between the variables at significance level 1%. Following Rahimi & Rad (2017), Kim & Byeongseon (2016), and Salahuddin & Alam (2016) however using ICT adoption (IA) and usage and modifying the population variables and including telecommunication imports instead of internet, the paper estimates four equations for the ICT adoption model (see equation 1).

$$lnIA_{it} = \beta_{10} + \beta_{11} lnGDP_{it} + \beta_{12} lnTEL_{it} + \beta_{13} lnYP_{it} + \varepsilon_{it} \qquad (1)$$

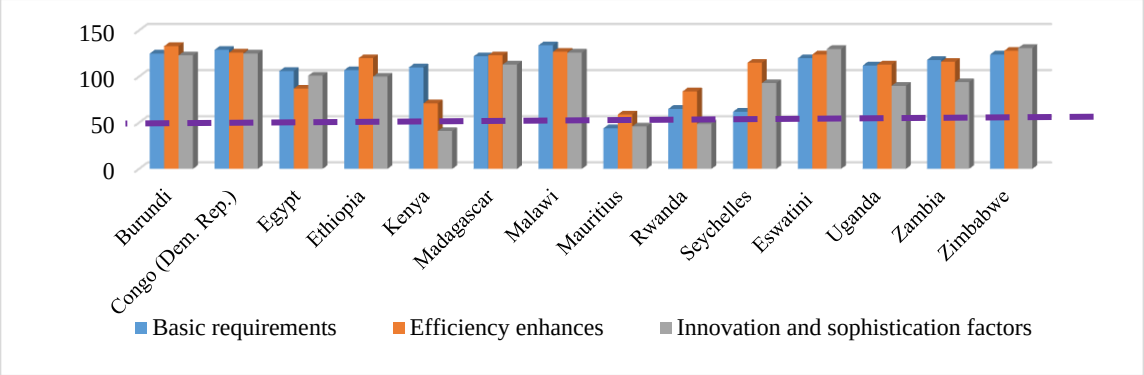
Where, ln denotes the natural logarithm; $i = 1, \dots, N$ for each country in the panel, and $t = 1, \dots T$ refers to the time period. β_{nm}, are parameters to be estimated (n runs from 1 to 3, denoting each equation and m runs from 1 to 4 denoting parameters of a particular equation), IA denotes ICT adoption which is represented by mobile subscriptions, GDP denotes GDP in constant 2010 US$, TEL denotes telecommunication imports, YP denotes the young population (0-14 years), while other age groups considered were; the youth population (15-34 years), the middle aged population (34-64 years), and the old population (65 and above). Equation (1) was repeated to produce separate results for the 4 age groups.

4.0 Results and Discussion

4.1 Innovation and Sophistication Factors

In terms of innovation and sophistication factors, Africa ranks very low compared with the developmental aspirations of the continent. Currently, most African countries have a low ranking on basic requirements, efficiency enhancers, and innovation and sophistication factors of the Global Competitiveness Index (GCI) (Fig. 4.1.1). Only Rwanda (49), Mauritius (46), and Kenya (41) ranked below 50 out of 137 countries on innovation and sophistication while a bulk of the countries, for instance, ranked above 90 with 5 countries ranking above 120 out of 137 countries in 2017 -18 GCI (Fig. 4.1.1). Moreover, even those states that ranked 50 and below out of the 137 countries on innovation and sophistication factors still performed poorly on efficiency enhancers - suggesting a lack of sound and well-functioning factors of production and product markets, and an absence of a vibrant innovation ecosystem.

