MAPPING SKILLS GAP AND SKILLS NEEDS FOR TECHINICIAN GRADUATES IN THE SELECTED ECONOMIC SECTORS FOR INDUSTIAL GROWTH IN TANZANIA

The National Council for Technical Education

Mapping Skills Gap and Skills Needs for Technician Graduates in the Selected Economic Sectors for Industrial Growth in Tanzania

National Council for Technical Education (NACTE)
Dar es Salaam

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Foreword

The government of Tanzania has ambitious plans to transform its economy into a competitive, high-growth, high productivity and middle-income country. The development of Tanzania's industrialised economy will be driven by the development of sectors such as; agri-business and agro-processing, transport and logistics, tourism and hospitality, energy, construction and Information Communication Technology (ICT). This economic transformation has resulted in employers struggling to find adequately qualified personnel to fill vacant positions. Tanzania's technical education sector has responded by expanding over recent years resulting in a growing number of graduates. This has raised questions whether increased numbers of technician graduates is addressing Tanzania's skills requirements or simply resulting in an oversupply of skilled workers for some occupations.

A strong understanding of the current supply of technician graduates and skills gaps in different economic sectors helps us to formulate skills development strategies and active labour market policies. This report highlights key statistics depicting trends in the number of technician graduates entering in the labour market. The report also sheds light on some of the causes for the skills mismatch, and unpacks what employers mean when they say graduates are not "employable." It is our sincere hope that this report will contribute to our knowledge on formulating strategies that will minimize the impact of skills shortages and start to close skills gaps.

This study established that only 95,771 technicians graduated with skills related to selected sectors have entered the labour market from different technical institutions since 2014/2015. This number is low compared to expected demand. It is estimated that the total number of jobs required in the Tanzanian economy will increase to 15 million by 2030. Similarly, it is projected that there will be a significant increase in the share and absolute numbers of high skilled occupations, including technicians. In this survey, skills gaps and mismatches were observed in almost every sector, with multiple examples of employees performing duties that were not related to their training. Employees with technical and scientific skills have a key role to play in the adopting, adapting and disseminating of new techniques, products, production processes, and organizational changes.

Furthermore, it is widely accepted that to meet employers' recruitment needs, there is a requirement to strengthen training in the development of key competences and soft skills. It is my hope that readers will find this report, a useful contribution towards Tanzania's concerted efforts in skills development.

Dr. Adolf B. Rutayuga
EXECUTIVE SECRETARY

Abbreviations

ATE	Association of Tanzania Employees
BOT	Bank of Tanzania
BTC	Basic Technician Certificate
CRB	Contractor Registration Board
CTI	Confederation of Tanzania Industries
CBET	Competence Based Education and Training
CSO	Contribution of Civil Society Organizations
DIT	Dar es Salaam Institute of Technology
ERB	Engineer Registration Board
ESPJ	Tanzania Education Skills for Productive Jobs
FDI	Foreign Direct Investment
FYD	Five Year Development Plan
GDP	Gross Domestic Product
HMI	Human Machine Interface
ICT	Information and Communication Technology
ILFS	Integrated Labour Force Survey
ILO	International Labour Organization
MPT	Managerial, Professional and Technical
MIS	Management Information Systems
MIT	Ministry of Industry and Trade
NACTE	National Council for Technical Education
NSDC	National Skills Development Council
NBS	Tanzania National Bureau of Statistics
NSDS	National Skills Development Strategy
NGO	Non-Governmental Organizations
NTA	National Technical Award

NVA	National Vocation Award
PO-RALG	President's Office- regional Administration and Local Government
PLC	Programmable Logic Controller
QRB	Quantity Surveyor Registration Board
SSA	Sub-Saharan Africa
TDV	Tanzania Development Vision
TVET	Technical and Vocational Education Training
UDOM	University of Dodoma
UDSM	University of Dar es Salaam
UNCTAD	United Nations Conference on Trade and Development
UN	United Nation
VETA	Vocational Education Training Authority

Definition of Terms

Adapting	Being open and willing to learn new things, take on new challenges and making adjustments to suit transitions in the workplace
Adopting	Involves an immediate, or nearly immediate transfer of skills.
Artisan	Someone in a skilled trade that involves making things by hand
Competency	A combination of skill, knowledge or attitude that enables an employee to perform their assigned tasks
Diffusing	Refers to the process of making knowledge or skills widely known or known to a lot of people
Employability Skills	Having a set of skills, knowledge, understanding and personal attributes that make a person more likely to choose and secure occupations in which they can be satisfied and successful
Generic Skills	Transferable skills that apply across a variety of jobs and life contexts
Horizontal Skills Mismatch	Refers to the extent to which workers, typically graduates, are employed in an occupation that is unrelated to their principal field of study
Industry	Is a group of companies that are related based on their primary business activities. A group of industries is known as a sector
Job	An activity, often regular and often performed in exchange for payment for a living
Job Requirement Approach	An approach used to understand qualities or qualifications that an individual must have in order to be considered suitable for a specific job

Sector	An area of the economy in which businesses share the same or a related product or services. It can also be thought of, as an industry or market that shares common operating characteristics
Skills	Is the ability to do something well at a certain level of competence or proficiency.
Skills gap	Skill gaps measure the extent to which workers lack the skills necessary to perform their current job.
Skills Mismatch	Defined as the gap between an individual's skills and the demands of the job market which are further categorised into vertical and horizontal skills mismatch, skills gap, skills shortage and skills obsolescence.
Skills Need	Refers to work abilities that are required by the labour market for effective and efficient production.
Skills Obsolescence	Refers to the process by which workers' skills become obsolete due to time from training which depreciates certain skills, through technological or economic change which renders certain skills unnecessary or through the underutilisation of skills
Skills Shortage	Refer to unfilled or hard to fill vacancies that have arisen as a consequence of a lack of qualified or skilled candidates for posts.
Soft Skills	Personal attributes that support situational awareness and enhances an individual's ability to get a job done parallel to effective and harmonious interaction with other people.
Technical Institutions	Refer to training institutions that offer programs at tertiary level that teach students about the technical aspects of particular occupation.

Technician	An expert in the practical application of a science and/or skills in a specific profession art or craft.
Training Programme	A set of modules designed for training with specific skills development outcomes.
Vertical Skills Mismatch	Refers to over-skilling or under-skilling, in the former, the worker possesses more skills than their current job requirements, and in the latter describes the situation whereby the worker's current skills do not meet the demands of the job.

Acknowledgements

Executive Summary

Skills gaps are one of Tanzanian employers'most pressing concerns. Skill gaps constrain organizations' ability to grow, innovate, deliver products and services on time, meet quality standards and meet environmental and social requirements. Closing skill gaps directly leads to improved productivity, employment, and enterprise creation in both the formal and informal sectors.

The objective of this study is to identify skills gaps at technician level in Tanzania's key economic sectors. This was to be conducted through an analysis of stakeholders' perceptions on the comparability of skills acquired through technician level training programmes to those required in the workplace. This survey utilised a job requirement approach that concentrates on the skills that employees use in their jobs. This approach focuses on a range of basic and generic skills such as literacy, communication and influencing skills. It also explored trends in the value of identified skills.

In the period from 2014/15 to 2019/20 it is estimated that a total of only 95,771 graduate technicians with skills related to the selected sectors entered the labour market. Those with skills in management of agri-business eenterprises and aagricultural related practices constituted the larger proportion of the graduate cohort (37%). This is followed by graduates with ICT related skills (27%) and construction related skills (19%).

Among the sectors analysed, the number graduates in agricultural related programmes increased from 7,139 to 8,045 between 2014/15 to 2015/16 and remained almost constant between 2016/17 to 2018/19. Within the same timeframe, the number of graduates in ICT remained constant with an average increase of 1%. The number of graduates who completed construction skills related programmes is low with an average of 3,701 graduates per year. The number of graduate technicians in programs related to sectors such as energy and mining (1,101), transport and logistics (1,173), tourism and hospitality (1,043) continued to remain low over this period.

There are currently only few technician level programmes aimed at providing skills related to transport and logistics sector. There has been an increase in the number of aircraft maintenance engineers, which is a relatively new program established to address skills gaps arising from the lack of domestic experts in aviation sub-sector.

Other programs have seen a drop in their number of graduates, for example; architecture graduates have decreased from 284 in 2014/15 to 174 in 2018/2019 representing a 39% drop. The advancement of technology in the architecture field, through modeling programs like ArchiCAD for building elevation have replaced hand sketching techniques, resulting in a drop in graduate numbers. Similarly, in the cases of automotive engineering, civil and highway engineering, civil and transportation engineering, civil engineering, civil engineering and electrical engineering, despite an increase between 2014/2014 to 2015/16 the number of graduates has dropped in subsequent years. The introduction of new heavy-duty equipment increasingly used in the engineering and highway engineering sectors, necessitates the development of new training programs that provide technician level skills that reflect up to date industry demand and job opportunities.

Transport and Logistics sector graduates took the longest time to find employment with an average of 20.2 months followed by Tourism and Hospitality with an average of 17.3 months. Those who graduated in ICT took the shortest time to find employment with an average of 4.6 months. There is acute shortage of technician graduates in oil and gas engineering and electrical hydropower engineering, whereas mining engineering forms a major part (1,940) of the total number of energy sector graduates. This is followed by graduate numbers in the petroleum geosciences and geology and mineral exploration sectors with a total of 815 and 753 technician graduates respectively.

Recruitment difficulties often stem from the need for soft skills and key competences, which demonstrates their importance in training programmes. The highest skills mismatches were observed in agribusiness (41.2%), construction (20.6%) and tourism and hospitality (17.6%). These were also sectors where there were a large number of employees who performed duties not related to their studies. On the other hand, employees in the ICT sector indicated the lowest skills mismatch, with only 9% of employees doing unrelated tasks. The majority of respondents indicated that they performed duties unrelated to their skills were in the sector of construction sector in the areas of shuttering and construction site management. Each of these sub-sectors recorded a 100% mismatch. This was followed by agribusiness in the areas of welding technology and programmable logic control (PLC), with recorded skills mismatches of 100%, 75% and 50% respectively.

Skills gaps, cited by employers, were also found in agribusiness; welding technologies, plumbing, fitter mechanics and occupational safety (>66%), in energy;

electrical installation and management, tracking technologies and instrumentation works (>60%) and in construction; site management, store keeping and stock management and shuttering (>50%). 50% of employers in the hospitality and tourism sectors mentioned customer care and services as a major skill challenge. Skills gaps were also reported in air-conditioning and deep refrigeration, PLC, masonry, locomotive maintenance and repair. Skills gap mostly cited (>50%) in ICT were software management, digital and e-marketing and sales and marketing.

Domestic skills gaps in the areas of Human Machine Interface (HMI) and Programmable Logic Controller (PLC) were also reported, resulting in modern electronic machine operations being commonly performed by imported experts. There was also a lack of domestic experts in the agribusiness sector in the areas of; leather technologists, wine making processors, sugar technologists, meat and fish technologists and grapes processing (wine production) technologists. In the energy sector, skills such heating, deep refrigeration, and air conditioning mechanics, drilling, mining and shot firing and metal fitting were also reported to be missing. In the construction sector there were domestic skills gases in a number of areas including; reinforced concrete finisher, premix concrete technologies, asphalt preparation technologies. There were further demands for technicians specializing in security and shutters installations and stones bridge design. Skills gaps in transport and logistics was reported in aircraft mechanics an in the ICT sector; network security technology, artificial intelligence and robotics.

Over 60% percent of all employers rated almost all soft skills as missing. Skills in the areas of; report writing, customer care, innovation, teamwork, computer literacy, communication, problem solving, communication/language and IT skills were described as being inadequate relative to firms' needs. While technical education provision has made great strides in promoting access to TVET, the number of technical graduates in the selected sectors has dropped from 20,152 in 2014/16 to 19,645 in 2019/19. Skills development in Tanzania is facing several challenges both at systemic and implementation/provider levels. Although the NACTE curriculum validation process requires training institutions to follow a Competency Based Education approach, 39% of the employers pointed out that most of their employees were unable to apply the knowledge in performing relevant tasks. 26% of employers cited that employees were trained in outdated technologies. There were also comments that technical institutions do not adequately train graduates in practical skills and job competencies. This has resulted in many companies offering in-house training, which they deem as more beneficial than hiring technical

graduates whose knowledge tends to be very theoretical. Additionally, employers feel that colleges do not prepare graduates to become entrepreneurs. It is also very important that students get adequate practical exposure opportunities through internships, field visits, and study tours. Collaborative efforts from all stakeholders are needed to reduce skills gaps between technical programmes and workplace.

1.0   Introduction

1.1   An Overview

This study aims to identify skills gaps and skills needs in six priority sectors: energy, agri-business and agro-business, construction, hospitality and tourism, transport and logistics and ICT. The study's objective is to identify skills gaps through an analysis of stakeholders' perceptions of the comparability of skills acquired through technician level training programmes to those demanded by employers. The study is divided into five sections. Section one reviews performance and skills needs for each sector. Section two highlights the approaches used to conduct this study. Section three describesgovernment initiatives promoting Tanzania's skills development and the corresponding supply of technician level employees across the target sectors. Section four, focuses on employers' and employees' perceptions on skills mismatch and skills gaps. Section five provides the report's conclusion and recommendations.

1.2   Background information on skills gaps and skills needs

Technical and Vocational Education and Training (TVET) is globally identified as a major contributor to industrial growth. UNESCO and the International Labour Organization (ILO) define TVET as "aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupants in various sectors of economic and social life" (UNESCO and ILO, 2001).

In 2020, the total population of the Tanzanian mainland is around 59 million with and 1.3 million in Zanzibar. The population is growing at around 3.1% per year. The estimated total workforce is 25.7 million out of which 22.3 million (87%) are economically active and 3.4 million (13%) inactive. The realisation of the Tanzania Development Vision 2025 (TDV, 2025), which aims to build a well-educated and learned society and strong and competitive economy, is threatened by several socio-economic and demographic factors. For example, out of the working age population of 25.7 million people, only 2.6 million, (approximately 10%), were employed in the formal sector (ILFS, 2014). Of these, approximately 0.7 million were employed by the public sector and 1.9 million were employed in the private sector (Table 1). A total of 15.9 million are self-employed, working in the informal economy, primarily in agriculture (12.2 million) and petty trading, Informal economic activities, while providing a vital livelihood, typically offer low incomes. Achieving the TDV 2025

goal of middle-income status requires a transition to a more formalized economy, which, in turn, requires a workforce with a higher level of skills and formal qualifications (NSDS, 2016).

Table 1. Employment Created by Public and Private Sector

Type of Employment	2015				2016			
	PRIVATE	**PUBLIC**	**TOTAL**	**%**	**PRIVATE**	**PUBLIC**	**TOTAL**	**%**
Regular	1304653	755360	2060013	88.2	1568022	848010	2416032	92.9
Casual	263512	11444	274956	11.8	180673	2605	183279	7.1
Total	**1568165**	**766804**	**2334969**	**100**	**1748695**	**850615**	**2599311**	**100**

Source: NBS, 2018

Over the next few years, it is projected that economic growth will be driven through; foreign and domestic investment in export industries, higher productivity in key sectors (agriculture and energy), transport infrastructure, as well as expected revenues from the oil and gas sector and urbanization (UNCTAD, 2017). According to United Nations Conference on Trade and Development, Tanzania was ranked 137th globally in the Doing Business Report in 2018 compared to 132nd in 2017. In 2018, to address these challenges, which led to drop in FDI, the Government of Tanzania established a Blueprint for Regulatory Reforms' with the goal of improving the business environment for investors. Improved skills development and planning was identified as a key factor in supporting the development of more business-friendly environment. This would also lead to the development of a more diversified economic model creating new occupations and more productive jobs. The needs for skills was also magnified through the ambitions of the Second Five Years Development Plan (2016/2017 – 2020/2021), which looked to more than quadruple the proportion of high-skilled workers and more than double the proportion of medium-skilled workers to keep pace with the projected demand for skills necessary for industrialization.

