A DIAGNOSTIC MANUFACTURING COMPETITIVENESS STUDY:

CHALLENGES, PROSPECTS AND POLICY OPTIONS FOR TANZANIA

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BCI	Business Competitive Index
BOT	Bank of Tanzania
C2C	Cotton-to-Clothing
CCI	Current Competitiveness Index
CGE	Computable General Equilibrium
CIP	Census of Industrial Production
CIP	Competitiveness Industrial Performance
CTI	Confederation of Tanzania Industries
DEA	Data Envelopment Analysis
EAC	East African Community
EPZ	Export Processing Zones
EPZA	Export Processing Zones Authority
EU	European Union
FDI	Foreign Direct Investment
FGLS	Feasible Generalized Least Square
FYDP	Five Year Development Plan
GAMS	General Algebraic Modelling System
GCI	Growth Competitive Index
GDP	Gross Domestic Product
HH	Hirschman-Herfindahl Index
IMD	Institute for Management Development
I-O	Input-Output
IR	Inception Report
ISIC	International Standards for Industrial Classification
ISO	International Organization for Standards
M2	Broad Money
MCF	Marginal Cost of Funds
MECI	Manufactured Export Competitive Index
MICI	Microeconomics Competitiveness Index
MITI	Ministry of Industry, Trade and Investment
MPSGE	Mathematical Programming System for General Equilibrium
MVA	Manufacturing Value Added
MW	Mega Watt
NBS	National Bureau of Statistics
NIS	National Innovative System
ODI	Overseas Development Institute
OECD	Organization for Economic Cooperation and Development
R&D	Research and Development
RCA	Revealed Comparative Advantage
REER	Real Effective Exchange Rate
REPOA	Research on Poverty Alleviation
RULC	Relative Unit Labour Cost
SADC	South African Development Community
SAM	Social Accounting Matrix
SET	Supporting Economic Transformation
SIDP	Sustainable Industries Development Policy
STC	State Trading Corporation
TDU	Textile Development Unit
TFP	Total Factor Productivity
TIC	Tanzania Investment Center
TNBC	Tanzania National Business Council
TPSF	Tanzania Private Sector Foundation
ULC	Unit Labour Cost
UN	United Nations
Comtrade	United Nations Commodity Trade
UNDP	United Nations Development Program
UNIDO	United Nations Industrial Development Organization
URT	United Republic of Tanzania
VAPO	Value Added Per Output
VAPW	Value Added Per Worker
VAT	Value Added Tax
VETA	Vocational Education and Training Authority
WEF	World Economic Forum.
WPW	Wage Per Worker.

EXECUTIVE SUMMARY

Assessing competitiveness of such a dynamic sector as Manufacturing can be a daunting task, not least because of the various issues that need to be taken into consideration in its definition, measurement and profiles. This study has attempted to define and measure competitiveness of Tanzanian Manufacturing sector within a small set of indicators, and informed by the context of the study based on its Terms of reference.

Overall, we find that the level of Tanzania's manufacturing competitiveness has been improving gradually since 2007 in two ways. First, based on the Global Competitiveness Index (GCI), the Tanzania has been performing strongly in areas of macroeconomic environment and institutions. Second and more importantly, productivity within the industrial manufacturing sector has been improving, albeit at a small extent. However, in both of these aspects, our analysis identified areas where Tanzania has continued to perform poorly or factors holding Tanzania's ability to leap frog in competitiveness space. For instance, from the GCI, Tanzania scores low in innovation and sophistication factors, higher education and training. Furthermore, reflecting low export capacity, Tanzania is positioned among the bottom countries in our MECI estimation falling behind Rwanda and Kenya.

Assessment of competitiveness indices also show that, although Manufacturing is the most competitive of all the industrial sectors, the wage rate has recently been increasing rapidly, suggesting that the manufacturing subsector has been losing its competitive edge. While this general trend may be worrisome, some firms' characteristics are more revealing. In particular, we observed that exporting firms have lower unit costs and higher value added per worker compared to non-exporting firms. A similar trend is respectively observed for foreign ownership have lower unit costs than those owned by a national investor. Private owned firms had the lowest compared to public owned firms. We complement these results with those obtained from our productivity analysis (chapter 3) where firm characteristics such as exporting firm, foreign owned firm, private owned firms, large enterprise (firms size) and those providing training were found to have higher levels of, and improve firm productivity over time. In addition, by controlling for time invariant firm characteristics, we found that management experience and business culture may be the factors that enhance the productivity performance of these firms (foreign owned and exporting firms are case in point).

Apparently, trends and levels of productivity have differed by sub-sectors. Our findings show that computer, electronic and optical products, beverages and apparel industry were observed to have performed well in terms of unit labor costs and value added per worker, hence better candidate for targeted policy initiatives to further improve development of the manufacturing sector. Finally, and consistent with Diao et al (2018), productivity growth appears to be driven largely by the formal manufacturing sector compared to that of the informal sector where employment is rapidly growing and outpacing growth in value added) thus dragging down aggregate manufacturing sector productivity growth.

The last part of the analysis focused on identifying priority reforms and sectors for supporting and promoting manufacturing competitiveness. We used CGE analysis to assess differential impact of the various policy actions or reforms in order to identify those with highest influence in achieving the desired level of competitiveness. From the literature review and recent policy discourses in Tanzania, we identified a couple of policy areas in which policy action and reforms are anticipated to enhance Tanzania's level of productivity and competitiveness of her manufacturing industrial sector. These areas include reducing costs (including high rates of taxes and high energy costs), improving productivity through increased investment in skills, ICT and transport infrastructure; and enhancing agriculture productivity to support growth of the manufacturing industry.

Findings from the CGE analysis show that, increasing investment in infrastructure to reduce energy costs, improving transport services and harnessing innovation through ICT will have significant effects on competitiveness compared to reducing tax rates. Using a dynamic CGE model (where data was available), we also analyzed the long run impact of various policy actions including (i) investment in ICT (given the role of technology and innovation); (ii) investment in skills; and (iii) various types of tax heads on competitiveness. First, increasing investment in ICT yields a multiplier of three, meaning that, for every shilling investment in ICT it generates 3 shillings in economic return. Furthermore, a 10 percent increase in ICT investment increases manufacturing value added by 0.41%.

Second, increasing labour productivity through investment in skills generates the largest positive effects on competitiveness compared to the impact of investment in ICT or reduction in tax rates, reinforced the imperative of improving economy wide levels of productivity as a measure to improve competitiveness of the manufacturing industry.

Finally, while reduction in tax rates is generally good for competitiveness, the Government is likely to reap much larger positive impact on competitiveness through reducing corporate tax. More importantly, using the Marginal Excess Burden (MEB) or tax multiplier analysis, the findings show that for every Tsh the government lost in terms of corporation tax revenue, it generates 77 cents of additional GDP, compared to 13 cents and 42 cents for VAT and income tax rate cut respectively. This result is not surprising, as the literature is clear that corporation tax is more damaging to the economy than VAT since it is a tax on capital stock.

The policy options for promoting manufacturing competitiveness also involve strategic decision on which sector/sub-sector to select for prioritised Government support. We went through the exercise of identifying priority sector(s) by analyzing the production capacity (using Industry survey data) and export capacity (using ITC trade map database) of the manufacturing sector. Overall, the results show that, Textile and Garments, Food products and Tobacco as the top three sectors with most potential for Tanzania to gain dramatic improvement in her manufacturing competitiveness. Others in the top ten list include Quicklime, Chemicals, Fertilizers, Metal products, Fish fillets, plastics and rubber.

Based on the above findings, the study makes several broad conclusions and recommendations.

First, as the economy begins to achieve some structural transformation, market failures becomes more significant, requiring substantial government interventions. In the context of low income country such as Tanzania, such intervention would involve dramatic policy measures to reduce costs of production, improve productivity, and adopt business environment reforms that will support broader private sector development.

Second, owing to the fact that competitiveness will require policy actions in several areas and sectors, the current analysis has identified priorities for Government policy actions.

(i) Avoid taxing inputs and investments by reducing corporate income tax rate and simplifying the tax structure to reduce cost of production for productive sectors;

(ii) Increase investment in transport, power and ICT infrastructure to spur growth of value added (production) and innovation;

(iii) Select 2-3 sectors for active Government support through investment promotion, and direct support in their supply/value chain development. These include: Textile and garments, food processing, tobacco products, fabricated metal, rubber and plastics.

However, REPOA shall consult relevant policy actors in selecting the priority sub-sector of focus, for which a follow up consultations will be undertaken with sampled firms and representative industry actors to determine industry needs/views for achieving desired level of manufacturing competitiveness. Depending on the resources available, a follow up study could be organized to assess supply/value chain development in these sectors, and build business consensus (partnership) with industry actors in view of identifying actual prioritization and strategies from industry perspectives.

Third, as competitiveness is getting tougher across countries, constant learning from what works (or doesn't) elsewhere and what worked or didn't in the past is a critical ingredient for building Tanzania's competitiveness. The study identified three countries as potential for providing useful lessons for Tanzania. These are Botswana, Mauritius and Ethiopia. In particular, a set of lessons include building quality institutions to support the process of transformation, leveraging openness to attract FDI and harness trade agreements, safeguarding independence in decision making, and the importance of learning by doing. Although our assessment of lessons from successful countries was somewhat patchy, our findings are generally in congruency with those of previous country studies.

Fourth and finally, the policies and strategies to support future improvement of manufacturing competitiveness will depend on the extent to which the state-business relationship will be based on affirmative actions aimed at addressing key bottlenecks, and harnessing Tanzania's comparative advantages and the incipient structural transformation. In brief, it is all about political will around (a) Building trust, partnership and common national agenda between the State and the Industry; and (b) being action and results oriented.

1 INTRODUCTION

1.1 Background

Expanding manufacturing production and exports, and increasing their sophistication, can drive industrialisation and create much-needed jobs (Dirk Willem te Velde and Neil Balchin, 2017). Indeed, export-led manufacturing is the only proven model to drive economic transformation and boost employment (Balchin et al., 2017). Owing to this importance, manufacturing competitiveness has increasingly become a subject of analysis over the last decade. However, although attaining manufacturing competitiveness is ultimately an important policy objective for any country, economists have accepted competitiveness as multi-faceted concept without a single agreed definition, mainly as a result of difficulties in measuring it (Damiyano et al., 2012).

The literature is mixed up and no common definition of the term "competitiveness" since the use depends on the perspectives and context in which it is being used (Stallworth, H., 2016). Moreover, competitiveness can be measured at different national, industry or firm levels (Vignes and Smith, 2005). Following, Jaffe, et al. (1995) emphasize the need for a general equilibrium approach to evaluate competitiveness due to the complexity of the issue. Despite this conceptual challenge, increasing fierce competition implies the need for developing countries to step up efforts to improve competitiveness. Much more generally, assessment of manufacturing[1] competitiveness is instructive given the prevailing policy emphasis on promoting industrialization for economic transformation.

1 *Manufacturing sector is generic term that often times is mixed up with industrialization, but this is essentially because manufacturing is the aspects of the broader industrial sector. Other aspects of the industrial sector include mining and utilities (energy, water) sectors. Thus policies that prioritize industrialization must therefore give due emphasis on manufacturing sector for several reasons, most important of which is that, manufacturing enhances economic transformation.*

In terms of measurements, the different indicators and measurements only explain the situation of the sector at one point in time, or relative to other sectors or countries. For convenience, we refer this as "static approach". The big question is then – so what? This question is legitimate because the policy makers are less interested with diagnostics that identifies challenges but those which proposes a solution for achieving the desired level of competitiveness. Identifying solutions requires assessment of various policy options for achieving the stated policy objective. Thus, assessment of competitiveness should aim at identifying strategies and policy options for achieving the desired level of competitiveness. We refer to this as "dynamic approach" to assessing competitiveness.

This report provides the results of a diagnostic study on manufacturing competitiveness in Tanzania, which aimed at assessing the challenges, prospects and policy options for achieving the level of competitiveness needed for supporting industrialization drive in Tanzania.

1.2 Objective of the Study

The general objective of the study is to assess competitiveness of the Tanzania's manufacturing industry in order to identify key factors and recommend policy options for attaining higher levels of competitiveness required to support industrialisation. The specific objectives are to: 1) review the policies for enhancing manufacturing competitiveness; 2) estimate the indices for measuring the level of Tanzania's manufacturing competitiveness; 3) Identify factors determining manufacturing competitiveness; 4) conduct policy analysis of various options for improving manufacturing competitiveness; and 5) propose recommendations.

1.3 Approach and Structure of the Report

Following this section, section 2 provides an overview of the manufacturing sector within the prevailing policy context of industrialization drive in Tanzania. Our analytical work begins in section 3 by assessing the current level/status of manufacturing competitiveness in Tanzania by using various indices. Such analysis is key as it provides the 'baseline' in terms of where the outcomes of future policy initiatives to improve competitiveness will be gauged. However, identification of policy measures for improving competitiveness can only be effective if it is based on systematic analysis of factors affecting (or empirical determinants of) competitiveness based on Tanzanian circumstances. Such analysis is conducted in section 4 by using firm level data to identify key drivers of firm productivity.

Our final empirical analysis in section 5 goes a step further to identify policy options that have greater chances of pushing Tanzanian manufacturing competitiveness to a higher level. Using a CGE analysis, we simulate impact of different policy action to evaluate which has greater potential for increasing competitiveness, and based on that, we develop projections of the increase in that competitiveness in the future (2040).

The remaining two sections of the report aim at developing recommendations for policy based on the above analyses and the feedback from industry. Specifically, we identified a sub-sector or industry that appears to be most competitive and with highest levels of productivity to form a case study for consultations with industry actors. The objective is to solicit feedback from the industry (and private sector more generally) on which of the identified policy actions augurs most effectively with their views of how to unlock potential for greater competitiveness in that sub-sector or industry. The results of this feedback are summarized in section 6. Finally, section 7 summarizes the study findings in terms of key messages and recommendations.

2 OVERVIEW OF THE MANUFACTURING SECTOR IN TANZANIA:

THE POLICY AND ANALYTICAL CONTEXT

2.1 Historical Perspectives

Industrialization in Tanzania has been characterized by the changing role of the state and the private sector. During the mid-1960s, the private sector was the main driver of industrial development, before the State took lead between 1967 to mid-1980. The adoption of the economic reforms in 1986 onwards included increased reduced role of the state and increased role of the private sector in the running of commercial and productive activities of the economy, including the industrial sectors.

At the time Tanzania attained independence, the country's industrial sector development was very poor, characterized mainly by primitive structure. The sector employed about 1% of the total population, contributed 4 percent to total country's GDP (Skarstein and Wangwe, 1986) and was dominated by agro processing and a few low value added-manufacturing activities (Gray, 2013). This performance was attributed to the division of priority sectors under the then EAC integration, which meant industrial activities, were more concentrated in Kenya due to its relatively more developed infrastructure and with more matured private sector (Rweyemamu, 1973). The Three Year Plan (TYP) 1961-1964 and the first Five Year Development Plan (FYDP I) guided the direction of the industry where investment was prioritized to the areas with promising quick returns and a good business environment in terms of exercising low degree of regulations and providing tax incentives. As a result of these efforts, the Industrial sector output grew more rapidly, although the sector's overall contribution to GDP remained at 6%, below the expected 10% (Rweyemamu, 1973).

Following the Arusha Declaration of 1967, the focus of the State led industrial development (that included nationalization of the major means of the economy) was on bridging the gap between industrial development and rural development. Tanzania's manufacturing firms could only buy from and sell to State Trading Corporation (STC). The public sector's contribution to GDP increased from 5% in 1966 to 32% in 1973 (Rweyemamu, 1973). This performance was coupled with improving manufacturing sector's value added and share in GDP. The 1973 Finance Act gave the government full power in controlling foreign exchange market leading to appreciating real exchange rate (Lipumba and Kasekende, 1991). The oil crisis in 1970's and the Kagera war destroyed the economy with the manufacturing inputs and goods experiencing shortages (Msami and Wangwe, 2016).

The calamities of the oil crisis and Kagera war led to the period of Structural Adjustment from 1986 onwards, which aimed at economy wide liberalization and opening up the economy to external world. Price control was abolished, regulatory controls were reduced, and the private sector role to the economy was encouraged. However opening up the economy led to de-industrialization with 22 out of 24 textile industries closed (Msami and Wangwe, 2016). In 1996, Tanzania adopted the Sustainable Industries Development Policy - SIDP (1996-2020) aimed at achieving sustainable industry development for enhancing job creation, economic transformation and equitable development. This reflected the return of industrial development as a Development agenda. However, continuous focus of poverty reduction strategies on social sectors and a lack of effective allocation and utilization of resources slowed implementation of the plan (Msami and Wangwe, 2016).

In recent years, nonetheless, Tanzania has recorded improved performance of the manufacturing sector, shown by growth of such sub-sectors as construction, pharmaceuticals and plastics (to mention but few). In addition to sectoral growth, manufactured exports (% of total merchandise exports) has grown notably from 14% in 2005 to 25% in 2017 (World Bank, 2019).

2.2 The Current Industrialization Strategy: Challenges and Prospects

2.2.1 Overview

Industrialisation has been the main policy agenda for the 5th Phase Government, and is considered pivotal to realizing Tanzania's ambition to become a middle-income economy by 2025, consistent with the literature that puts industrialisation at the centre of economic transformation, jobs and development (Martorano et al., 2017). Clearly, the focus of the industrialization agenda (and hence analysis for this study) is on manufacturing as the core sub-sector driving industrial production and competitiveness. Nonetheless, the key question is to what extent has the implementation of industrialization drive been successful in raising the level of manufacturing competitiveness for Tanzania. A review of progress on industrialization by Kweka J (2018b) shows a mixed picture. On one hand, Tanzania has made remarkable achievement in the number of manufacturing firms established in the last two years.

On the other hand, Tanzania still faces a number of constraints that hold back realization of her numerous potential for developing and improving a competitive manufacturing sector. Some constraints affect implementation capacity of the various Government supportive policies and strategies, including inadequate financial and human resources, ineffective coordination mechanisms across ministries, departments and agencies (MDAs) and an unfavorable regulatory environment. Others constraints such as business environment challenges affect the competitiveness of firms, mainly through the high cost of production, transaction costs and inadequate availability of quality raw materials or intermediate inputs, shortage of skilled labour and affordable finance. This mixed picture requires a review of the policies for supporting manufacturing competitiveness in order to identify where policy solutions may contribute to addressing those constraints.

Clearly, the Integrated Industrial Development Strategy (IIDS) 2025 is currently the main policy guiding Industrialization drive in Tanzania. The IIDS is built upon the reviews of the Sustainable Industrial Development Policy (SIDP) and lays down a road map for its implementation in order to achieve the country Vision of becoming a middle-income country by 2025. IIDS highlights the importance of improving agriculture productivity to support industrialization, and proposes Horizontal and Vertical framework for developing the manufacturing sector in Tanzania (URT, 2011) .

The Horizontal approach advocates the need to harness the main natural endowment and infrastructure to support competitiveness. One key example is Tanzania's geographical advantage as a strategic hub for Eastern and Central African region as an advantage for improving Tanzania's competitiveness. Specific proposed measures include the need to improve capacity and operational efficiency of Tanzania's ports (especially Dar-es-Salaam port and construction of twin port at Bagamoyo) while investing in road and rail transport infrastructure that will facilitate economic activities and reduce costs of production. Another proposed measure in the policy is the development of industrial clusters which for creating domestic linkages but also enhances competition and collaboration among firms. Indeed, clusters are also considered to be critical avenues for learning and innovation. Related to the issue of cluster development, the policy recommends the need to harness development of growth corridors (URT, 2011).

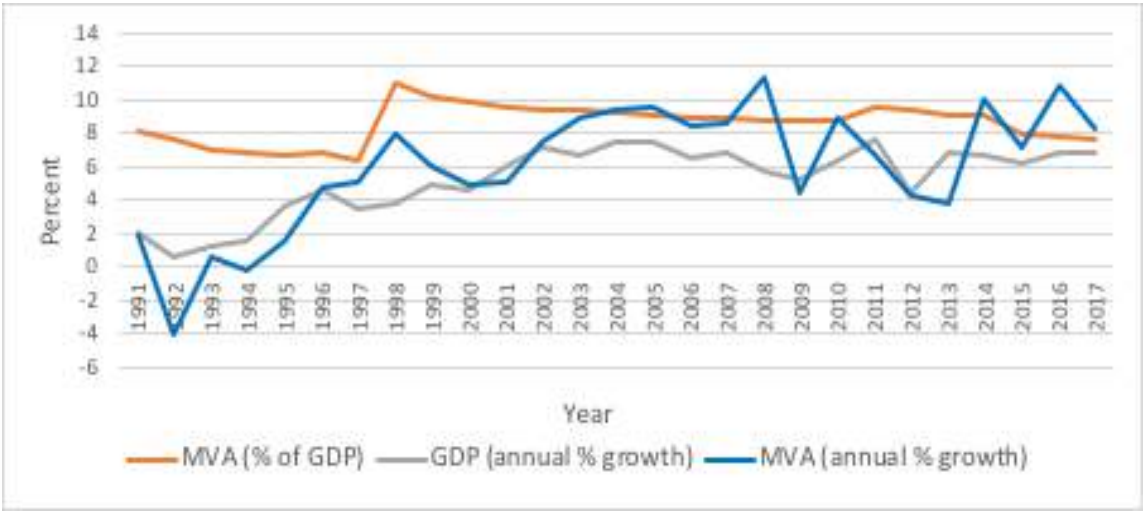
The vertical approach advocates measures that will support competitiveness and growth within a sector or firms. Specific measures proposed in the strategy include the need to push growth of the micro and small enterprises to medium and large status. The policy supports development of small and light manufacturing enterprises, and industrial parks which provides working facilities and opportunities to enhance firm capacity. Further, the plan recommends interventions to strengthen sectors with strong linkage with the manufacturing industry.

As noted earlier, while the policy framework exists to guide efforts of the Government and other stakeholders in implementing the industrial drive, it is important to review performance on the ground in view of understanding the scope for policy to support future growth.

2.2.2 Manufacturing Performance: Challenges and Prospects

Figure 1 shows trends in manufacturing and Gross Domestic Product (GDP) growth in Tanzania. Over the past three years, the manufacturing sector has been growing at an annual average of 9.1% but the share of manufacturing to GDP declined from 9.1% in 2014 to 8.1% in 2018 (BOT, 2019). This share is lower than the African average, which stands at 10%. Food and beverages account for more than half of Tanzania's manufacturing output. The formal manufacturing sector employed 95,678 people in 2016, which is an increase of 5% from 91,008 people in 2015. The most recent (2013) Census of Industrial Statistics by the National Bureau of Statistics (NBS) reveals that Tanzania has a total of 53,876 firms (NBS, 2018), but most of these (over 85%) are micro enterprises; while medium and large enterprises account for just 0.8% of the total.

Figure 1: Trends in GDP and manufacturing growth in Tanzania



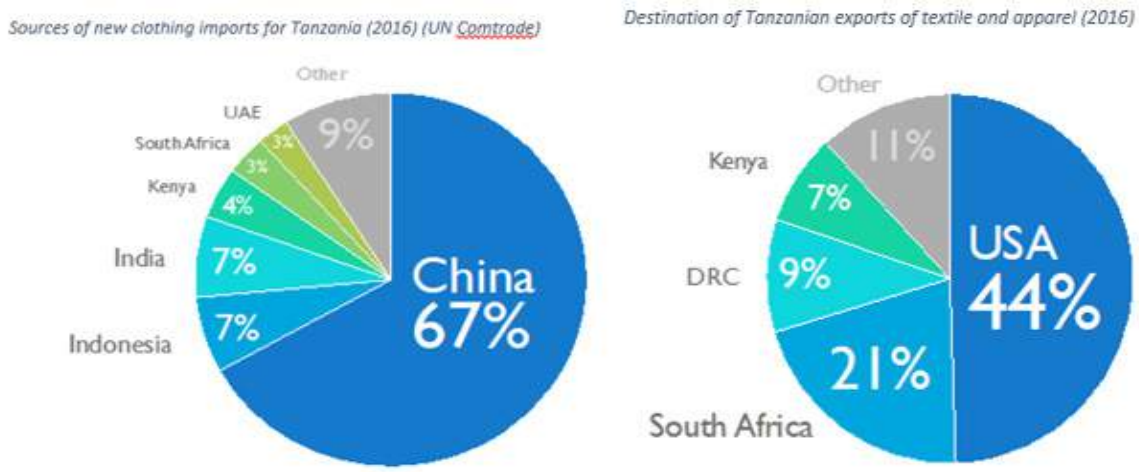
Source: World Bank World Development Indicators (2018)

The United Nations Industrial Development Organization (UNIDO) (2012) reports that, although Tanzania recorded very high growth in manufactured exports (31% per annum) in the early 2000s from $129 million in 2000 to $1,904 million in 2010, these remained concentrated in few products with low levels of value addition. Manufacturing value added as a share of GDP stagnated around 9.5% between 2000 and 2010, and declined to around 6% in 2012 and 2015 – which is still below the average for the region, making Tanzania one of the least industrialised countries. The share of manufactured exports to total exports increased from 9.3% in 2000 to 22.3% in 2010, and further to 23.9% in 2015. Food and beverages alone account for nearly half of total manufacturing value added, followed by non-metallic mineral products (11%), tobacco (7%) and textiles (5%). Industrial activity is largely concentrated in Dar es Salaam and to a lesser extent in Arusha. Recent initiatives have led to an increasing number of industrial establishments in the Coast region.