Figure 4.1.1 Ranking of COMESA States in the Global Competitiveness Index

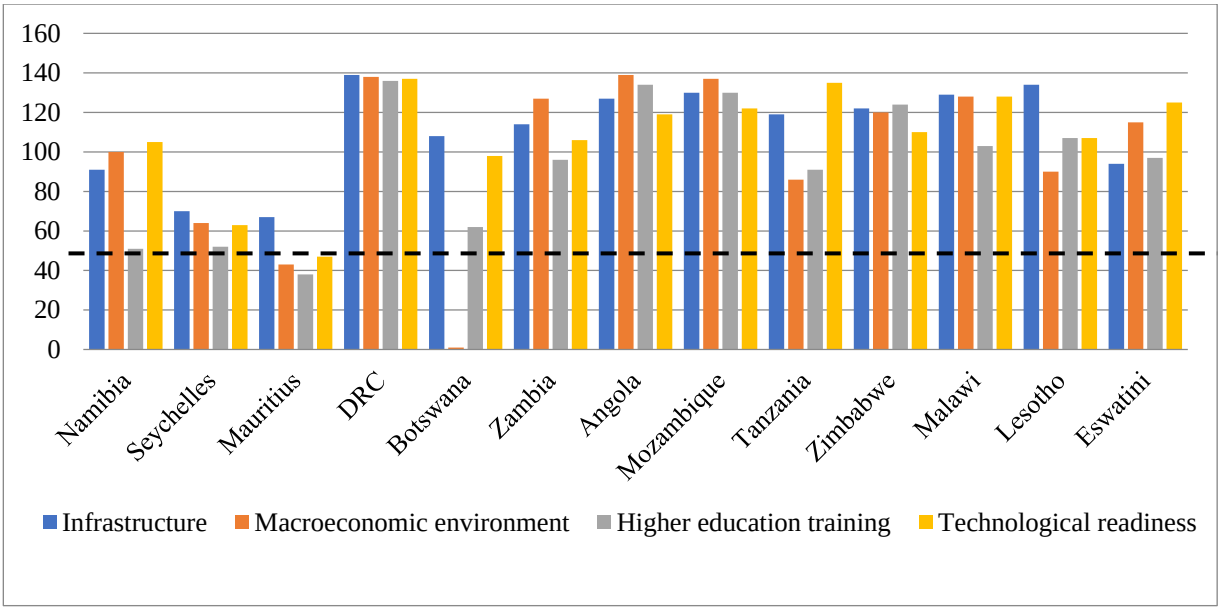


Source: Authors' representation using data from the Global Competitive Index 2017 – 18 Edition.

Notes: The Figure shows that only three countries (Rwanda, Mauritius, and Kenya) had a ranking of 50 or better out of 137 countries, suggesting very low competitiveness.

Whereas past efforts have focussed on improving the education system, particularly increasing funding into higher education and infrastructure development, minimal effort has gone towards building robust pan-African enterprises that can compete at the global level. Similarly, the investment made into infrastructure and higher education has not translated into any actual output in as far as the competitiveness of these economies is concerned (Newman, et al., 2016). The GCI (2017-18) show that Africa is performing poorly in as far as infrastructure and higher education are concerned (see Fig. 4.1. 2). For instance, Eswatini ranks below 100 in the Global Competitiveness Index 2018 on Institutions and Infrastructure, but it is still struggling to increase its innovation capability. The Global Innovation Index (GII) (2017) ranks most African countries above 50 out of 127 countries. The low ranking on economic competitiveness and innovation means that African states are unable to attract the kind of investment it needs to develop a robust industrial base.

Figure 4.1.2. Ranking of SADC States on infrastructure, Macroeconomic Environment, Higher Education and Training, and Technological Readiness Pillars of the Global Competitiveness Index



Source: Authors' representation using data from the Global Competitive Index 2018 Edition.

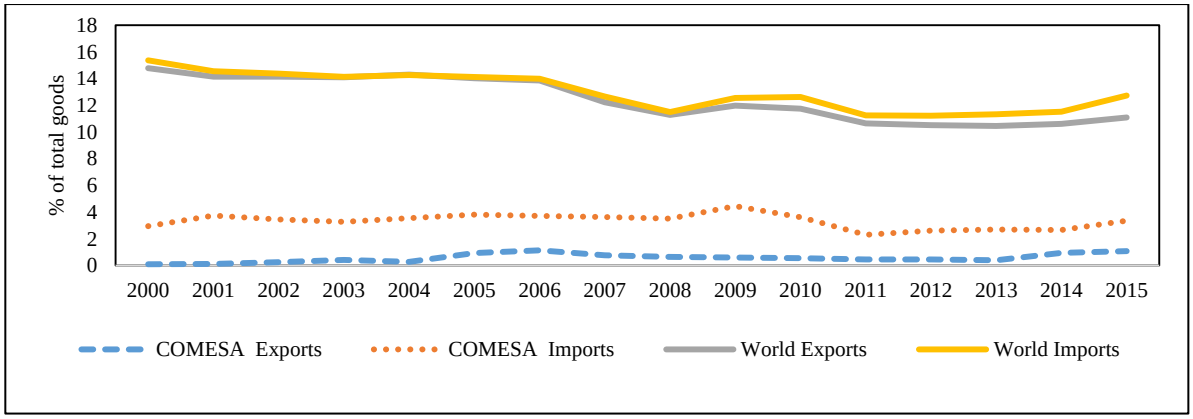
Notes: The figure shows that none of the countries ranked 50 or less out of 140 countries in infrastructure while only Mauritius (ranked below 50) had a technological readiness ranking of below 60 (shown by the horizontal dotted line).