Tanzania aims to become a semi-industrialized country by 2025, for which the contribution of manufacturing to the national economy must reach a minimum of 40% of the GDP (Dinh 2013 Mkapa, 2005; Kikwete, 2014). To realise this objective, Tanzania aims to diversify its economy from being dominated by natural resource exploitation activities and extractive industries (agriculture, tourism, and mining) to a broad base of manufacturing, processing and packaging industries. This process will include through the development of five priority sectors; agri-business and agro-

processing, transport and logistics, tourism and hospitality, energy, construction and ICT.

1.2.1 Growth in Agricultural Sector

The Government Tanzania Development Vision 2025 and the Five-Year Development Plan (FYDP II) sets out ambitious goals for reducing poverty and sustainable industrial growth so that the country can achieve middle-income status by 2025. The government recognizes agriculture as central to realizing its objectives in socioeconomic development, which is clearly articulated in the Second Agriculture Sector Development Program (ASDP II). Among the goals of ASDP II are to transform agriculture by promoting commercialization, prioritizing high-potential commodity value chains, and mobilizing capital by giving the formal private sector a growing sector role.

Growth in agricultural GDP averaged only 3.5% from 2006 to 2016 (despite 6% annual growth is generally considered necessary to adequately propel the national economy to a growth trajectory of above 8 percent per annum. Agricultural labour productivity also went up slightly during this period. In 2018 there was an increase in real growth in agriculture from 3% to 5.3% but agricultural value-added growth slowed to 4.4% from 5.5% in 2019(Figure 1).It is apparent that, for Tanzania to meet its growth and job targets, agriculture must change.The ASDP II acknowledges that, Tanzania needs competitive labour-intensive sectors to help absorb the growing youth labour force. This mitigates the risk represented by the rapid migration of young people from remote or land-constrained agricultural areas adding to the number of underemployed workers in low-skill urban services.

According to the Integrated Labour Force Survey, there are nearly 15 million Tanzanian youth aged 15-35 years, including over 15% who are considered to be economically inactive (NBS, 2014). The development of entrepreneurial and agribusiness skills has been cited as an opportunity to address both the issue of youth underemployment and the need for enhanced skills. There is also emerging evidence, through the implementation of the ASDPII, of the growing importance in the agriculture sector of skills on climate change and nutrition through the introduction of innovations such as bio fortification. This requires training institutions to ensure that their graduates have skills that support nutrition-sensitive agriculture and agricultural development investment, leadership and management.

Figure 1. Performance of selected Tanzanian economic sectors
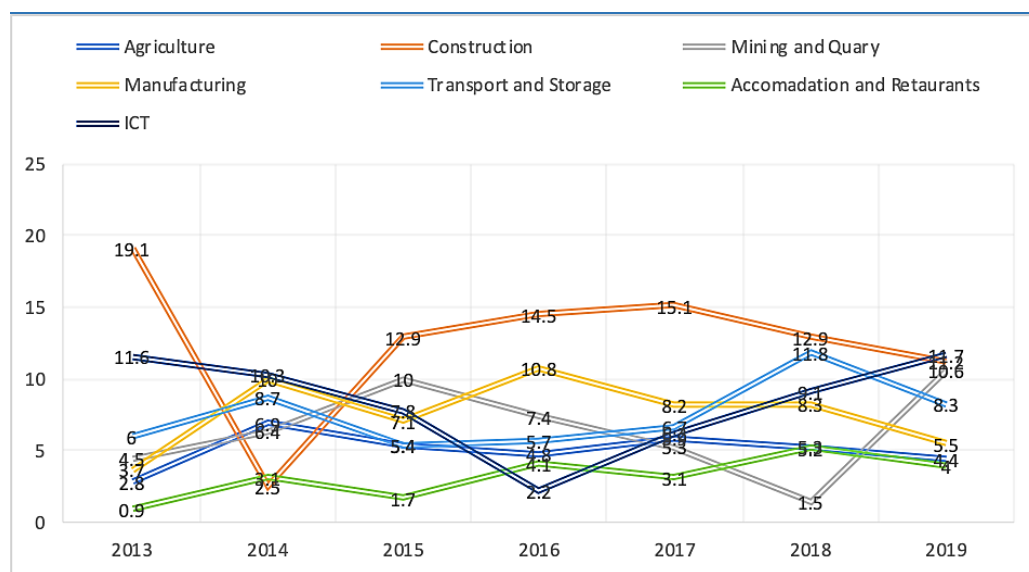
1.2.2 Construction

According to the NBS (2019), the construction sector is the biggest driver of gross domestic product growth. The sector recorded a growth rate of 11.7% in the first quarter of 2019, compared with 12.9% in the corresponding quarter of 2018. Sector growth can be attributed to an increase in local production of construction materials such as cement, iron and steel. NBS (2018) attributed construction sector growth to the increase in the construction of commercial and residential buildings and ongoing infrastructure projects. Major infrastructure projects included; the Standard Gauge Railway (SGR), expansion of Mwanza airport, construction of bridges at TAZARA and the Ubungo intersection in Dar es Salaam, construction of the Manyoni to Tabora road, the Songosongo natural gas project, which involved the construction of a 512-kilometre pipeline from Mtwara to Dar es Salaam, the Madimba processing centre, and the infrastructure for Phase 1 of the Dar es Salaam Rapid transit bus and hydropower plant at River Rufiji. Leeds (2016) sets out the four main challenges facing the construction sector; poor productivity resulting from easy entry and stiff competition; poor project performance; shortage of skilled labour; and sustainability concerns. These, along with the concerns that have traditionally impacted the sector on the continent, such as constantly rising project costs, corruption, lack of skilled labour, on-site safety, and capital supply constraints (Bonface, 2015), hinder the successful development of the sector.

The next largest sectors in terms of contribution to GDP were transport and logistics at 11.1% and mining and quarrying at 10%.

1.2.3 Transport and Transportation

The development of Tanzania's transport infrastructure has been conducted through the implementation of a series of development plans. These plans have included those focusing on the general development of the economy such as Vision 2025 and the First Five-Year Development Plan, and those that focus on the transport sector such as the Implementation Strategy of the Transport Policy (2011 to 2025), the Local Government Transport Programme (LGTP) and the Transport Sector Investment Programme (TSIP) (ADB, 2013)[1]. Despite several challenges, Tanzania's transport and logistics sector performs well in regional comparisons. Historically, Tanzania's geographical advantage and untapped potential as a regional trade centre have been restricted by poor transport infrastructure. This infrastructure deficit is now being steadily being addressed via a series of transport and utilities infrastructure projects worth in excess of USD 19 billion (EU, 2016)[2]. This unprecedented level of investment will also have positive spill-over effects for other sectors, including tourism, which will benefit from improved access, and agriculture, which will benefit from the emergence of new and more accessible markets.

Further investments in infrastructure are planned by the Government of Tanzania (GoT) in the recent Five-Year Development Plan II. This is reflected in the 2016/17 national budget, in which the GoT has allocated more than 2 billion Euros for development in the transport sector. 200 million Euros from this budget have been allocated to the upgrading of the railway central corridor to a standard gauge track.

1ADB, (2013). Tanzania Transport Sector Review. Transport and ICT Department.
2 How European investment contributes to industrialisation and development in Tanzania European Commission, Dar es Salaam, 2016.

Figure 2. Tanzania's Backbone Infrastructure
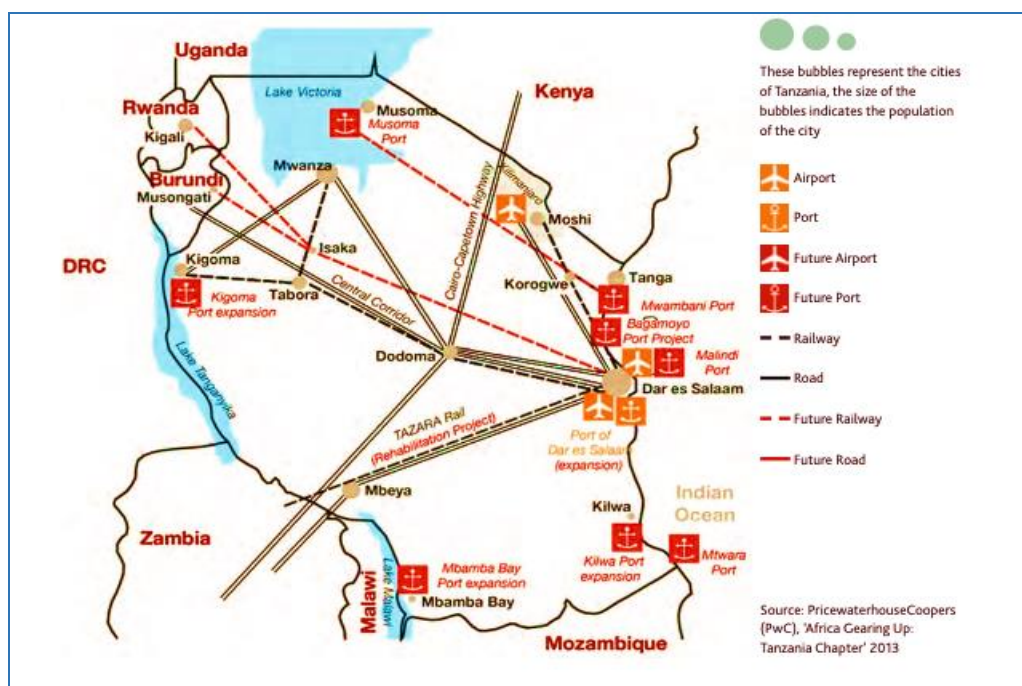
2.3.4 Energy Sector

The Energy sector plays a critical role in the socio-economic development of any country. Access to affordable and reliable modern energy services are considered to be a key ingredient towards achieving Tanzania's socio-economic development. About 90% of Tanzania's primary energy supply comes from biomass (mainly firewood and charcoal), while other energy sources include petroleum (9%), electricity (4.5%), and other renewable energy sources (1.2%) (Mokveld and Eije, 2018).

Figure 3. Various Sources of Energy in Tanzania
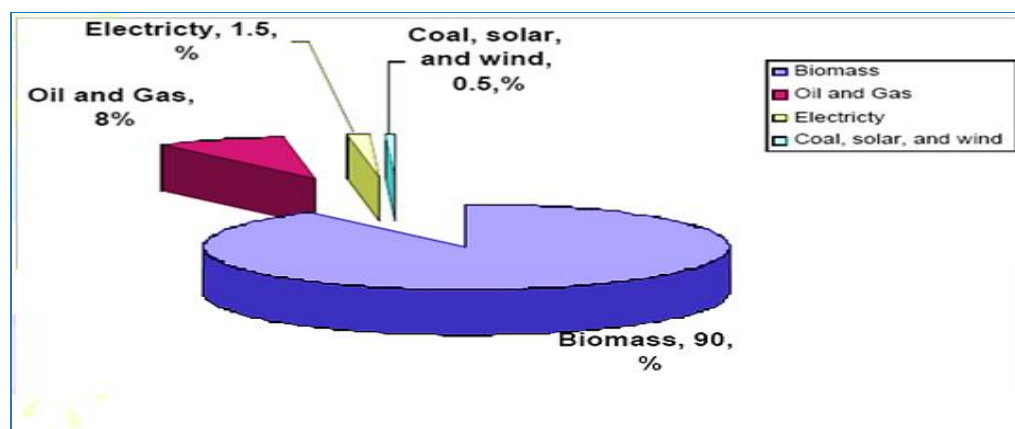
Source: NBS, 2019

Over recent years, the Tanzanian solar energy sector has experienced rapid growth and solar products are now a common sight in shops and markets throughout the country. There are several factors have contributed to this growth. On the supply side, research and development initiatives have greatly reduced the prices of solar-PV products. The recent introduction of innovative services such as pre-paid solar energy services have helped to provide clean and affordable solar lighting to off-grid households. There is potential for the Tanzanian sugar sector to produce ethanol or ethanol gel as a cooking fuel that could serve as a replacement for kerosene or charcoal. Studies have also revealed potential sites for Tanzanian wind farms. Proven natural gas reserves in Tanzania are estimated at more than 45 billion m³ with significant deposits found at Songo Songo in Lindi region, Mnazi bay in Mtwara Region and Mkuranga in the Coast Region. This has led to plans for the expansion of natural gas use for power generation and other industrial applications. Currently, the five major gas suppliers namely; BP Gas, Oryx Gas, Alpha, Mohan Gas and Pan African/TPDC are piloting the bottling and distribution of natural gas. There is also a growing Liquid Petroleum Gas (LPG) sector, for example in the middle-class areas of Kinondoni Municipality of Dar City, gas kiosks can be found less than a kilometre from each other. The Government of Tanzania is also developing a strategic approach to generating electricity using Mchuchuma coal in collaboration with the private sector. Furthermore, Tanzania's second Five-Year Development Plan (FYDP II), unveiled in June 2016, foresees a six-fold expansion of the power grid over the next decade. The plan sets a top-line installed base target of 10GW by 2025/26, which is a significant increase from only 1.5GW in 2015. The implementation of various power generation projects is expected to increase the

capacity of the national power grid from its current 1,602 megawatts to 10,000 megawatts by 2025.

1.2.5 Tourism and Hospitality

Tanzania's Tourism and Hospitality sector is built on the country's rich and diverse natural resources, especially in wildlife. About a third of the country's total area is under protection, one of the world's highest ratios making it a prime global tourism destination. Tanzania's natural resources include; national parks, game reserves, marine parks, marine reserves, and multiple forest reserves, that host world renowned biodiversity, wildlife, and unique ecosystems. The Tourism sub-sector is now being developed to include embedded supporting sub-sectors such as retail and transport. The Hospitality sub-sector has an important role in promoting tourist satisfaction through the delivery of services including in hotels, camps, lodges, restaurants and cafes. (World Bank, 2018[3]).

Table 2. **Annual trends of tourist arrivals and revenue generated from their activities**

Year	Number of Visitor Arrivals	Annual Change %	Receipts (US $ Mil)	Receipts (TZ Mil)
2005	612,754	4.8	823.05	929,058.85
2006	644,124	5.12	950.00	1,079,137.01
2007	719,031	11.62	1,198.76	1,290,542.11
2008	770,376	7.14	1,288.70	1,520,429.11
2009	714,367	-7.27	1,159.82	1,511,704.59
2010	782,699	9.5	1,254.50	1,767,967.85
2011	867,994	10.89	1,353.29	2,107,613.85
2012	1,077,058	24	1,712.75	2,691,929.18
2013	1,095,884	1.7	1,853.28	2,962,653.40
2014	1,140,156	4	2,006.32	3,316,647.59
2015	1,137,182	-0.26	1,901.95	3,774,443.94
2016	1,284,279	12.1	2,131.57	4,640,641.05
2017	1,327,143	3.2	2,258.96	5,040,191.55

Source: Tourism Statistical Bulletin, Ministry of Tourism and Natural Resources

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The tourism and hospitality sector offer the potential for multiple income sources and tax revenue, both directly within the sector and indirectly with associated sub-sectors. This has resulted in the sector being prioritised under the government's Five-Year Development Plan and other national strategies such as NSDS (National Strategy for the Development of Skills). These look to capture the sector's growth potential through attracting an increasing number of international visitors to the country over the next few years. The sector's growing potential has also resulted in an increase in the number of tourism sector businesses and an associated increase in skills demand.

1.2.6 Information and Communication Technology (ICT)

ICT is one Tanzania's fastest growing priority sectors representing a mix of large, medium and small-scale enterprises. The sector currently provides substantial employment and self-employment opportunities. Despite being a comparatively new sector, ICT has experienced significant growth. In 2019, ICT grew by 11.7% compared to a national growth in GDP of 6.8%. Other fast-growing sectors included; construction 11.2%, water supply 10.9% and mining and quarrying 10.6% (NBS, Q3 2019).

ICT development in Tanzania has contributed to widespread social economic development by increasingthe efficiency and productivity of other key priority sectors. For example, the introduction of mobile money platforms in Tanzania has created new banking avenues for people who previously did not have access to banking services with a financial inclusion rate of 65%. This opportunity has seen the establishment of multiple SMEs acting as mobile banking agents, with a sector now creating and supporting the employment and livelihoods of 47,685,232 mobile subscribers. (TCRA, 2019). ICT has also contributed to improvements in both public and private sector service delivery, including; healthcare, formal and informal education and various e-services contributing to the delivery of e-government.