According to a recent budget speech by the Minister of Industry, Trade and Investment, about 3,306 industries have been established since the 5th Phase Government came to power in February 2018.[2] The speech noted further that, out of these, 393 are large establishments expected to employ 36,025 people. However, it is not clear whether these numbers are estimates from projects registered by the Tanzania Investment Centre (TIC) and Export Processing Zones Authority (EPZA) or recorded by actual factories.

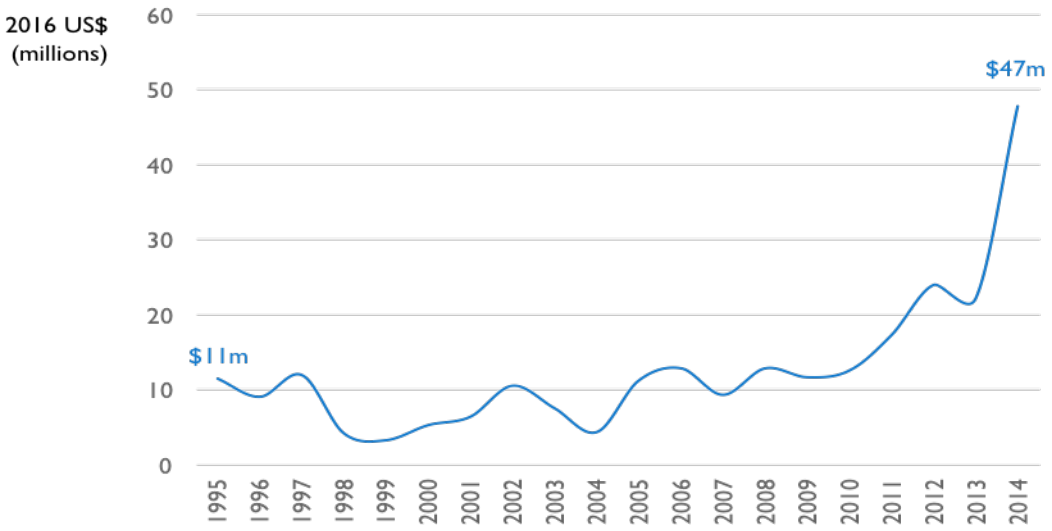
Consistent with findings by Balchin et al. (2016), some sectors in Tanzania appear to have greater potential for growth than others, including agro-processing, fast-moving consumer goods and construction materials. For example, the domestic and export markets for textile products show enormous opportunity for pushing Tanzania's industrialisation (URT, 2016; TDU analysis, 2018). Taking the textile industry as an example, Figure 2 shows an interesting dichotomy. On the one hand, the fast-growing market for new clothes in Tanzania is dominated by Chinese imports; on the other, large-scale (mostly export processing zone -EPZ) Tanzanian manufacturers export over 80% of clothing, mainly to the United States (through the African Growth and Opportunity Act). Indeed, there are reliable signs indicating that the Tanzania's apparel industry is beginning to recover from its decline in the 1980s and 1990s. However, as shown in Figure 3, the size of the sector remains relatively small in terms of production and employment. Given the importance of the sector, the Ministry of Industry, Trade and Investment (MITI) launched the Cotton-to-Clothing (C2C) Strategy 2016–2020, a blueprint for the development of the cotton, textiles and apparel industry. The strategy targets annual exports of $150 million and 10,000 jobs by 2020.

Figure 2: Import and export of textiles and apparel, 2016



2 https://www.dailynews.co.tz/news/here-comes-industrial-priorities.aspx

Figure 3: Tanzanian clothing exports, 1995–2014



Source: TDU analysis (2018), data from UN Comtrade

Studies carried out in recent years have confirmed that Tanzania has potential to develop a competitive textile industry (MITI, 2017), but a number of constraints prevent that potential from being realised. For instance, according to a study conducted by the Textile Development Unit (TDU) in the Ministry of Industry and Trade, five factors are the key drivers of competitiveness in the sector. These are: (i) Cost and quality of raw materials, (ii) Cost and quality of labour, (iii) Technology and productivity, (iv) Supporting infrastructure and (v) Business and regulatory environment. Although these factors are identified in the context of the textile industry, they apply across the manufacturing sector.

Below we provide a quick overview on each of these challenges.

Cost and quality of raw and intermediate materials

Agriculture remains one of the driving forces of industrialisation in Tanzania (Mufuruki et al., 2017). However, the small size of and poor technology used by agricultural production limits its ability to supply adequate raw materials to support industrialisation. For instance, Bakhresa Food Products wanted to invest in the UHT coconut cream industry but failed because of a lack of raw materials, and instead imported from Indonesia, despite the fact that Tanzania is the main grower of coconut in Africa (Zacharia, 2018). The problem is that, existing supply levels are insufficient to meet the raw material requirements for the factory given the high demand for raw unprocessed coconut. The use of domestically produced raw material inputs for downstream processing is also limited in other areas. For instance, according to the Bank of Tanzania (BOT) (2017), only 40% of sunflower oil demand is met domestically (330,000 tonnes); the remaining 60% is imported. In August 2018, cement manufacturers reported a deficit in coal availability, and GoT responded by banning exports of coal to meet local demand – but the problem persists. The 2017 Diagnostic Trade Integration Study (DTIS) update for Tanzania provides a strong emphasis on the need to develop agribusiness sector as a strategy for supporting industrialization (World Bank, 2018).

Cost and quality of labour

Tanzania is well positioned in some areas, with a large unskilled urban workforce readily available and a competitive wage rate of about $60–75 per month (MITI, 2017), but not in the availability of skilled and semi-skilled labour. While the specific skills needed to enhance Tanzania's industrial competitiveness is yet to be accurately identified, the general concern is that the current supply of skills does not match with the demand in terms of quality, competency and quantity. However, common views exist among industry actors that, business management and soft skills are in high shortage in the Tanzanian labour market. Indeed more efforts are needed to improve the relevance of training provided through the Vocational Educational and Training Authority (VETA). Furthermore, policy should make it easier to hire foreign skilled expatriates.

Supporting infrastructure

Power represents a significant portion of costs of production in the Tanzanian Manufacturing firms (e.g. 35% for spinning in textile production), such that a fraction of reduction in the cost of power will have an enormous impact on firm-level competitiveness. According to TDU (2017), firms pay $0.12/kwh in Tanzania, which (according to World Bank Doing Business estimates of 2019) is four times higher than in Ethiopia ($0.04/kwh) and 25% more than in Kenya (which has introduced a subsidy for textile and apparel manufacturers to make it more competitive, bringing the costs down from $0.20/kwh to $0.09/kwh) although the cost is lower than that faced by firms in highly competitive economies such as United States ($0.27/kwh) and United Kingdom ($0.17/kwh) (We have provided a graphical presentation of the data in Appendix 5).

Nonetheless, recent initiatives to implement energy projects have addressed challenges related to availability, although reliability is still a concern. These initiatives include addressing losses and inefficiencies in power generation, distribution and transmission, and additional capacity to the national grid from Kinyerezi II (167.82 MW) as of April 2018. Clearly, Dar port is a critical asset in reducing costs to improve competitiveness. However, efficiency of customs and other government departments needs further improvement to realise this advantage.

Business and regulatory environment

Tanzania enjoys favourable (domestic and export) market opportunities given existing preferential market access and a growing middle class, but the realisation of these opportunities is largely hampered by business environment challenges. These challenges include limited access to affordable finance, shortages in the availability of appropriate skills and difficulties associated with paying taxes. Tanzania's performance has also been deteriorating on a number of relevant Doing Business indicators[3]. Firms also find it burdensome to comply with multiple charges and taxes by various agencies. Nonetheless, the recent Government's blueprint and roadmap initiatives to address these challenges appear to be promising policy boost to the sector (see URT, 2018).

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3 These include Paying taxes, Registering property and Resolving insolvency whose scores have declined (in between 2015 and 2019) from 56.38 to 50.85; 51.37 to 50.14 and 39.56 to 39.04 respectively (WB, 2019).

Indeed, the Blueprint proposes measures to improve the business-enabling environment and put in place a framework that facilitates regular reviews of the business climate in Tanzania, while making recommendations in a number of specific areas (URT, 2018). These include, for instance, the need for tax relief to promote domestic industries (including raw materials for producing animal feed) and backward linkages to agriculture to support industrialisation. Other proposed measures include establishment of one-stop-service centres for investment and trade facilitation in order to guide investors, and incentives to the energy sub-sector to support industrialization (URT, 2018).

2.3 Learning from Successful Countries

2.3.1 Overview

In this section, we review several countries which have had successful experience in the pursuits of policies to support manufacturing competitiveness. We limited sampling to include only African countries so as to inspire relevance of learning from them. These includes Ethiopia, Botswana and Mauritius.

Indeed, Mauritius is probably the most cited country in Africa that has been able to build a strong competitiveness in her manufacturing sector. The country attained independence in 1968 and like any other African colony, the economic conditions at that time (of independence) were very poor. The economy was heavily reliant on the sugar industry, which contributed over 92% of the country's exports and about a third of output and employment (Yeunglamko, 1998). Several decades later, the country's economy became significantly diversified; where the share of secondary sector (manufacturing, electricity and water and construction) and tertiary sector (services) in GDP increased from 23% and 50% in 1976 to 28% and 70% in 2010 respectively while the primary sector declined from 23% to 4% in that same period. Moreover, the country's growth averaged at 5.2% above the Sub-Saharan Africa average of 3.3% while per capita income growth averaged at 4.2% and 0.7% respectively (Zalafar, 2011; Seechurn et al, 2013).

Ethiopia's success story is a distinct one, featuring bold experiments in industrial policy. In recent years, the country has made remarkable progress including an average double-digit growth rate (11%) during the 2003-2014 period (Oqubay, 2015). The growth rate of industry output averaged 20% between 2011 and 2014 above that of agriculture of 6.3% while growth of manufacturing industrial subsector averaged at 11.7% (Shiferaw, 2017). The recent successful development of flower industry in the country highlights the importance of experimentation and government support. The industry started with 2 investors experimenting on producing summer flower and exporting them to European Union (EU). Subsequently, its exports increased tremendously from half a million USD in 2000 to 200 million USD in 2012 (Oqubay, 2015).

During the time of independence (1966), Botswana was in a dire economic status. Per capita income was 70 USD, and the international development assistance contributed 60% of the government expenditure. At that time, manufacturing, mining and service sectors were still underdeveloped (Moyo, 2016). Three decades later, the country had attained middle-income status with the mining sector (diamond) being a cornerstone of the country's transformation. Growth averaged 9 percent between 1966 and 1999, and her per capita income reached more than 6,000 USD in 2009 (Sekwati, 2010). The share of international development assistance in Government budget reduced to 3%. One keen feature of this transformation is that, Botswana was able to avoid the Dutch disease effects[4] and effectively allocate large revenues from mining to development plans.

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4 Dutch disease is a situation where an economy is characterized by booming and lagging sectors, with the booming sector being based around resources and the lagging sectors being manufacturing and agriculture (Pegg, 2006).

More recently, the country has put efforts to develop diamond processing and jewelry manufacturing industries to protect itself from mineral depletion concerns by providing loans, infrastructure and skills training (Moyo, 2016).

2.3.2 Lessons for Tanzania

First, quality of institutions and political leadership matters. Mauritius benefited from a domestic political system that is inclusive and provides a basis for keeping social conflict manageable. Furthermore, the same institutions have been responsible in providing good macroeconomic management that is pragmatic and supportive of long-term growth aspirations (Brautigam, 1999). Rather than consuming rents received from the sugar boom period (in 1970's and 1980's), the country was able to allocate these resources to capital accumulation, including to invest in the textile and apparel sector (Zafar, 2011). This supported the country's economy diversification efforts. In addition, exchange rate was kept competitive, while debt burdens were kept at manageable levels, and there was readiness to correct internal and external imbalances (Iman and Manoiu, 2008).

Unlike many resource rich countries that have suffered from resource curse, Botswana shows that diamond resource has been a blessing. This was only possible as the government consistently committed to development by allocating revenues obtained from diamond mining to beneficial public goods and infrastructure projects (Moyo, 2016). For instance, the government developed a saving fund and unlinked public expenditure from revenues to avoid volatility curse[5] Furthermore, there have been efforts to diversify the economy through establishing diamond processing and jewelry manufacturing industries. As the license with De Beers Pvt Ltd was coming to a close, the government used its position to negotiate new terms among them requiring the company to support the government to establish diamond processing and jewelry manufacturing industries that will employ local citizens (Moyo, 2016). Thus, it is not surprising that we find Botswana and Mauritius performing very well in Institution quality pillar of Global Competitiveness Index. In 2018 the two countries scored 54.7 and 62.9 (out of 100) respectively while 65% of African countries scored below 50 (Schwab, 2018).

Second, economic openness provides critical support to building competitiveness. Mauritius realized the benefits of economic openness from the early stage. The country was able to execute effective sector policies (including Special Economic Zones strategy) while building a favorable investment climate. This played a major role in attracting both foreign (FDI) and local investment while the interplay between Export Oriented Industrialization and Import Substitution Industries proves to be an interesting story. Adoption of smart tax policy (the Finance Act 2006) further helped attract more FDI while reducing tax expenditure and increasing tax revenue (Rambaksh and Hussen, 2013). Indeed, openness is one single most important factor for attracting FDI, which the countries need to establish a strong manufacturing base. Mauritius was originally able to attract more FDI through the SEZ scheme which was in part crucial in developing the textile and apparel industry. More importantly, it was the FDI that kick started the development of manufacturing sector by bringing to Mauritius technology, know-how, and much-needed capital and entrepreneurship (Ancharaz, 2003).

Another aspect of openness is the critical role of trade agreements and regional integration in supporting export competitiveness. Partnership agreements should be encouraged. Botswana exporters benefit favorable access to the European Union through the Cotonou Agreement and recently through the interim Economic Partnership Agreement (EPA) which has further improved market access abroad.

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5 The volatile nature of mineral price tend to destabilize the economy through exchange rate so that the latter appreciates during boom and depreciate during bust period. Since fiscal policy tends to be pro-cyclical, this would lead to inefficient provision of government policies and infrastructure (Hausmann and Rigobon, 2003).

Moreover, Botswana has attained preferential access to the United States' market through the African Growth and Opportunity Act (AGOA) where it exported textiles and clothing that appears to have stimulated exports growth (Moyo, 2016).

Third, avoid policy interference. Political independence is important in making tough policy decisions free of political pressure from Donors, and without succumbing to particular interest. In addition, such independence underline the right of the country to make mistakes and learn from them along the way, and being free to make major policy choices that involve high risks and bold experiments (Oqubay, 2015). Ethiopia has consistently urged African countries to take the driver's seat when it comes to matters of national development. For instance, the Ethiopian government rejected advices to focus on energy sector expansion and primary school and instead went on to expand universities (Monga and Lin, 2019). In another instance, Meles Asres (13th Prime Minister of the country) was involved in a disagreement with the IMF over opening the banking system to foreign financial banks which consequently caused the IMF to suspend some of its funding to the country (Stiglitz, 2002). However, these hard decisions greatly supported the country's process to structural transformation and despite the highlighted confrontations, the country has been an effective partner in beneficial programs including implementation (Monga and Lin, 2019).

Fourth and finally, learn by actually doing. In the case of Ethiopia, the country had to go through a policy making process that was complex, surrounded by conflicts and disagreements, but most importantly the country learned throughout the journey. For instance in the cement industry, the government stimulated demand for the then imported good which increased imports and because cement depend a lot on transportation, the government then modernized the transport fleet, leading to increased profit in the industry, which, together with high imports, signaled a need for new investment in the sector. With the government further intervening through fiscal incentives, output started to increase rapidly (increased fivefold between 2005 and 2016) and once there was enough capacity to serve domestic demand, all cement imports were banned (Monga and Lin, 2019).

However, the government devaluation of exchange rate by 20% in 2010 derailed the sector's growth as energy supplies could not keep up with expanding demand in the industry. Fortunately, the country was able to address this situation through foreign exchange obtained from export earnings (floriculture industry) and this highlights the complementarity relationship between Import Substitution and Export-Led Industrialization (Monga and Lin, 2019). While this experience shows the ups and downs in the industrial development, it also provided a great platform for policy learning (Oqubay, 2019). With policy independence, the country had the freedom to design and experiment policies for different sectors and along the way, an opportunity to learn upon outcomes (success or failures).

In the context of Tanzania, the prevailing Government initiatives to invest in major infrastructure (including the SGR and the Stiegler's Gorge HEP) projects should go unabated. Ethiopia is currently constructing the Grand Ethiopian Renaissance Dam which is Africa's largest hydro dam that will generate 6,000 MW of electricity. The investment costs 5 billion USD and is being financed internally. Put aside the possible future benefits, these efforts highlight the country's aspiration as a late industrializer to catch up by lowering the cost of production (specifically making energy reliable and a lot cheaper). The floriculture industry project with the same dynamics.

However, in learning by doing, Tanzania needs a role model to emulate. Ethiopia has been looking to East Asia (newly industrializing Korea, Taiwan and China) as role models. There are also close links with Japanese and Korean scholars on industrial policy while policy makers have been making regular visits to China. In the manufacturing sector, the Japanese kaizen concept has been picked to lead productivity and quality improvements while vocational education and training, and higher education have been arranged based on the German model (Oqubay, 2015).

3 APPROACHES AND INDICATORS OF MANUFACTURING COMPETITIVENESS

This chapter presents results of the analysis of indices commonly used for measuring manufacturing competitiveness. Given the lack of an established framework for putting together various indices, we first review the different approaches and methodology used for measuring competitiveness. Subsequently, we present results to show the status of manufacturing competitiveness for Tanzania, and discuss the key emerging issues.

3.1 Approaches and Methodology for Measuring Competitiveness

A large number of studies on manufacturing competitiveness are concerned with measurement of competitiveness, and less about empirical analysis. Various indicators are used to measure competitiveness at a single point in time or changes over time; and may include comparisons between sectors, or between countries for particular sectors. One of the setbacks of using indicators is that, they do not provide analysis of the counterfactual situation, including forecasting of future ranking or index or causal relationship, but rather provide a measure of situation as it is (Masters, 1995). In most cases, these indicators do measure competitiveness of specific sector/industry for a particular country. Another challenge is multiplicity of indicators, which adds to confusion in conducting sensible analysis of competitiveness, partly owing to variety of approaches and models for assessing competitiveness. In any case, we would need to use some of the indices to address the different facets of competitiveness. For instance, our assessment of manufacturing competitiveness should reflect both the macro and micro perspectives; and be able to capture the relevant dynamics at the international (external sector) and national (domestic/regional economy). In addition, some measures are only plausible at the economy-wide level versus sector level and vice versa. Such multilayer dimensions are necessary since one cannot achieve manufacturing competitiveness in isolation of other sectors of the economy.

Our first attempt at literature review is to provide a summary of these approaches. Wignaraja (2003) highlighted the theories of manufacturing competitiveness by highlighting the macroeconomic perspective, business strategy view and technology and innovation approach. These approaches were further adopted and expounded by Vignes and Smith (2005), which we consider to be a useful starting point for a serious analysis of manufacturing competitiveness. The summary abridged from Vignes and Smith (2005) is presented below for exposition purposes.

3.1.1 Macroeconomic Perspective

While there are various macroeconomic indicators to gauge country or sectors competitiveness, we delve into two most commonly used one. These are real exchange rate and unit labour costs. Macroeconomic perspective hinges on the fact that exchange rate is necessary instrument for achieving international competitiveness (proxied by relative price of non-tradable goods to tradable goods and consumer price indices). It defines international competitiveness "as the level of the real exchange rate which in combination with the requisite domestic economic policies achieve internal and external balance". An appreciation of the real exchange rate is associated with a loss in a country's international competitiveness, while a depreciation of the real exchange rate implies an improvement.

According to Vignes and Smith (2005), the most popular and widely used of these measures is the real effective exchange rate given the easy availability of the data required for calculating it. Other measures include the relative price of nontradeables to tradeables, real effective exchange rates, relative consumer prices, relative wholesale prices and relative unit labour costs in the manufacturing sector. Estimates of these measures were applied by Damiyano et al. (2012) in examining manufacturing competitiveness in Zimbabwe. The major criticism of the macroeconomic perspective is using only relative prices factors and ignoring non-price factors such as technological capabilities, role of infrastructure and skills which are paramount in the context of developing world. For instance, in a study of price competitiveness of the Manufacturing Sector, Đozović (2017) found that changes in price competitiveness across sectors in the majority of the observed EU member states were not accompanied by the expected changes in the share of exports on the global market, indicating the relevance of non-price export competitiveness. Furthermore, the macro perspectives implies little if any scope for government policy to influence competitiveness on a particular sector.

3.1.2 Business Strategist Perspective

Unlike the first approach which is based on economic grounds, the Business Strategy approach hinges on a business studies perspective, mainly advocated by Porter (1990) in addressing the issues of rivalries between firms and the strategies adopted by firms as they compete with each other locally and internationally. According to Porter, competitiveness and productivity are the same, since in his opinion the "only meaningful concept of competitiveness at the national level is national productivity", due to the fact that productivity is primarily associated with improving a nation's prosperity and standard of living over time. He developed a "Diamond Model" in which he identified four interrelated factors necessary for sustaining competitiveness, these are: firm strategy, structure and rivalry, demand conditions, related supporting industries and factor conditions (key factors that are created e.g. skilled labour, capital and infrastructure). The government acts as facilitator in this model encouraging firms to become competitive and creating the environment that enables firms to increase productivity and become more competitive by improving the infrastructure and investing in education and engineering, etc.

They defined competitiveness as "that collection of factors, policies and institutions which determine the level of productivity of a country and that therefore determine the level of prosperity that can be attained by an economy. However, productivity is also the key driver of the rates of return on investment, which in turn determine the aggregate growth rates of the economy. Thus, a more competitive economy is one that is likely to grow faster over the medium to long term". Given its broad nature, many countries use this definition to compile composite indices on competitiveness that shows microeconomic aspects of benchmarking their competitiveness against each other. Such indicators include the business competitiveness index (BCI) and the growth competitiveness index (GCI).

The main criticism of the business strategy perspective (advocated Krugman) is its notion that nations compete like corporations on the world markets, since "international trade is not a zero sum game but one in which specialization and trade according to comparative advantage results in gains to all nations". Secondly, the definition of productivity is unclear since it does not specify if total factor productivity or partial productivity indicators should be used. Finally, the role of government is too limited since the presence of market failures constrains the development of competitiveness.

3.1.3 Technology and Innovation Perspective

This approached is rooted in industrial competitiveness in that it emphasizes role of FDI, learning, R&D in fostering competitiveness. It accentuates the role that enterprises must play in importing technology and the ability to learn it. The innovation and learning process necessitate interactions among different institutions (firms, government, support institutions and other actors) within the National innovative system (NIS).

This theory defines competitiveness (see, OECD, 1992) as "the capacity of firms to compete, to increase their profits and to grow. It is based on costs and prices, but more vitally on the capacity of firms to use technology and the quality and performance of products. At the macroeconomic level it is the ability to make products that meet the test of international competitiveness while expanding domestic real income." One of main measures associated with the approach is the manufacturing export competitiveness index (MECI), which is used to benchmark manufactured export competitiveness in developing countries by using data on the value of manufactured exports per capita, average manufactured export growth over medium to long term and technology-intensive manufacture exports as a percentage of total merchandise exports. However, MECI is somewhat challenging to construct since it is difficult to determine what criteria should be used for selecting exports that are technologically intensive. Other measures under this school of thought are the market share indicators (e.g. country's exports to the World export, or region). Details of the measurements for each of these indicators can be found in Vignes and Smith (2005).

3.1.4 Composite Indices

While the above indicators can be used in their own merit, some studies advocate use of composite indicators to allow for a much broader measurement of national competitiveness (Vignes and Smith, 2005). The choice of indicators used depends on the focus of the study or other considerations such as data availability and analytical techniques in place. For instance, one of the most popular and widely used composite indices of competitiveness include those constructed by the World Economic Forum (WEF) and published in the Global Competitiveness Report.

The WEF compiles two complementary composite indices which capture the understanding of national competitiveness, namely: the growth competitiveness index (GCI), the microeconomic competitiveness index (MICI), the current competitiveness index (CCI) or business competitive index (BCI). The GCI measures the capacity of the national economy to achieve sustained economic growth over the medium term. The aggregation of GCI comprises three main components; namely: technological capacity, the quality of public institutions and quality of the macroeconomic environment. Despite their usefulness for identifying weaknesses in different sectors of the economy and formulating relevant policies to address them, the formulation of these indices have been criticized on lack of theoretical foundation, inconsistent methodology or simply too broad a measure of competitiveness.

Based on the above review, and informed by availability of data and relevance to the manufacturing sector, we selected a couple of indicators to provide a broad view of the status of the competitiveness of the manufacturing sector in Tanzania. Indeed, most of the indicators (e.g. exchange rate) apply to measuring competitiveness at the national level rather than for a particular sector. Below we provide a brief outline of methodology for analyzing competitiveness indices for manufacturing sector in Tanzania.

3.2 Methodology

From the review of literature, it is evident that, there are many approaches to measuring competitiveness and no single measure agreed upon across the different studies (see Ketels, 2016). In light of the objective and scope of this study, and owing to data availability, we chose four complementary measures of competitiveness. These are: the Global Competitiveness Index (GCI), Real Exchange Rate, Unit Labour Costs (ULC) and Manufactured Exports Competitiveness Index (MECI). These are described below.