So what can be done to kick-start industrialisation? Alternatively, what should be done to develop a strong manufacturing base and the knowledge needed to sustain the industries therein? We turn to this next.

4.2 Information Communication Technologies (ICTs) and The Youth Bulge

Figure 4.2.1 shows import and export data of ICT goods in the COMESA region compared to the rest of the world. The graph demonstrates that COMESA imports more than it exports in ICT goods and services. Figure 4.2.1 also illustrates that while the number of exports and imports show an increasing trend in recent years, imports for ICTs have skyrocketed at the back of a demographic transition that has opened a window of opportunity in the region. The figure shows that although COMESA's ICTs exports grew from 0.55% of total exports in 2010 to 0.89% in 2015, technology imports stood at 3.35% of total imports into COMESA in 2015.

Figure 4.2.1: The import and export of ICT goods from 2000 - 2015

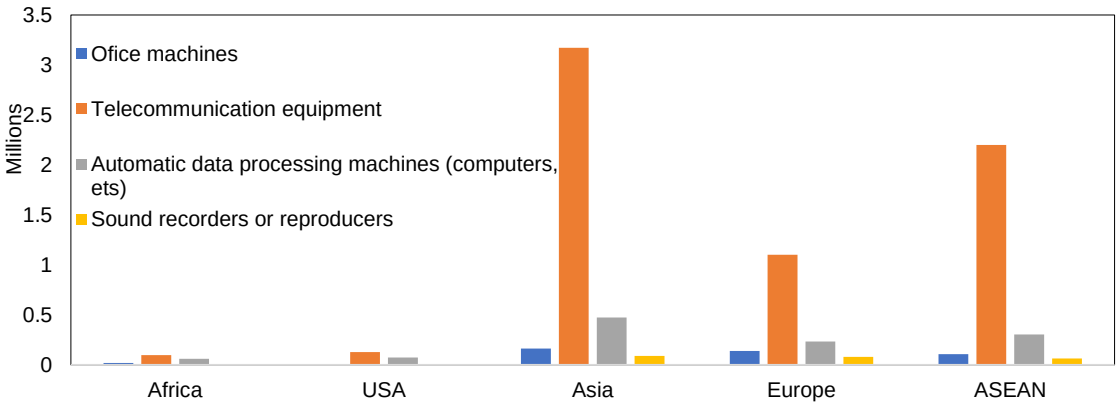


Source: Authors' representation using data from the World Development Indicators 2018.

Notes: ICT goods are those that are either intended to fulfil the function of information processing and communication by electronic means, including transmission and display, OR which use electronic processing to detect, measure and/or record physical phenomena, or to control a physical process.

Moreover, while the continent is an emerging significant consumer of ICTs, to supply the growing demand for ICTs in the continent, African countries are increasingly reliant on international markets. Figure 4.2.2 shows imports and country of origin data for some of the ICTs imported by countries in Africa. The figure shows that most ICTs such as telecommunication devices, equipment, and automatic data processing machines (which include computers and laptops) originated mostly from Asia and the ASEAN countries. There is only minute ICT technology trade within Africa.

Figure 4.2.2: Imports of selected ICT products by trading partner in 2016



Source: Authors' representation using Merchandise trade matrix 1995-2016 data from the UNCTAD

Notes: The diagram shows that most ICT technologies imported by African countries are from Asia, ASEAN region and Europe.