ICT is a knowledge-based industry and requires workers equipped with cognitive, non-cognitive and technical skills. The emergence of ICT driven enterprises and processes has resulted in a need for innovative workers who can apply knowledge, make decisions and perform duties independently and efficiently. It is important that Tanzania's ICT training institutions develop programmes that reflect the growing sector's growing demand for skills.

1.3   Employers' Perceptions on TVET Graduates in Tanzania

Tanzanian employers, as is the case in many countries, struggle to find adequately qualified personnel to fill vacant positions. Several studies have indicated that there is a considerable divergence between the kind of graduates' employers expect, in both the public and private sectors, and those produced by colleges and universities (Mkumba 2010; Mwita, 2018). Similarly, World Bank (2016) reported that Tanzanian private sector firms faced a shortage of trained low, medium and high-skilled workers needed to grow and create jobs. This was illustrated by about 40% of all firms covered by the Enterprise Survey for Tanzania identifying an inadequately educated workforce as a major constraint. This result was well below the Sub-Saharan Africa (SSA) and world averages of 23% and 24%, respectively (World Bank 2016, ESPJ, 2016). There are a lack of studies focusing on Tanzanian employers' perspectives, however, those that have been conducted; Crowley *et al*, (2017), Austin (2011) highlighted the constraints employers face due to skills shortages. Low skilled workers dominate the Tanzanian workforce (84 %), followed by medium skilled (13%) and high skilled (3%) workers (Moyo *et al.,* 2010). This is in comparison to an average Lower Middle-income Country (LMIC) ratio of 55% low skilled, 33 % medium skilled, and 12% high skilled workers (Moyo *et al.,* 2010).

Skills mismatch, resulting from skills being taught by education institutions not matching the demand of the labour market, is a common phenomenon with high social and economic costs (ILO 2008), particularly when it results in youth unemployment. Skills mismatches can also result in low productivity. In addition to existing technical skills challenges, there are also soft skills shortages. Over 70 % of Tanzania employers highlighted the importance of 'soft skills', such as; work ethics, teamwork, problem solving, and communication. Employers also described the absence of this soft skill amongst many Tanzanian workers, including those with strong academic or technical qualifications (NSDS, 2016).

1.4   Problem of Skills gaps and mismatches

Skills gaps and mismatches often result from of a lack of shared sector level information on the demand and supply of skills. This discrepancy requires sector level planning and understanding of current and future skills needs. Since its establishment in 1997, the National Council for Technical Education (NACTE) has overseen the provision of quality technical education and training leading to awards, including at technician and professional levels. However, up to now, this has been conducted with little available documented information on the nature of skills gaps

among graduates who are currently employed in various economic sectors in Tanzania.

Vision 2025's objectives will be realised through the implementation of a series of three to five-year development plans. One its key ambition is the development of an industrial economy built on agro-processing and medium technology industries. It also looks to oversee the improved competitiveness across the economy. This development needs to be supported through effective skills development initiatives focusing on meeting defined skills demands. There have been a few studies (NSD, VETA, and NACTE) investigating skills gap and manpower requirements in the identified priority sectors (NSD, 2016). This study, attempts to contribute to this understanding by mapping skill gaps at technician level in Tanzania's priority sectors. Tanzania's rapid expansion in technical education has not occurred homogenously across all sectors, which has impacted on the labour market and employers' access to trained labour. The growth in the number of technician graduates has also raised some questions. For example; is there any evidence that the supply of graduates is providing the skills required for Tanzania's development agenda or has the increase in technical education graduates resulted in an oversupply of certain skills? To answer these questions, we need to understand the supply of technical graduates from 2014/15 to 2018/19.

1.5 Specific Objectives of this Survey

This survey seeks to address the following objectives;
i) Analyse institutional context of skills development in Tanzania and supply of technician level manpower in the selected sectors;
ii) Skills gaps in the selected sectors; and
iii) Determine skill needs for growth in the selected sectors.

2.0 The Survey – Contents and Coverage

2.1   Selecting sectors for the survey

This survey involved a total of six (6) economic priority sectors selected for their importance in realising Tanzania's industrialization (NSDS, 2016). These selected sectors are; agriculture, agribusiness and agro-processing, transport and logistics, tourism and hospitality, energy, construction and ICT. These sectors have been prioritised through the Government's FYDP II, and the National Skills Development Strategy due to their potential for economic growth, job creation and proving an enabling role for wider sectors' growth. These sectors also represent the potential for a high labour market productivity return to skills and education.

Over the past decade, the growth in jobs in these key economic sectors has considerably outpaced growth in the rest of the economy. Between 2006 and 2014, the number of individuals employed by these six sectors grew from just over 800,000 to almost two million workers, an increase of 137%. If a similar growth continues through 2016–2021, it will give rise to a large and constant demand for new, skilled labour market entrants. Additionally, there are considerable opportunities within these sectors for informal sector employment, which will provide substantial youth employment opportunities.

The survey utilised non-probability (purposive) sampling, which allowed for the use of predefined characteristics and ensured the inclusion of specific target population. Rasool & Botha (2011) highlighted that purposive sampling requires the researcher to utilise their experience or ingenuity to identify and find the participants that are deemed to be representative of the population of interest. On this basis, the study sample was purposively drawn from employers, training providers, and employees currently active in skills value chain development in the selected sectors. In developing the most appropriate sample, previous studies as well as insights from sector experts were considered. These insights were helpful in developing a good understanding for the selected sample's characteristics.

2.2   Establishing Government skills supply side initiatives in the priority economic sectors

The Government plays a significant role in growing the supply of skills. Tanzania's TVET provision has been expanding to match the growing demand across the economy for skilled employees. This survey looks to explore the impact of government initiatives and associated drivers of change which have impacted on the

supply of skills over the last five years (2014/215 to 2018/219).This was conducted through analysis of information on the number of graduates, courses offered and graduates education qualification obtained from 124 technical institutions withinthe identified sectors. Table 3 summarizestraining programmes across the priority economic sectors.

In this study, skill is defined as the 'ability to apply knowledge and knowhow to complete tasks and solve work-related problems. The study makes the assumption that technician graduates make up a significant proportion of the 'technician level workforce' and thus represents the supply of labour at this level. This study is also grounded on the premise that a significant number of graduates automatically enter employment in the sector that they trained for.

Table 3. Programmes Available for Supply of Skills

Sector	Programmes
Energy and Minerals	Pipe Works, Oil and Gas Engineering, Electrical and Hydro Power Engineering, Renewable Energy; Auto Electrical and Electronic Engineering; Heavy Duty Equipment Engineering.
Agribusiness	Agriculture (crop production), Horticulture, Animal Production, Food Science and Technology, Agribusiness, Leather Product Technology.
ICT	Communication Systems Technology; Computer Engineering, Electronics and Telecommunication Engineering; Information Technology; Computing and Information Communication Technology
Transport and Logistics	Aircraft Maintenance Engineering; Automobile Engineering; Accounting and Transport Finance; Freight Clearing and Forwarding; Logistics and Transport Management; Transportation Engineering
Construction	Civil and Irrigation Engineering; Electrical and Hydro Power Engineering; Heavy Duty Equipment Engineering; Civil Engineering; Automotive Engineering; Architecture; Highway Engineering
Tourism and Hospitality	Accommodation Operations; Culinary Art; Event Management; Food and Beverage Services; Food Production; Pastry and Bakery Production, Front Office Operations; Hospitality Management; Hospitality Operations; Hospitality Operations-apprenticeship Programme; Housekeeping and Laundry; Tour

Sector	Programmes
	Guiding Operations; Tourism Operation; Travel and Tourism; Wildlife Management; Wildlife Tourism Management, Wildlife Management and Law Enforcement

2.3   Measuring Skills Gaps

The applied methodology for measuring skills is an important consideration in defining skills matching and gaps. Typically, information about skill levels is collected through surveys of individuals and employers. These surveys tend to use one or more of the following measures for skills; (i) occupation (ii) qualification; (iii) duration of education; (iv) skill tests (v) self-assessment and (vi) job requirements.

This survey utilised a job requirement approach that asked respondents about the skills they use in their jobs. This provides a proxy measure of skills possessed by individuals as they exercise their jobs; and skills needed by employers in a particular job. The study analysed areas such as skills acquired, needs and mismatches. It also looked at skills needed for emerging technology. This approach focuses on a range of basic and generic skills, including   literacy, communication and influencing, and whether the importance of a particular skill is increasing or decreasing.

2.4   Data Sources and sample size

This survey involved 105 companies drawn from 1,426 companies representing a 7% sample. The sample size was determined by following Boyd and Stach, (1988) formula that 5-15% is reasonable for a survey. Lists of companies whose business were related to the six selected priority economic sectors were obtained from the Ministry of Industry and Trade (MIT), Confederation of Tanzania Industries (CTI), President's Office- regional Administration and Local Government (PO-RALG).

To gauge opinions on skills constraints, 105line managers (immediate technical supervisors), 65 human resource managers and 487 employees (technicians) were sampled. A range of 3 – 10 employees (depending on the size of the company) was selected from each company. The summary of the sectors involved in the study, number of companies and number of respondents for each sector is presented in Table 4.

Table 4. Sectors, Companies and Respondents Involved in the Study

SN	Sector	Number of Companies	Respondents			
			Employees/Technicians	Line Managers	HR Managers	Total Respondents
1	Agriculture, Agribusiness and Agro-processing	30	139	30	21	190
2	Construction	31	143	31	16	190
3.	Energy	8	43	8	5	56
4.	Tourism and Hospitality&	22	88	22	14	124
5.	ICT	8	33	8	5	46
6.	Transport & Logistic	6	41	6	4	51
	TOTAL	105	487	105	65	657

Respondents provided information on skills gaps, mismatches, and skills required for in the workplace, including due to emerging technologies. Structured questionnaires for both line-managers/supervisors and employees were administered while semi-structured questionnaires were administered to human resource managers. Focus group discussions were employed in companies with more than 10 technicians.

2.5   Stakeholders Consultative Meeting

In addition to the data gathered through questionnaires and secondary sources, the study conducted a series of consultative meetings with key stakeholders, drawn from; government ministries and agencies, regulatory bodies, private employers and their apex unions (listed in appendices). This allowed the survey to capture information on skills gaps that were not initially captured through the survey data.

3.0 Institutional Context and Skills Development in Tanzania

3.1 Overview

Tanzania's need for skilled labor is being addressed through the delivery of strategic initiatives. The current industrialization drive, embedded in the country's National Five-Year Development Plan (FYDP II) 2016/17–2020/21, themed '*Nurturing Industrialization for Economic Transformation and Human Development*', is intended to promote the growth ,economic transformation and technological advancement articulated in the Tanzania Development Vision (TDV) 2025 (Kweka, 2018).The Tanzanian government is currently focusing on the development of an industrial economy which will require skills graduates for across the industrial production chain. This will require TVET providers and training programmes to to focus, concentrate and prioritize on the required industrial skills. This section, highlights the major drivers of change for skills development in Tanzania. This includes an overview of the supply of skills from technical institutes.

3.1.1 Development Vision 2025

For Tanzania to achieve its Development Vision 2025 of becoming a middle-income country, it will need to develop the right mix of high-quality skills to drive further growth (ESPJ, 2016). Countries' efforts to upgrade the workforce skills are driven by two imperatives; the need for a skilled labour force which can support the growth of key economic sectors, and the need to accommodate large numbers of young people entering the labour force every year in search of productive jobs. Tanzania's medium-term growth will be driven through; foreign and domestic investment in export industries; higher productivity in agriculture, electricity, ports and transportation infrastructure; revenues from the oil and gas sector; and urbanization. This growth will also result in a more diversified economic structure, more productive jobs and varied occupations, including those with greater skills content. At the same time, young people expected to enter the labour market over the next 15 years and those who have recently joined the labour force have high aspirations for moving out of poverty, finding quality jobs and building a better future for themselves and their families. Therefore, the strengthening the skills will put Tanzania on a trajectory for development that combines growth with poverty reduction and shared prosperity (ESPJ 2016).

3.1.2 Increased Budget allocation for the Education sector

Education is one of Tanzania's priority sectors, as represented by its allocation of 15% of the total budget (or 21% if the government's method of excluding debt servicing and other expenditures captured under the consolidated fund is applied), making it the second largest government funded sector. Education is also among six top priority areas included in the Vision 2025 policy document and in the more recent Five-Year Development Plan, which contains a stronger emphasis on industrialisation. The education sector has enjoyed a significantly increasing trend in both budgetary allocations and actual spending. The budgetary allocation for the FY 2020/21 is nearly twice the amount allocated in FY 2015/15, while actual spending increased by 55% over FYs 2015/2015 –2020/2021 (Figure 4). This growth in funding is consistent with the recommendations for an increased educational budget made in 2015 by the Committee on the Convention on the Rights of the Child.

Figure 4. Budget Allocation for Education Sector
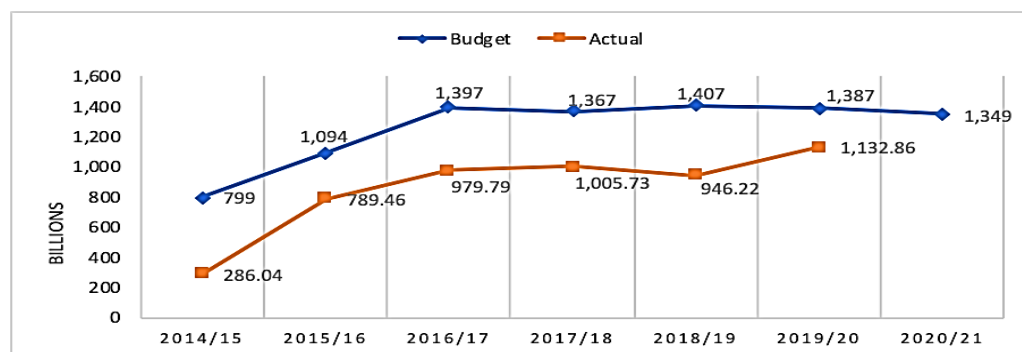
Source: MoEST, 2020

3.1.3 Expansion in the youth demographics

It is estimated that 15 million youth will enter the labour market between now and 2030. Over the next few years, over one million young people a year, with varying levels of education and skills, are expected to leave the education system and potentially enter the labor market (ESPJ). By 2030, this number is projected to reach 1.6 million per annum. This requires a rapid expansion of employment opportunities to keep pace with the supply of new labour market entrants. While the fast expansion of the youth demographic is a challenge, it also represents a unique economic opportunity through the implementation of efficient workforce development.

Figure 5. Total Population, Tanzania
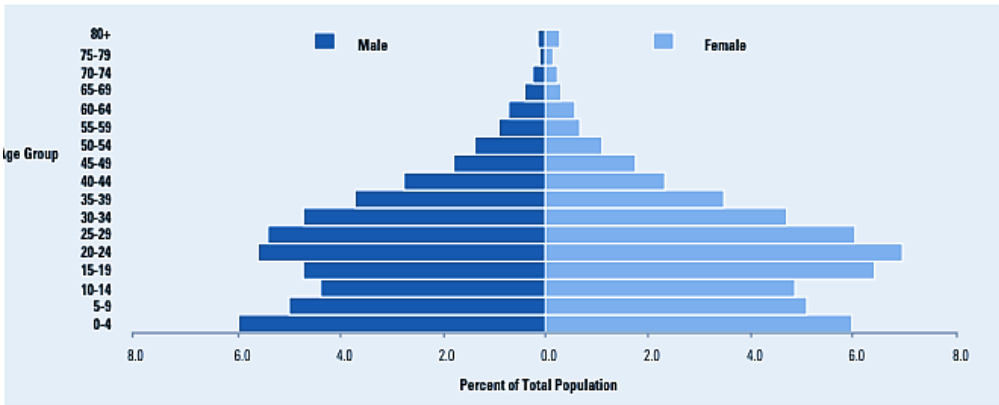
Source: Tanzania Human Development, 2017

3.1.4 Tanzania's Free Basic Education Policy

In the medium and long term, the Tanzanian Government's emphasis on promoting access to quality secondary education will increase the flow of students from primary and secondary education to vocational and technical routes. The Government launched the 'Free Basic Education Policy' in 2015, which extended free education to the secondary school level, cutting tuition fees up to Form IV. This policy has reduced dropouts and increased the number of students taking the general secondary education route (Figure 6). In the long term, this policy will probably result in a reduction in the number of students choosing vocational education after completing primary education. It will also help to strengthen the basic competencies of the secondary graduates who will later take technical courses. These outcomes would be consistent with global evidence that core/basic competencies and skills are best acquired through general education prior to students taking up vocational or technical training.