3.2.1 The Global Competitive Index

The Global Competitiveness Index (GCI) is an indicator that measures a country's level of productivity and ability to provide opportunities for citizen prosperity by measuring a set of relevant institutions, policies and factors (Porter et al, 2004). The index prepared annually by World Economic Forum (WEF) since 2004, as part of the Global Competitiveness Report and is used to rank countries from the most to the least competitive one.

The index is made from three sub-indices which are further divided into a total of 12 pillars. The first sub-index is the Basic requirement sub-index group; which include institutions, infrastructure, macro-economic environment, health and primary education pillars. The second sub-index is Efficiency enhancers' index which includes higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, and market size pillars. The third and final sub-index is the Innovation and sophistication factors which includes business sophistication; and innovation pillars (WEF, 2019).

These pillars do interact, such that failure or lack of progress in one pillar may have a deteriorating effect on another one. The GCI provides a weighted aggregate of these pillars while prior to that each pillar is measured individually in order to enable countries identify areas where they lag behind (WEF, 2019). Despite its popularity and usefulness, the index faces significant level of criticism. For instance, Lall (2001) notes that the index's methodology is flawed because it uses too broad a definition and many of its qualitative measures are redundant or wrong and therefore questions its applicability. On the positive note, the index is generally considered as useful measure for ranking countries.

For the purposes of this study, we have used this index to rank/compare Tanzania national level competitiveness with that of other countries[6] as a first step towards assessment of a sector specific indices for the manufacturing sector. Clearly, the WEF has been providing estimates of the GCI as part of the Global Competitiveness Report for many years. We have therefore drawn data from such reports (for the period between 2007 and 2017) to help in identifying factors (external to manufacturing sector) which affect competitiveness but also shed light on progress (being) made by Tanzania in the desire to achieve higher level of competitiveness.

Apparently, this index answers one key question: what is the position of Tanzania in the Global Competitiveness index?

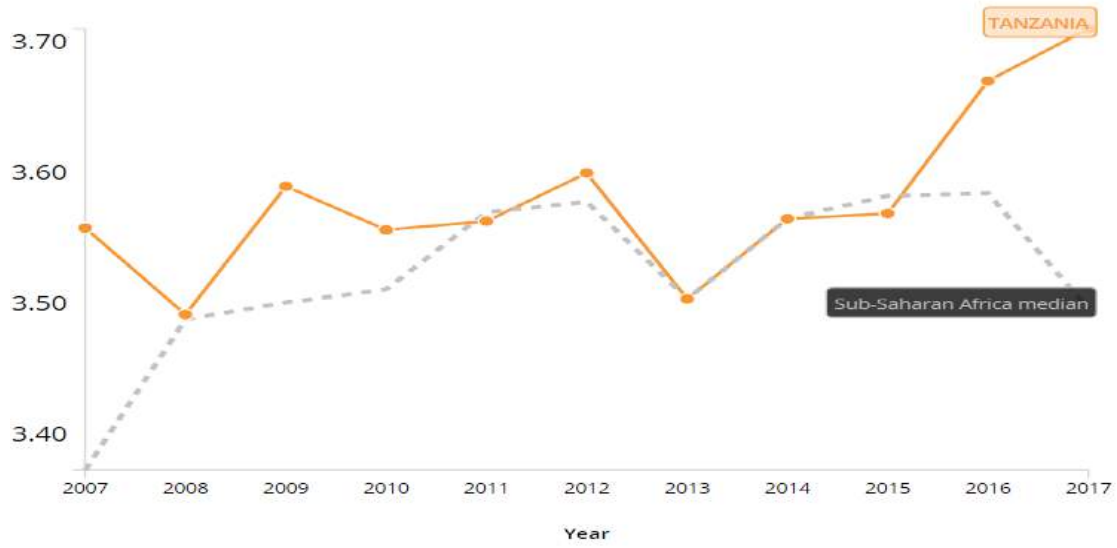
3.2.1.1 Tanzania's Rank in the Global Competitiveness Index

Since the World Economic Forum started to provide estimates of Tanzania competitiveness index in 2007, Tanzania has had a slight improvement in her score; from 3.56 in 2007 to 3.71 in 2017(See, figure 4). Furthermore, Tanzania is one among five countries (Ethiopia, Senegal, Rwanda and Ivory Coast) in Sub Saharan Africa whose index improved for five consecutive years since 2010 (Schwab, 2017). These countries have relatively put more effort on diversifying their economies, a trend which could also be observed in the Africa's most competitive economy - Mauritius (Adesina et al, 2017). In 2008, Tanzania attained her lowest index score (3.49 out of 7), performing poorly in areas of quality of overall infrastructure, venture capital availability, quality of electricity supply, quality of railroad infrastructure and quality of internet access to school (WEF, 2007). Poor economic infrastructure such as ports, feeder roads, railways, markets, information, storage, transport, and poor availability and accessibility of investment capital were identified as challenges that hindered implementation of MKUKUTA I (2005-2010) and MKUZA (2006-2010) (UNIDO, 2010).

In 2013, Tanzania recorded her second lowest index score (3.50 out of 7) performing poorly in areas of quality of electricity supply, quality of overall infrastructure, number of procedures to start a business, prevalence of trade barriers, general quality of health and education including business impact of malaria, tuberculosis and HIV/AIDS, quality of primary education and in higher education and training (WEF, 2013). The poor performance in electricity supply sub pillar in 2013 is in line with electricity problems in that same year caused by drought in 2011 and 2012. In those years, Tanzania experienced a period of low energy security, unreliable energy supply and high electricity losses (USEA, 2013). Furthermore, the country's quality of education was poor characterized by shortage of facilities and equipment (BEST, 2012), poor working conditions to teachers (WB, 2011) and poor quality teachers (Mkumbo, 2012).

6 The other countries used here are those of the East African Community including Kenya, Uganda, Rwanda, Burundi and South Sudan. These countries have been chosen based on their similar aspirations of developing their industrial sector in order to bring about development.

Figure 4: Trend of Tanzanian Global Competitiveness Index score



Source: World Economic Forum Global Competitiveness Index

Despite the slight improvement, some areas of competitiveness have continued to perform poorly during the last decade, including Higher education and training, innovation, technological readiness, health and primary education and infrastructure (see Adesina et al, 2017). Indeed, UNICEF (2018) points out the quality of education in Tanzania has been generally poor due to shortage of quality teachers, insufficient infrastructure and insufficient allocated budget[7] while URT (2017) reveals that Tanzania has a very low level of transport and power infrastructure compared to Sub Saharan Africa (SSA) average[8]. Moreover, the health sector is hampered by such problems as shortage of skilled personnel (UNFPA, 2018) and inaccessible and low-quality health services (URT, 2017).

Clearly, Tanzania has also continued to perform well in some other pillars which helps in improving Tanzania's competitiveness. One such pillar is the macro economic environment whose index score has improved from 4.1 in 2013 to 4.6 in 2017. Furthermore, the country has done well in improving the quality of her institutions where institutions score has increased from 3.6 in 2013 to 3.8 in 2017 (Adesina et al, 2017; Schwab, 2013). This performance reflects the country's relentless efforts in managing country's macroeconomic environment and in improving the quality of her institutions.

Rwanda, which was Africa's best performing country in 2017, has not experienced a fall in GCI score since 2013. The country attained 52nd position with a GCI score of 4.4 in 2017. During that year, the country had a very strong performance in pillars of institutions (5.4, 7th) and labor market efficiency (5.6, 13th). Kenya has been performing better than Tanzania in Innovation and sophistication factors pillar since 2013 and while they have improved since then (from 3.7, 56th position to 4.0, 40th position in 2017) for Kenya, Tanzania's performance in that pillar has remained relatively similar (from 3.3, 92nd position to 3.4, 96th position in 2017). Over the years, Tanzania has generally remained above Uganda and Burundi, although Uganda appears to have performed better than Tanzania since 2014 (see figure 5).

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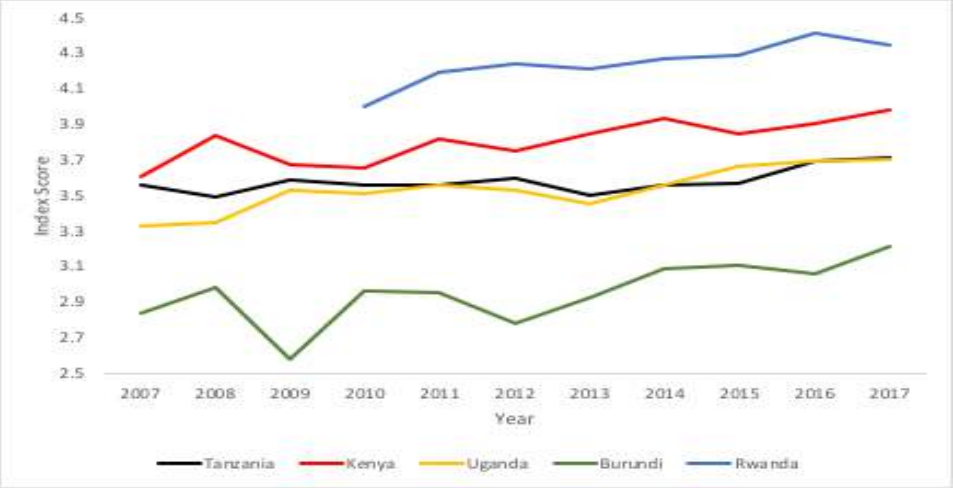
7 Between 2014 and 2017, the share of education budget (out of the total national budget) has declined from 20% to 15% and is therefore below the Global Partnership for Education target of 20% (UNICEF, 2018)

8 According to (WB)Tanzania road density is approximately 10km for every 100 square km area (20km for SSA) while electricity production per capita is 100 kwh (190 kwh for SSA)

In 2017, Uganda performed very well in the area of labour market efficiency (4.7, 27th position) (Adesina et al, 2017). Tanzania needs to put more efforts in the area of innovation and sophistication factors as these have not improved since 2013 (aside from having a large gap between the country and Kenya and Rwanda) while maintaining good performance in efficiency enhancers and basic requirements sub pillars.

Figure 5: Annual GCI for selected countries



Source: World Economic Forum Global Competitiveness Index

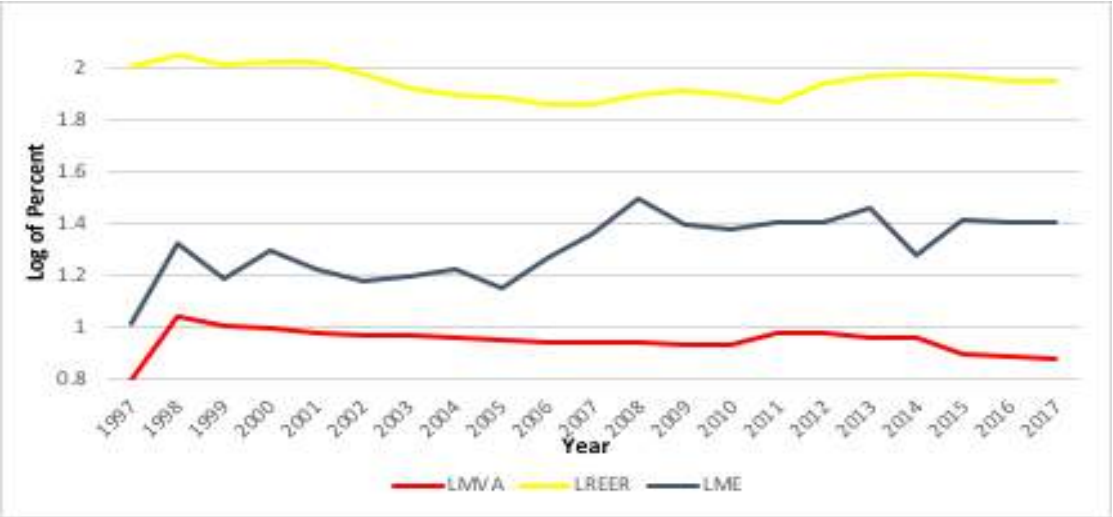
3.2.2 Exchange Rate and Manufacturing Sector Competitiveness

A competitive real exchange rate is often viewed as crucial in promoting a country's exports. Rodrick (2008) argues that, an undervalued exchange rate is important for promoting export-led industrialization. In fact, his argument stems from an observation that episodes of high growth in African countries coincided with periods of undervalued currencies. Generally, there are often two sides to this argument; One, a devalued exchange rate increases exports revenues as it makes exports cheaper. Indeed, Krueger (1978) sees exchange rate devaluation as a way to compensate financial losses obtained from protection of traded inputs; Two, an undervalued currency may undermine production and profitability through inflating the costs of imported goods particularly if the import intensity of the tradable sector is very high (Wondemu and Potts, 2016).

Tanzania's currency value against US dollar has depreciated almost 3 times in between 1970 (1 USD costed 7.60 Tshs) and 2017 (1 USD costed 2177 Tshs) (URT, 2018; Proti, 2013). Consequently, this has led to concerns that if currency depreciation is not effectively addressed, domestic firms will face high production costs through high import costs and subsequently locally produced goods will become uncompetitive in the market (Taylor, 2019). Despite, looking at the annual Real Effective Exchange Rate, the MVA share in GDP and the share of Manufactured Exports in Total Merchandise Exports data[9], it can be observed that periods of Tshs currency depreciation were associated with periods of increasing manufacturing exports while on the other side, MVA was observed to generally fall (See figure 6).

9 *The data presented in figure 6 is in logarithm format while in estimating correlation coefficient between the variables w used the data that was not transformed.*

Figure 6: Trend of MVA (% of GDP), REER Index and Manufactured Exports (% of Merchandise Exports)



Source: World Bank Development Indicators database

This highlights the significance of two arguments discussed and the relevance of exchange rate in overall. Nevertheless, exchange rate devaluation is practiced and still strongly viewed as a way to promote export growth. In Mauritius's manufacturing experience, competitive exchange rate devaluation is identified by the literature as among factors that aided the improvement of manufacturing sector (Moyo 2016; Frankel, 2014; Zafar, 2011). Furthermore, rigorous analysis as conducted by Wondemu and Potts (2016) showed that Tanzania exports are highly responsive to changes in real exchange rate and while they conclude that keeping the real exchange rate closer to its equilibrium (competitive devaluation) is necessary, they also add that maintaining a devalued exchange rate is desirable. However, Rutasitara (2004) findings should warn us against devaluation wherein he finds evidence of a positive relationship between exchange rate devaluation and inflation in Tanzania.

Table 1: Correlation between selected variables

Variable	(1)	(2)	(3)
(1) MVA	1.000		
(2) REER	0.234	1.000	
(3) ME	-0.024	-0.295	1.000

Source: Author's calculation using WDI data set

We further conduct a correlation analysis of the three variables as seen in table 6 (MVA % of GDP, REER and Manufactured Exports % of total Merchandise Exports). We found that the correlation between REER and MVA is 0.234 and that between REER and Manufactured Exports is -0.295. Despite the values of the correlation being insignificant (that is less than 0.5), the signs of the coefficients do confirm the arguments we have been making. It is clear that in order to promote competitive manufacturing sector, perhaps the right approach is neither to maintain a devalued exchange rate only nor to set a competitive exchange rate alone. What is needed is a balance between the two sides (an equilibrium exchange rate) such that the country is able to promote exports while not hurting production through high costs. In addition, prudent macroeconomic policy management is also relevant for competitiveness as large unproductive spending would derail export performance

3.2.3 Unit Labour Cost

Unit Labour Cost (ULC) is an index which measures the ratio of labour compensation to labour productivity. In other words, it measures the labour costs incurred for each unit of output. In that regard, to maintain competitiveness, changes in productivity have to be in line with changes in labour costs. Where labour costs grow quicker than labour productivity, competitiveness will fall and vice versa.

We calculated ULC as follows

$$ULC = \frac{W_n}{Q_i/H_i} \quad \text{..... (1)}$$

Where W_n is the Nominal Wage

Q_i is the Domestic output in industry i and

H_i is the number of hours worked in industry i

Related to the ULC, we also calculated the Relative Unit Labour Cost (RULC) in order to compare the competitiveness of manufacturing sector relative to other sectors of the economy. This measure is given as:

$$RULC = ULC_m/ULC_o \quad \text{..... (2)}$$

Where ULC_m is the Unit Labour Cost in Manufacturing sector, and

ULC_o is the Unit Labour Cost of another sector.

The Tanzania National Bureau of Statistics uses International Standard Industrial Classification (ISIC) of all Economic Activities Revision 4 in classifying its sectors (industries). The classification has 21 industries including; Agriculture, Forestry and Fishing, Manufacturing, Mining and Quarrying, Construction, Transport and Storage, and Information and Technology to mention a few (URT, 2015, p. 3). Our selection of the sector for comparison was based on data availability.

It should be noted that ULC is not a comprehensive measure of competitiveness but rather a measure of cost competitiveness (specifically labour costs). Thus, other costs such as capital costs are not included despite being an important factor of production. De Benedictis, (1998) and Kaldor (1978), for instance, concluded that cost alone is not enough to comprehensively measure competitiveness and suggested addition of other aspects such as technology. This is why our analysis of competitiveness was based on more than one index. Concerning the estimation of ULC and RULC, we draw a panel data from CIP and ASIP data provided by the NBS.

3.2.3.1 Trends in ULC for the Industrial Sector

Unit labour cost is calculated as a ratio of wage per worker and value added per worker[10]. We calculate annual Unit Labour Cost (ULC) for each Industrial sub sector in Tanzania based on data from the Annual Survey of Industrial Production (ASIP) panel (2008-2016). Table 2 shows the results of our estimation including ULC for each sector, Value Added per Worker (VAPW) and Wage per Worker (WPW).

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10 This is a slight departure from what we stated in methodology that is in analysis we use gross value added rather than gross output. We have adopted this variable as a result of data problems where we could only calculate gross output for 2013, 2015 and 2016 while gross value added could be calculated for all years (2008 up to 2016) in the panel data set hence giving us more years for analysis. This variable (value added) has also been used by Felipe and Kumar (2010) in estimating unit labour cost.

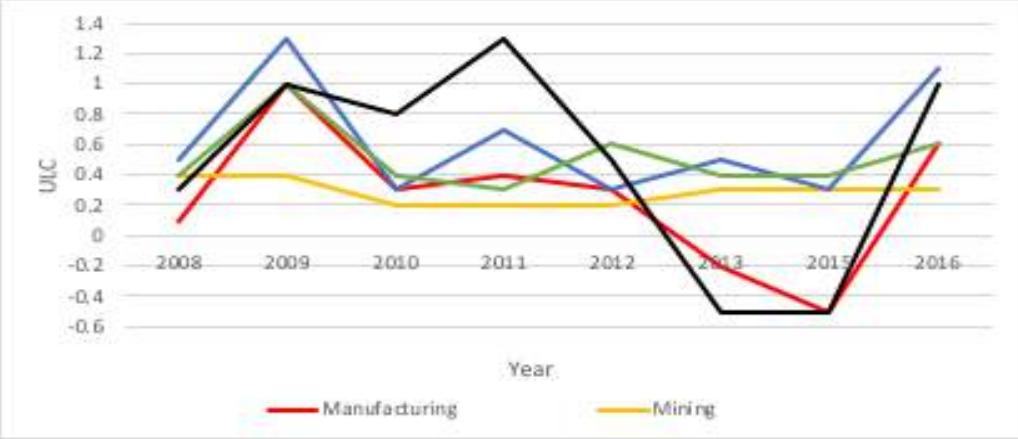
Table 2: ULC, WPW and VAPW for Industrial subsectors (average 2008-2016)

Sector	ULC	WPW (Tshs)	VAPW (Tshs)
Manufacturing	0.2	4,759.5	35,751
Mining	0.3	9,604.2	69,077.6
Electricity[1],	0.6	18,283	5,558,560.2
Water[2]	0.5	3,795.3	39,892.5

Source: Author's calculation using ASIP panel (2008-2016)

Table 2 shows that manufacturing sector has the lowest average unit labor costs (0.2) during the period between 2008 and 2016 followed by mining sector (0.3), Water supply; sewerage, waste management and remediation activities (0.5) and finally Electricity, gas, steam and air conditioning supply (0.6). This implies the manufacturing sector is the most cost competitive industrial sub sector in Tanzania. The results further show that, manufacturing sub sector has the lowest VAPW (35,751 Tshs per worker) than all other subsectors and is the last but one in terms of WPW (4759 Tshs per worker). This implies that while manufacturing has the lowest ULC and thus most cost competitive, the sector still pays very low wages and contributes little to value added. It is also evident from the data that sectors with high VAPW such as Electricity, gas, steam and air conditioning have high WPW while those with low VAPW such as manufacturing have low WPW.

Figure 7: Annual mean ULC and RULC for Industrial subsectors



Source: Author's calculation using ASIP panel (2008-2016)

We further calculate the annual Unit Labour Cost for each manufacturing sub-sector (See figure 7). We first note the negative ULC values[11] in 2013 and 2015 for the manufacturing sector. This implies that several firms from those two years had negative Value Added (VA) which we find in our analysis to be true. We also find that, mean (across all sectors) annual fuel cost in 2013 and 2015 was very high relative to other years while mean annual ULC for the same years was negative (see appendix 1). Recall that, Value Added is the difference between gross output and intermediate consumption (e.g. fuel, electricity and water consumed). Therefore, we conclude that the negative ULC values were caused by high fuel costs with the former (negative ULC) leading to low average ULC in manufacturing sector (as seen in figure 7). The problem of high fuel cost is consistent with the energy shortages experienced in Tanzania in 2013 and its effect went on from negative ULC to very low GCI score in 2013.

11 Negative ULC means some firms had negative VAPW implying these firms have no value added while they still pay wages. We assume these firms incur very high ULC compared to those with high positive ULC values because at least for them, they have positive value added.

We further observe a sharp increase in ULC across all subsectors (except mining) in 2009. We believe this may be caused by increase in wages as total wages increased during that year (see appendix 4). This implies that although manufacturing sector is cost competitive by ULC measure, it is reflection of relatively low wages and low MVA. This is why the use of different indices (as done in this study) to measure competitiveness is very important. The trend of Relative Unit Labour Cost (RULC) of Manufacturing sector (relative to ULC of other sectors) has generally increased from 0.3 in 2008 to 1 in 2016 implying the manufacturing sector has experienced a loss in competitiveness relative to other sectors during that period.

We further estimate ULC based on different characteristics of firms in the manufacturing industrial subsector including employment size, nature of ownership and by exporting status. (Results are shown in Table 3). Clearly, exporting firms have lower ULC than non-exporting firms while they also pay more WPW and create more VAPW. Although large firms have higher ULC than small firms, they have higher VAPW and WPW than small firms and medium firms. Of note is the relatively very small VAPW figure for small firms (28,182.49 Tshs per worker compared medium and large sized firms with 50,000 Tshs per worker) which suggests low productivity problem faced by small firms. However, it should be noted that ASIP data covers firms with only 10 or more employees, leaving out the micro and small firms (1-4 employees). To address that problem, we use CIP 2013 data which covers the entire sample of firms from 1 employee to estimate ULC. Results (Table 4) show that large firms are more cost competitive than small and micro firms although medium firms were the most cost competitive. Consistent with our ASIP results, we find that (from CIP data) large firms have the highest WPW and VAPW values than all the other types of firms while the micro and small firms have very small figures of VAPW again suggesting the low level of productivity problem in these firms.

Table 3 further shows that, firms owned jointly (by both foreign and national investor) are more cost competitive than those owned by only either a foreign or a national investor and while foreign firms have the highest VAPW and WPW, the difference with VAPW and WPW of jointly owned firms is relatively small. Although firms operated by both public and private sector have higher ULC than those operated by either the public or the private sector alone, these firms have relatively very high VAPW and WPW. Private owned firms had the lowest ULC (and therefore more cost competitive) than all the other types of firms.

Table 3: Average estimated ULC, WPW and VAPW based on firm characteristics

Firm characteristic		ULC	WPW	VAPW
Exporting	Non exporting firm	0.22	4425.19	28833.90
	Exporting firm	0.07	7684.14	96506.09
Employment size	Small	0.16	4755.81	28182.49
	Medium	0.31	4042.40	50011.28
	Large	0.34	5254.67	53158.19
Origin of ownership	National	0.12	4234.79	31774.90
	Foreign	0.90	7262.67	57097.53
	Joint	0.08	7216.29	49893.05
Sector	Public	0.29	3411.33	37709.95
	Private	0.20	4739.17	34585.18
	Mixed	0.61	10488.38	118627.88

Source: Author's calculation using ASIP panel (2008-2016)

Table 4: ULC, WPW, and VAPW by firm size using CIP 2013 data

Firm type	ULC	WPW	VAPW
Micro	0.472291	1615.2051	5136.217
Small	0.455023	2206.3004	11569.79
Medium	0.373962	5257.0144	36740.57
Large	0.423728	8281.6027	49625.59

Source: Author's calculation using CIP 2013 data

We further estimated the values of ULC, WPW and VAPW for each manufacturing sub sector as seen in appendix table 3. We then present the 7 top performing subsectors and 7 at the bottom performance on each measure (see table 5). We find that, based on all three measures, Manufacture of computer, electronic and optical products, wearing apparel and beverages are the best performing subsectors while the other manufacturing sub sectors (including sports goods, games and toys and musical instruments to mention a few) performed poorly than all sub sectors. Although the textile subsector performs well in terms of ULC, it is associated with lower VAPW and WPW suggesting low level of productivity. Other transport equipment subsector performs well in 3 indicators (VAPO, WPW and VAPW) although it performs poorly in ULC.