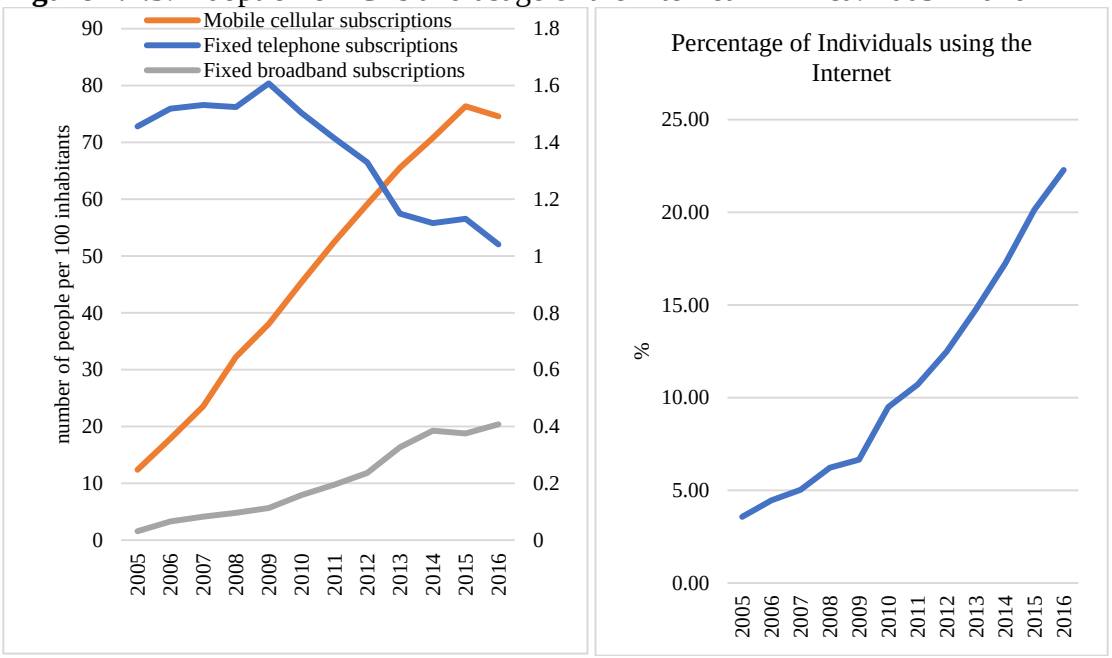
The pooled mean group estimation (PMG)/Auto Regression Distributed Lag (ARDL) model (Appendix 1) finds that youth population growth will have a significant impact on ICT adoption and telecommunication imports in the long run. The estimated long-run coefficient of the youth population is 4.79, which means that a 1% increase in the youth population will result in a 4.79% increase in the use and adoption of ICT (mobile subscription). The estimated long-run coefficient of telecommunication imports is 0.354, which means that a 1%

increase in the import of telecommunication devices and equipment will result in a 0.354% increase in ICT adoption. This means that there is a positive relationship between technology adoption and youth population growth emphasising the opportunities for ICT development in harnessing the demographic dividend.

Comparing the impact of different age groups the analysis also shows that the estimated long-run coefficient of the middle aged population will have a negative impact on ICT adoption, which means that a 1% increase in the middle aged population will result in a 3.80% decrease in mobile subscriptions. The young and old population were found to be insignificant. Consequently, the Pairwise Dumitrescu Hurlin Panel Causality Tests (Appendix 1) shows that an increase in the youth population, causes an increase in the import of telecommunication devices, economic growth and ICT adoption also impacts the youth. The study also concurs with literature that ICT adoption has a positive impact on economic growth while telecommunication imports does not. Thus if African countries continue to import more ICT technology than export it, it will have no significant impacts on gross domestic product.

In addition, Figure 4.2.3 demonstrates that the adoption of ICTs and usage of the internet in SSA is growing and following the adoption trends seen elsewhere in the world. This suggests that there is an opportunity for African states to anchor industrial policy on the production of those technologies that are in high demand amongst the youth in the region, such as ICTs. However, the GCI in section 4.1 demonstrates that Eswatini like most African countries currently has low tacit productive capacities in the manufacture of ICTs. The implication is that these countries will continue to import these technologies, while they present an opportunity for employment creation.

Figure 4.2.3: Adoption of ICTs and usage of the internet in Africa: 2005 - 2016



Source: Authors' own representation using ITU data, 2018.

Notes: The graphs show the adoption of ICTs and the Internet in Sub-Saharan Africa. The curve of the adoption of ICTs is shown by the graph on the LHS while the graph on the RHS shows the adoption rates of the internet in SSA. The graph shows that the adoption of the internet is growing and on an upward trend in SSA and that it had reached 22.6% in 2016, while ICTs excluding mobile

cellular telephones are still used by less than 10 people per 100 inhabitants (RHS see right hand side scale).

Decision makers need to introduce deliberate policy efforts geared towards building the productive capacities needed to start producing ICTs in the region. The SADC industrialisation strategy 2015-2063 begins to lay the foundation for ICT manufacturing in the region, and Eswatini should not be left behind. In this sense, industrial policy would have to prioritise the development of technological capabilities, for instance through technical and vocational education and training (TVET) which prioritises learning by doing. Whereas the prioritisation of investment in ICT hubs and incubators is a step in the right direction, there is a need to build more technology-based companies to support existing industries and venture into untapped fields including the conduct of R&D in ICT.