Figure 6. Total Enrolment in Secondary Schools, 2012 – 2018

# of pupils enrolled x100000	2012	2013	2014	2015	2016	2017	2018
■ Public	1542687	1450689	1520292	1339823	1377049	1467958	1704712
■ Private	260123	277845	349988	308536	298544	299932	286309
■ Total	1802810	1728534	1870280	1648359	1675593	1767890	1991021
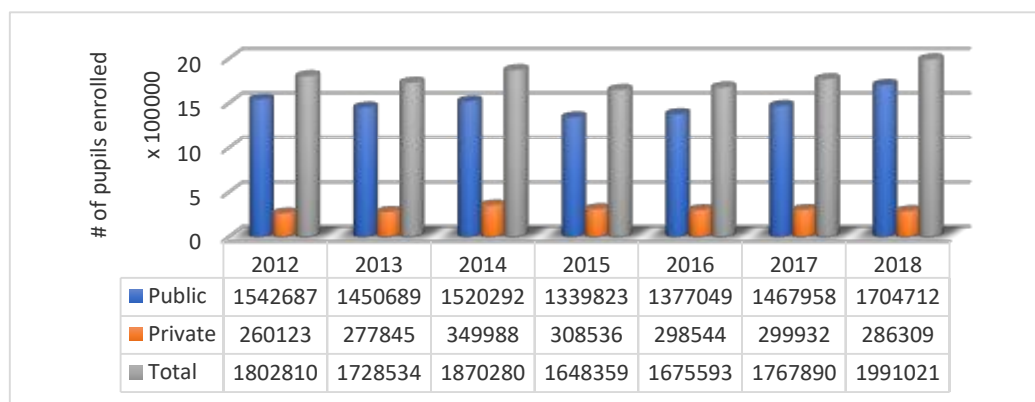
Source: BEST, 2018

3.1.5 Impact of technological innovation

Like many other countries, Tanzania has prioritised industrial policies and science, technology and innovation (STI or innovation policies) to support industrialization and closing technological gaps. Industry has been assigned specific targets for growth, GDP contribution, innovation and job creation. Projections based on current performance indicate that some of these targets may not be realised within the planned time frame. Industry performance, and manufacturing in particular, is still perceived as weak compared with its potential contribution to GDP, exports and job creation. Reasons for this include; shortages in skilled labour; unfair competition from improperly taxed imports; and high operating costs (ESRF, 2018).

3.1.6 Impact on the demand for Skills

According to the LO/FTF Council Report 2016, based on ILO data, around 850,000 young people enter the country's job market annually, but only 50,000 to 60,000 formal-sector jobs are created each year (Table 5). With more than 66% of the population under age 25, this job shortage poses a critical challenge to the economy and broader society. Due to the limited absorption capacity of the formal sector, there has been an increase in underemployment and informal-sector employment. Almost one out of five (22%) of the working-age population and 35% of the youth population (15-24 years old) are inactive in the labour market.

Table 5. Formal Employment Created (number) by Sector, 2013/2014 - 2017/2018

Sector/Project	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018
Government	49,615	44,797	71,496	82,302	18,000
Government Development Projects	172,245	271,920	124,178	132,147	397,009
Private Sector	408,756	257,323	195,002	239,017	137,054
Total	**630,616**	**574,040**	**390,676**	**453,466**	**552,063**

Source: NBS, 2018

3.1.7 Need for Skills development coordination

Several critical challenges need to be addressed to ensure that the education and training development system can deliver the skills needed by employers to grow their businesses and for Tanzanians to secure (self-) employment. These challenges exist at the overall system level and at the training service provider level. The major *system-level challenges* are: (i) lack of coordination of skills policies and initiatives at national and sector levels; (ii) weak quality assurance systems; (iii) low public-private sector cooperation in the governance and delivery of training programs; (iv) lack of effective LMI to inform policy planning and training provision; and (v) low effectiveness and efficiency of skills development funding. At the *service provider level*, key challenges are: (i) few skills development opportunities with limited equity; and (ii) low quality and relevance of skills development programs. These challenges result in inefficiencies, training mismatches, insufficiently skilled graduates, and poor labour market outcomes.

3.2   Technical Skills Development and Regulation in Tanzania

The National Council for Technical Education Act, 1997, established the National Council for Technical Education (NACTE). The Act provides a legal framework for the Council to establish an efficient National Qualifications Framework that provides quality assurance of technical institutions and supports the sector's responsiveness to changing domestic needs global technological advancements.

The role of NACTE is to oversee and coordinate technical education and training in all Tanzanian post-secondary, non-university tertiary education institutions. Pursuant to Section 11 of the NACTE Act, NACTE has within its scope all tertiary education institutions, other than universities and their affiliated colleges, delivering courses at technician, semi-professional and professional levels, with entry

qualifications of Form IV or above leading to awards of certificates, diplomas, degrees, and other related awards.

Tanzania Development Vision 2025 looks to promote increased productivity through the development of high-quality education at all levels, with an emphasis on transforming the education system by enhancing scientific and technological programmes. The Education Sector Development Programme (2008 – 2017) outlines key operational targets, including; improving TVET provision and equity through the design of demand-driven programmes, developing training facilities, providing adequate finances, and introducing a student loan system. Other TVET initiatives have included there sourcing of conducive teaching and learning environment by; enhanced TVET trainer quality, the use of ICT, strengthened quality assurance systems, and reviewing the TVET curriculum in cooperation with key stakeholders (UNESCO 2016). The implementation of Education Sector Development program has resulted in an increase in the number of registered technical institutions. There are 392 technical institutions registered by NACTE offering different programs at certificate and diploma levels (Table 6).

Table 6. Registration and Accreditation of Technical Institutions, 2020

Subject Board[4]	Registered	Ownership		Registration Stages			Accreditation Stages			% (Full Accredited)
		Public	Private	Full	Provisional	Preparatory	Full	Provisional	Candidacy	
BTP[5]	143	67	76	109	29	5	57	6	28	40.1%
HAS[6]	162	44	118	142	20	0	84	10	26	51.8%
SAT[7]	87	56	31	69	17	1	38	3	16	44.3%
TOTAL	392	167	225	320	66	6	179	19	70	45.9%

Source: NACTE, 2020

Although, enrolment rates, especially in professional courses, are still low compared with market demand, Tanzania's technical training institutions have recorded a66% growth in enrolment between 2015 and 2020. This growing demand for technical education and for competent graduates can be seen as both an opportunity and a challenge.

4Subject Boards are NACTE's Committees dealing with matters across various subject matters.
5Business, Tourism and Planning (BTP)
6 Health and Allied Science (HAS)
7Science and Allied Technologies (SAT)

Table 7. Students Enrolment in Technical Institutions from 2015/2016 – 2019/2020

Award Levels	2015/16	2016/17	2017/18	2018/19	2019/20
Basic Technician Certificate (NTA 4)	21,859	60,850	46,953	60,392	72,968
Technician Certificate (NTA Level 5)	20,107	43,629	27,718	39,354	36,917
Ordinary Diploma (NTA Level 6)	36,946	43,227	23,614	36,982	21,272
GRAND TOTAL	**78,912**	**147,706**	**98,285**	**136,728**	**131,157**

Source: NACTE, 2020

3.3 Supply Skills by Technical Institutions in the Selected Economic Sectors in Tanzania

Tanzanian technical education and training institutions play an important role of in providing graduates with the skills they need to meet economic demand. The Tanzanian TVET sub-sector requires new strategies to attract and retain students, especially in critical professions (UNESCO, 2013). There is also need for relevant knowledge and skills that are crucial for the job market, especially those that address skills requirements arising from Government infrastructure projects. As mentioned earlier, the Government of Tanzania is currently implementing a series of ambitious projects, including; the construction of a new central railway line to Standard Gauge, expansion of the Dar es salaam Port, construction of the Mkunazi Agriculture City, construction of a new International airport in Dar es salaam, construction of a Crude Oil Pipeline from Hoima, Uganda to Tanga Port in Tanzania and the construction of Phase II of the Dar es salaam Rapid Bus System (DART). These projects are being implemented through six priority sectors; energy, agri-business and ago-business, construction, tourism and hospitality, transport and logistics and ICT.These ambitious plans to transform the economy are highly dependent on the availability of skilled labour. This has resulted in an increased demand for skilled labour, especially at technician level over the past few years, accompanied by an associated increase in the number of technical institutions offering certificate and diploma programmes especially in the selected sectors (Table 8).

Table 8. **Technical Institutions offering Training Programmes Across Sectors**

Sectors	Number of Technical Institutions
Agribusiness	41
ICT	43
Construction	14
Energy and Mining	9
Tourism and Hospitality	10
Transport and Logistics	7
Total	**124**

3.3.1 Technical education graduates from 2014/2015 to 2018/2019 in the selected sectors

It is estimated that a total of 95,771 technician graduates with different skills related to selected sectors have entered the labour market since 2014/215. The largest proportion of graduates (37%) has graduated in agribusiness enterprises and agricultural related practices. This is followed by graduates in ICT related skills (27%) and construction related skills (19%). The number of those who graduated in energy and mining and transport and logistics is still very low representing only 6% each in all levels of technicians. This could indicate an insufficient supply of technician level workers in these sectors (Table 9).

Table 9. Summary of Technical Education Graduates since 2014/2015 to 2018/2019 in the Identified Sectors

Sector	Cumulative Number			Percentage
	Male	**Female**	**Total**	
Agribusiness	21,095	14,108	35,203	37%
ICT	20,017	5,459	25,476	27%
Construction	15,314	3,192	18,506	19%
Energy and Mining	4,496	1,010	5,505	6%
Tourism and Hospitality	3,386	1,829	5,214	5%
Transport and Logistics	3,601	2,267	5,867	6%
Total	**67,907**	**27,864**	**95,771**	**100%**

The number graduates in agricultural related programmes increased from 7,139 to 8,045 between 2014/15 – 2015/16. There was a drop of 6,576between 2015/16 and 2016/17 (19%) and remained almost constant between 2016/2017 to 2018/2019. Similarly, the number of graduates in ICT has remained constant over the period with average increase of1%. The number of graduates who completed programmes related to construction is still low with average of 3,701 graduates per year. The number of technician graduates in programs related to sectors such as energy and mining, transport and logistics, tourism and hospitality has continued to remain very low estimated at 1101,1173 and 1,043 respectively (Figure 8).

Figure 7.   Number of Graduates supplied per sector supplied from 2014/15 – 2018/19
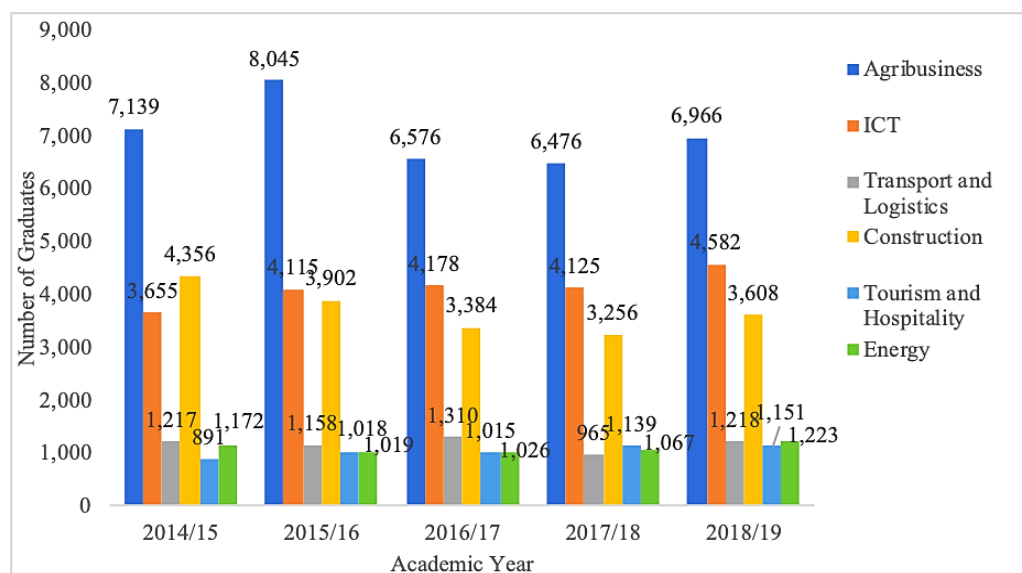
3.3.1.1 Available Skills in agriculture related sectors

In this sub-section, we present the distribution of graduates across the agribusiness sector in the period 2014/2015 to 2018/2019 (Table 10). The agribusiness sector comprises of programmes related to agriculture, forestry and forest products, food, animal health and production related programmes. An analysis of these programmes helps to illustrate the distribution of skills across the sector.

Graduate figures in Table 10 indicate that general agriculture is the most common agriculture sector course. However, it is also worth noting that there has been a drop in the number of graduates choosing this 'general' route, due a growing focus on more specialist options. The drop in the number of graduates choosing general

agriculture can also be assigned to the decrease in Government sponsorship that had been previously offered to students through the implementation of the Agricultural Sector Development Programme (2006/07 to 2012/13).

Technicians in animal health also formed a large proportion of agriculture sector graduates. The number of graduates in animal health and production have increased from 2,238 in 2014/15 to 2,448 2015/16 (9%) but dropped in 2016/217. Between 2017/18 and 2018/19, the number of graduates increased by 10% from 2,306 to 2,566 (Table 10). There are acute shortages of skills in leather products technology, laboratory science and technologies, food production and nutrition and aquaculture. The drop in the overall number of agriculture sector graduates also potentially impacts on skills supply in several associated subsectors.

Table 10. Number of Graduates in the Programmes Related to Agriculture, Agribusiness, Agro-processing

Programme	2014/15	2015/16	2016/17	2017/18	2018/19	Total
Agribusiness	135	190	95	135	160	**715**
Agro-Mechanization	84	86	78	46	23	**316**
Animal Health and Production	2,238	2,448	2,111	2,306	2,566	**11,669**
Aquaculture Technology	123	150	230	205	250	**958**
Beekeeping	75	73	56	133	146	**483**
Community Development	-	419	175	81	193	**868**
Fisheries Management and Technology	289	219	210	175	154	**1,046**
Fisheries Science and Technology	313	251	236	171	193	**1,164**
Food Production	30	25	25	66	18	**164**
Food Production and Nutrition	34	26	19	0	11	**90**
Forestry	450	574	705	836	825	**3,390**
General Agriculture	3,265	3,440	2,461	2,153	2,203	**13,521**
Horticulture	39	45	114	138	171	**506**
Irrigation	43	45	43	29	28	**186**
Leather Products Technology	0	0	0	3	0	**3**
Range Management and Tsetse Control	24	55	19	0	14	**111**
Science and Laboratory Technology	0	0	0	0	14	**14**
Total	**7,139**	**8,045**	**6,576**	**6,476**	**6,966**	**35,203**

The leather industry has been prioritised for revival but the sector will need to address the current lack of skills to support its successful regeneration. There is currently lack of skilled workers and the majority of these are at retirement age. This skills shortage has resulted in the underutilisation of machinery.

Table 11. Capacity of Tannery Industries in Tanzania

Company	Location	Installed Annual Capacity (ft²)
Afro Leather Industries Ltd	Dar es Salaam	10,650,000
Lake Trading Company Ltd	Kibaha	4,260,000
Himo Tanners and Patrners Ltd	Moshi	6,300,000
SAK International Ltd	Arusha	15,300,000
Moshi Leather Industries Ltd	Moshi	9,900,000
ACE Leather (T) Ltd	Morogoro	27,450,000
Meru Tanneries	Arusha	8,310,000
Xing Hua Investment Co. Ltd	Shinyanga	12,700,000
Huacheng International Ltd	Dodoma	9,000,000

Source[8] 2016

3.3.1.2 Skills in the ICT Sector

Information and Communications Technology (ICT) plays an increasingly important role in the development of modern economies. Tanzania has seen the development of an open, organised and competitive ICT sector. This has resulted in technical institutions making significant investments in response to this growth by increasing the number of ICT programs ranging from basic ICT literacy to technical maintenance and support and network administration.