We then added another variable (not those used in calculating ULC), that is Value Added Per Output (VAPO) to see how these subsectors perform. The results are presented in the 5th column of table 5. The values in this column are however computed averages for 3 years rather than 8 years as available in the panel. This is because as we noted earlier, the gross output variable in the ASIP panel is available only for 3 years (2013, 2015 and 2016). Taking into account the VAPO indicator, only Computer, electronic and optical products remains in the top 7 across all indicators. While beverages and wearing apparel subsectors do not feature in the top 7 of VAPO indicator, they are not far off that list (0.459, 9th and 0.467, 8th respectively) and when compared to the first (Repair and installation machine, 0.542) the gap is small.

Table 5: Ranking of Top 7 and Last 7 manufacturing subsectors based on ULC, WPW and VAPW

	ULC	WPW	VAPW	VAPO
Best 7	Coke and refined petroleum products	Wearing apparel	Wearing apparel	Repair and installation of machinery and equipment
	Beverages	Other transport equipment	Tobacco products	Computer, electronic and optical products
	Computer, electronic and optical products	Computer, electronic and optical products	Computer, electronic and optical products	Manufacture of wood and of products of wood and cork, except furniture;
	Textiles	Fabricated metal products, except machinery and equipment	Motor vehicles, trailers and semi-trailers	Pharmaceuticals, medicinal chemical and botanical products
	Wearing apparel	Tobacco products	Beverages	Furniture
	Fabricated metal products, except machinery and equipment	Beverages	Rubber and plastics products	Other transport equipment
	Chemicals and chemical products	Pharmaceuticals, medicinal chemical and botanical products	Other transport equipment	Fabricated metal products, except machinery and equipment
Last 7	Other transport equipment	Paper and paper products	Electrical equipment	Other manufacturing
	Printing and reproduction of recorded media	Basic metals	Basic metals	Basic metals
	Pharmaceuticals, medicinal chemical and botanical products	Motor vehicles, trailers and semi-trailers	Repair and installation of machinery and equipment	Electrical equipment
	Rubber and plastics products	Textiles	Printing and reproduction of recorded media	Paper and paper products
	Other non-metallic mineral products	Other manufacturing	Textiles	Machinery and equipment n.e.c
	Electrical equipment	Food products	Furniture	Rubber and plastics products
	Other manufacturing	Furniture	Other manufacturing	Coke and refined petroleum products

Source: Author's calculation using ASIP panel (2008-2016)

3.2.4 Manufacturing Export Competitiveness Index (MECI)

This method stems from the work of Wignaraja and Taylor (2003) who adopted the technology and innovation approach in developing the Manufacturing Exports Competitiveness Index for 80 developing countries. The index uses three variables, namely:

a) Manufactured Exports per capita;
b) Average annual growth rate of manufacturing exports; and
c) Technology-intensive exports as percentage of total merchandise exports (Wignaraja and Joiner, 2004).

By looking at these variables, the index is able to assess a country's current position in the export market, the dynamism of manufactured export over time and the degree to which a country's exports are technology intensive (Wignaraja and Taylor, 2003). The calculation of MECI followed generally two steps as elaborated in Wignaraja and Joiner (2004). First, for each variable, an index is calculated and subsequently (in the second step), a weighted sum of the three resulting indices called the MECI is estimated. In this study we calculated the index of each variable using the following formulae:

$$Index = \frac{Actual\ Value - Minimum\ Value}{Maximum\ Value - Minimum\ Value} \quad \ldots\ldots (3)$$

The actual value refers to the value of the variable on a given year for which we want to calculate the index; while the maximum and the minimum values refers to such values as identified from the sample of the study. Using the indices we obtained (as estimated from equation 3), we then estimated the MECI values using the following method:

$$MECI = {}^{1}/_{3} * (Manufactured\ Exports\ per\ caapita\ index + Average\ Manufactured\ Exports\ growth\ index + Technology\ intensive\ exports\ index) \quad \ldots\ldots (4)$$

The calculation of the index resembles that used by UNDP (2003) in preparing Human Development Index (UNDP, 2003, p. 341). However, the availability of technology intensive manufactured exports data was a challenge, which we addressed by proxying this variable with Manufacture Value Added (MVA) as a percent of GDP as used by Wignaraja and Joiner (2004)[12]. We used the MECI to know where the competitiveness of Tanzania manufactured exports stands in relation to that of other countries. Other countries selected for this study include those forming the EAC, ECOWAS and SADC given similarities of their economic structure with that of Tanzania, and the importance of the regional market (see the list of countries in appendix table 1). For Manufactured Exports per capita and share of MVA in GDP we have used data for the year 2016 while average growth of manufactured exports was calculated for a period between 2000 and 2016. In computing the MECI, we constructed and used a panel data set consisting of manufactured export per capita and MVA as a percent of GDP for the year 2016; and average manufactured export growth for the period between 2006 and 2016. The panel is constituted by 20 countries (See Table 1).

[12] *Wignaraja and Joiner (2004) argued that for small countries the technology intensive exports data is un available or not distinctive enough and therefore they came up with Small States Manufacture Export Competitiveness Index which is similar to MECI in all steps of calculation except where they proxy Technology Intensive Export index with Manufacture Value Added.*

3.2.4.1 Performance on the MECI

As part of our analysis, we estimated the MECI and then present the results in table 6. In summary, table 6 shows the individual index score (for each individual factor that constitute the MECI that is manufactured exports per capita, share of MVA in GDP and average growth of manufactured exports) and their respective ranking for each country. Table 6 further shows MECI score for each country and ranks them based on such scores from highest to lowest.

Table 6, shows that Tanzania is one of the countries at the bottom (17th out of 20 countries) with MECI estimate of 0.1419 while Botswana, Madagascar, Nigeria, Mauritius and South Africa occupied the five top- most positions with MECI values in the range of 0.4274 to 0.2932 respectively. Wignaraja and Joiner (2004) found similar results where Botswana, Mauritius and Namibia performed well in their MECI ranking. Table 6 further shows that, Tanzania ranks lower than her neighbors; that is Kenya (0.1560, 15th), Burundi (0.1464, 16th), Uganda (0.176, 13th), and Rwanda (0.2209, 9th). In terms of individual index, Tanzania performs well in average growth of manufactured exports index (0.1287, 9th) than in manufactured exports per capita (0.1701, 13th) and in share of MVA in GDP (0.1177, 14th). The countries at the top five positions (i.e. Botswana, Madagascar, Mauritius and South Africa) performed poorly in average growth of manufactured exports index while those at the bottom five positions (including Burundi, Angola, Tanzania, Malawi and Niger) performed poorly in manufactured exports per capita index and in share of MVA in GDP index.

Countries such as Mauritius, Botswana and South Africa have a relatively more matured industrial sector with much stronger share of MVA in GDP and Manufactured Exports per capita than average annual growth of manufactured exports. Only Nigeria has attained a high MECI ranking based on a good performance in average annual growth of manufactured exports. Although the bottom countries performed better than the top ranked countries in terms of average growth of manufactured exports, their poor performance in terms of MVA share in GDP and in Manufactured Exports per capita implies they have a small manufacturing sector and growth of their manufactured exports occurs from a very low base. Surprisingly, table 6 also shows Burundi has more competitive edge over Tanzania despite Tanzania performing better (compared to Burundi) in areas of share of MVA in GDP and in manufactured exports per capita (see appendix table 4) implying average annual growth of manufactured exports has enhanced the overall performance of MECI for Burundi[13]. However, the small size of manufacturing sector in Burundi implies that the strong performance in average annual growth in manufactured exports occurs from very small values of manufactured exports.

13 Despite Tanzania outperforming Burundi in share of MVA in GDP and Manufactured Exports per Capita indices, the difference in index magnitude is small while Burundi's Average annual growth of manufactured exports index is approximately 4 times that of Tanzania. This maybe the reason why Tanzania's better performance in those two pillars did not make a difference in the overall MECI ranking. Never the less, If we remove the average growth of manufactured exports index in calculating the MECI, we find that Tanzania is ranked 13th above Nigeria, Burundi, Uganda, Rwanda, Malawi, Angola and Niger (See appendix table 4)

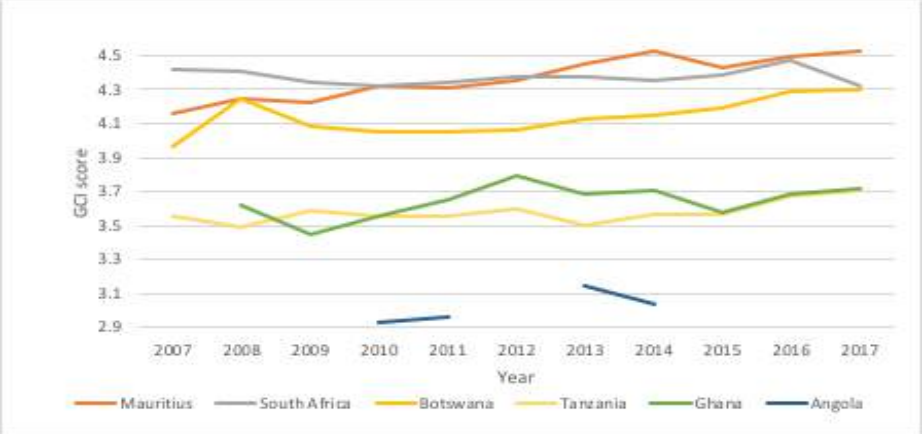
Table 6: Estimates of MECI for selected countries in the sample

Country	MECI Index		Manufactured Exports per Capita		Share of MVA in GDP		Average annual growth of Manufactured Exports	
	Index	Rank	Index	Rank	Index	Rank	Index	Rank
Botswana	0.4274	1	1.0000	1	0.0401	19	0.0513	18
Madagascar	0.3985	2	0.1828	10	1.0000	1	0.0846	15
Nigeria	0.3430	3	0.0000	20	0.1433	13	1.0000	1
Mauritius	0.3256	4	0.6238	2	0.2534	3	0.0000	20
South Africa	0.2932	5	0.5120	3	0.2428	5	0.0518	17
Namibia	0.2807	6	0.5041	4	0.2127	8	0.0508	19
Senegal	0.2336	7	0.2439	5	0.3711	2	0.0824	16
Ghana	0.2326	8	0.2386	7	0.2156	7	0.2414	6
Rwanda	0.2209	9	0.0896	17	0.0583	18	0.5585	2
Mozambique	0.2190	10	0.1780	12	0.1440	12	0.3487	4
Ivory Coast	0.2019	11	0.2420	6	0.2525	4	0.0979	13
Zimbabwe	0.1790	12	0.1818	11	0.2297	6	0.1247	11
Uganda	0.1760	13	0.1385	14	0.1443	11	0.2579	5
Zambia	0.1569	14	0.2110	8	0.1139	15	0.1277	10
Kenya	0.1560	15	0.2004	9	0.1554	10	0.0974	14
Burundi	0.1464	16	0.0052	19	0.0000	20	0.4811	3
Tanzania	0.1419	17	0.1701	13	0.1177	14	0.1287	9
Angola	0.1340	18	0.1325	15	0.0863	16	0.1838	8
Malawi	0.1214	19	0.0899	16	0.1682	9	0.1165	12
Niger	0.1071	20	0.0578	18	0.0622	17	0.2178	7

Source: Authors calculations using secondary data from World Development Indicators

More generally, these results show that, countries which are doing well in the MECI index such as Mauritius, South Africa and Botswana are also doing well in the GCI ranking (See figure 6). This implies that the general national level competitiveness has implications on competitiveness of a country's manufactured exports. However, countries such as Ghana whose performance in GCI has been close to Tanzania have performed far better in MECI ranking (8th position) compared to Tanzania and have surpassed the country in all MECI sub pillars.

Figure 8: GCI trend for selected countries 2007-2017



Source: World Economic Forum Global Competitiveness Index

3.2.5 Conclusion

Our analysis of competitiveness covered Tanzania as a whole and the manufacturing sector in particular. We find that Tanzania's Global Competitiveness has been improving gradually since 2007 where the country has performed well in terms of institutions and macro-economic environment pillars. However, high dependence on hydroelectric power meant drought problems of 2012 had adverse impact on quality of electricity supply and together with poor quality of infrastructure, factors which regressed the country's competitiveness performance in 2013. The effect of this was reflected in terms of high fuel costs in the manufacturing sector in 2013 and in 2015 and consequently some firms had negative Unit Labour Costs.

Furthermore, we find that exporting firms have lower unit labor costs (ULC) coupled with higher VAPW and WPW than non-exporting firms, showing that exporting firms are much more competitive than non-exporting firms. In addition, firms with foreign ownership are more competitive (have lower ULC) than those that are locally owned. More generally, private owned firms are more cost competitive compared to either firms owned by Public alone or those under Public – Private Partnership. We also found large firms to have higher VAPW and WPW. In particular, the VAPW for small firms are relatively very small suggesting low productivity. Similarly, using the Census of Industrial Production (CIP) data from the NBS, we find that micro and small firms have higher ULC than either large firm or medium firms.

Compared to other sectors, the ICT, beverages and apparel sector appears to perform much better in terms of ULC, VAPW and WPW. We also find that, overtime ULC for manufacturing sector has been increasing rapidly implying that the manufacturing sector has been losing its competitiveness compared to other industrial subsectors. Although the MECI index ranks Tanzania lower than Burundi and Uganda, the results need a cautious interpretation especially because the relatively stronger performance of those countries arise from a significant annual average growth of manufactured exports, which is computed from very low base. To confirm this argument, we recalculated the index (MECI) by removing the average annual growth pillar in the calculation. The results put Tanzania at the rank of 13th position (4 positions higher than before) and above Nigeria, Burundi, Uganda, Rwanda, Malawi, Angola and Niger. This shows that, contrary to these countries, Tanzania's MECI performance depends more on share of MVA in GDP and in Manufactured Exports per capita which is a good signal of a stronger sector.

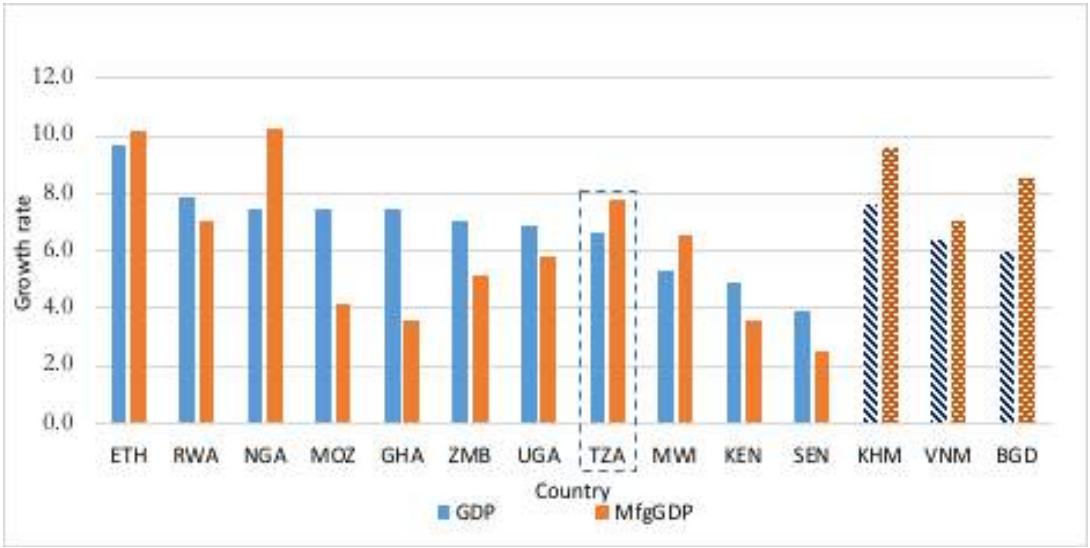
Although devaluation of currency appears to be a convincing way to enhance the competitiveness of manufacturing exports from the macroeconomics perspectives, the inflationary consequences of such devaluation suggests perhaps the right approach should be to promote exports by lowering high costs of production and improving productivity. Such an approach requires a firm understanding of the drivers of productivity. The following section explores this approach by examining trends and identifying the determinants of productivity growth in the manufacturing sector.

4 DRIVERS OF PRODUCTIVITY GROWTH IN THE MANUFACTURING SECTOR

4.1 Introduction

There is no doubt that a healthy manufacturing sector can help to bridge the gap in income levels between rich and poor countries (Rodrik 2013). In some African countries manufacturing appears to be performing well. For example, in Tanzania – one of the most rapidly growing African economies – value added in manufacturing grew more rapidly than GDP (Figure 9). In fact, manufacturing value added grew more rapidly in Tanzania than it did in Vietnam (VNM) over the period 2000-2016 – albeit from a lower base. Manufacturing employment also grew rapidly in the country (Figure 4.2). A good deal of the expansion in the manufacturing sector occurred in the informal sector (Diao et al. 2018). Growth in these countries has been accompanied by a significant increase in the demand for locally produced services and goods – a natural part of the development process (Lewis 1979).

Figure 9: GDP and Manufacturing GDP Annual Growth Rate, 2000-2016 (%)



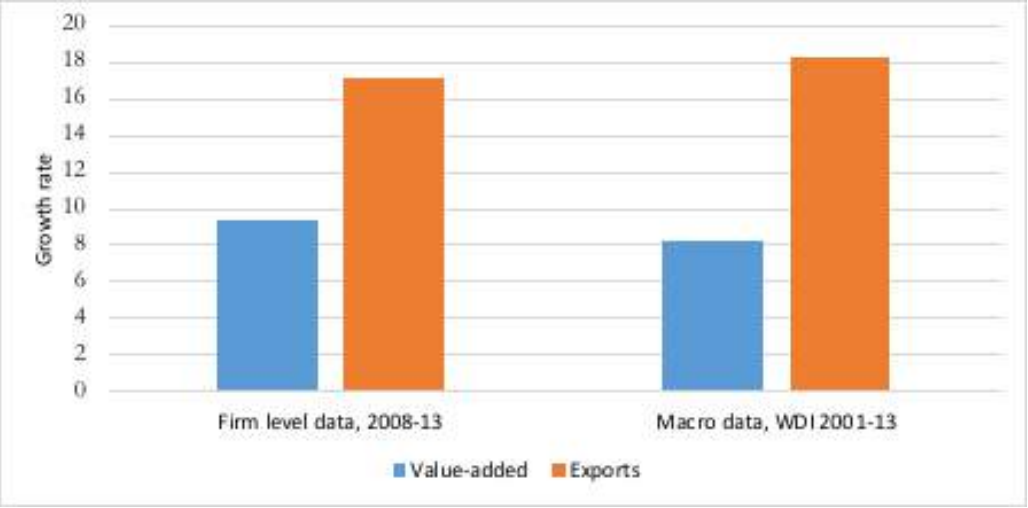
Source: Author's calculations using World Development Indicators data.

But while growth in informal manufacturing is not a problem per se, it will not be a driver of economy wide productivity growth. In fact, the growth in informal manufacturing may be one of the explanations for the poor within sector productivity growth in manufacturing documented by Diao et al. 2017. But there are at least two other plausible explanations. The first is the difficulty of measuring output in the informal sector.[14] A more worrying explanation would be poor performance in the formal manufacturing sector.

To disentangle these explanations, we examine the performance of formal manufacturing firms in Tanzania using firm level census data for the period 2008-2016 (Tanzania). We set the stage for this analysis by describing Africa's recent growth boom and comparing it with growth in low income Asian countries (based on work by Diao et al. 2017b). Next, we turn to an examination of firm performance in the formal manufacturing sector of Tanzania. We conclude this analysis by laying out key challenges to and opportunities for manufacturing in Tanzania.

To better understand it, we begin with a comparison of the national accounts and comtrade data to aggregates constructed using Tanzania's Annual Survey of Industrial Production, a census of manufacturing firms in Tanzania. Annualized growth rates are reported in Figure 10 for the period 2001 to 2013 using macro data and for the period 2008 to 2013 using firm level data, as the firm level data are only available beginning in 2008. The results reveal a remarkable similarity between the firm level statistics and the national accounts and trade data. The implication is that all of the growth in manufacturing value added is coming from the formal sector – a point to which we shall return. They also reveal that the value of Tanzania's manufacturing exports grew rapidly; to exclude re-exports, we went through the products item at the HS 6-digit code and removed all items that are not produced domestically based on the firm surveys. Thus, our export numbers are smaller than those reported in UN comtrade.

Figure 10: Annual Growth Rate of Value-added and Exports from Firm Data and Macro Data (%)

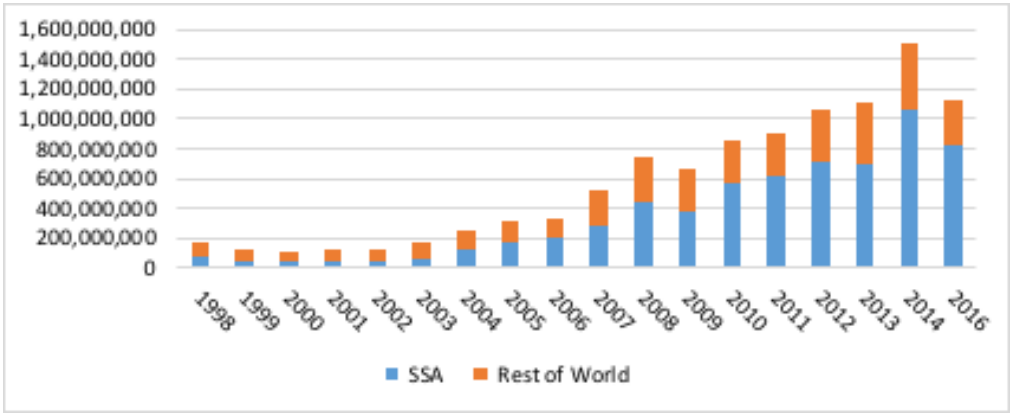


Source: Author's calculations from various data sources.

14 This is because the employment numbers used for the productivity calculations often come from population censuses while the value added numbers are based on national accounts. Estimating the output of the informal sector is notoriously difficult since these businesses typically do not pay taxes and are often run out of the household; by contrast employment is easier to count.

Note: The annual growth rate for TZA 2008-2013 is the compounded annual growth rate calculated from two years' data. The firm-level data are aggregates calculated from the Annual Survey of Industrial Production (ASIP) for 2008 and Census of Industrial Production (CIP) for 2013, obtained from the National Bureau of Statistics in Tanzania. Manufacturing value-added macro data is from the World Development Indicators, and manufacturing export data is from the BACI International Trade database.

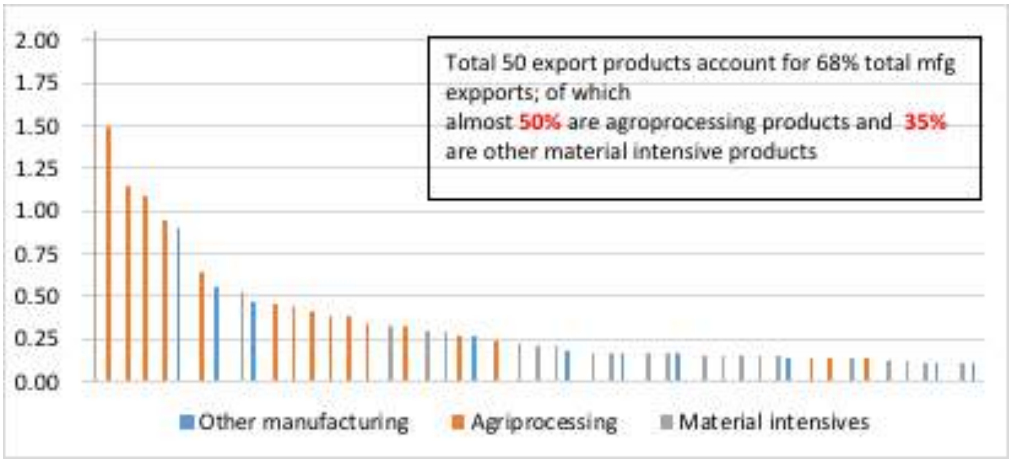
Figure 11: Tanzania Manufactured Exports and their destination, 1998-2016 (Figures in USD)



Source: Author's calculations using data from the BACI International Trade database.

Figure 12 based on trade data further reveals the steady upward trend in the value of exports from Tanzania. It also reveals a striking pattern in the destination of exports from Tanzania: a large majority of the country's exports go to other countries in Africa. Note that the patterns observed in Tanzania are not driven by re-exports since we have excluded them.

Figure 12: Tanzania's Share of Exports of Top 50 Manufacturing Products in GDP (2013-2016)



Source: Author's calculations using data from the BACI International Trade database.