Everything considered, Africa and in particular the demographic structure presents strong evidence that without robust industries to create jobs and add value to raw materials, African youths risk remaining shackled by joblessness and poverty for a very long time to come. Therefore, deliberately establishing local high technology enterprises will help in the acquisition and diffusion of ICT knowledge and where possible reverse engineering of Western and Eastern technologies to create the needed capacities for industrial development. In addition, it will lead to the creation of the tacit knowledge required to produce ICTs that are in high demand amongst the youth and to help meet the goal of industrialising the country.

5.0 Conclusions and Recommendations

Africa has seen a decade of improved economic growth, which has brought new priorities such as sustaining the resultant momentum for development. However, there remain significant problems with youth unemployment and a lack of diversification of economic activities (UNECA, 2016; EBC, 2013) at the back of a demographic transition. Low economic competitiveness means that African countries are continually unable to attract the kind of investment that is required to create employment for their youths. Therefore, the biggest challenge facing the continent is to address the low levels of organisational capabilities that are increasingly affecting competitiveness and the ability to attract FDIs. In this paper, we explored the question of what should African states- including Eswatini do to increase levels of organisational capabilities, diversify the economy, fast track the creation of jobs that will benefit African youths, increase funding for R&D, and develop the competitive edge required to attract foreign direct investors into the region. The paper shows that for Africa to attain the preceding objectives, it needs to create tacit knowledge, which is attainable through learning by doing. To answer the question of where industrial policy should focus on, the paper used data from the GCI and GII to demonstrate that African states are better off focusing their industrial policy into the creation of tacit productive capacities in the manufacturing of ICTs, such as smartphones, laptops, and other similar gadgets. to harness the demographic dividend the study also demonstrated that the growth of the youth population presents opportunities for the increased consumption of such technologies.

6.0 Policy Implications

Given that for a very long time, the Eswatini and most African countries have relied on ICTs imported from outside the continent, it will be desirable for the country to

- Deliberately create and support enterprises in the manufacture of ICTs that are in high demand amongst the youth.
- Increase funding for R&D to support and sustain the industries therein with new knowledge.
- Developing and building ICT backbone infrastructure, including fibre and submarine cables
- Engage in mind-set altering programmes to change the mind-sets of Emaswati on the importance of consuming ICTs and other goods produced in the region – make consumers conscious of the role they have to play in industrialising the region.
- Strengthen regional collaborations to facilitate the identification and support of pan-African tech start-ups involved in the manufacturing of ICTs
- Enact sound regulatory policies and economic governance structures to complement skills development and infrastructure investment in the CFTA.

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Appendix 1: Econometric Model Results

Panel Unit Root Test Results

The variables were tested for stationarity using a number of panel unit root tests which included the Levin, Lin & Chu (LLC) test (Levin, Lin, & Chu, 2002) , Im, Pesaran, & Shin (IPS) test (Im, Pesaran, & Shin 2003), and Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1981). The table shows the results obtained from the LLC, IPS, ADF, and PP tests.

Test statistic	LLC		IPS		ADF		PP
Level							
Mobile subscription (per 100 habitants)	-10.1268 (0.0000)		-5.63536 (0.0000)		52.1938 (0.0000)		51.0640 (0.0000)
GDP (constant US$ 2010)	-2.98429	0.0014	1.18071	0.8811	8.74559	0.5564	3.40278 0.9703
Telecommunication imports (Total)	-1.78235	0.0373	-0.22471	0.4111	8.36203	0.5935	15.3446 0.1200
Young population (Total, 0-14 yrs)	-14.4084	0.0000	-27.5267	0.0000	790.330	0.0000	790.173 0.0000
Youth population (Total, 15-35 yrs)	0.85719	0.8043	3.17440	0.9992	2.43470	0.9918	22.3978 0.0132
Middle aged population (total 35-64yrs)	1.08673	0.8614	2.72375	0.9968	2.37740	0.9925	27.3046 0.0023
Old population (Total 65+)	1.10109	0.8646	5.15455	1.0000	0.64261	1.0000	0.41678 1.0000
First Difference							
Youth population (Total, 15-35 yrs)	-2.01868	0.0218	-1.77597	0.0379	18.5266	0.0467	10.0139 0.4393
GDP (constant US$ 2010)	-3.19951	0.0007	-3.15802	0.0008	27.3738	0.0023	27.0274 0.0026
Telecommunication imports (% goods)	-5.80290	0.0000	-6.31566	0.0000	51.3825	0.0000	64.3273 0.0000
Middle aged population (Total 35-64yrs)	-2.98331 (0.0014)		-1.20024 (0.1150)		15.1055 (0.1283)		18.9539 (0.0409)
Old population (Total 65+)	0.50803	0.6943	-0.44633	0.3277	12.3552	0.2620	18.6009 0.0456
Second difference							
Middle aged population (Total 35-64yrs)	-3.98706	0.0000	-3.11343	0.0009	26.4588	0.0032	27.9848 0.0018
Old population (Total 65+)	-4.41753	0.0000	-3.12039	0.0009	29.4330	0.0011	34.2944 0.0002