Computing and Information Technology has the largest proportion of graduates followed by Information and Communication Technology (ICT). Information System and Network Technology has the lowest number of graduates (Table 12)

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[8]URT (2016). Leather Sector Development 216-2020

Table 12. Number of Graduates in the Programmes Related to ICT

Programme	2014/15	2015/16	2016/17	2017/18	2018/19	Total
Business Information Technology	244	185	192	179	152	**952**
Communication System Technology	45	36	45	65	86	**277**
Computer Engineering	530	437	287	297	324	**1875**
Computer Science	109	129	111	102	118	**569**
Computing and Information Technology	1,242	1,396	1,115	1,003	1,100	**5856**
Computing, Information and Communication Technology	314	412	602	597	727	**2652**
Information and Communication Technology (ICT)	751	1,084	1,326	1,328	1,347	**5836**
Information and Communication Technology with Business	27	22	30	13	34	**126**
Information System and Network Technology	56	23	13	16	14	**122**
Information Technology	262	285	335	373	489	**1744**
Journalism and Media Production	36	63	86	109	125	**419**
Multimedia and Film Technology	39	43	36	43	66	**227**
Grand Total	**3,655**	**4,115**	**4,178**	**4,125**	**4,582**	**20156**

3.3.1.3 Transport and Logistics Sector

The logistics and transport sectors are the basis for national development; they create a strong platform for the efficient operation of other sectors. A lack of skilled labour in the logistics has resulted in Tanzania lagging behind other countries with similar geographical advantages. This gap is being addressed by programmes being offered in training institutions that aim at providing skills at technical levels related to transport and logistic sectors. In this subs-section, we provide graduation (Certificates and Diploma) data from 2014/2015 to 2018/2019 for technicians (as shown in Table 13). Aircraft maintenance engineering is a relatively new program tailored to cater for the transport and logistics sector, which has been established to address the lack of domestic technician level expertise in the Tanzanian aviation sub-sector. Similarly, number of graduates in freight, clearing, forwarding and port management has decreased by 80% from 298 in 2014/15 to only 55 in 2018/19. This is due to due the shrinking of number of private clearing and forwarding companies that employ technician graduates resulting from amendments of Tanzania Shipping Agencies Act (2017). The new legislation extended the mandate of Tanzania Shipping Agency Corporation (TASAC) to include airports, ports and pipelines allowing it to operate as both regulator and operator. This resulted in restrictions on the award of shipping agency licenses and limited the establishment

of shipping agencies. Logistic and transport management has the highest number of technician graduates with a growth from286 in 2014/215 to 459 in 2018/219 representing an increase of 60%. This increase was due to a growing number of logistics and transport management companies, creating more employments opportunities to graduates especially at technician levels.

In Tanzania, there has been a sharp increase in the application of Unmanned Aerial Systems (UAS). The introduction and subsequent wide spread application of UAS as resulted in a demand for skills related to drones. UAS application falls into the sectors and sub-sectors of; energy, agriculture, forestry and fisheries, earth observation and remote sensing, communication and broadcasting, firefighting and various government applications.

Table 13. Number of Graduates in the Programmes Related to Transport and Logistics

Programme	2014/15	2015/16	2016/17	2017/18	2018/19	Total
Accounting and Transport Finance	18	27	36	28	39	**148**
Aircraft Maintenance Engineering	0	0	0	0	16	**16**
Aerodrome Control	0	0	0	0	32	**32**
Freight Clearing and Forwarding	91	104	105	83	81	**463**
Freight Clearing Forwarding and Port Management	298	123	123	53	55	**652**
Logistics and Supply Management	13	22	15	25	64	**140**
Logistics and Transport Management	286	349	377	396	459	**1,866**
Procurement and Logistics Management	220	204	241	108	73	**846**
Shipping and Logistics Management	291	329	413	272	414	**1,719**
Grand Total	**1,217**	**1,158**	**1,310**	**965**	**1,234**	**5,873**

3.3.1.4 Construction Sector

Many students have graduated from traditional programs such as civil, electrical, mechanical engineering and architecture (Table 14). The number of architecture graduates has decreased from 284 in 2014/19 to 174 in 2018/219 representing a drop of 39%. The advancement of architecture technology, like ArchiCAD, has replaced hand sketching skills. The number of graduates in automotive engineering, civil and highway engineering, civil and transportation engineering, civil engineering, civil engineering and electrical engineering increased between 2014/2014 to 2015/16 but dropped in subsequent years. Heavy duty equipment engineering and highway engineering are new programs developed to provide technician level skills at for the fast-growing construction sector, especially through on-going major

infrastructure projects. The rapid increase of graduates in mechatronics engineering can be assigned to the growing adoption of emerging technologies such as drone and surveillance systems.

The construction sector is currently estimated to have 18,506 technicians' graduates in the different fields of engineering and architecture. However, despite Government education sector initiatives, Tanzanian technical colleges still face major constraints in teaching construction sector programs due to inadequate equipment and resources that don't match modern industry technology.

Due to the drop in graduate numbers the Tanzanian construction sector will continue to be affected by inadequate skills at technician level, as illustrated by a recent report by Lema (2017), which highlighted skills shortages in the construction sector. Lema further explained that internationally, the recommended ratio for engineers, technicians and artisan is 1:5:25. However, in Tanzania it is 1:0.2:2.6 reflecting the country's 10,000 professionals, 2,000 technical, 26,000 artisans which is far from the recommended figures of 10,000, 50,000, 250,000 respectively.

Table 14. Number of Graduates in the Programmes Related Construction

Programme	2014/15	2015/16	2016/17	2017/18	2018/19	Total
Architecture	284	184	168	184	174	**994**
Automotive Engineering	96	108	80	70	88	**442**
Civil and Highway Engineering	74	38	50	50	60	**272**
Civil and Irrigation Engineering	90	48	30	18	28	**214**
Civil and Transportation Engineering	42	64	48	44	44	**242**
Civil Engineering	1,588	1,532	1,408	1,240	1,260	**7,028**
Civil Engineering with Community Development	938	644	386	380	456	**2,804**
Electrical Engineering	516	616	526	508	542	**2,708**
Heavy Duty Equipment Engineering	0	0	0	0	0	**0**
Highway Engineering	0	0	0	34	56	**90**
Mechanical Engineering	678	594	560	598	724	**3,154**
Mechatronics Engineering	50	74	128	130	160	**542**
Total	**4,356**	**3,902**	**3,384**	**3,256**	**3,592**	**18,490**

3.3.1.5 Energy Sector

Tanzania's natural resources could allow access to a varied mix of energy sources, including; natural gas, biomass, hydropower, geothermal, coal, solar and wind power. Biomass supplies more than 90% of consumed energy. The remaining energy

sources are; fossil fuels (6.6%), gas (1.5%), hydro (0.6%) and coal and peat (0.2%). A shortage of skilled and experienced manpower at technician level hinders Tanzania's capacity to exploit its natural resources. Oil and gas engineering and electrical and hydropower engineering are new programs developed to bridge the skills gaps in the gas and petroleum and hydro-power generation subsectors, aligning with Government investment in the gas and petroleum projects as well as hydropower generation at River Rufiji. The center of excellence for renewable energy was established to address sector skills shortages. Further skills development opportunities were realized through on-going oil pipeline projects in Hoima-Tanga, which has resulted in skills development being conducted through multinational companies and the establishment of new oil and gas engineering courses.

Although there was a decrease from 2014/2015 to 2016/2017, the number of students graduating in mining engineering has been increasing since 2017/2018 due to demand for technicians in the growing mining sector (Table 15). The number of mining engineering related graduates has also be increased due to incentives offered through the Mineral Act (2017). On the other hand, there is a general decrease in number of technician graduates in geology and mineral explorationfrom 218 in 2014/2015 to 99 in 2018/2019.

A general increase in graduate technicians has been also observed in renewable energy technology and meteorology whichreflects the shift in demand for skills from working with minerals to more sustainable energy sources.

Table 15. Number of Graduates in the Programmes Related to Energy

Programme	2014/15	2015/16	2016/17	2017/18	2018/19	Total
Electrical and Hydropower Engineering	0	0	0	0	2	**2**
Environmental Engineering and Management in Mines	117	87	86	93	68	**450**
Geology and Mineral Exploration	218	167	158	113	99	**753**
Land and Mine Surveying	0	0	0	35	129	**164**
Meteorology	0	50	51	66	86	**252**
Mineral Processing Engineering	137	117	144	141	159	**698**
Mining Engineering	393	357	339	408	443	**1,940**
Oil and Gas Engineering	0	0	0	0	2	**2**
Petroleum Geosciences	240	170	162	125	119	**815**
Renewable Energy Technology	68	72	87	87	119	**432**
Grand Total	**1,172**	**1,019**	**1,026**	**1,067**	**1,223**	**5,505**

3.3.1.6 Tourism and Hospitality sector

Technical institutions in the tourism and hospitality sector include; College of African Wildlife Management, Pasiansi Wildlife Training Institute, National College of Tourism and VETA - Arusha. Annually, there are around 1,000 students graduating from these institutions. This supply of technician graduates does not match current demand (Table 16).

The largest proportion of these students graduated in tour guiding operations and wildlife management and law enforcement. It is important to note that the tourism industry in both the Tanzania mainland and Zanzibar is dependent on skilled foreign workers. There are about 3,500 trained skilled workers in hotels, transport and ticket booking companies in Tanzania, mostly in managerial posts (URT[9], 2018).

In the hospitality sector, the programmes in hotel management in food and beverage Services, and pastry and bakery have the highest number of graduates compared to other programs. The accommodation, food and beverage sub-sector under which these programmes fall, plays a key role in overall levels of visitor / tourist satisfaction. The sub-sector has grown steadily over the years in response to the growing tourism sector. The growth in tourism has also generated a growing demand for tour guide and wildlife management training programmes. The growth in international visitors has created skills needs for the hospitality industry and an associated training program.

Certain job roles in the tourism and hospitality industry are characterised by low wages which can influence training program enrolments. This perception of low paid roles can impact on enrolment numbers for programmes in areas such as; accommodation operations, housekeeping and laundry and hospitality operations. Secondly, businesses in the sector, prefer to have access to staff who can perform multiple roles, which increases the attractiveness of programmes that cover a range of skills (Table 16.).

The total number of technicians graduating from technical institutions in the tourism sector is still very low compared to the demand. This has resulted in companies having to employ unskilled to low skilled staff and offer on-the-job

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[9]URT (2015). Human Resource Needs and Skill Gaps in the Tourism and Hospitality Sector in Tanzania. Dar es Salaam.

training. The low supply of technician level graduates also results in companies employing VET graduates and overseas experts to fill domestic skills gaps.

Table 16. Number of Graduates in the Programmes Related Tourism and Hospitality

Programme	2014/15	2015/16	2016/17	2017/18	2018/19	Total
Accommodation Operations	4	0	0	0	0	4
Culinary Art	12	17	13	0	0	42
Front Office Operations	28	15	8	37	5	93
Hospitality Operations	0	0	0	6	30	37
Hotel Management in Food and Beverage Services	31	31	23	32	10	127
Housekeeping and Laundry	4	1	8	9	11	33
Pastry and Bakery	25	22	14	47	9	117
Rooms Division	9	8	1	0	0	18
Tour Guiding Operations	136	199	269	290	283	1,177
Tourism Enterprise Management	0	5	22	7	7	42
Travel and Tourism	71	69	74	54	69	338
Wildlife Management	89	140	73	140	157	599
Wildlife Tourism	31	34	28	44	82	220
Wildlife Management and Law Enforcement	451	475	481	472	488	2,367
Wildlife Trophy Hunting	0	1	0	0	0	1
Total	**891**	**1,018**	**1,015**	**1,139**	**1,151**	**5,214**

4.0 Skills gaps and mismatch in the selected economic sectors

4.1 An Overview

In this section, skills gaps and mismatches are discussed based on study findings. Skills mismatches are the discrepancy between the skills that are demanded by employers and the skills that are possessed by employees (potential or current).Mismatches between skills and job requirements demonstrate that education and training providers are not providing the skills demanded by the labour market, or that the economy is not creating jobs that correspond to individuals' skills. Skills shortages occur when employers cannot find enough employers with the right qualifications and skills. Over/under skilling is when workers have skills above or below those required for the job. This report summarizes findings from a field survey focusing on skills discrepancies in the Tanzanian job market.

The conducted survey was developed through the application of the job requirement approach, by asking employees and employers about the skills required in their jobs. This provides both a proxy measure of skill levels (individuals are assumed to possess the skills they exercise in their jobs) and of skills demand (the skills needed in a particular job). This approach focuses on a range of basic and general (employability) skills e.g. literacy, communication, influencing, and whether the importance of a particular skill is increasing or decreasing. Information on the missing skills were obtained from both employees (technicians) and line managers. We begin by presenting some key features of the sampled employees affected their job performance.

4.2 Qualification Level of Employees

The levels of education refers to an individual's educational attainment and is an important indicator for skills acquisition (Anderson, 2015). Of the survey's 281 respondents, Ordinary Diploma (NTA 6) and Basic Technician Certificate (NTA 4) were the most common education levels with 28.5% and 21% respectively. The least common education level was Higher Diploma (NTA 7) with 5.3% of respondents. ICT had the most employees with Ordinary Diploma (47.8% of all ICT respondents), construction had the most with Basic Technician Certificate (NTA 4) and National Vocation Award (NVA) (Figure 8). The higher percentage of ICT employees holding an Ordinary Diploma is attributed to the fact that the Diploma program offer a more in-depth curriculum than a certificate, which is more

applicable to the mastering of ICT skills which required knowledge and high-level skills such as software applications and computer languages.

Figure 8. Respondents' Levels of Education
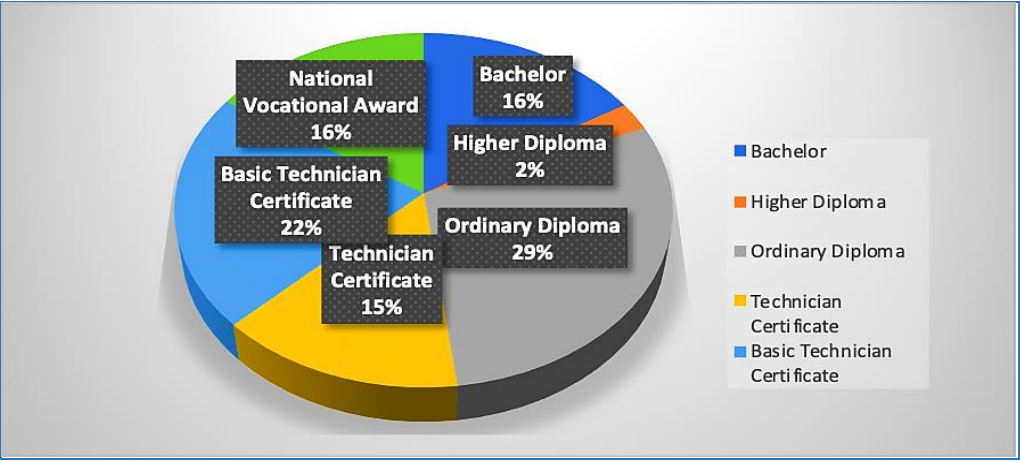
4.3 Age of Employees

Age is an important factor for skills development. Soft skills tend to increase with age as well as experience. Across the selected sectors, respondents with highest average age were from the transport and logistics sector (43.7 years), followed by tourism and hospitality with an average age of 39.1. Respondents in construction sector had average age of 35.3years, agribusiness (34.5 years), energy (33.2 years) and ICT (29.5) (Table.17). This illustrates that ICT is an emerging sector that has attracted many young people.