Next, we dig into the product composition of exports from Tanzania. To do this, we examine the top 50 export

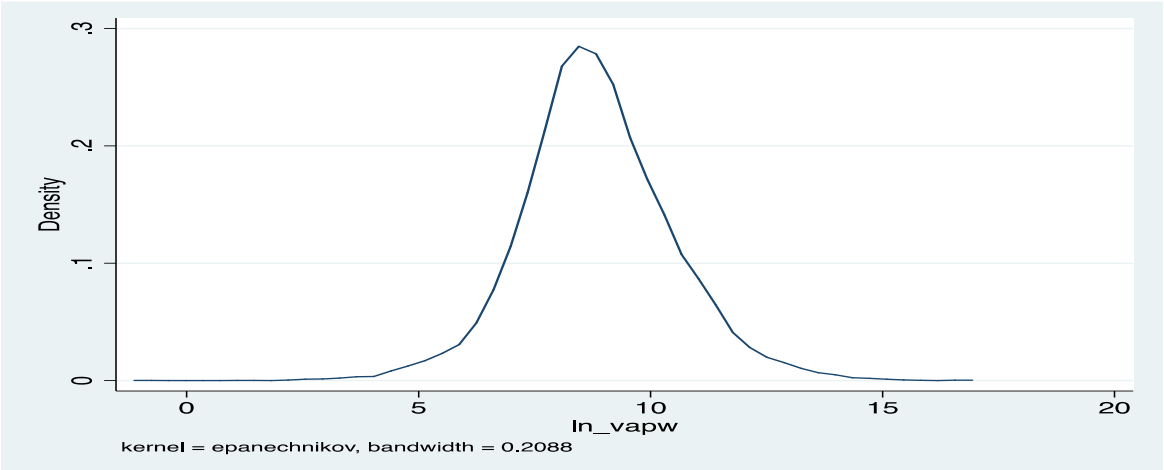
products in the country and classify them by industry. Figure 15 shows that 85 percent of Tanzania's export products are resource intensive with 50 percent classified as agri-processed goods and another 35 percent classified as material intensive products. The agri-processed goods consist of items like bottled juices, cooking oils and packaged flour while the resource intensive products consist of items such as wood products and furniture, household articles made from plastic materials, and construction materials such as cement, glass, and ceramic products. Tanzania also exports textile products, but its' share in total manufacturing exports is small at less than 10 percent.

4.2 Firm Level Determinants of Employment and Labor Productivity

Our analysis of the performance of the manufacturing sector is based on firm-level census data from the Annual Survey of Industrial Production (ASIP) in Tanzania. The survey was conducted in 2008-2012, 2013, and 2015-2016 and these data are newly available in panel form. Each year, the ASIP is a census of all large industrial establishments in mainland Tanzania. These are classified as establishments engaged in mining/quarrying, manufacturing, or electricity, gas and water supply, with ten or more workers engaged. In this section, we use the ASIP data—restricted to only firms in the manufacturing sector—to examine relationship between observable firm characteristics and performance, and develop a micro perspective on the performance of the formal manufacturing sector.

We model the relationship between our performance measures and firm characteristics using both pooled OLS and firm fixed effects. Using firm-level fixed effects allows us to control for any unobserved heterogeneity within firms that does not change over time—for example, the education of the entrepreneur or the corporate culture within the firm. This gives us more confidence that the relationships between firm characteristics and our explanatory variables revealed in the results are not the result of some third, unobserved factor that is related to both performance and the explanatory variable. It is important to note that these results are not causal. Reverse causality could be an issue, and revealed correlations between firm characteristics and performance may be explained by unobserved factors that affect both our explanatory and outcome variables. While the fixed effects model helps by controlling for time-invariant unobserved factors at the firm level, there may still be unobserved, time-variant factors affecting our results. However, there are still valuable insights that can be gained from understanding the characteristics of the firms that are performing well in the formal manufacturing sector in Tanzania.

Figure 13: Kernel Density of ln (VAPW)



Source: Author's calculation using Tanzania Annual Survey of Industrial Production, 2008-2016

We evaluate firm performance in terms of two measures—labor productivity and employment. Labor productivity is measured in terms of value-added per worker. Figure 13 plots the kernel density of value-added per worker and shows that there is significant heterogeneity in its level among manufacturing firms in Tanzania. Employment is measured in terms of the number of workers engaged by a firm. For our analysis, we consider how firm characteristics relate to the levels of each of these measures and also how they relate to rates of growth (measured from year-to-year) of each measure.

We consider several firm characteristics that may be related to performance. These include whether the firm exports, its form and origin of ownership, whether it trains its employees, whether it operates at full capacity, the value of its capital, and its age. When considering the relationship between labor productivity (or growth of labor productivity) and firm characteristics, we also include firm size, as measured by employment.

Our Model

The relationship between our measures of firm performance and the various firm characteristics is estimated using the following equation:

$$y_{it} = \partial_{1it}(export) + \partial_{2it}(private) + \partial_{3it}(mixed) + \partial_{4it}(foreign) + \partial_{5it}(training) + \partial_{6it}(low\ capacity) + \beta_{1it}(\ln\_emp) + \beta_{2it}(\ln\_emp^2) + \beta_{3it}(ln\_capital) + \beta_{4it}(ln\_age) + \mu_{4it}\mathbb{Z} + \epsilon_{it}$$

Where represents one of our four outcome variables—the log of either labor productivity employment, or the growth rate of either labor productivity or employment—for firm i in year t. is a dummy variable equal to one if the firm exports any amount of its production, and zero otherwise. is a dummy variable equal to one if the firm is privately owned, and zero otherwise. is a dummy variable equal to one if the firm has mixed ownership, and zero otherwise. is a dummy variable equal to one if the firm reports being foreign or joint foreign-domestically owned, and zero otherwise. is a dummy variable equal to one if the firm spends anything on labor training, and zero otherwise. is a dummy variable equal to one if the firm reports operating at less than 80 percent capacity, and zero otherwise.

is our variable for employment (firm size), measured as the natural log of the total number of persons engaged in the firm. To allow for a non-linear relationship between firm performance and size, we also include its square, . These employment-based measures of firm size are excluded when employment is our outcome variable. is the natural log of the value of capital stock, where capital stock is measured as the average of the value of capital (land, building, machinery, etc.) at the beginning and end of the reporting period. is the natural log of firm age.

Finally, represents a set of controls. In the pooled OLS model, this includes year, subsector, and region dummies. In the fixed effects model, we only include year and subsector dummies, as region is constant for each firm over time and is therefore automatically omitted by the fixed effects model. We introduce these controls gradually, such that in each table of results, columns 1-2 do not include any controls, columns 3-4 include year dummies, columns 5-6 includes year and region dummies, and columns 7-8 includes year, region, and subsector dummies.

4.3 Analysis of Labor Productivity and Employment in Levels

Table 7 presents the results for the log of value-added per worker, while Table 8 presents the results for the log of employment. Table 9 presents the results for the growth rate of value-added per worker, and Table 10 presents the results for the growth rate of employment. In the discussion below, we primarily report the coefficients for the regressions in columns 7-8, which include all of the firm controls (year, region, and subsector).

We begin our discussion with the results for the levels of our performance measures. The pooled OLS results in Table 7 show that if a firm exports its product, this corresponds to a 79.1 percent increase in labor productivity; meanwhile, if it is foreign-owned, this corresponds to a 41 percent increase in labor productivity. And if the firm spends on labor training, this corresponds to a 29.3 percent increase in labor productivity.

According to the firm fixed effects, however, once we control for unobserved time-invariant heterogeneity within firms, the relationship between exporting and labor productivity declines in magnitude (in this case exporting corresponds to a 46.4 percent increase in labor productivity), while the relationship between foreign ownership and labor training and labor productivity becomes insignificant. These results reinforce the common perceptions that foreign-owned firms and firms engaged in foreign trade may be more efficient, and with the intuition that spending money on labor training would correlate with labor productivity. However, they also show that once we control for unobserved heterogeneity within firms, these characteristics become less important. This suggests that these coefficients might be based on factors such as management experience or business culture.

The results for form of ownership (public vs. private vs. mixed) also fit in with this possibility. The pooled OLS results in table 3.6 suggest that, as compared to public ownership, private ownership of firms corresponds to a 17.7 percent increase in labor productivity, and mixed ownership corresponds to a 35.5 percent increase. Both of these relationships become insignificant when we estimate the relationship with the fixed effects model. This indicates that private sector firms are more productive than public sector firms, likely due to time-invariant characteristics such as the business culture.

Table 7: Determinants of Log (VAPW)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Pooled OLS	Firm fixed effects	Pooled OLS	Firm fixed effects	Pooled OLS	Firm fixed effects	Pooled OLS	Firm fixed effects
Firm exports (dummy)	0.584***	0.403***	0.567***	0.380***	0.541***	0.380***	0.583***	0.381***
	(0.0601)	(0.0739)	(0.0606)	(0.0733)	(0.0605)	(0.0733)	(0.0608)	(0.0733)
Form of ownership: private	0.163**	-0.0224	0.170**	-0.0630	0.132	-0.0630	0.163**	-0.0468
	(0.0824)	(0.113)	(0.0826)	(0.112)	(0.0810)	(0.112)	(0.0824)	(0.112)
Form of ownership: private-public	0.260	-0.135	0.257	-0.130	0.258*	-0.130	0.304**	-0.117
	(0.166)	(0.197)	(0.165)	(0.194)	(0.156)	(0.194)	(0.153)	(0.194)
Foreign-owned	0.373***	0.00542	0.370***	0.00279	0.361***	0.00279	0.344***	-0.0161
	(0.0447)	(0.0639)	(0.0445)	(0.0632)	(0.0442)	(0.0632)	(0.0447)	(0.0634)
Firm spends on labor training (dummy)	0.294***	0.0193	0.307***	0.0427	0.311***	0.0427	0.257***	0.0537
	(0.0425)	(0.0509)	(0.0419)	(0.0503)	(0.0418)	(0.0503)	(0.0422)	(0.0503)
Firm is operating at <80% capacity (dummy)	0.122***	0.0822**	-0.261***	-0.278***	-0.274***	-0.278***	-0.243***	-0.285***
	(0.0321)	(0.0408)	(0.0462)	(0.0582)	(0.0461)	(0.0582)	(0.0459)	(0.0583)
Log(employment)	0.482***	-0.710***	0.503***	-0.649***	0.369***	-0.649***	0.306***	-0.632***
	(0.0756)	(0.168)	(0.0748)	(0.166)	(0.0729)	(0.166)	(0.0751)	(0.167)
Log(employment) ^2	-0.0680***	-0.000205	-0.0698***	-0.00526	-0.0611***	-0.00526	-0.0543***	-0.00773
	(0.00797)	(0.0192)	(0.00785)	(0.0190)	(0.00773)	(0.0190)	(0.00800)	(0.0190)
Log(capital)	0.180***	0.100***	0.182***	0.0892***	0.210***	0.0892***	0.194***	0.0903***
	(0.00925)	(0.0116)	(0.00911)	(0.0116)	(0.00845)	(0.0116)	(0.00855)	(0.0116)
Log(firm age)	0.0855***	0.168***	0.0996***	0.0939***	0.0850***	0.0939***	0.0875***	0.0906**
	(0.0162)	(0.0328)	(0.0160)	(0.0354)	(0.0161)	(0.0354)	(0.0166)	(0.0355)
Constant	5.405***	9.724***	5.070***	9.610***	4.991***	9.610***	5.244***	9.533***
	(0.169)	(0.379)	(0.175)	(0.377)	(0.207)	(0.377)	(0.213)	(0.392)
Year controls	NO	NO	YES	YES	YES	YES	YES	YES
Region controls	NO	NO	NO	NO	YES	N/A	YES	N/A
Industry Controls	NO	NO	NO	NO	NO	NO	YES	YES
Observations	7,401	7,401	7,401	7,401	7,401	7,401	7,401	7,401
R-squared	0.206	0.093	0.221	0.118	0.275	0.118	0.293	0.128
Number of id		3,278		3,278		3,278		3,278

Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

The pooled OLS results indicate that while employment (firm size) is positively correlated with labor productivity—a 1 percent increase in employment corresponds to a 0.31 percent increase in labor productivity—this effect diminishes as employment increases. The fixed effects results, on the other hand, suggest that, once unobserved, time-invariant heterogeneity is removed, employment (firm size) is negatively correlated with labor productivity and a 1 percent increase in firm size corresponds to a 0.63 percent decrease in labor productivity.

The results in Table 7 further show that if the firm is operating at low capacity, this corresponds to a 21.6 percent decrease in labor productivity; this result is consistent with the fixed effects model, which suggests that low capacity corresponds to a 24.8 percent decrease in labor productivity. Meanwhile, a firm's level of capital is positively correlated with labor productivity—a 1 percent increase in a firm's level of capital corresponds to a 0.19 percent increase in its labor productivity; in the fixed effects model, it corresponds to a 0.09 percent increase. Older firms also tend to have higher labor productivity—a 1 percent increase in firm age corresponds to approximately a 0.09 percent increase in labor productivity in both the pooled OLS and fixed effects model.

Table 8 shows the relationship between firm characteristics and levels of employment. Exporting corresponds to an 81.7 percent increase in employment (this effect becomes insignificant in the fixed effects model), while foreign ownership corresponds to a 44 percent increase (or 5.2 percent increase in the fixed effects model), and spending on labor training corresponds to a 31.7 percent increase (this becomes insignificant in the fixed effects model). The sign and magnitude of these relationships are very similar to those in table 3.6.

In contrast to the labor productivity results in table 7, the pooled OLS results in table 3.7 suggest that, in comparison to public ownership, private ownership corresponds to a 17.1 percent decrease in employment, while private-public ownership corresponds to a 23.1 percent decrease. Both of these relationships become insignificant in the fixed effects model. This is likely because these variables don't change much over time and so their effect is largely diminished by the firm fixed effects. These results indicate that public sector firms employ more workers than private sector firms.

Similar to the results in table 7, operating at low capacity is negatively related to performance, this time in terms of employment—it corresponds to a 5 percent decrease in employment (this becomes insignificant in the fixed effects model). Capital and firm age are both positively correlated with employment. A 1 percent increase in the value of capital corresponds to a 0.18 percent increase in employment; when we estimate the relationship with a fixed effects model, this changes to a 0.01 percent increase. A 1 percent increase in age corresponds to a 0.10 percent increase in employment; when we estimate the relationship with a fixed effects model, this changes to a 0.05 percent increase.

Table 8: Determinants of Log (employment)

VARIABLES	(1) Pooled OLS	(2) Firm fixed effects	(3) Pooled OLS	(4) Firm fixed effects	(5) Pooled OLS	(6) Firm fixed effects	(7) Pooled OLS	(8) Firm fixed effects
Firm exports (dummy)	0.696***	-0.00192	0.678***	0.00202	0.623***	0.00202	0.621***	0.000747
	(0.0413)	(0.0264)	(0.0413)	(0.0265)	(0.0409)	(0.0265)	(0.0412)	(0.0265)
Form of ownership: private	-0.156***	-0.0121	-0.144***	-0.00665	-0.162***	-0.00665	-0.187***	9.39e-05
	(0.0552)	(0.0416)	(0.0552)	(0.0417)	(0.0535)	(0.0417)	(0.0504)	(0.0417)
Form of ownership: private-public	-0.269***	-0.0459	-0.269***	-0.0424	-0.212**	-0.0424	-0.263***	-0.0308
	(0.0945)	(0.0716)	(0.0940)	(0.0715)	(0.0917)	(0.0715)	(0.0917)	(0.0716)
Foreign-owned	0.475***	0.0460**	0.466***	0.0471**	0.419***	0.0471**	0.364***	0.0506**
	(0.0312)	(0.0233)	(0.0312)	(0.0233)	(0.0304)	(0.0233)	(0.0299)	(0.0234)
Firm spends on labor training (dummy)	0.314***	0.0258	0.306***	0.0215	0.282***	0.0215	0.275***	0.0205
	(0.0287)	(0.0187)	(0.0288)	(0.0187)	(0.0283)	(0.0187)	(0.0278)	(0.0187)
Firm is operating at <80% capacity (dummy)	-0.0865***	-0.0399***	-0.0471*	-0.0144	-0.0592**	-0.0144	-0.0509**	-0.00906
	(0.0180)	(0.0149)	(0.0255)	(0.0214)	(0.0259)	(0.0214)	(0.0257)	(0.0215)
Log(capital)	0.187***	0.0164***	0.188***	0.0164***	0.194***	0.0164***	0.182***	0.0159***
	(0.00460)	(0.00429)	(0.00460)	(0.00433)	(0.00436)	(0.00433)	(0.00458)	(0.00435)
Log(firm age)	0.127***	0.0438***	0.125***	0.0488***	0.103***	0.0488***	0.103***	0.0485***
	(0.00887)	(0.0121)	(0.00899)	(0.0132)	(0.00916)	(0.0132)	(0.00959)	(0.0133)
Constant	0.900***	3.150***	1.060***	3.169***	0.670***	3.169***	0.784***	3.102***
	(0.0751)	(0.0674)	(0.0804)	(0.0679)	(0.0963)	(0.0679)	(0.0961)	(0.0799)
Year controls	NO	NO	YES	YES	YES	YES	YES	YES
Region controls	NO	NO	NO	NO	YES	N/A	YES	N/A
Industry Controls	NO	NO	NO	NO	NO	NO	YES	YES
Observations	7,823	7,823	7,823	7,823	7,823	7,823	7,823	7,823
R-squared	0.503	0.009	0.507	0.016	0.531	0.016	0.555	0.024
Number of id		3,390		3,390		3,390		3,390

Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.)

These results suggest that many of the correlates of performance are similar for labor productivity and employment, but that private sector firms tend to have higher labor productivity while state-owned firms tend to have higher employment. Overall, 3.88 percent of firms are state-owned, while 94.88 are privately-owned and 1.24 percent are mixed. These percentages are consistent through each year, with the percent of state-ownership ranging from 3-6 percent in any given year.

The results also provide some insights into the role of foreign firms in Tanzania; this is an important issue as significant focus is directed at attracting FDI to the country, especially the manufacturing sector. Foreign firms are often perceived as higher performing—however, at times this may be a conflation of effects from exporting behavior and levels of capital, for example, which may be correlated with foreign ownership. In this case, as we are controlling for factors such as exporting behavior and the level of capital, it seems likely that the foreign ownership dummy is picking up other factors, such as management experience. This possibility is reinforced by the fact that once we control for unobserved time-invariant firm-level factors in the fixed effects model, the relationship between foreign ownership and performance becomes either insignificant or small in magnitude. Underlying the importance of this issue, the CARI/JHU in collaboration with the Tanzania National Bureau of Statistics (NBS) conducted a survey[15] in 2018 aimed at assessing the linkages and mechanisms of knowledge transfers between domestically owned and foreign firms in Tanzanian Manufacturing sector, and to understand the benefits of these relationships. The study results show that, knowledge transfer is more significant than formal links between foreign and domestic firms, and that it occurs mainly through indirect means (observations and competition). Most important benefit of the knowledge transfer is improvement in production technology, extent of which depends on owner and firm characteristics, and not on previous experience with FDI nor location in an Industrial park.

4.4 Analysis of Growth Rates of Labor Productivity and Employment

We now move on to the relationship between the growth rate of these performance measures and the firm characteristics. Table 9 shows the results for the relationship between firm characteristics and growth in labor productivity. It is immediately clear that our explanatory variables do a far worse job of explaining growth in labor productivity than they do the level of labor productivity. Exporting, form of ownership (public vs. private vs. mixed), spending on labor training, and firm age do not seem to have any relationship with the growth of labor productivity.

Table 9 shows that operating at low capacity corresponds to a 29.9 percent decrease in the growth rate of labor productivity. Meanwhile, a 1 percent increase in capital corresponds to a 0.087 percent increase in the growth rate of labor productivity; this increases to a 0.21 percent increase in the fixed effects model. The firm fixed effects results suggest that foreign ownership corresponds to a 123.2 percent increase in the growth rate of labor productivity. This result reinforces the idea discussed above, that a time-invariant within-firm factor such as management experience may be significantly and positively affecting foreign firm performance. And the firm fixed effects results suggest that a 1 percent increase in employment (or firm size) correlates to a 2.09 percent decrease in the growth rate of labor productivity.

15 The survey was funded by the JHU CARI programme and fully implemented by NBS in 2018 as an additional module in the Annual Survey of Industrial Production (ASIP). The survey covered 2,462 manufacturing firms surveyed in 2016, out of which 1,558 firms responded to the S&T transfer module. Of these 1,558 firms, a total of 1,354 were wholly domestically owned.

Table 9: Growth in VAPW

VARIABLES	(1) Pooled OLS	(2) Firm fixed effects	(3) Pooled OLS	(4) Firm fixed effects	(5) Pooled OLS	(6) Firm fixed effects	(7) Pooled OLS	(8) Firm fixed effects
Firm exports (dummy)	0.460*	0.325	0.395	0.206	0.324	0.206	0.322	0.234
	(0.245)	(0.506)	(0.244)	(0.506)	(0.247)	(0.506)	(0.250)	(0.510)
Form of ownership: private	0.176	-0.345	0.130	-0.309	0.132	-0.309	0.141	-0.199
	(0.237)	(0.861)	(0.236)	(0.856)	(0.246)	(0.856)	(0.255)	(0.862)
Form of ownership: private-public	-0.433	-0.683	-0.408	-0.870	-0.304	-0.870	-0.238	-0.616
	(0.445)	(1.426)	(0.439)	(1.417)	(0.449)	(1.417)	(0.435)	(1.426)
Foreign-owned	0.345*	0.753*	0.316*	0.811*	0.279	0.811*	0.273	0.803*
	(0.193)	(0.438)	(0.192)	(0.436)	(0.198)	(0.436)	(0.200)	(0.443)
Firm spends on labor training (dummy)	0.0219	0.0881	0.00980	0.0921	0.0395	0.0921	0.0712	0.0988
	(0.173)	(0.350)	(0.170)	(0.349)	(0.172)	(0.349)	(0.176)	(0.350)
Firm is operating at <80% capacity (dummy)	0.213	0.518*	-0.278	-0.693	-0.364**	-0.693	-0.355**	-0.687
	(0.134)	(0.274)	(0.169)	(0.443)	(0.172)	(0.443)	(0.172)	(0.449)
Log(employment)	0.0793	-2.003*	-0.0711	-1.873*	-0.180	-1.873*	-0.255	-2.093*
	(0.275)	(1.124)	(0.280)	(1.120)	(0.285)	(1.120)	(0.298)	(1.128)
Log(employment) ^2	-0.0359	0.0597	-0.0218	0.0479	-0.0108	0.0479	-0.00551	0.0698
	(0.0263)	(0.126)	(0.0268)	(0.125)	(0.0275)	(0.125)	(0.0286)	(0.126)
Log(capital)	0.0838***	0.229***	0.0755***	0.225***	0.0900***	0.225***	0.0874***	0.207***
	(0.0271)	(0.0789)	(0.0258)	(0.0790)	(0.0274)	(0.0790)	(0.0263)	(0.0802)
Log(firm age)	0.0418	-0.289	0.00233	-0.101	0.00664	-0.101	0.0124	-0.100
	(0.0640)	(0.259)	(0.0672)	(0.270)	(0.0671)	(0.270)	(0.0682)	(0.273)
Constant	-0.394	4.978*	0.303	4.672*	0.0347	4.672*	0.308	3.857
	(0.582)	(2.658)	(0.651)	(2.689)	(0.709)	(2.689)	(0.711)	(2.792)
Year controls	NO	NO	YES	YES	YES	YES	YES	YES
Region controls	NO	NO	NO	NO	YES	N/A	YES	N/A
Industry Controls	NO	NO	NO	NO	NO	NO	YES	YES
Observations	4,693	4,693	4,693	4,693	4,693	4,693	4,693	4,693
R-squared	0.006	0.019	0.024	0.035	0.029	0.035	0.038	0.040
Number of id		2,377		2,377		2,377		2,377

Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Table 10 shows the results for the growth in employment. Consistently, employment is positively correlated with employment growth, such that a 1 percent increase in employment corresponds to a 0.29 percent increase in the growth rate of employment—indicating that employment growth is more rapid in larger firms--while its square it negatively correlated with employment growth, suggesting that the relationship between higher employment and employment growth diminishes as the level of employment increases. The pooled OLS results suggest that exporting corresponds to an 8.7 percent decrease in the growth rate of employment; the firm fixed effects model suggests that exporting is insignificant. This is likely because exporter status does not change much over time, and so its effect is diminished by the fixed effects model as it removes time-invariant factors. Foreign ownership corresponds to a 3.7 percent decrease in the growth rate of employment; though this becomes insignificant once region controls are introduced, and the fixed effects model does not reveal any relationship between foreign ownership and the growth of employment.

Meanwhile, a 1 percent increase in the level of capital corresponds to a 0.02 percent decrease in the growth rate of employment; this becomes insignificant once fixed effects are introduced. A 1 percent increase in firm age corresponds to a 0.02 percent decrease in the growth rate of employment; again, this becomes insignificant once fixed effects are introduced. These results indicate that while the correlates of levels of labor productivity and employment are remarkably similar, they are not so consistent in their relationship with the growth of the respective performance metrics. These results may give us an idea of what we can expect from the contributions of different types of firms in the formal manufacturing sector. For example, it seems that while foreign firms may be able to play a role in improving productivity, they may not offer as much potential for increased employment.

Taken together, these results suggest that exporting corresponds to improved performance in terms of both labor productivity and employment, as does foreign ownership and labor training. The magnitude of exporting is the greatest, followed by foreign ownership and then labor training. All of these relationships become insignificant or smaller in magnitude when estimated with fixed effects, suggesting that the results may be driven by time-invariant factors such as management experience or business culture that are associated with exporting, foreign ownership, or labor training. The results also suggest that private sector firms have higher productivity than state-owned firms, but state-owned firms tend to employ and hire more.