Pedroni Residual Cointegration Test Results

After applying panel unit roots tests, the Pedroni (2004) residual co-integration test was employed to find out whether there exists a long-run equilibrium relation between the variables. The results are shown below.

Panel co-integration statistic	Statistics	Probability
Within Dimension		
Panel v-Statistic	-1.308246	0.9046
Panel rho-Statistic	2.166642	0.9849
Panel PP-Statistic	-1.694162	0.0451
Panel ADF-Statistic	-2.464920	0.0069
Between Dimension		
Group rho-Statistic	2.768488	0.9972
Group PP-Statistic	-4.512592	0.0000
Group ADF-Statistic	-3.548894	0.0002

Kao Residual Cointegration Test Results

	t-Statistic	Prob.
ADF	-3.033068	0.0012
Residual variance	0.047391	
HAC variance	0.068815	

The two tests above indicate that there is a presence of co-integration among the variables in the model

Pooled Mean Group (PMG) Estimation Results

Dependent Variable: mobile subscription

Eq1: young population		**Eq2: youth population**		**Eq3: middle aged population)**		**Eq4: Old population**	
Regressor	Coefficient	Regressor	Coefficient	Regressor	Coefficient	Regressor	Coefficient
GDP	-8.251977*	GDP	0.327052	GDP	4.425740*	GDP	0.323222
Telecom.	2.467224***	Telecom.	0.353651***	Telecom.	1.804090*	Telecom.	1.108345***
young	9.247031	youth	4.792341***	middle age	-6.997067**	old	3.796807
Short Run Coefficients							
Error correction coefficient	-0.107194	*Error correction coefficient*	-0.288127	*Error correction coefficient*	-0.191325	*Error correction coefficient*	-0.213895
GDP	2.443859	GDP	2.850934*	GDP	1.381858	GDP	2.258786
Telecom.	-0.088536**	Telecom.	-0.015424	Telecom.	-0.137135	Telecom.	-0.082024*
young	-26.53997	youth	4.717351	middle age	-9.558516	old	-9.859221***
Intercept	9.803472	*Intercept*	-14.35065	*Intercept*	-11.87856	*Intercept*	-8.560603

Pairwise Dumitrescu Hurlin Panel Causality Tests

Null Hypothesis:	**W-Stat.**	**Zbar-Stat.**	**Prob.**
LGDP does not homogeneously cause LMOBILE_SUB	1.95496	-0.37761	0.7057
LMOBILE_SUB does not homogeneously cause LGDP	7.02137	3.13249	0.0017***
LTEL_IMP does not homogeneously cause LMOBILE_SUB	1.82592	-0.46702	0.6405
LMOBILE_SUB does not homogeneously cause LTEL_IMP	2.66074	0.11137	0.9113
LYOUTH does not homogeneously cause LMOBILE_SUB	2.51386	0.00960	0.9923
LMOBILE_SUB does not homogeneously cause LYOUTH	11.8597	6.48459	9.E-11***
LTEL_IMP does not homogeneously cause LGDP	3.41236	0.63210	0.5273
LGDP does not homogeneously cause LTEL_IMP	3.12392	0.43227	0.6655
LYOUTH does not homogeneously cause LGDP	7.39032	3.38811	0.0007***
LGDP does not homogeneously cause LYOUTH	15.3877	8.92884	0.0000***
LYOUTH does not homogeneously cause LTEL_IMP	7.26996	3.30473	0.0010***
LTEL_IMP does not homogeneously cause LYOUTH	2.50573	0.00397	0.9968