Table 17. Respondents Age

Sector	Average Age (years)
Agribusiness	34.5
Energy	33.2
Construction	35.3
Tourism and Hospitality	39.1
Transport and Logistics	43.7
ICT	29.5
Total	**36.0**

4.4   Skills Mismatches

There can be vertical and horizontal skills mismatches. Vertical mismatches are when the level of education is higher or lower than the level expected on the job, while horizontal mismatches are when workers work in an area that is different from their training. Different types of mismatches may co-exist, for instance, a person can be simultaneously overqualified and under skilled. This often happens when the field of education does not correspond to the field of occupation. Skills mismatch results in unemployment, negatively impact on economic competitiveness and reduce investment attractiveness. Education funding is supplied with the objective that programmes will yield positive results in terms of employment, so skills matches can be viewed as the failure of this investment. The consequences of skills mismatch impact on all parts of the labour market. This can be on an individual level through salary levels or by companies being unable to implement new products, services or technology. Skills mismatches can also result in; youth unemployment (Msigwa, 2013), staff turnover, lack of productivity, the loss of profits and a drop-in market share.

4.4.1 Horizontal Mismatches

Two types of horizontal skills mismatch were explored by this study; education mismatch and job design mismatch. This looked to understand if employees' skills are being utilised in their jobs and if their current role was a good fit for their skills.

a.   Educational mismatch

Although job design may result to mismatch, a number of employers cited recruitment difficulties resulting from a lack of key competencies and soft skills. This emphasises the importance of strengthening the development of these areas in training programmes (Cedefop, 2018). Results in figure 9 show that Agribusiness (41.2%), Construction (20.6%) and Tourism and Hospitality (17.6%) have a large number of employees employed in areas not related to their fields of study. This contrasts with the ICT sector, where only9% of employees reported being employed in areas unrelated to their training. This implies that, in general, the TVET sector is developing skills that are not demanded by employers (Chuwaka, 2018).

The policy and strategic focus on agribusiness has resulted in the sector being able to provide employment opportunities to technical graduates from other sectors. The study identified that more than half of all graduates at NTA level 4 – 6 are from agribusiness allied sciences, making it a top supplier of labour amongst studied

sectors. Tanzania has seen a major growth in the construction sector (10% per annum) making a contribution of about 26% to GDP for the past three years (BOT, 2019). This is the highest figure from across the studied and it anticipated that skills mismatches will occur as a result of training providers not being able to keep pace.

Figure 9. Education Mismatch
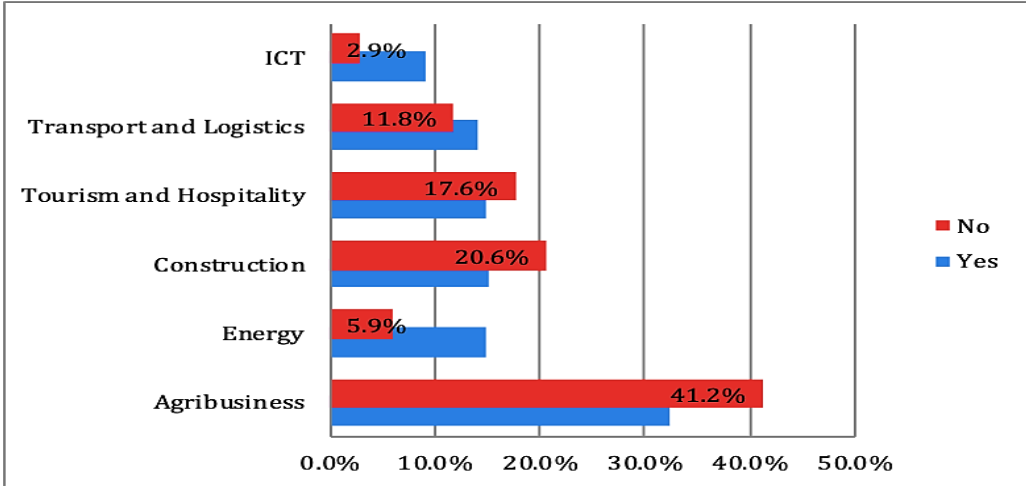
b. Job design mismatch

Employees were asked if the job they were doing was related to the skills they developed through training. The largest proportion of respondents that performed duties unrelated to their training were in the construction sector. This was particularly observed in the areas of shuttering and construction site management, each of which recordeda100% mismatch. This was followed by agribusiness in the areas of welding technology and programmable logic control (PLC) with mismatches of 100%, 75% and 50% respectively (Figure 10). Construction has been Tanzania's fastest growing sector since the inception of the strategic focus (2015/16) and large-scale infrastructure programmes. This has created demand for skills that have not been previously required in Tanzania. Technological changes are also creating a demand for new goods and services. Tanzanian companies are also adopting new technology and processes in areas such as welding and PLC. Due to the rapid introduction of new technology and innovative models the domestic supply of skills has been unable to keep pace. ICT sector respondents working in software management (100%), digital and e-marketing (66.7%) and sales (60%) were performing duties that they had not trained for during their studies.

Figure 10. Job design Mismatch
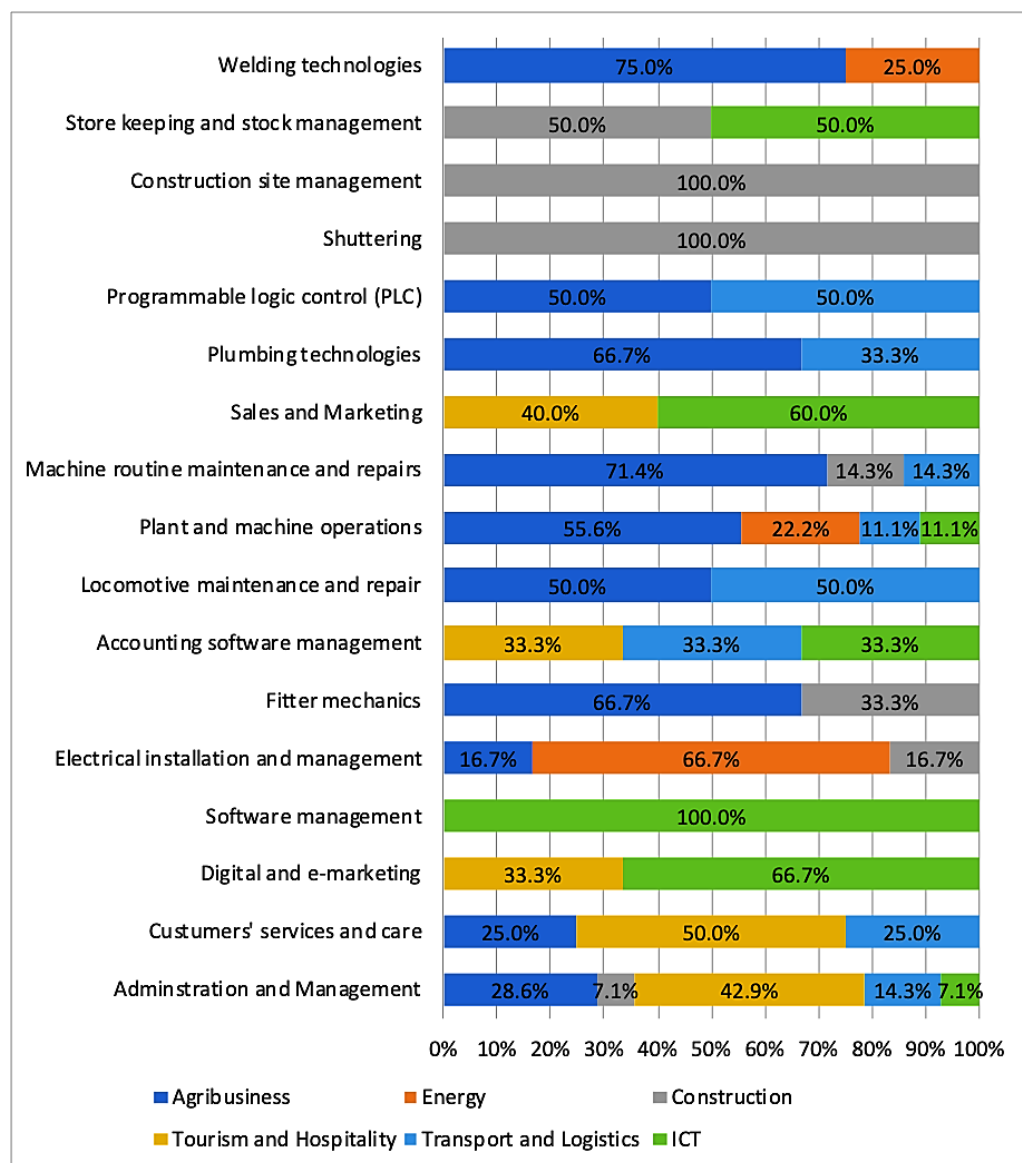
4.5   Reasons for skills gaps

4.5.1   Reported Skills Gaps

Employers reported that skills gaps were common in agribusiness; welding technology, plumbing, fitter mechanics and occupational safety (>66%), energy electrical installation and management, tracking technologies and instrumentation works (>60%) and in construction site management, store keeping and stock management and shuttering (>50%). In the hospitality and tourism sector, customer

care and services were reported as being areas of skills gaps, highlighted by around 50% of respondents. Other skills such as administration and management digital and e-marketing were highlighted by 36% and 33% of employers respectively. In the transport and logistics sector; air-conditioning and refrigeration, PLC, masonry, locomotive maintenance and repair and data and database management received more than 50% responses. The most skills gap mostly cited (>50%) in ICT were software management, digital and e-marketing and sales and marketing (Table 10). Reports on the agribusiness sector indicate skills gaps in marketing and after sales skills, processing and packaging technologies, and machine operations and maintenance (Brethenoux et al., 2012; Takei, 2016). Mwakapugi et al., (2010)identifies skills gaps in the Tanzanian energy sector, in the areas of electrical installation and management. URT, (2013) found skills gap in instrumentation in oil and gas.

The study showed that larger companies reported wider skills mismatches (almost every skill was mismatched to some extent for large companies). There are eight areas that can be highlighted for skills mismatches in large companies; air-conditioning and deep refrigeration, construction site management, shuttering, masonry, machine maintenance and repair, instrumentation works, tracking technologies and occupational safety and measures. Medium sized companies also reported skills mismatches in e-marketing and customer services and care, small companies reported issues with skills in accounting software and programmable logic control – PLC (Figure 11). These findings align with reports that Tanzania's private sector faces a shortage in the trained skilled workers required grow and create new jobs (Andreoni, 2018). Despite economic growth being impacted on by a range of different factors, such as; access to finance and electricity, tax rates and administration, competition with informal firms, transport and regulation. The large number of Tanzanian firms identifying skills as a constraint to growth underlines the importance of addressing skills development in Tanzania. This includes when comparing Tanzanian skills shortages to Sub-Saharan African and worldwide averages (Sabarwal, 2013).

Figure 11. Skills gaps reported by line managers.
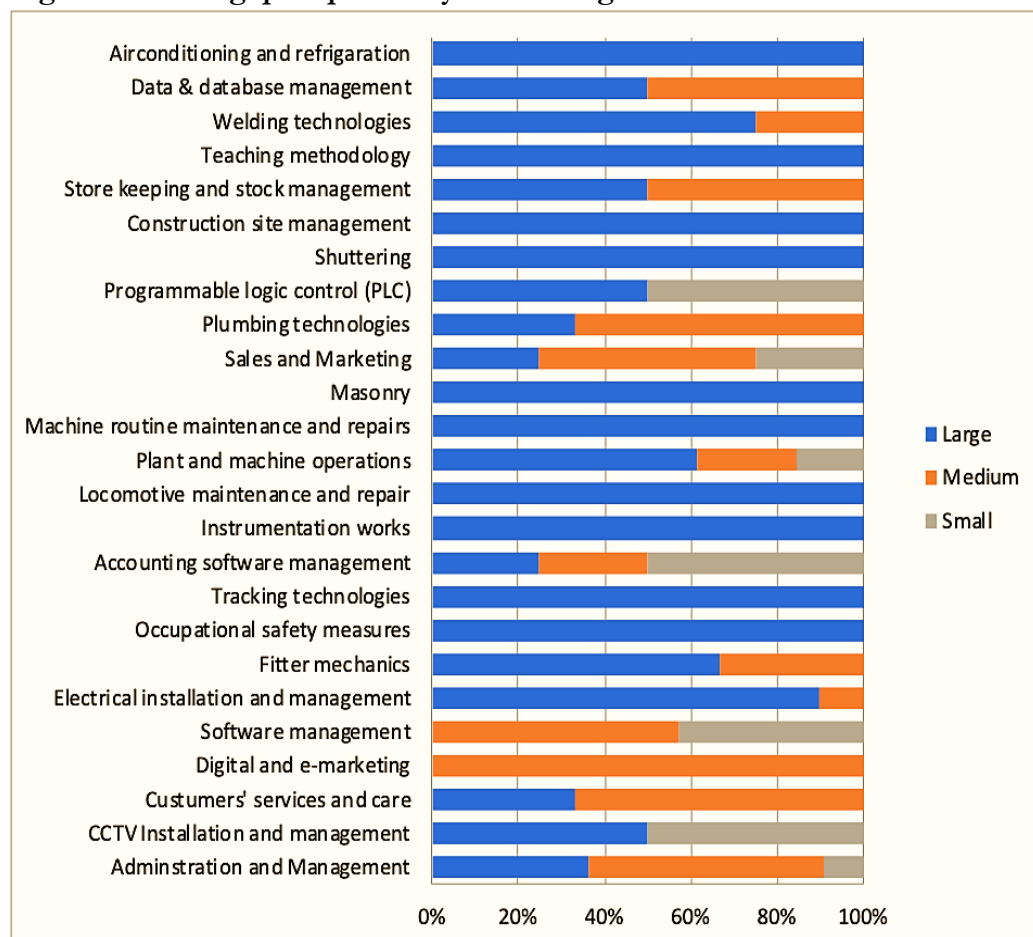
One of the reasons referenced by employers for graduate skills gaps is the lack of practical training conducted in technical programmes. The largest skills gaps perceived by line managers was in ICT (62.5%) followed by energy (33.3%) (Figure12).

Nchahoruri and Mungwabi, (2015) identified training constraints in ICT resulting from; unreliable connectivity, inadequate pedagogical skills, low broadband, lack or inadequate technical support, lack of necessary ICT equipment or unreliable ICT equipment/facilities and power interruptions. The Energy sector has suffered from low investment in training and a lack of a strategic approach to developing apprenticeship programs that have restricted graduates opportunity to develop practical skills prior to employment. (Mwakapugi *et al.,* 2010).

Figure 12. Skills Gaps Perception by Line Managers across Sectors
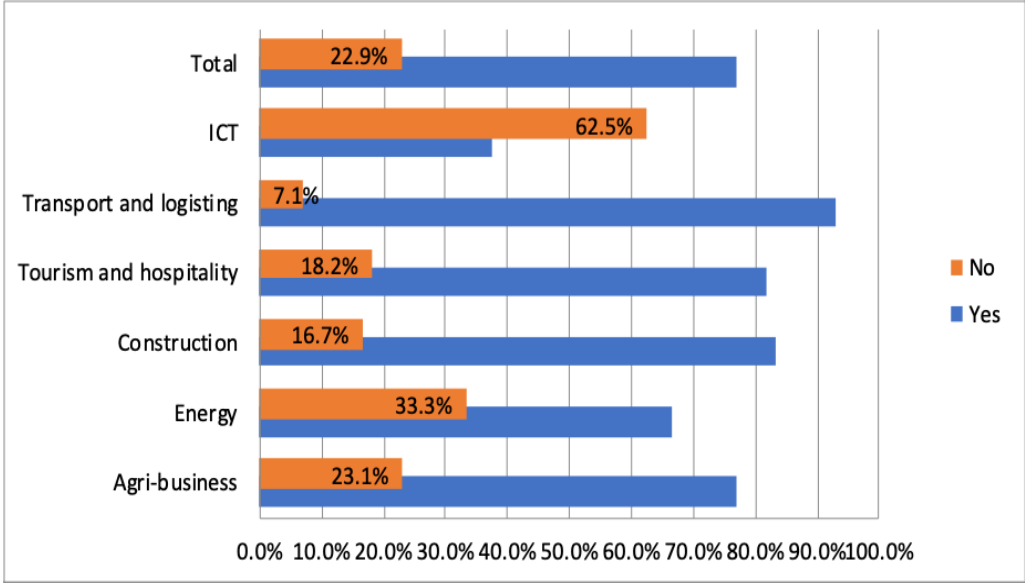
4.5.2 Skills gaps explained

Line managers surveyed in this study reported that employees did not have the minimum skills required for their job duties. This was assigned this to skills being too theoretical (39%), and the result of training being conducted on outdated technologies (26%) (Figure 13).The lack of trainees practical skills was also in part brought about due to the lack of formal apprenticeship programmes (Mwakapugi *et al.,* 2010). Despite NACTE requirements that training institutions follow CBET models, budgetary restraints often limit providers opportunities to provided practical training. This outcome is supported by literature that references the importance of an understanding of CBET, support facilities and resources, industry collaboration and trainer motivation in addressing skills gaps (Tambwe, 2017).