Table 10: Growth in employment

VARIABLES	(1) Pooled OLS	(2) Firm fixed effects	(3) Pooled OLS	(4) Firm fixed effects	(5) Pooled OLS	(6) Firm fixed effects	(7) Pooled OLS	(8) Firm fixed effects
Firm exports (dummy)	-0.0864***	-0.0339	-0.0834***	-0.0353	-0.0867***	-0.0353	-0.0911***	-0.0434
	(0.0230)	(0.0362)	(0.0231)	(0.0363)	(0.0239)	(0.0363)	(0.0242)	(0.0366)
Form of ownership: private	0.0209	-0.0535	0.0186	-0.0560	0.0211	-0.0560	0.0234	-0.0601
	(0.0285)	(0.0609)	(0.0283)	(0.0609)	(0.0286)	(0.0609)	(0.0290)	(0.0612)
Form of ownership: private-public	-0.0227	-0.0972	-0.0218	-0.0937	-0.0246	-0.0937	-0.0218	-0.114
	(0.0444)	(0.103)	(0.0441)	(0.103)	(0.0441)	(0.103)	(0.0450)	(0.104)
Foreign-owned	-0.0408**	0.0338	-0.0395**	0.0309	-0.0372**	0.0309	-0.0297	0.0328
	(0.0176)	(0.0318)	(0.0176)	(0.0319)	(0.0178)	(0.0319)	(0.0183)	(0.0322)
Firm spends on labor training (dummy)	-0.0225	0.000269	-0.0233	0.00164	-0.0218	0.00164	-0.0226	0.000163
	(0.0161)	(0.0251)	(0.0161)	(0.0251)	(0.0162)	(0.0251)	(0.0166)	(0.0252)
Firm is operating at <80% capacity (dummy)	-0.0231**	-0.0110	0.000449	-0.0268	0.00196	-0.0268	0.00308	-0.0336
	(0.0117)	(0.0196)	(0.0157)	(0.0321)	(0.0160)	(0.0321)	(0.0159)	(0.0323)
Log(employment)	0.271***	1.048***	0.269***	1.042***	0.269***	1.042***	0.285***	1.036***
	(0.0265)	(0.0844)	(0.0263)	(0.0845)	(0.0269)	(0.0845)	(0.0286)	(0.0850)
Log(employment) ^2	-0.0204***	-0.0327***	-0.0203***	-0.0319***	-0.0199***	-0.0319***	-0.0211***	-0.0307***
	(0.00281)	(0.00956)	(0.00280)	(0.00958)	(0.00287)	(0.00958)	(0.00306)	(0.00962)
Log(capital)	-0.0143***	0.00309	-0.0149***	0.00203	-0.0159***	0.00203	-0.0151***	0.00273
	(0.00235)	(0.00573)	(0.00239)	(0.00577)	(0.00254)	(0.00577)	(0.00263)	(0.00583)
Log(firm age)	-0.0209***	-0.0164	-0.0231***	-0.0200	-0.0220***	-0.0200	-0.0218***	-0.0198
	(0.00565)	(0.0188)	(0.00576)	(0.0198)	(0.00595)	(0.0198)	(0.00632)	(0.0200)
Constant	-0.393***	-3.148***	-0.403***	-3.102***	-0.358***	-3.102***	-0.402***	-3.063***
	(0.0550)	(0.194)	(0.0578)	(0.199)	(0.0665)	(0.199)	(0.0692)	(0.206)
Year controls	NO	NO	YES	YES	YES	YES	YES	YES
Region controls	NO	NO	NO	NO	YES	N/A	YES	N/A
Industry Controls	NO	NO	NO	NO	NO	NO	YES	YES
Observations	4,738	4,738	4,738	4,738	4,738	4,738	4,738	4,738
R-squared	0.058	0.358	0.063	0.360	0.067	0.360	0.072	0.368
Number of id		2,385		2,385		2,385		2,385

Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0)

Firm characteristics' relationships with the growth of both performance metrics are varied. For example, while growth in labor productivity is positively correlated with foreign ownership and the level of capital, both of these characteristics correlate negatively with employment growth. Furthermore, the growth results are not consistent with the results for the levels of performance. For example, while older firms consistently tend to have higher levels of performance in terms of labor productivity and employment, they do not seem to experience faster growth in either performance metric.

Many of these results reinforce existing perceptions, such as the idea that foreign-owned firms perform better, while others fit in with intuition, such as the idea that spending money on labor training would be related to labor productivity. Further research is needed to better identify which factors are actually drivers of firm performance and to develop a deeper understanding of the role that different types of firms play in the performance of the formal manufacturing sector in Tanzania.

4.5 Discussion

Overall, productivity growth in the formal manufacturing sector seems healthy. This may suggest that poor economy wide performance of manufacturing in Tanzania documented in Diao et al. (2017b) is explained by the performance of informal sector manufacturing. Specifically, it seems as if employment in the informal sector is rapidly expanding and outpacing growth in value-added, leading to a decline in economy wide labor productivity. Therefore, the aggregate manufacturing performance results are consistent with the informal manufacturing sector dragging down aggregate manufacturing sector productivity growth.

The overall trend in the informal sector does not mean that there aren't productive informal sector manufacturing firms. Diao et al. (2018) confirm that there is significant heterogeneity in informal sector manufacturing firms, and that there exists a subset of productive informal firms. Regardless, activity in the informal sector is notoriously difficult to measure, and more research is needed to verify that employment outpacing value-added growth in the informal sector explains the aggregate manufacturing productivity trends in Tanzania.

We have shown that in many respects, the formal manufacturing sector in Tanzania is performing well. Labor productivity growth and export growth are rapid, though participation in global value chains is minimal. This may be good news given the prospects for entering global value chains.

In addition, Tanzania's manufacturing exports to the region rely more heavily on local resources. It is likely that firms participating in this exporting have more linkages with the local economy than firms producing for global value chains, though more research is needed to determine the extent to which these linkages can generate productivity and employment growth. Public investments in infrastructure and human capital along with pan-African trade agreements present opportunities to foster growth in firms that serve local and regional markets.

5 STRATEGIC POLICY OPTIONS FOR PROMOTING MANUFACTURING COMPETITIVENESS

5.1 Introduction

This chapter presents analysis of alternative policy choices to improve manufacturing competitiveness. The policy choices are analyzed in three ways. The first is a choice of policy reforms made by comparing impact of various alternative policy scenarios using a CGE analysis. The basic argument is that each policy choice at the disposal of the Government has a cost implication, hence the need to ensure the desired impact is significant enough to bring about the desired payoff on improved competitiveness. Thus, the objective is to support policy reform based on sound analytical insights.

The second is a choice of sectors. Indeed, selecting sectors for additional support (investment, reforms or markets etc.) is a critical ingredient of an Industrial policy. However, such selection is not as straightforward. It may reflect Political factors, Economic or Market realities. Our aim is to analyze existing information so that such selection can as objective and realistic as possible.

The final choice is building partnership with industry actors to, among other objectives, address key bottlenecks and opportunities for spurring competitiveness. This would require getting systematic feedback from the industry actors, especially those in the most competitive sectors. However, this feedback would involve consultations with industry which will be conducted as a follow-up to this report. Thus, the chapter will focus on the first two policy choices.

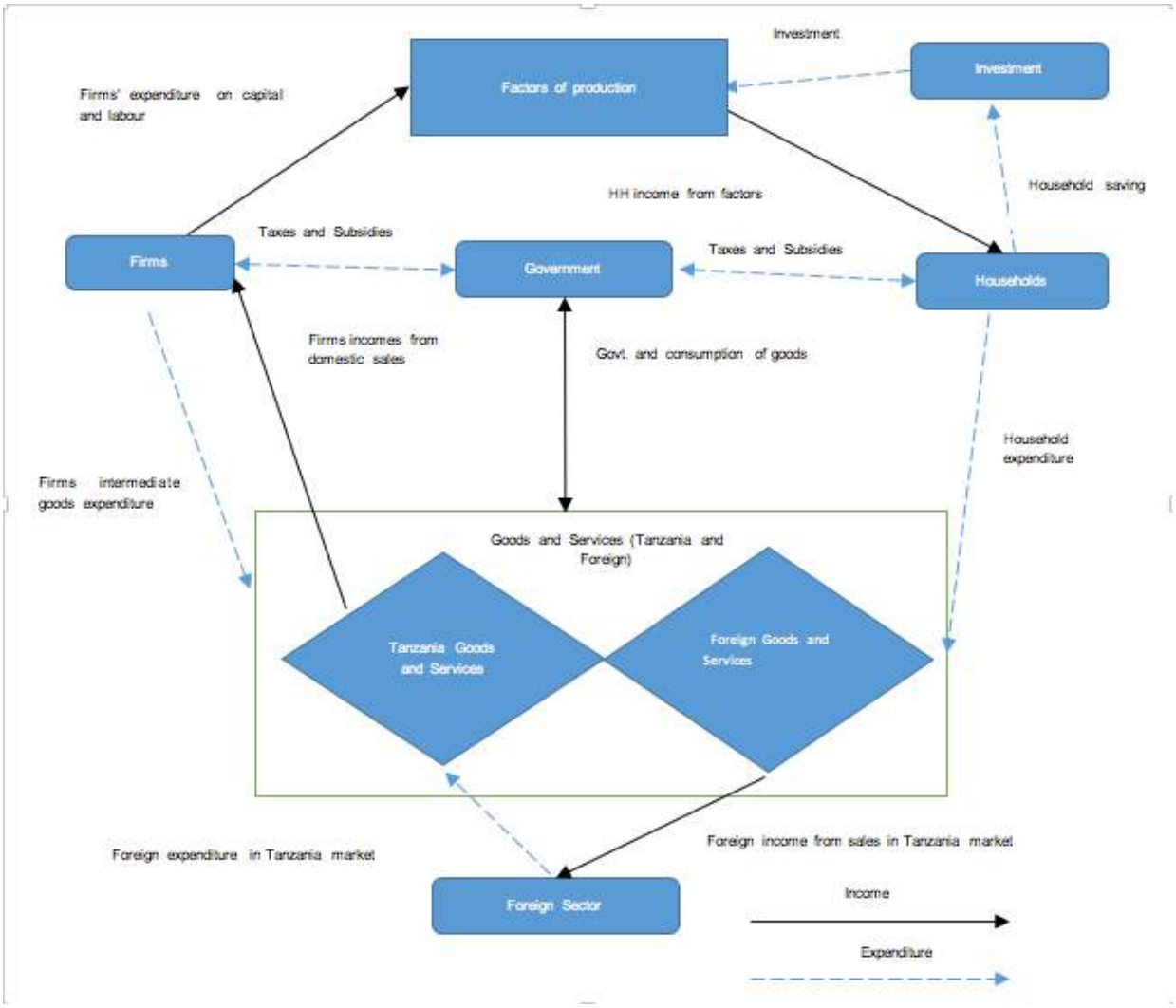
5.2 Analysis of alternative Policy Reforms

As noted above, our main analytical tool in this chapter is the Computable General Equilibrium (CGE) model that is usually used to assess economy-wide impact of policy shocks. The literature is well informative on the conceptual issues, and discourses on application of CGE modelling including its merits and demerits (see Whaley, 2016). Below we show the structure of the CGE model we use for this purpose.

5.2.1 Structure of the Model

The structure of CGE model follows the neo-classical school and is underpinned by the circular flow of income. The basic flows depicted in the model are illustrated in figure 17.

Figure14: Structure of the CGE model



The model is a fully dynamic based on rational expectation and it tracks the evolution of the economy over time (typically over 30 years) in response to a policy change. In the baseline, it is assumed the economy follows a steady-state growth path where all economic activities grow at constant rate.

One key advantage of the CGE model if that it captures interlinkages among the sectors in the supply chain across the whole economy. The model will capture both the forward and backward linkages among the all the sectors. It is hence possible to investigate the effects of an increase in competitiveness in the manufacturing sector on other sectors in the economy. For instance, we can measure the effect of an expansion of the manufacturing sector on the financial sector and the subsequent effects of an expansion of the financial sector on other sectors. The proposed model was disaggregated into 58 sectors.

The factor market consists of labour, capital and land. For each of the 58 sectors, labour is split into primary, secondary and tertiary to reflect the type of work they are involved in. Typically, CGE models assume no involuntary unemployment such that there is always full employment and zero excess capacity in labour. This assumption is not relevant for the Tanzanian economy, and as a result, we introduce structural unemployment in the model which is governed by a wage curve within a labour-leisure choice supply framework. The model also has the capability of setting up a minimum wage. This sophisticated labour market framework enabled accurate modelling of labour productivity/efficiency policies. On the other hand, capital is divided into agricultural, mining and non-agriculture to reflect the structure of the industry in Tanzania. Every year some of the existing capital stock depreciates and firms must replace obsolete capital with new capital in order to maintain output. Additional capital is replenished via investment: what is not spent on consumption can be saved and invested, leading to additional capital in the future. The model accounts for the cost of installing new capital over and above the price of capital. This can be thought of as the cost of installing new equipment or training workers to operate new machinery.

Investment in the model is subject to installation costs whereby the cost of investment is related to the current level of capital stock, the magnitude of investment and a 'cost of capital adjustment' parameter. This implies that more rapid capital accumulation becomes increasingly costly:

$$I_{j,t} = J_{j,t}\left(1 + \emptyset \frac{J_{j,t}}{2K_{j,t}}\right) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

where ø is adjustment cost of capital, I is gross investment and J is net investment. When ø is greater than zero, investment incurs additional costs over and above the purchase price of capital. This may include installation costs or learning and training costs.

There are 15 household groups in the model classified based on their activities and income level. In terms of activities, there are three main groups 'rural farm', 'rural non-farm' and 'urban'. Each of these sub categories are further split into five income quintiles. Unlike standard CGE models, in the Tanzania model we proposed to use, the household sector is involved in both consumption and production.

The model also modelled the behavior of other economic agents like government, corporate sector, investors, importers and exporters.

The foreign sector purchases exports from domestic firms, and domestic households and firms purchase imports from the foreign sector. Foreign exchange is used to purchase imports, and its value is determined by the value of exports and imports in the economy. For example, if the value of exports increases because of domestic firms becoming more competitive after an export tax cut, then this increases the value of foreign exchange causing the price of imports to fall. Data for the value of imports and exports of goods and services by product came from the Supply and Use Tables.

Government collects all tax revenues and is also a major demand source for public goods like education, health and public administration. The government also provides transfers (like benefits) to households. The model has the ability to test various government closure rules. For instance, extra tax revenues can be used to reduce debt or increase demand for public goods or increase transfers payment.

Major tax heads such as income tax, corporation tax, VAT, customs duty, export taxes are modelled. Income tax rate is differentiated by household types, while the other taxes are levied on a sectoral basis making the model very flexible in terms of modelling designs of tax reforms.

Model was coded using the GAMS/MPSGE programming language. We conduct simulations on a static as well as a dynamic CGE model. Below we start by reporting results of a static CGE model in section 5.3, before reporting results of a dynamic CGE analysis in section 5.4.

5.2.2 Short Term Impact of Selected Policy Reforms

The economic impact of each policy will be assessed against a variety of indicators to evaluate the effects on competitiveness of the economy. Here are some suggested economic indicators that each scenario will be assessed against changes in GDP, Investment, Consumption, Exports and Imports (hence balance of trade), tax revenue, income distribution and welfare.

Our static CGE model will be used to conduct three simulations to assess policies that can be adopted to improve manufacturing competitiveness in the short run, namely:

(i) Reduction in energy costs (by reducing energy tariffs);
(ii) Improvement in transport infrastructure;
(iii) Improvement in agriculture productivity, and finally;
(iv) Reduction in VAT rate from the current rate of 18% to 16%.

The results are shown in Table 11. Overall, the results suggests that improvement in manufacturing competitiveness requires policy mix with actions in several areas, ranging from infrastructure improvement to reduce transport costs, to improving linkages between manufacturing and other sectors (e.g. agriculture productivity improvement), as well as reducing costs of production (e.g. energy costs which are relatively higher compared industrialized countries) and improving transport infrastructure to facilitates key linkages between consumers and producers. Implementing these policies and investments simultaneously would significantly enhance manufacturing competitiveness. As shown in Table 11, the impact of various policy reforms/actions differ significantly, hence the need to prioritize based on the policy mix with highest impacts. Such assessment is made by examining the results of various policy simulations.

A: Reduction in energy costs (10%)

Given the prevailing high costs of energy in the economy, we simulate the impact of reducing electricity tariff by 10% in order to examine the extent to which it will reduce production costs, hence increase manufacturing competitiveness. The results show that reduction in energy costs catalyse manufacturing exports by 6%, which is higher compared to other simulations. Energy cost reductions also benefit households in terms of income growth, with larger gains accruing to urban households (1%). This increase in income may enhance purchasing power of households, which will further increase their demand for manufactured products. As a result of increased consumption and incomes, overall welfare increases by 3.2% following decrease in energy prices. This gain in welfare is higher than the gains in other simulations. However, GDP is found to decrease by 0.1%, which is expected given the large investment in energy required to achieve the 10% decrease in costs (i.e. the additional burden borne by the government and the change in prioritization required to achieve the 10% decrease in energy costs).

B: Investment in transport infrastructure (10%)

Transport costs account for a large share of production costs in most manufacturing industry, thus limiting ability of firms to become more competitive. Increased Investment in transport infrastructure is thus expected to lower transport costs, especially for agriculture, manufacturing and distribution services sectors, thus increasing competitiveness of domestic production. Results show that a 10% increase in investment in transport infrastructure increase welfare by 1.1%, while slightly increasing GDP by 0.2%. Notably, the increase in transport infrastructure appears to have significant impact on the agriculture sector. In particular, Agriculture exports increased by 10.2% compared to the manufacturing (6%). The large increase in agricultural exports is also accompanied by less proportional decrease in agricultural imports by 0.4%. At the same time, exports in the manufacturing sector increases at higher extent (6%) compared to imports (3.2%).

C: Agriculture productivity (10%)

We finally simulated the impact of increase in agriculture productivity on manufacturing sector given the country's highly reliant on agriculture sector in terms of GDP (over 24%), employment (70%), agricultural exports (18%) and welfare (food security), but more importantly given the fact that the sector is the main supplier of raw materials for most of the manufacturing activities. Despite its importance, the sector is characterized by low level of productivity, affecting its ability to play a dramatic role in the economic transformation. Thus, improvement in agricultural productivity will significantly enhance competitiveness of the manufacturing sector. The results show that, raising agricultural productivity by 10% leads to increase in manufacturing exports, although by a modest extent (0.8%) compared to the increase in agriculture exports (10%). Similarly, the improvement in agricultural productivity leads to slight increase in GDP, compared to the rise in general welfare by 1.8% - mainly due to increase in incomes of rural households (3.2%).

D. Reduction of VAT to 16%

One of the major concerns of the business community in Tanzania include high costs of running business (and lower competitiveness) due to high tax rates and compliance costs. We simulate the impact of reduction in VAT from 18% to 16%. The overall impacts on the economy are modest, with slight increase in GDP, exports, imports, incomes, and factor demand (all increase by less than 1%), while welfare decreases more modestly due to decrease in Tax revenue.

Table 11: Estimated Impact of Various Policies for Improving Manufacturing Competitiveness

	A: Reduction in energy costs (10%) (% change)	B: Investment in transport infrastructure (10%) (% change)	C: Agriculture productivity (10%)	D: Reduction in overall tax rate (VAT) by 10% (fixing VAT rate at 16%)
Welfare	3.2	1.1	1.8	-0.04
GDP	-0.1	0.2	0.7	0.04
Overall Exports	3.5	1.6	1.2	0.7
Agriculture exports	0.4	10.2	10	0.24
Manufacturing exports	6.2	6	0.8	0.92
Overall Imports	1	-0.4	-2	1.3
Agriculture imports	1.3	-2	9.2	0
Manufacturing imports	4	3.2	-2	0.3
Income – HH (Rural)	0.2	0.9	3.2	0
Income – HH (Urban)	1	0.1	1	0.006
Demand for Labour	0.03	1.2	1.5	0.1
Demand for Capital	0.2	2	1	1.3

5.2.3 Long Term Effects of Selected Policy Reforms

Our dynamic CGE model will be used to forecast the economic impact of the various policies on improving the competitiveness of the manufacturing sector in the long run (the next 30 years). The proposed policy changes (simulations) are in three broad categories, namely:

(i) Increasing Investment in ICT
(ii) Improving Skills
(iii) Reducing Tax Rate (comparative cases of custom duties, export tax, corporate tax and VAT)

The economic impact of each policy will be assessed against a variety of indicators to evaluate the effects on competitiveness of the economy. The model shows the increase in output as a result of higher competitiveness. Hence the competitiveness effect can be proxied by the change in output. Here are some suggested economic indicators that each scenario will be assessed against changes in GDP, Investment, Consumption, Exports and Imports (hence balance of trade), tax revenue, income distribution and welfare. For every simulation, the model will estimate the change in each indicator over 30 years. For example, it will show how GDP will change every year, compared to the baseline forecast, for every policy simulation.

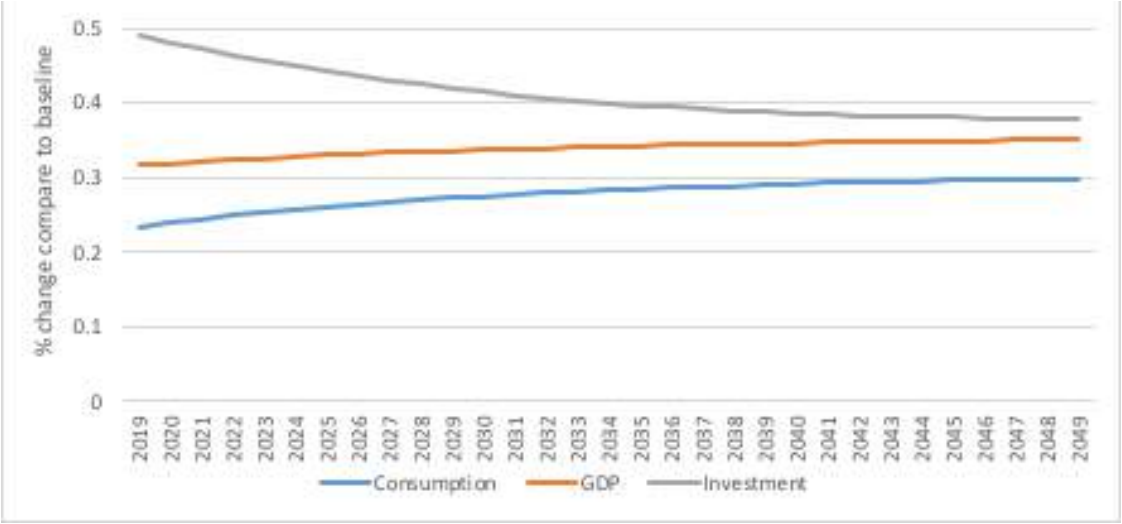
5.2.4 Increasing Investment in ICT

In line with Technology and Innovation approach to assessing competitiveness, we use investment in ICT as a proxy for firms' ability to adopt and use innovation and sophistication in their quest for competitiveness. Within a macroeconomic framework, an increase in ICT investment will have two main effects. First, it will increase the production capability of firms by adding to their capital stock. This will in turn have a direct expansionary effect on output. Secondly, ICT investment will also increase the efficiency of the existing labour force. ICT investment such as mobile technology, high internet speed, faster computers are likely to enable people to be more productive at work. This will lead to an increase in labour productivity which will in turn increase output further.

We simulated the above effects using a dynamic CGE model for Tanzania. We assumed a 10% increase in ICT investment across all sectors in the economy. We found that GDP will be on average 0.32% higher than the baseline level. There is also a boost in total investment which expands by 0.47% compare to the baseline. Total consumption also increases by 0.23% as a result of the expansion of the economy. Please note that CGE analysis reports result as percentage change relative to the baseline values. Baseline values are the forecasted values of the macroeconomic variable under the business as usual (no policy change) state of the economy.

Figure 17 below shows the effects of an increase in ICT investment on GDP, consumption and investment over the next 30 years. The chart shows to what extent each indicator will be higher than the baseline values. For example, in 2022 GDP value will be 0.32% higher than the baseline values. The effects on GDP and consumption gradually increases over time as the economy fully adjusts and the additional investment cumulates into capital stock over time. The change in investment is high in the initial years because of the extra ICT investment. Over the long run the change in investment converges to the same level as GDP changes.

Figure 15: Macroeconomic effects of an increase in ICT investment



The 10% increase in investment is equivalent to an additional investment of approximately Tsh 120 billion. The monetary value of the 0.32% increase in GDP is roughly 3 times this amount. Hence the multiplier of the ICT multiplier is around three, implying that for every Tsh we invest in ICT we can expect Tsh3 in economic return. A large proportion of ICT investment comes from the manufacturing sector and a boost in ICT is likely to benefit this sector more than others. In fact we found that gross value added of the manufacturing sector will expand by 0.41% as a result following the national increase in ICT investment of 10%.

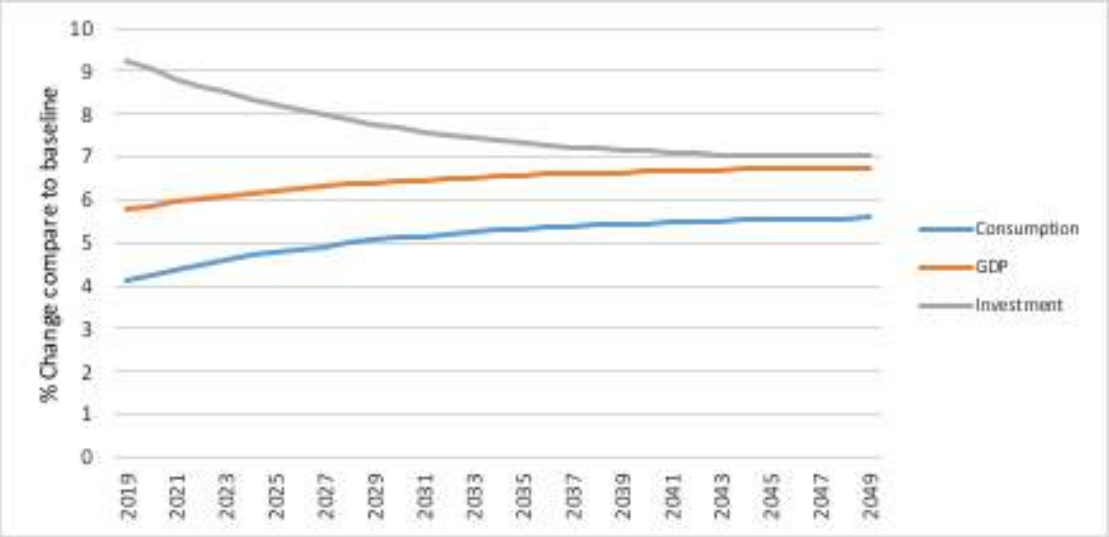
5.2.5 Improving Skills

People is one of the main assets of a society and this is reflected in the composition of the Tanzanian GDP in which returns to labour consists of more than 60%. Improving the skills of the labour force has the potential of significantly boosting the economy. A more skilled labour force will improve efficiency and productivity implying that more can be produced with the same labour force. With higher productivity, wage rate will rise and the population will benefit from a higher disposable income and consumption, which will boost the economy further. Standard of living will increase, and more people will be able to enjoy a better quality of life.