Figure 13. Employers' Perception on Reasons for Employees Not Meeting Skills Required in Duties Assigned
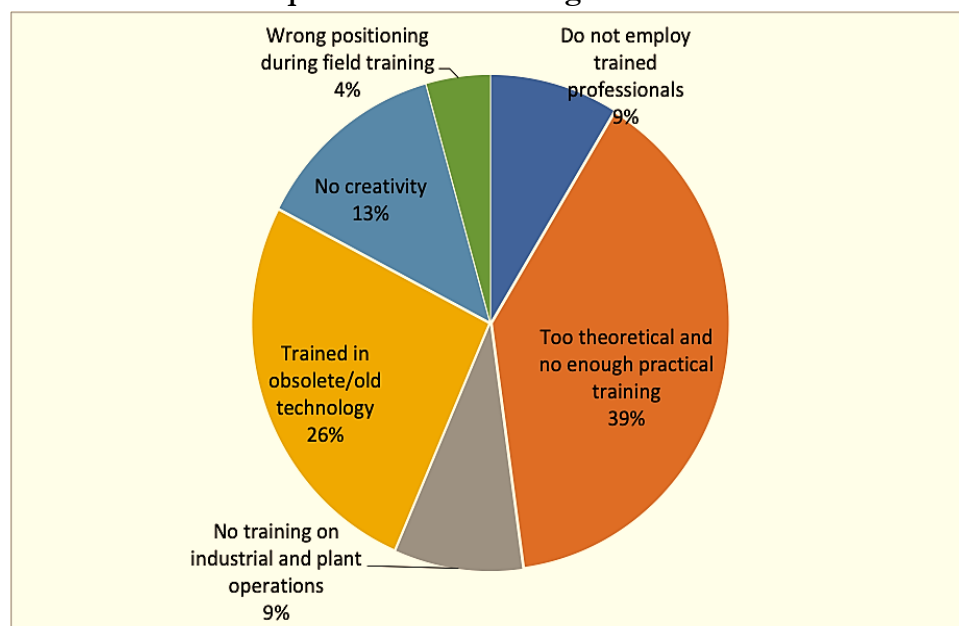
4.6   Skills demand and supply

Skills demand and supply can be studied through the time it takes to find a job. If the time taken to find employment is relatively long it means the skills are in low in demand (or high supply) or that training isn't developing the right skills. The longest time taken to find a job was in the transport and logistics sector with an average of 20.2 months followed by tourism and hospitality (17.3 months). ICT graduates had the shortest time to find a job (4.6 months) (Table 2). This can be assigned to the growing demand for ICT skills resulting from the introduction of emerging technologies (ILO, 2014).

Table 18. Respondents Time Taken to Find Current Job

Sector	Time to find job (Months)
Agribusiness	14.9
Energy	15.0
Construction	15.1
Tourism and Hospitality	17.3
Transport and Logistics	20.2
ICT	4.6
Total	**15.1**

4.7   Skill deficits and operational constraints

Skills gaps in many sectors are increasingly seen in terms of generic rather than specific technical competencies. Studies of employers' expectations from graduates Baum (1990) and Christou (2000) indicate a demand for skills such as; communication, problem solving, team working, IT skills, application of numbers, working with others and an ability to improve personal learning and performance. There is also a demand for generic skills in; reasoning, organisation, diagnosing problems, work process management, visualizing output, working backwards for forward planning purposes and sequencing operations. The need for enhanced generic skills is common a cause of many skills gaps that result in slow business growth (Baum, 2006).

Figure 15 summarizes Likert scale results of survey questions asking employers to rate their workforce skills in different areas. Surprisingly, there are only minor differences in the results for low-skill and high-skill demand firms. Over 60% percent of all employers rated almost all soft skills as missing. Report writing, customer care, innovation, teamwork, computer literacy, communication skills, problems solving and application skills, communication/language and IT skills were all rated as being insufficient for firms' needs (Figure 14).

Figure 14. Percentage of Firms Reporting Skill Constraints in Operations
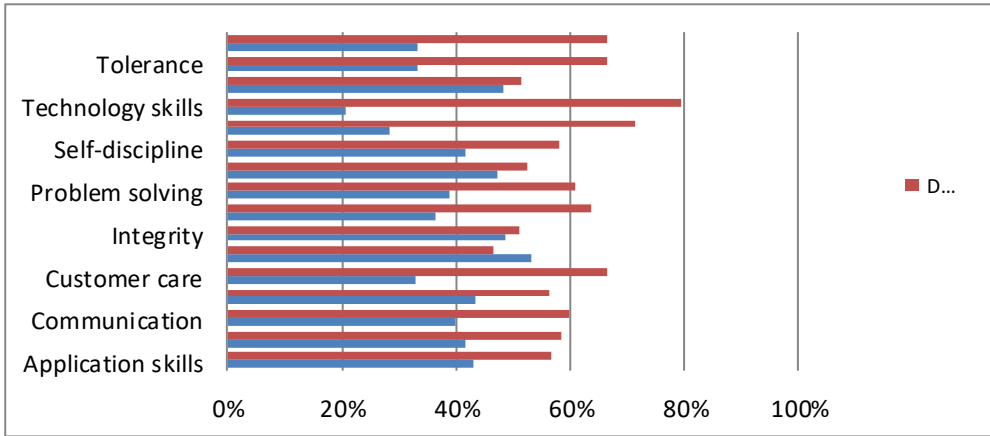
4.8   Skills requirements for emerging technologies

Skills gaps caused by inadequate practical training and learning conducted on obsolete or old technologies has resulted in companies adopting on the job training (Figure 15). Training or retraining existing staff in areas where skills are lacking is an important approach to addressing skills shortages (Cabus and Somers, 2018).

Immigration challenges have resulted in companies considering domestic solutions to developing their employees' skills. Companies have also addressed skills challenges by developing flexible operating models, organizational structures, and career paths centred on skills rather than business functions (Paul, 2018). Firms use a variety of strategies to address skill deficits, including; enhancing existing employees' skills through in-service training, hiring new workers to fill skill gaps, using highly-skilled expatriate managerial, professional and technical (MPT) workers or out-sourcing professional services.

Figure 15. Techniques Industries Use in Addressing Skills Requirements in Relation to Emerging Technologies
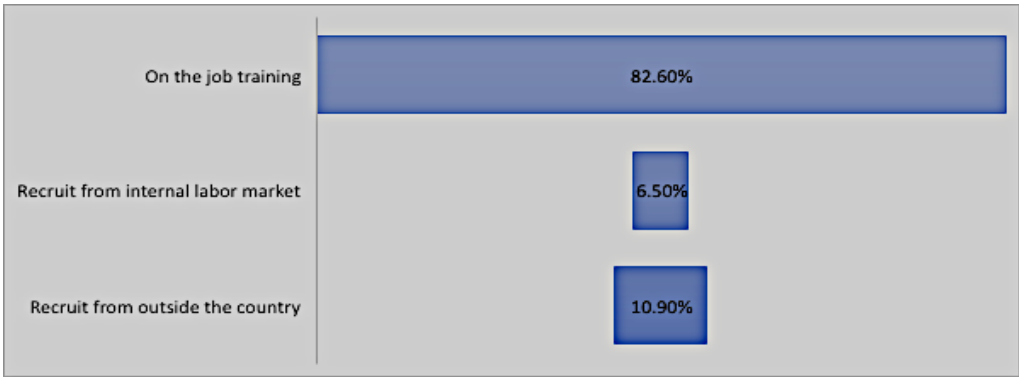
4.9   Identification of key subsectors

This study has also identified key subsectors; red meat, hides and skins, fisheries and tourism, that represent a significant opportunity for short to medium economic growth. These subsectors require skills that support the introduction of processes and technology which will allow them to realise their growth potential (Table19). (a summary of these results in appendix.)

Table 19. Key Subsectors Identification through Key Informant Interviews

Subsectors	Current status	Potential	Constraints
Red Meat	-290,000MT/yr production	-500,000MT/yr production	-Poor Slaughter Houses and Equipment -Limited Cold Chain -Poor Food Safety
Hides &Skins	-1.2mil/yr hides &2.6mil/yr skins	-3mil Hides/yr -4mil Skins/yr	-Fly Cuts -Brand Marks -Flyers Lacking Leather Technologist
Fisheries	-USD 872mil/yr -184,000 direct jobs	-USD 4bn/yr	-Poor Fishing Gears -Limited Cold Chains
Tourism	-USD 2bn/yr -1.1mil/yr visitors -500,000 direct jobs	-USD 5.5bn/yr -3mil/yr	-Skills Mismatch – Customer Care -Undersupply of Skilled Personnel

4.10 Key missing skills

Generally, it was observed that the largest skills gaps were in areas of human machine interface (HMI) and programmable logic controller (PLC). This has resulted in the operation of modern electrons machines being performed by overseas experts (e.g. Kilimanjaro Biochemical Ltd and Bakhresa Food Products). Despite the risk of skills gaps, many private sector employers and companies prefer to use unskilled casual labor to minimize wage costs. This was clearly observed, through the survey, in the steel, cementand poultry farming sectors. Most surveyed employers reported hiring casual labour on a three months basis. There are also many companies which hire on a daily basis, selecting from workers arriving looking for employment. This has resulted in companies such as Lodhia Steel industry, Vita Foam, Kisarawe Cement and Bakhresa Food Products not developing long term staff development plans and relying on a hiring short term staff to meet demand. This approach is particularly common in the construction sector. It was also noted that hired staff are expected to perform multiple tasks as required.

Table 20. Key identified missing skills

Sector	Missing/Shortage Skills
Agribusiness	*Leather Technologists* *Wine Making* *Sugar Technologists* *Meat and Fish Technologist* *Grapes Processing (Wine Production) Technologist* *Food processing* *Milk Processing* *Agriculture engineering* *Food processing and Packaging* *Greenhouse making/farming*
Energy	*Heating, Deep Refrigeration, and Air Conditioning Mechanics* *Drillers, Miners and Shot Firers Technologist* *Metal Fitters Technologist* *Solar and alternative source of energy*
Construction	*Programmable Logic Controller (PLC)* *Technicians Specializing in Reinforced Concrete Finisher* *Concrete Technologist* *Asphalt Preparation Technologist* *Technicians Specializing in Security and Shutters Installations* *Stones Bridge Design Technologist*
Tourism and Hospitality	*Taxidermy* *Cast/replica production* *Scenographer* *High level hotel management* *Tour Guiding* *Multi lingual skills*
Transport and Logistics	*Management Information Systems (MIS)* *Global Logistics and Supply Chain Management Technologist* *Warehousing and inventory control Technologist* *Aircraft Mechanics* *Railway logistics and operations* *Ship building and repair* *Railway construction and maintenance* *Marine repair and maintenance* *Marine economics (Blue economy)* *Marine engineering* *Navigation* *Telematics*

Table 20. Key identified missing skills

Sector	Missing/Shortage Skills
	Railway management
	Intermodal skills
	Naval architecture and Hydrography
ICT	*Network Security Technologist*
	Artificial Intelligence
	Robotics
	Information System Auditing,
	Cyber Security
	Data Science and Analytics

This survey established that there are few or no technicians graduating in emerging but fast-growing sectors such as wine making and meat processing. Many employees in these sectors are either Form Four leavers or below and get skills through on-the-job training. For example, in 'Meat King Distributor' in Arusha, only one technician is employed as a supervisor, the majority of the other employees were either Form Four or lower levels of education. At Kilimanjaro Biochemical Industry and Tanganyika Plantation Company (TPC) -Moshi, there was a lack of technicians who could operate emerging technology such as PLC and deep refrigerators. It was found that most of the employees working in these companies were on the job trained. In the leather industry in Moshi, it was observed that there was only one leather technologist from Pakistanwho also servedas a manager. During the interview, the manager revealed the factory couldn't recruit domestically trained leather technologists despite the sector producing the second higher number of animals and skin products in Africa (second to Ethiopia).

At Tanganyika Plantation Company (TPC) in Moshi, it was reportedthat the sugar industry lacked sugar technicians (sugar technologist) this was due to the Sugar Training institute (Kidatu) halting sector training programmes in 1990s and the majority of its graduates are now reaching retirement. Despite the huge potential resulting from Tanzania's wildlife and gaming, there areno certified technicians in taxidermy. Lorenzo taxidermy reported that it had no trained taxidermists, this can be partly explained by Mweka Wildlife College and Sokoine University of Agriculture no longer offer such courses in this area.

5.0 Conclusions and Recommendations

5.1 Conclusions

This study was aimed at identifying skills gaps at technician level in Tanzania's key economic sectors through an analysis of stakeholders' perceptions. This concentrated on the comparability of skills acquired through technician level training programmes to those demanded by employers in six selected sectors; energy, agri-business and agro-business, construction, hospitality and tourism, transport and logistics and ICT. Specifically, the study aimed at establishing an understanding of; total technician level supply, skills gaps and skill needs. Vision 2025 prioritises education development and the more recent Five-Year Development Plan, contains a stronger emphasis on skill development for supporting Tanzania's economic growth. Through government and private sector investment, technical education in Tanzania has expanded rapidly resulting in an increased number of technician level graduates entering the labor market. Despite this investment, the findings of this report show that the number of technician level graduates is still low compared to expected demand. It is estimated that the total number of jobs will increase by 15 million in various levels by 2030.

Agriculture and associated sectors will continue to employer a significant proportion of the labour force. However, economic growth and global trends are likely to result in a shift of the labour force towards services (trade, hotels, transport, construction, and financial services) frommanufacturing and mining. This changing sectoral composition of employment will also affect skills needed in the labor market. There is likely to be a significant reduction in the number of agricultural and other low-skilled occupations (even if their absolute numbers will continue to rise). There will also be a significant increase in the share and absolute numbers of high skilled occupations, including technicians. Employees with technical and scientific skills will play a critical role in adopting, adapting and diffusing new inputs and products, production processes, and organizational changes.

Employer prioritisation of key competences and soft skills will necessitate the strengthening of training in these areas. The largest skills mismatches were observed in sectors such as agribusiness, construction and tourism and hospitality. These were all sectors in which a large number of employees performed duties that were not related to their field of study. Employees that had studied agriculture, ICT and transportation and logistics all noted skills mismatch from their studies.

The education level of most of the surveyed employees was NTA level 6 i.e. Diploma and NTA level 4 i.e. Basic Technician Certificate (BTC). Diploma level employees were most common in ICT while BTC level graduates were most common in the construction sector. Technician level employees in transport and logistics had the highest average age compared to those in the ICT sector who were the youngest. The energy sector offered the highest salary and tourism the least. It took four times as long for gradates in the transportation and logistics sector to find work in comparison to the ICT sector. The agribusiness sector was the largest sector for employment, whilst the ICT was the lowest at technician level. More than half of all labour supplied from NACTE registered institutions to the market in the past five years came from agribusiness related training while the least came from energy. As expected, large companies reported the most skills gaps. The agribusiness sector had the most reported skills gaps, including in; welding technologies, plumbing, fitter mechanics and occupational safety. This was followed bythe energy sector, which recorded skills gaps in; electrical installation and management, tracking technologies and instrumentation works. Tourism and hospitality reported the lowest skills gaps; however, they were still reported in; customer service and management.