Being a bottom-up approach where we model the production function of each sector, CGE models is well suited to evaluate the economy-wide effects of an improvement in labour productivity. We ran a scenario where we increase labour productivity across all sectors and labour categories (skilled, semi-skilled and unskilled) by 10%. How does productivity increase as a result of increase in skills is not something that CGE models can evaluate. The model is however able to measure how much investment in skills is required to generate a 10% increase in labour productivity.

GDP increases by around 6% compared to the baseline values, while consumption and investment expands by 4.4% and 9%, respectively. These effects encompass all the direct, indirect and induced effects of higher labour productivity, including higher productive capabilities of firms, higher disposable income and consumption of employees, and the supply chain effects across sectors. Figure 18 exhibits the macroeconomic effects over time. As the economy adjusts and capital stock accumulates over time, the effects of GDP and consumption gradually increases. Investment effect converges to the GDP effect over time.

Figure 16: Macroeconomic effects of an increase in Skills



The manufacturing sector is mostly a capital-intensive sector and higher labour productivity as a result of skill enhancement will have a less than proportionate effect compared to other sectors. We found that the output of the manufacturing sectors expand by 3.1% as a result of a 10% increase in labour productivity.

5.2.6 Changing Tax Rates

Tax reform has been at the center of economic reform of various developing countries over the last three decades. Taxes can change the cost of production of producers and alter the behaviors of both consumers and producers towards activities favoured by the government. Tax reform is a powerful tool that can be used to improve competitiveness of Tanzania. Most of the tax changes to boost competitiveness would involve a tax cut, which would reduce government tax revenue. We should therefore be mindful that the tax cut is expansionary enough to justify the loss in tax revenue.

We simulate a reduction in tax rate for three largest tax heads in terms of revenue generation on Tanzania, namely, income tax, VAT and corporation tax. We cut each tax rate by five percentage points and assess the impact on GDP.[16] The resulting GDP expansions are 0.5%, 0.12% and 0.03% for income tax, VAT and corporation tax, respectively. The results are given in figures 19, 20 and 21. VAT has a proportionally higher increase in consumption than investment as it is a tax reduction on consumption. Similarly, being a tax on capital, the reduction in corporation tax rate leads to a proportionally larger increase in investment. Consumption and investment obviously compete for each other.

Figure 17: Macroeconomic effects of reduction in VAT rate

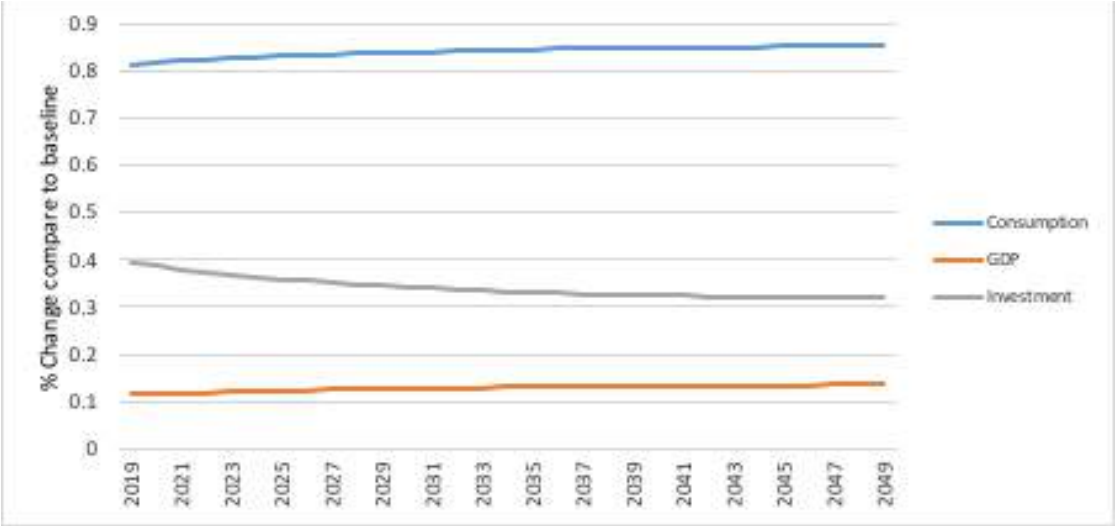
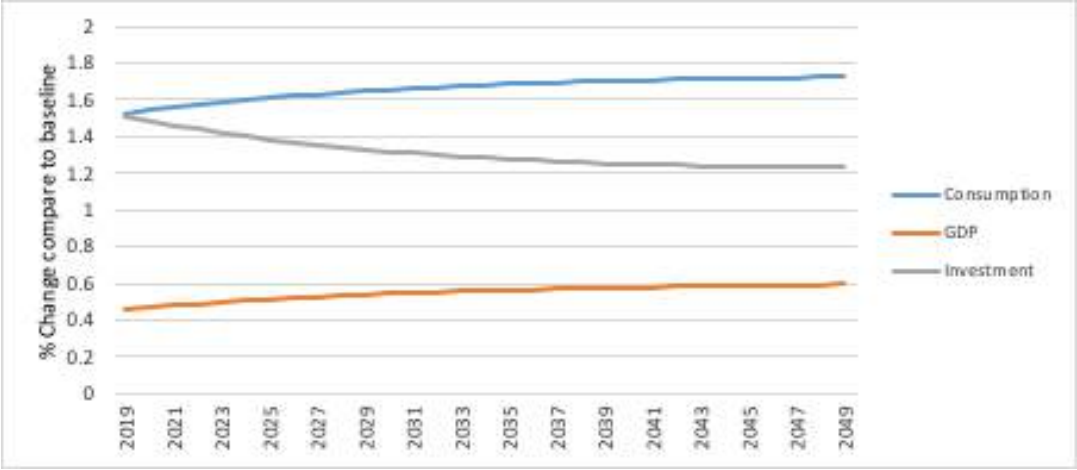
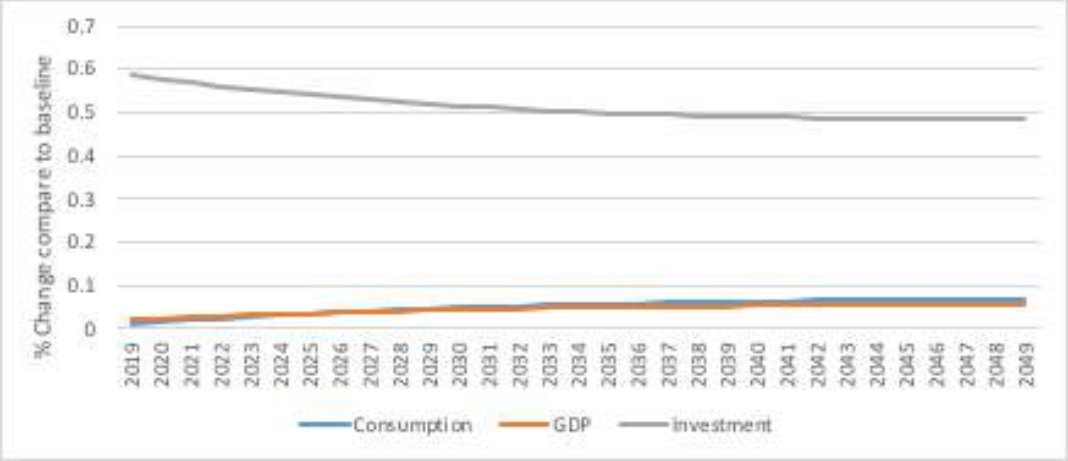


Figure 18: Macroeconomic effects of reduction in Income Tax rate



16 *Please note that CGE modelling works with average tax rate. We have estimated the corresponding average tax rate change following a cut of five percentage points reduction in marginal tax rate using macro data. Arguably the best approximation would be using micro data in which we did not have at the time of this study.*

Figure 19: Macroeconomic effects of reduction in Corporation Tax rate



These three tax heads have a different tax base and hence the implications in terms of tax revenue loss and impact on the economy are similarly different. Therefore, the GDP effect reported below are not comparable. The Marginal Excess Burden (MEB) is a more appropriate indicator to compare the efficiency of the tax changes. The MEB, also known as the tax multiplier, normalises the size of the tax shock and shows the GDP effect per Tsh. The average MEB for the first five years are given in table 10. It shows that corporation tax has the highest MEB and VAT has the lowest. This implies that for every Tsh the government lost in terms of corporation tax revenue, it generates 77 cents of additional GDP. The corresponding GDP benefit for a VAT and income tax rate cut are 13 cents and 42 cents, respectively.

Table 12: Marginal Excess Burden by tax head

Corporation Tax	Income Tax	VAT
-0.77	-0.42	-0.13

This result is not surprising. It is well documented in the literature that corporation tax is more damaging to the economy than VAT. Corporation tax is a tax on capital stock and a reduction in capital stock in year 1 will be accumulated over time in the process of capital stock accumulation. This will hence amplify the distortions brought about by the corporation tax. In addition, corporation tax is a tax on capital which is an input to production whereas VAT is mostly a tax on final consumption. Taxing inputs is more distorting to the economy as it distorts both the production technology (combination of inputs used in production) and consumption decisions (relative combination of each good purchased), whereas a VAT will only distort the consumption decision. Finally, the effects of an input tax cascade through the supply chain and gets amplified in the process. For example, an increase in tax in sector A will affect both production and consumption decision in sector A and lead to an increase in price for good A. All sectors using product A as an intermediate input will face higher cost of production distorting their production mix and eventually the consumption decision. Hence the distortion in sector A will be spread across all the economy via the supply chain.

Tax revenue is an important source of revenue for governments to provide for the welfare state, especially for governments facing increasing public debt. MEB can be a useful tool for government to know which tax to cut that will maximise GDP expansion. With a higher GDP expansion, the government is also more likely to recoup some of the lost tax revenue from other taxes as the tax base (income, consumption, profit) expands. In addition, the MEB suggest that the government can increase VAT and reduce corporation tax rate by some rates such that the total tax revenue is unchanged and still generate an expansion in GDP. The same can be worked out with changing income tax rate. However, one consideration that this analysis ignored is the income distribution effects, which was beyond the scope of this study.

The story line does not change for the manufacturing sector. The corporation tax cut boosts the manufacturing sector output by around 0.05%. This is higher than the average GDP growth because of the relatively higher capital-labour ratio for the manufacturing sector. The VAT cut leads to an expansion by 0.12% in output of the manufacturing sector, which is similar to the overall GDP expansion. A decrease in income tax will raise the disposable income of households leading to an increase in consumption. Having a larger share of total consumption, the manufacturing sector will more than proportionately benefit from the income tax reduction. The reduction in income tax rate will also boost supply but being a capital-intensive sector the manufacturing sector will not benefit much from this labour supply effect. The net boost to the manufacturing sector output after the cut in income tax rate is 0.54%, slightly higher than the average.

5.3 Selecting Priority Sectors for Promoting Competitiveness

5.3.1 Production Profile of Industrial Manufacturing Industries

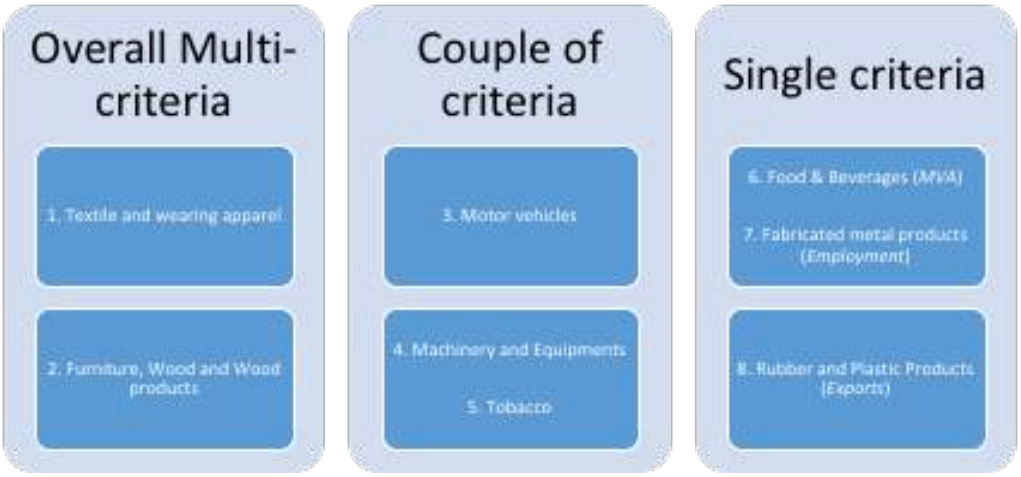
We analyzed the industrial survey data (Census of Industrial Production – CIP) obtained from the NBS in view of mapping sectors according to their various economic strength. In particular, we ranked the sectors according to three criteria, namely: manufacturing value added, employment and exports measured by manufacturing value added per output, number of individuals employed per gross output and export sales per gross output. For each manufacturing industrial subsector, the three estimates were calculated using summarized data found in URT (2016) and UNIDO (2017) and the estimates were used to rank the sector to obtain the top ten highest value estimate.

Table 13: Top 10 leading Sub-sectors with high potential for Manufacturing Competitiveness

Rank	MVA/Gross Output	Employment as % of Gross Output	Export Sales/Gross Output
1	Tobacco	Wearing Apparel	Wearing Apparel
2	Wood and wood products	Fabricated metal products	Computers
3	Food and beverages	Wood and wood products	Rubber and plastic product
4	Motor Vehicles	Machinery and Equipment	Wood and wood products
5	Machinery and Equipment	Furniture	Tobacco
6	Wearing Apparel	Textile	Paper and paper products
7	Textile	Motor Vehicles	Textiles
8	Other Non-metallic mineral products	Other manufacturing	Motor Vehicles
9	Printing and reproduction of recorded media	Printing and reproduction of recorded media	Coke and Refined petrol
10	Repair and Installation	Electrical equipment	Other Non-metallic mineral products

Source: Author calculations using data from URT (2016) and UNIDO (2017)

Figure 20: Priority Sectors by Significance of Criteria



Source: Author calculations using data from URT (2016) and UNIDO (2017)

5.3.2 Export Market Profile of Manufactured Products

Taking a trade performance approach, we examine Tanzania's export performance in terms of the export product categories. The purpose is to identify the manufactured products exported by Tanzania in any recently available year. To do this, we used the UN COMTRADE database to firstly examine the Tanzania export basket in order to show the position of the manufactured products compared to other sectors. This is shown in Figure SS. Apparently mining is the major export product for Tanzania, accounting for nearly 40 percent, followed by fruits and vegetables (13%).

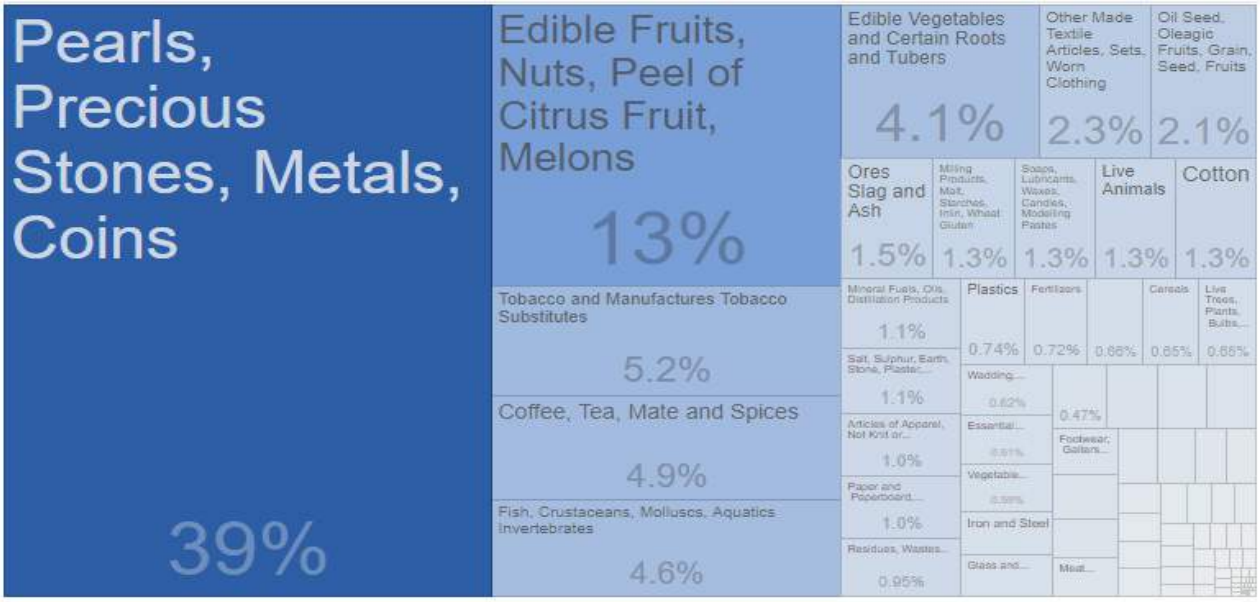
Clearly, given the small size of the manufacturing sector, the contribution of the manufactured exports is relatively less significant. In Table 2, we sorted only the manufactured products, whose total exports in 2017 was valued at $1.2 billion. The top ten manufactured products account for nearly three-quarter of the total, and include Tobacco, Fish products, Textile and apparel, Cement, Cereals and other food products, Paper and paper products, Wood and wood products and Animal foods.

While this information is useful as it shows where Tanzania has a chance to build a competitive export manufacturing sector, it does not tell much of the export competitiveness story. For convenience, we distinguish between regional vs world exports so as to identify the manufactured products with potential for gaining competitiveness at the global level. This distinction is critical since, given the deepening regional integration, exports to the regional markets should instead be termed as domestic sales. More importantly, the export market requirements including standards and other Non-Tariff Barriers are rather stringent in the global compared to regional markets. Thus, the global export sales is more robust filter for identifying products/sectors with greatest potential for export competitiveness. Finally, to ensure comprehensive review, we show the export profile by value and volume.

The profile of manufactured exports by global and regional markets is shown in Tables 14-19. Clearly, Tobacco is still the top-most manufactured export product for Tanzania across the four categories of markets. From the tables, we identified manufactured goods, and ranked them by the frequencies they appear in the global, regional or African export markets. Clearly, some products appear to hold strong market position in all the three markets, while others have a stronger competitiveness at the regional level as shown in Tables 14-19. Overall, the products with highest potential for competitiveness include: Vegetables, Cement, Oilcake, Textile and Garments, Quicklime, Chemicals, Fertilizers, Fish fillets and Bran.

Finally, based on this information, we combine the list of products with strong competitiveness from the production side and with those that demonstrate strong presence in export markets to approximately derive a list of products that are common in both sets of data. This derived list will be our recommended menu of priority sectors that policy Actors may consider for promoting further investment and growth. These are Textile and Garments, Food products, Tobacco and Rubber/plastics.

Figure 10: Tanzania export products map



Source: https://tradingeconomics.com/tanzania/exports-by-category.

Table 14: Top 10 Manufactured export products for Tanzania in 2017

		Value (US$)	Percentage
1	Tobacco	$216,980,000	18.2%
2	Fish products	$192,770,000	16.1%
3	Textile and apparel	$190,162,230	15.9%
5	Cement	$111,860,000	9.4%
6	Cereals and other food products	$68,251,700	5.7%
7	Paper and paper products	$43,680,000	3.7%
9	Wood and wood products	$42,418,940	3.6%
10	Animal foods products	$42,280,000	3.5%
	Top 10	**$908,402,870**	**76%**
	Others	$285,821,370	24%
	Total	**$1,194,224,240**	**100%**

Source: UNCOMTRADE Database.

Table 15: Global Export Market for Tanzania

	Top 10 Tanzania Exports to the World (2017)		
	VOLUME (TONS)		
Code	Product	Tons	%
'0712	Dried vegetables	505,821	18.1
'0801	Coconuts	330,622	11.8
'2523	Cement	226,021	8.1
'2302	Bran	171,396	6.1
'2604	Nickel ores and concentrates	165,000	5.9
'0713	Dried leguminous vegetables	160,813	5.7
'2306	Oilcake	97,255	3.5
'1207	Other oil seeds	80,646	2.9
'2522	Quicklime	79,095	2.8
'0102	Live bovine animals	50,255	1.8
	Top 10	**1,866,924**	**66.7**
	Remaining	930,505	33.3
	TOTAL	**2,797,429**	**100**

	Top 10 Tanzania Exports to the World (2017)		
	VALUE (US$)		
Code	Product	US$	%
'7108	Gold	1,538,874	36.8
'0801	Coconuts	541,157	13.0
'2401	Unmanufactured tobacco	195,805	4.7
'0304	Fish fillets	143,432	3.4
'0901	Coffee	127,183	3.0
'0713	Dried leguminous vegetables	92,773	2.2
'1207	Other oil seeds	74,200	1.8
'0712	Dried vegetables	65,563	1.6
'7102	Diamonds	64,440	1.5
'2616	Precious-metal and concentrates	62,117	1.5
	Top 10	**2,905,544**	**69.5**
	Remaining	1,272,565	30.5
	TOTAL	**4,178,109**	**100**

	Top 10 Tanzania Exports to the Rest of the World (2017)		
	VOLUME (TONS)		
Code	Product	Tons	%
'0801	Coconuts, Brazil nuts	330,364	26.4
'2604	Nickel ores	165,000	13.2
'2302	Bran, sharps	164,887	13.2
'0713	Dried leguminous vegetables	155,499	12.4
'1207	Other oil seeds	80,593	6.4
'2401	Unmanufactured tobacco	44,496	3.6
'0901	Coffee	40,836	3.3
'6309	Worn clothing	22,593	1.8
'2306	Oilcake	21,916	1.7
'0304	Fish fillets	21,614	1.7
	Top 10	**1,047,798**	**83.7**
	Remaining	204,589	16.3
	TOTAL	**1,252,387**	**100**

	Top 10 Tanzania Exports to the Rest of the World (2017)		
	VALUE (US$)		
Code	Product	US$	%
'7108	Gold	866,070	31.6
'0801	Coconuts, Brazil nuts	539,244	19.7
'2401	Unmanufactured tobacco	191,973	7.0
'0304	Fish fillets	140,740	5.1
'0901	Coffee	122,404	4.5
'0713	Dried leguminous vegetables	92,027	3.4
'1207	Other oil seeds	74,198	2.7
'7102	Diamonds	64,416	2.4
'2616	Precious-metal ores	62,117	2.3
'0902	Tea, whether or not flavoured	28,690	1.0
	Top 10	**2,181,879**	**79.7**
	Remaining	557,453	20.3
	TOTAL	**2,739,332**	**100**

Source: Authors' compilation from the ITC Trade map Database

Table 16: Regional Export Market for Tanzania

	Top 10 Tanzania Exports to SADC (2017)		
	VOLUME (TONS)		
Code	Product	Tons	%
'2523	Cement	98,504	13.8
'2522	Quicklime	68,379	12.7
'2713	Petroleum coke	37,021	11.1
'3401	Soap	28,102	7.6
'1101	Wheat or meslin flour	24,594	6.4
'7010	Carboys	18,642	6.1
'3102	Mineral	10,950	3.9
'2501	Salts	9,987	3.8
'2519	Natural magnesium	7,634	3.2
'3304	Beauty products	5,575	2.8
	Top 10	**309,388**	**71.5**
	Remaining	90,658	28.5
	TOTAL	**400,046**	**100**

	Top 10 Tanzania Exports to SADC (2017)		
	VALUE (US$)		
Code	Product	US$	%
'7108	Gold	672,804	13.8
'3401	Soap; organic surface	52,241	12.7
'1101	Wheat or meslin flour	49,874	11.1
'2402	Cigars	20,929	7.6
'6403	Footwear	17,109	6.4
'7010	Carboys	10,925	6.1
'2523	Cement	9,072	3.9
'2522	Quicklime	9,016	3.8
'2712	Petroleum jelly	8,943	3.2
'3304	Beauty products	7,581	2.8
	Top 10	**858,494**	**71.5**
	Remaining	149,949	28.5
	TOTAL	**1,008,443**	**100**

	Top 10 Tanzania Exports to EAC (2017)				Top 10 Tanzania Exports to EAC (2017)		
	VOLUME (TONS)				VALUE (US$)		
Code	Product	Tons	%	Code	Product	US$	%
'0712	Dried vegetables	486,533	42.5	'0712	Dried vegetables	54,037	12.6
'2523	Cement	122,068	10.7	'0102	Live bovine animals	52,930	12.3
'2306	Oilcakes and other solid residues	75,339	6.6	'4804	Uncoated kraft paper	28,813	6.7
'0102	Live bovine animals	49,971	4.4	'1007	Grain sorghum	23,067	5.4
'2701	Coal; briquettes	45,238	4.0	'6304	Articles for interior furnishing	22,184	5.2
'4804	Uncoated kraft paper	40,236	3.5	'2712	Petroleum jelly, paraffin wax	16,269	3.8
'1005	Maize or corn	21,763	1.9	'2306	Oilcake and other solid residues	14,645	3.4
'0805	Citrus fruit, fresh or dried	21,200	1.9	'0902	Tea, whether or not flavoured	14,297	3.3
'2505	Natural sands of all kinds	20,500	1.8	'6305	Sacks and bags, of a kind	11,214	2.6
'3102	Chemical Fertilizers	19,686	1.7	'3102	Chemical fertilisers	11,098	2.6
	Top 10	**902,534**	**78.8**		**Top 10**	**248,554**	**57.8**
	Remaining	242,462	21.2		Remaining	181,780	42.2
	TOTAL	**1,144,996**	**100**		**TOTAL**	**430,334**	**100**

Source: Authors' compilation from the ITC Trade map Database

Table 17: Non-Regional African Export Market for Tanzania

	Top 10 Tanzania Exports to the Rest of Africa (2017)				Top 10 Tanzania Exports to the Rest of Africa (2017)		
	VOLUME (TONS)				VALUE (US$)		
Code	Product	Tons	%	Code	Product	US$	%
'6309	Worn clothing and accessories	22,426	46.8	'6309	Worn clothing and accessories	25,088	22.2
'2523	Cement	5,420	11.3	'6204	Textile and Garments	22,561	20.0
'2306	Oilcake and other residues	3,617	7.5	'6306	Tarpaulins, awnings and sunblinds	17,578	15.6
'7010	Carboys, bottles	2,295	4.8	'9403	Furniture and parts thereof, n.e.s.	12,181	10.8
'4101	Hides and skins	2,060	4.3	'0901	Coffee	2,813	2.5
'5607	Twine, cordage	1,472	3.1	'6304	Articles for interior furnishing	2,525	2.2
'5303	Jute and other textile bast fibres	1,442	3.0	'3926	Articles of plastics	2,434	2.2
'0901	Coffee	1,265	2.6	'5607	Twine, cordage, ropes and cables	2,382	2.1
'6304	Articles for interior furnishing	691	1.4	'5303	Jute and other textile bast fibres	2,183	1.9
'2201	Waters	616	1.3	'3924	Tableware	2,095	1.9
	Top 10	**41,304**	**86.1**		**Top 10**	**91,840**	**81.4**
	Remaining	6,665	13.9		Remaining	20,999	18.6
	TOTAL	**47,969**	**100**		**TOTAL**	**112,839**	**100**

Source: Authors' compilation from the ITC Trade map Database.

Table 18: Frequency of presence in export markets by manufactured products

Code	Product	World	Regional	Africa	Total
'0713	Dried leguminous vegetables	4	2	-	6
'2523	Cement	1	3	1	5
'2306	Oilcake	2	2	1	5
'6309	Textile and Garments	1	-	3	4
'2522	Quicklime	1	2	-	3
'7010	Carboys	-	2	1	3
'3102	Mineral or chemical nitrogenous fertilizers	-	3	-	3
'0304	Fish fillets	3	-	-	3
'2302	Bran	2	-	-	2
'3401	Soap	-	2	-	2
'1101	Wheat or meslin flour	-	2	-	2
'3304	Beauty products	-	2	-	2
'4804	Uncoated kraft paper	-	2	-	2
'5607	Twine, cordage	-	-	2	2
'5303	Jute and other textile bast fibres	-	-	2	2
'6304	Articles for interior furnishing	-	-	2	2
'2712	Petroleum jelly	-	2	-	2
'2713	Petroleum coke	-	1	-	1
'6403	Footwear	-	1	-	1
'6305	Sacks and bags, of a kind	-	1	-	1
'6204	Textile and Garments	-	-	1	1
'6306	Tarpaulins, awnings and sunblinds	-	-	1	1
'9403	Furniture and parts thereof, n.e.s.	-	-	1	1
'3926	Articles of plastics	-	-	1	1
'5607	Twine, cordage, ropes and cables	-	-	1	1
'3924	Tableware	-	-	1	1

Source: Authors' compilation from the ITC Trade map Database.

6 CONCLUSION AND RECOMMENDATIONS

6.1 Summary of Findings

This study assessed the competitiveness of the Tanzanian manufacturing sector in view of its critical role in enhancing development of a sustainable industrial sector and economic transformation. Three key questions informed the approach of this assessment. First, what is the current status of manufacturing competitiveness? Second, what are the key determinants (drivers) of competitiveness? Third and finally, what priority policy actions/reforms can yield the desired (higher) level of competitiveness? The study answered the above questions using different analytical techniques.

Overall, we find that the level of Tanzania's manufacturing competitiveness has been improving gradually since 2007 in two ways. First, based on the Global Competitiveness Index (GCI), the Tanzania has been performing strongly in areas of macroeconomic environment and institutions. Second and more importantly, productivity within the industrial manufacturing sector has been improving, albeit at a small extent. However, in both of these aspects, our analysis identified areas where Tanzania has continued to perform poorly or factors holding Tanzania's ability to leap frog in competitiveness space. For instance, from the GCI, Tanzania scores low in innovation and sophistication factors, higher education and training. Furthermore, reflecting low export capacity, Tanzania is positioned among the bottom countries in our MECI estimation falling behind Rwanda and Kenya.

Assessment of competitiveness indices also show that, although Manufacturing is the most competitive of all the industrial sectors, the wage rate has recently been increasing rapidly, suggesting that the manufacturing subsector has been losing its competitive edge. While this general trend may be worrisome, some firms' characteristics are more revealing. In particular, we observed that exporting firms have lower unit costs and higher value added per worker compared to non-exporting firms. A similar trend is respectively observed for foreign ownership have lower unit costs than those owned by a national investor. Private owned firms had the lowest compared to public owned firms. We complement these results with those obtained from our productivity analysis (chapter 3) where firm characteristics such as exporting firm, foreign owned firm, private owned firms, large enterprise (firms size) and those providing training were found to have higher levels of, and improve firm productivity over time. In addition, by controlling for time invariant firm characteristics, we found that management experience and business culture may be the factors that enhance the productivity performance of these firms (foreign owned and exporting firms are case in point).

These findings are generally a reflection of the various Government policy initiatives to support competitiveness of the economy through public investment in infrastructure, the ongoing measures to improve business environment, and development in key sector of the economy such as agriculture, mining, manufacturing, tourism and other cross-cutting support service sectors such as financial and ICT services, etc. Despite the ongoing policy initiatives, measures to enhance competitiveness of the manufacturing sector need to be informed by the knowledge of productivity levels and drivers. The study employed different measures of productivity analysis including unit labour costs. Our findings show trends and levels of productivity have differed across sub-sectors. For instance, compared to other sub-sectors, computer, electronic and optical products, beverages and apparel industry appear to have performed well in terms of unit labor costs and value added per worker, hence better candidate for targeted policy initiatives to further improve development of the manufacturing sector. Finally, and consistent with Diao et al (2018), productivity growth appears to be driven largely by the formal manufacturing sector compared to that of the informal sector.

The last part of the analysis focused on identifying priority reforms and sectors for supporting and promoting manufacturing competitiveness. We used CGE analysis to assess differential impact of the various policy actions or reforms in order to identify those with highest influence in achieving the desired level of competitiveness. From the literature review and recent policy discourses in Tanzania, we identified couple of policy areas in which policy action and reforms are anticipated to enhance Tanzania's level of productivity and competitiveness of her manufacturing industrial sector. These areas include reducing costs (including high rates of taxes and high energy costs), improving productivity through increased investment in skills, ICT and transport infrastructure; and enhancing agriculture productivity to support growth of the manufacturing industry.

In particular, findings from the CGE analysis show that, increased investment in infrastructure to reduce energy costs, improve transport services and harness innovation through ICT will have significant effects on competitiveness compared to reducing tax rates. Using a dynamic CGE model (where data was available), we also analyzed the long run impact of various policy actions including (i) investment in ICT (given the role of technology and innovation); (ii) investment in skills; and (iii) various types of tax heads on competitiveness. First, increasing investment in ICT yields a multiplier of three, meaning that, for every shilling investment in ICT it generates 3 shillings in economic return. Furthermore, a 10 percent increase in ICT investment increases manufacturing value added by 0.41%.

Second, increasing labour productivity through investment in skills generates the largest positive effects on competitiveness compared to the impact of investment in ICT or reduction in tax rates, reinforced the imperative of improving economy wide levels of productivity as a measure to improve competitiveness of the manufacturing industry. Finally, while reduction in tax rates is generally good for competitiveness, the Government is likely to reap much larger positive impact on competitiveness through reducing corporate tax. More importantly, using the Marginal Excess Burden (MEB) or tax multiplier analysis, the findings show that for every Tsh the government lost in terms of corporation tax revenue, it generates 77 cents of additional GDP, compared to 13 cents and 42 cents for VAT and income tax rate cut respectively. This result is not surprising, as the literature is clear that corporation tax is more damaging to the economy than VAT since it is a tax on capital stock.

The policy options for promoting manufacturing competitiveness also involve strategic decision on which sector/sub-sector to select for priority Government support. We went through the excise of identifying priority sector(s) by analyzing the production capacity (using Industry survey data) and export capacity (using ITC trade map database) of the manufacturing sector. Overall, the results show that, Textile and Garments, Food products and Tobacco as the top three sectors with most potential for Tanzania to gain dramatic improvement in her manufacturing competitiveness. Others in the top ten list include Quicklime, Chemicals, Fertilizers, Metal products, Fish fillets, plastics and rubber.

In conclusion, competitiveness of manufacturing industry in Tanzania appears to be improving but a number of reforms would be needed to garner the progress, including specific measures to reduce cost of production and improve productivity. While policies are in place to support improvement in manufacturing competitiveness, implementation may be constrained by lack of adequate financial resources, calling for prioritization of policy reforms and sectors of focus. Owing to the fact that, competitiveness is multifaceted outcome, further knowledge is required to understand the efficacy of the institutional framework for supporting manufacturing competitiveness.

6.2 Conclusions and Recommendations

Based on the above findings, the study makes several broad conclusions and recommendations. First, as the economy begins to achieve some structural transformation, market failures becomes more significant, requiring substantial government interventions. In the context of low income country such as Tanzania, such intervention would involve dramatic policy measures to reduce costs of production, improve productivity, and adopt business environment reforms that will support broader private sector development.

Second, owing to the fact that competitiveness will require policy actions in myriad of areas and sectors, the current analysis has identified priorities for Government policy actions.

(i) Avoid taxing inputs and investments by reducing corporate income tax rate and simplifying the tax structure to reduce cost of production for productive sectors;

(ii) Increase investment in transport, power and ICT infrastructure to spur growth of value added (production) and innovation;

(iii) Select 2-3 sectors for active Government support through investment promotion. These include: Textile and garments, food processing, tobacco products, fabricated metal, rubber and plastics.

Third, as competitiveness is getting tougher across countries, constant learning from what works (or doesn't) elsewhere and what worked or didn't in the past is a critical ingredient for building Tanzania's competitiveness. The study identified three countries as potential for providing useful lessons for Tanzania. These are Botswana, Mauritius and Ethiopia. In particular, a set of lessons include building quality institutions to support the process of transformation, leveraging openness to attract FDI and harness trade agreements, safeguarding independence in decision making, and the importance of learning by doing. Although our assessment of lessons from successful countries was somewhat patchy, our findings are generally in congruency with those of previous country studies.

Fourth, the policies and strategies to support future improvement of manufacturing competitiveness will depend on the extent to which the state-business relationship will be nurtured with affirmative actions aimed at addressing key bottlenecks, and harnessing Tanzania's comparative advantages and the incipient structural transformation. In brief, it is all about political will around (a) Building trust, partnership and common national agenda between the State and the Industry; and (b) being action and results oriented.

Finally, a few areas for further research can be identified to include analysis of (i) sources and drivers of competitiveness at product level, including status and requirement for value chain development in the selected sectors; (ii) Identifying type of political and economic institutions for enhancing competitiveness (including private accountability framework).

6.3 Next Steps

Following review of the study findings, we recommend the need for REPOA to organize a brief survey to seek feedback from the industry on the identified recommendations and priority sector(s). The feedback will be used to define a package of recommended policy actions for further discussion and consideration with appropriate Government Authority.

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APPENDICES

Appendix 1. Annual averages for fuel cost and ULC

Year	Average fuel cost	Average ULC
2008	419069.43	0.12471163
2009	503272.62	1.0914763
2010	184855.15	0.31159426
2011	226788.85	0.36135754
2012	308289.64	0.28828894
2013	1296789.4	-0.06484395
2015	1347775.8	-0.31344262
2016	893742.9	0.54930461

Source: Author's calculation using ASIP panel (2008-2016)

Appendix 2: Average values of ULC, WPW and VAPW for each manufacturing sub sector

Sector	ULC	RANK	WPW	RANK	VAPW	RANK	VAPO	RANK
Coke and refined petroleum products	0.118516	1	4434.374	13	38752.62	12	0.236944	23
Beverages	0.122832	2	6546.713	6	66033.73	5	0.459078	9
Computer, electronic and optical products	0.337784	3	12392.78	3	78009.67	3	0.538178	2
Textiles	0.345631	4	2721.655	20	23571.68	21	0.455577	10
Wearing apparel	0.349245	5	48902.71	1	177070.8	1	0.467433	8
Fabricated metal products, except machinery and equipment	0.358019	6	11894.33	4	39780.27	11	0.483788	7
Chemicals and chemical products	0.359791	7	3642.271	16	40669.04	9	0.43008	13
Wood and of products of wood and cork, except furniture;	0.388914	8	4990.495	11	44516.58	8	0.526304	3
Motor vehicles, trailers and semi-trailers	0.40862	9	2766.452	19	75075.52	4	0.427735	14
Tobacco products	0.414821	10	8177.03	5	84267.55	2	0.422027	16
Repair and installation of machinery and equipment	0.531625	11	5215.248	10	25227.26	19	0.54184	1
Paper and paper products	0.593342	12	3130.895	17	30558.61	16	0.3469	20
Furniture	0.649388	13	2131.173	23	12255.95	22	0.496974	6
Basic metals	0.676418	14	2911.137	18	25777.05	18	0.383025	18
Machinery and equipment n.e.c	0.867629	15	3704.252	15	39835.23	10	0.346434	21
Food products	0.914815	16	2282.219	22	32529.6	15	0.427677	15
Other transport equipment	1.8145	17	14201.1	2	46817.21	7	0.512395	5
Printing and reproduction of recorded media	-0.02046	18	5618.13	8	24571.2	20	0.439834	11
Pharmaceuticals, medicinal chemical and botanical products	-0.06104	19	5694.148	7	38367.13	13	0.518981	4
Rubber and plastics products	-0.23631	20	3786.906	14	47315	6	0.342636	22
Other non-metallic mineral products	-0.4324	21	4860.507	12	35734.66	14	0.43423	12
Electrical equipment	-0.57383	22	5607.474	9	28206.41	17	0.368619	19
Other manufacturing	-5.32048	23	2365.067	21	10273.51	23	0.389643	17

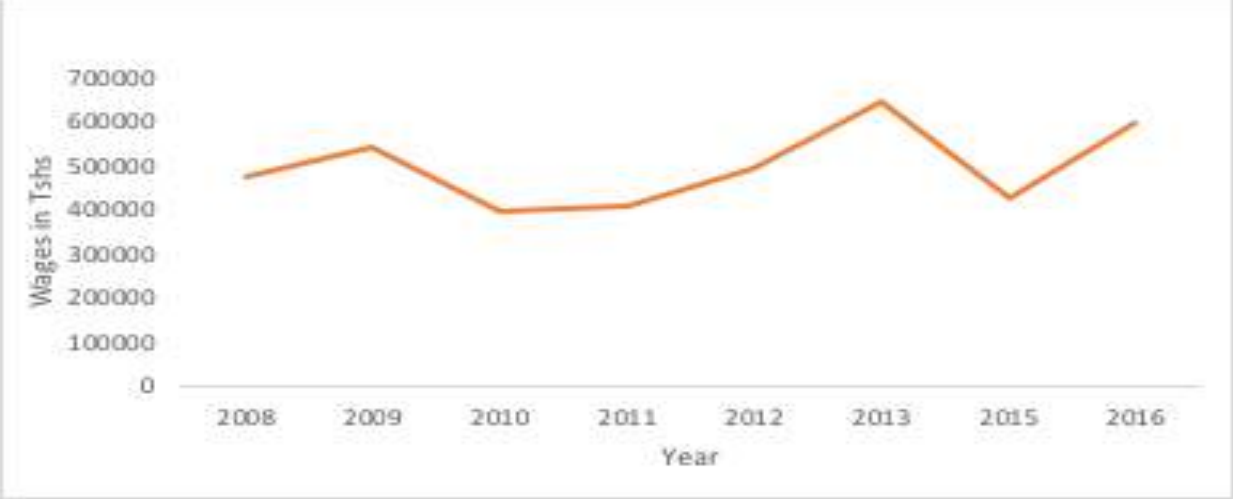
Source: Author's calculation using ASIP panel (2008-2016)

Appendix 3: Detailed MECI estimation

Country	Share of MVA in GDP		Manufactured Exports per Capita					Annual growth of ME		MECI log	MECI no log	MECI[3]
	value	Index	Value	index	log	Index log	Average	Value	Index	Index	Index	
South Africa	12.0402	0.2428	69688.0983	0.2265	4.8432	0.7975	0.5120	0.0719	0.0518	0.2932	0.1790	0.2777
Botswana	5.1939	0.0401	306961.6493	1.0000	5.4871	1.0000	1.0000	0.0713	0.0513	0.4274	0.4274	0.4120
Mauritius	12.3990	0.2534	116679.2558	0.3797	5.0670	0.8679	0.6238	0.0075	0.0000	0.3256	0.2279	0.3256
Namibia	11.0221	0.2127	66693.6980	0.2168	4.8241	0.7915	0.5041	0.0706	0.0508	0.2807	0.1657	0.2655
Kenya	9.0885	0.1554	3525.4288	0.0108	3.5472	0.3900	0.2004	0.1287	0.0974	0.1560	0.0802	0.1268
Zambia	7.6861	0.1139	4066.0370	0.0126	3.6092	0.4095	0.2110	0.1664	0.1277	0.1569	0.0775	0.1186
Zimbabwe	11.5960	0.2297	2736.4916	0.0083	3.4372	0.3554	0.1818	0.1626	0.1247	0.1790	0.1096	0.1416
Mozambique	8.7040	0.1440	2597.1185	0.0078	3.4145	0.3483	0.1780	0.4414	0.3487	0.2190	0.1509	0.1144
Madagascar	37.6100	1.0000	2770.9628	0.0084	3.4426	0.3571	0.1828	0.1127	0.0846	0.3985	0.3287	0.3731
Tanzania	7.8137	0.1177	2325.3768	0.0069	3.3665	0.3332	0.1701	0.1676	0.1287	0.1419	0.0767	0.1033
Uganda	8.7115	0.1443	1493.1560	0.0042	3.1741	0.2727	0.1385	0.3284	0.2579	0.1760	0.1223	0.0987
Angola	6.7527	0.0863	1372.8555	0.0038	3.1376	0.2612	0.1325	0.2362	0.1838	0.1340	0.0825	0.0789
Malawi	9.5189	0.1682	746.9779	0.0018	2.8733	0.1781	0.0899	0.1524	0.1165	0.1214	0.0861	0.0864
Rwanda	5.8096	0.0583	743.0956	0.0018	2.8710	0.1774	0.0896	0.7025	0.5585	0.2209	0.1857	0.0533
Burundi	3.8400	0.0000	218.6132	0.0001	2.3397	0.0103	0.0052	0.6062	0.4811	0.1464	0.1444	0.0021
Senegal	16.3720	0.3711	6247.7603	0.0197	3.7957	0.4682	0.2439	0.1100	0.0824	0.2336	0.1439	0.2089
Nigeria	8.6797	0.1433	202.7023	0.0000	2.3069	0.0000	0.0000	1.2519	1.0000	0.3430	0.3430	0.0430
Ghana	11.1224	0.2156	5835.9775	0.0184	3.7661	0.4589	0.2386	0.3079	0.2414	0.2326	0.1445	0.1601
Ivory Coast	12.3680	0.2525	6098.4757	0.0192	3.7852	0.4649	0.2420	0.1293	0.0979	0.2019	0.1128	0.1726
Niger	5.9418	0.0622	469.2629	0.0009	2.6714	0.1146	0.0578	0.2785	0.2178	0.1071	0.0844	0.0418
Correlation between transformed MECI and untransformed MECI= 0.93												
Correlation between MECI calculated by equal weight and that calculated by different weight= 0.93												

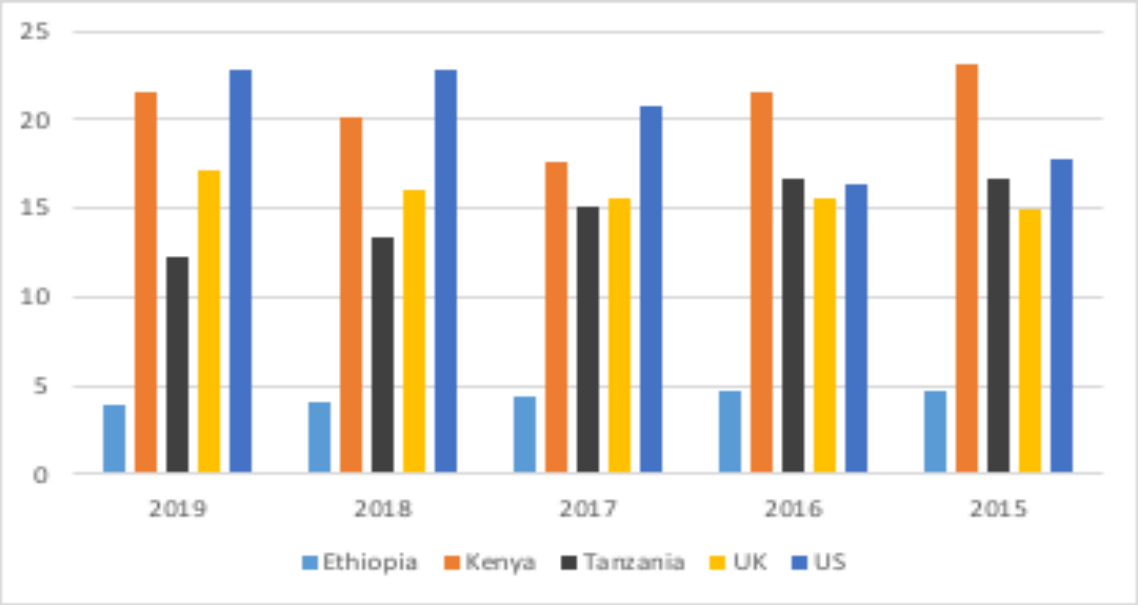
Source: Author's calculations based on data from World Development Indicators

Appendix 4: Annual average wage for the Industrial sector



Source: Author's calculation using ASIP panel (2008-2016)

Appendix 5: Price of electricity (US cents per kWh) for selected years

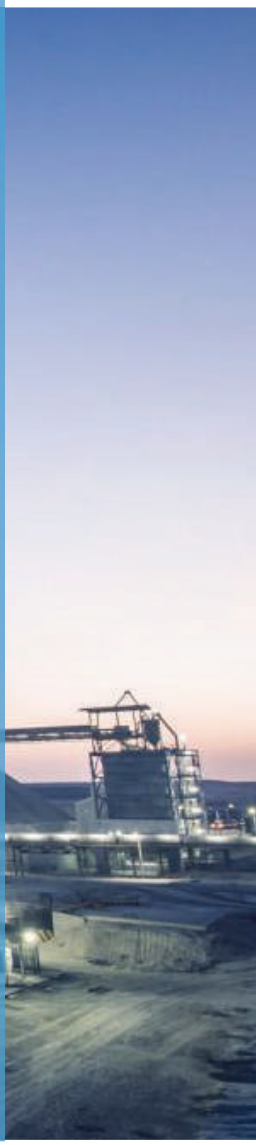


Source: World Bank Doing Business Data, 2019

Appendix 6: More explanations on MECI Estimation

In calculating the MECI particularly the manufactured exports per capita index, we needed to take consideration of the country's population size. In our country sample, some countries like Nigeria have relatively very large population size while others like Rwanda and Burundi have very small population size. This implies there would be great variability in the values of this variable where only 4 countries have an index value of greater than 0.2 (see appendix table 4). To counter this we transform these values into their log form and then calculate the manufactured exports per capita index although with the new index even the very low performing countries such as Malawi and Rwanda were obtaining values above 0.1.

Therefore, we calculated the average of the two indices and used the new variable in calculation of the MECI. We find that the correlation between the MECI index calculated using the transformed manufactured export per capita index and that calculated without any transformation is 0.93 implying the use of the transformed variable had limited impact. In weighting the sub-indices, we use 40:30:30 ratio rather than the equal third where 40 is for the manufactured exports per capita index and the remaining (30 and 30) is for MVA share of GDP index and for average annual growth of manufactured exports index. We give 40 to manufactured exports per capita due to interest on current performance and the need to consider the varying sizes of the countries in the sample. Correlation between MECI obtained by similar weights and that obtained using different weights is 0.93 also suggesting that use of different weights has limited effect on outcome This technique was adopted from Wignaraja and Joiner (2004).



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