5.2   Rationale of Findings

The occupational and qualifications profile of employees surveyed in this study was defined by its focus on technician level graduates. This meant that most surveyed employees had a Diploma or Basic Technician Certificate (BTC), with BTC being the most common education level of the surveyed employees.

The fact that most of the respondents were employed in agribusiness sector is consistent with the fact that sector employs about 65% of Tanzania's active population and agribusiness training institutions supply more than half of all graduates annually. The historic investment in training for the agriculture sector has had an impact on number of available courses and training institutions, which can explain the sector's high number of graduates. The relatively high average age of transport and logistics employees and time it takes to find employment can be assigned to the sector's slow economic growth. This could have contributed to low staff turnover and numbers of market entrants. ICT graduates took the shortest time to find employment indicating a high demand for ICT skills. This is reflective of the growing need for a range of ICT skills across the economy. Energy employed the lowest number of respondents, which is probably due to the small number of training institutions working in the sector.

ICT has the largest horizontal skills mismatch and employers reported skills gapsdue to lack of practical training opportunities in training programmes. The transport and logistics sector had the lowest skills gap, which could possibly be due to sluggish growth rates and low staff turnover keeping expertise in the sector. Reported skills mismatches found in the agribusiness can be assigned to a historic tendency of an oversupply of graduates (labour) and the fact that agriculture entry and exit cost are still very low in Tanzania. Skills mismatches in ICT were limited due to the high skills levels required at entry level.

Large skills gaps were found in the construction sector, which, due to large infrastructure projects, is the largest current contributor to the GDP. This growth has resulted in a growing skills demand. The energy sector, reported the lowest skills gaps due to slow of introduction of new technology and recent slow sector growth. This does not reflect international trends where there has been a shift toward renewable energy sources driving significant change in energy sector skills demand.

Large companies report skills gaps in relation to machine operation, automation and maintenance. Medium and small companies reported less skills gaps but highlighted the need for skills in the areas of marketing and management. This can be explained by the fact that large companies are more likely to own and utilise large scale machinery and employ production systems that rely heavily on automation. Whilst, small to medium companies more are likely to rely on manual (hand based) to semi-automated which reduces the need a large number of highly skilled labour. However, SMEs might have significant numbers of artisan level employees who will require some level of skilling.

5.3   Limitation of Findings

This study's limitations include; limited prior studies, data collection methods, access to data from employers, longitudinal effects and the fact that data from interviews is self-reported. Due to the impact of domestic and global changes on the target sectors it is important to conduct future studies to capture this effect. Although, it would have been valuable to have data based on companies' manpower projections, experience has shown that survey questions asking firms to predict future employment quantitatively usually produce implausible estimates, especially when added together and grossed up to population level and are best avoided. However, the use of qualitative questions on future plans, could be useful if combined with sector data and sector-based macro-economic models.

The study has also assumed that number of graduates make up a significant enough proportion of the 'technician level workforce' to be representative of the supply of labour at this level. The study further assumed that graduates automatically enter employment in the sector that they trained for and it is probable or at least possible, that employers will not source skills from supply outside the number of graduates entering the labour market. In-house training programmes, importing labour are assumed to insignificantly affect the supply of labour entering the labour market.

5.4   Comparison of Findings

Studies indicate that Tanzanians are less qualified at post primary education levels compared to the Sub-Saharan Africa (SSA) averages (LO/FTF, 2016). However, those with ICT qualifications tend to be more educated (Ndyali, 2016). While NBS (2015) reported average age of the most frequent responding employees' group to be between 35 and 64 years, Ndyali (2016) found that skilled Tanzania gets job at 34 years of age or above which is within Transport and logistics sector in this study. Similar to these findings, several studies have also reported missing of soft skills and skills mismatch in working places in Tanzania.

Additionally, the construction sector is currently estimated to have 18,506 technicians' graduates in the different fields of engineering and architecture. This finding also corroborates those of Lema (2017), which highlighted skills shortages in the construction sector. Lema further explained that internationally, the recommended ratio for engineers, technicians and artisan is 1:5:25.

It is not surprising to find more Tanzanian youth classified as undereducated more than overeducated (ILO, 2013), therefore it's more likely for those who are not ready to be underemployed (or shift to find employment in another sector) they may take more time to find job. This seemed to be the case with transport and logistics in this study, since the sector's growth is sluggish those who have been employed settle hence very small rate for new entrants. Literature shows strongest dissatisfaction regarding job applicants' technical and computer skills, which coincides with a very high under education rate among technicians and associate professional occupations (ILFS, 2014; Shamchiyeva et al, 2014), in this study majority of responding employers also reported ICT sector to harbour the largest skills gap. Nevertheless, Ndyali (2016) and NBS (2015) found that more than half of skills mismatch problem in Tanzania is mitigated through on job training. This is also comprehensible to findings of this study.

5.5   Study Implications and Recommendations

Agribusiness sector has experienced policies and strategies interventions over time and now it supplies more than half of mid-level graduates every year. Any sector if need be, upon getting as such strong and sustained campaign, it is almost likely to produce more graduates and absorb in its job platform i.e. there has been a push mechanism as a policy to push people, skills etc. into agribusiness. While ICT has soaring demand, its graduates got most of the skills gaps and job design skills mismatches, only second to agriculture. It is important to policy makers, training institutions to revisit current curricula that will produce competent graduates, hence reducing skills gaps and horizontal mismatch of all types observed (educational and job design) and in proportions. These can be achieved through;

(i)   **Investing in Teaching and Learning Infrastructures;** This survey has established that while there is increased number of technical institutions offering programs at technician levels, number of graduates is still low compared to supply. This number is low especially in technical colleges due to inadequate teaching and learning facilities. Both Public and private investments are therefore needed to increase the capacities of technical institutions in the studies sectors to absorb more students than it is now.

(ii)   **Bridging Technical Skills Gap:** Skills gap has been established almost in every sector studied. The overall picture is consistent with the view that new technology — especially information technology — is raising the skill level needed to thrive in the workplace. Technical institutions don't teach all of these skills and consequently on-the-job learning is very important. Employers aren't the only ones who recognize this challenge. Employees know the skills gap is real, and they're trying to close it. Technical institutions should develop relevant courses/programs that will address the missing skills identified in this survey.

(iii)   **Bridging Soft Skills Gap:** Developing the foundation of soft skills among graduates is the responsibility of technical institutions by incorporating them into curricula. Therefore, prioritizing the soft skills based on employer needs is important.

(iv)   **Development of National Skills Development Policy:** It is recommended that that there should be National Skills Development Policy that will focus on the future skills needed;

(v)   **Strengthening Stakeholders Collaboration in Skills Development;** Enhancing multi-actor collaboration between government, private sector and

academia to boost a sector, possibly add CSO's/NGO's to make it a quadruple helix in supporting skills development in Tanzania is necessary. All stakeholders and partners should establish inclusive structures and create a unifying vision that will help manage power imbalances in a social and technology ecosystem that is constantly changing. Inclusive processes will help bridge differences and ensure that the young students are able to build long-term sustainable careers. Therefore, employers need to be an active part of the decision-making process on how the talent is being trained for jobs in their businesses or in their sector.

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APPENDICES

Appendix 1. Questionnaire for line-managers (Head of department/section)

QUESTIONNAIRE NO: ……….……

This questionnaire is intended to generate information on skills gap and skills needs in six national prioritized economic sectors which are: Agri-business, Energy, Construction, Tourism and Hospitality, Transport and Logistics and ICT. The survey will map-out skills required to scale-up industrial under takings. Kindly assist the review team to meet its objectives by filling/responding to questions hereunder as accurately and frankly as possible. We would like to ensure you that the information provided will be used for the indicated purpose only.

SECTION A: COMPANY PARTICULARS

Q1.   Name of Organisation: ……………………………………………………………

Q2.   Region: ………………………………………...

Q3.   District/City/Municipality/Town: ....

Q4.   Physical Address of Organization……………………………………..………….

Q5.   Telephone/Cell phone ……………………………………………..…………

Q6.   E-mail Address …………………………………………………………………

Q7.   Type of Ownership: (**circle as appropriate**)
       1=Government organization
       2=Private

Q8.   Name of interviewee (optional)……………………………………..………..

Q9.   Position held by interviewee……………………………………………………

Q10.   Which economic sector do you belong? (Circle the appropriate)
       1= Agri-business,
       2= Energy,
       3= Construction,
       4= Tourism and Hospitality,
       5= Transport and Logistics and;
       6= ICT

Q11.   What is the core product/service/business of your firm/organization …………...?

Q12.   Which year was your firm/company established? ....?

Q13.   Which size does your industry /Company belong based on employees? (Circle the appropriate)
       1= Large,
       2= Medium,

3= small sized

(Categorization of firms based on number of employees; 1- 5 = Micro 6-49 = Small, 50-100 = Medium, 100+ = Large)

SECTION B: AVAILABLE SKILLS AND MISSING SKILLS

Q14. Do you have technicians and artisans employed by your organization?
1=Yes,   2= No

Please indicate numbers of employees in your organization in accordance to the specified levels by filling in the table

S/N	Level	Number of employees
Q14.	National Vocational Awards (NVA –VETA Graduates)	
Q15.	Basic Technician Certificate	
Q16.	Technician Certificate	
Q17.	Ordinary Diploma	
Q18.	Bachelor and Above (from non-universities)	

Please indicate numbers of employees in your organization relevant to core business/service of the organization/firm.

S/N	Level	Number	Gender	
			Male	Female
Q19	National Vocational Awards (NVA – VETA Graduates)			
Q20.	Basic Technician Certificate			
Q21.	Technician Certificate			
Q22.	Ordinary Diploma			
Q23.	Bachelor and Above (from non-universities)			

Q24. Do the employees (Technician and artisan graduates) in your organization meet skills requirements of the duties assigned?
1=Yes
2=No

Q25. If **No** in Q24, please give reason (s)
………………………………………………………………………………………
………………………………………………………………………………………

Q26. Do the technician(s) and artisan(s) possess relevant skills required in your organization?
1=Yes   2=No

Q27. If **No** in Q26, please give reason (s)
………………………………………………………………………………………
………………………………………………………………………………………

Q28. Is there any new technology that has emerged in your organization/business?
1=Yes
2=No

Q29**.** If **Yes** in Q29**,** please indicate type of technology and skills missing by filling in the Table

S/N	Emerging Technology	Skills missing

Q30. How do you address skills requirements in relation to the emerging technologies provided in question 29? Please tick as appropriate.
1=Provide on the job training
2=Recruit from internal labour market
3=Recruit from outside the country
4=Others (specify) …………………………………………………………

Q31. Rate your Technician(s) and artisan(s) based on the following attributes scaled as
1=Satisfactory 2= Good 3=Very Good 4= Excellent: **[tick (√) as applicable]**

Skills	Satisfactory	Good	Very good	Excellent
Writing				
Customer Care				
ICT				
Communication				
Problem solving				
Self confidence				
Creativity				
Commitment				
Teamwork				
Self-discipline				

Skills	Satisfactory	Good	Very good	Excellent
Time management				
Application skills				
Tolerance				
Multitasking skills				
Technology skills				
Ethical understanding				
Integrity				
Computer literacy				

SECTION C: MANPOWER PROJECTIONS

(To be filled in by Human Resource Manager where deemed necessary)

Q32. What is the size of your organisation in terms of manpower (Please provide number)?
…………………...

Q33. What is your projection of manpower in terms of size, skills and areas?

S/N	OCCUPATION (Job)	SIZE	SKILLS Required	AREAS

Appendix 2. Questionnaire for Technician Employees

QUESTIONNAIRE NO………….…

This questionnaire is intended to generate information on skills gap and skills needs in six national prioritized economic sectors which are: Agri-business, Energy, Construction, Tourism and Hospitality, Transport and Logistics and ICT. The survey will map-out skills required to scale-up industrial undertakings. Kindly assist the review team to meet its objectives by filling/responding to questions hereunder as accurately and frankly as possible. We would like to ensure you that the information provided will be used for the indicated purpose only.

SECTION A: COMPANY PARTICULARS

Q1.   Name of the Company/Organization: …………………………………………….

Q2.   Region: …………………………..

Q3.   District/City/Municipality/Town: ....

Q4.   Which of the following economic sector does your industry/ company belong? (Circle appropriate sector)

      1= Agri-business,

      2= Energy,

      3= Construction,

      4= Tourism and Hospitality,

      5= Transport and Logistics and;

      6= ICT

Q5.   Which year was your industry/company established? ....

Q6.   Which size does your industry /Company belong to basing on capital invested/employees? (Circle the appropriate)

      1= Large,

      2= Medium,

      3= small sized

SECTION B: PERSONAL INFORMATION

Q7.   Name of Respondent (optional)…………………………………………………

Q8.   Age of respondents……………………………………………………… (years)

Q9.   Sex (Please circle appropriate response)

      1   = Male, 2 = Female

Q10. Name(s) of the institution(s) attended for training excluding secondary education

S/N	Name of Institution attended	Programme (s)Studies	Year of graduation	Highest Level Attained: 1=Bachelor (NTA Level 8), 2=Higher Diploma (NTA Level 7), 3=Ordinary Diploma (NTA Level 6), 4=Technician Certificate (NTA Level 5), 5=Basic technician Certificate (NTA Level 4), NVA Level (I, II, III)

SECTION C: EMPLOYMENT AND EMPLOYMENT HISTORY

Q11. What is the status of your current employment? (**[tick (√) as appropriate]**
   1=Permanent terms
   2=Part-time
   3=Temporarily
   4=Contractual

Q12. What is your job area of specialization? .... (Please mention)

Q13. What is your Gross Monthly Income ……………………………(TZS)?

Q14. How long did it take for you to get a job after completing your training?
   ……………………………. (Month (s))

Q15. Where did you get information about your job?
   1=Friends
   2=Media Advertisements
   3=Job hunting
   4=Other (Please specify) ……………………………………………….…………

Q16. Are you employed in your field studied?
   1=Yes, = No

Q17. If No which area are you working in? ....

SECTION D: ACQUIRED SKILLS AND SKILLS NEEDED

Q18. Are skills acquired from the training useful to your current job/business? (Please tick the appropriate number)
1= Very applicable
2= Applicable
3= Somewhat applicable
4=Not applicable

Q19. If skills acquired from the training institutions are not applicable at all to your current job/business, what could be the reason(s)?
…………………………………………………………………………………………
…………………………………………………………………………………………

Q20. Which duties you are performing in your organization do(es) not match with skills acquired? (Fill in the table)

S/N	Duties performed	Skills Required

Q21. Would you recommend the program/course you studied to a friend, colleagues or relative?
1=Yes, 2=No

Q22. If NO, give reason (s) for your answer in Q21
…………………………………………………………………………………………
…………………………………………………………………………………………

Q23. Is there new technology that has emerged in your organization?
1=Yes
2=No

Q24. If YES in Q23 above, please indicate type of technology and skills you by filling in the Table

S/N	Emerging technology	Missing Skills

Q25. Rate yourself on your competencies based on the following attributes/skills in your current job.

Attributes scaled as 1= satisfactory 2 = Good 3 = Very good 4=excellent: **[tick (√) as appropriate]**

Skills	Satisfactory	Good	Very good	Excellent
Writing				
Customer Care				
ICT				
Communication				
Problem solving				
Self confidence				
Creativity				
Commitment				
Teamwork				
Self-discipline				
Time management				
Application skills				
Tolerance				
Multitasking skills				
Technology skills				
Ethical understanding				
Integrity				
Risk taking				
Computer literacy				

Q26.What is your opinion regarding the adequacy of training? **[tick (√) as applicable]**

Statement	Strongly disagree	Disagree	Not applicable	Agree	Strongly agree
Q27. The training adequately prepared me for work					
Q28. My employer/former employer is/was satisfied with my level of competences					
Q29. I find myself to be very effective in my current/previous job					

Equipping the workforce with the skills required for the jobs of today and those of tomorrow is a strategic concern that will help Tanzania to realize the envisaged industrial economy and attain the middle income economy come 2025. Already, employers in Tanzania are feeling the impact of the talent shortage and they foresee this skills gap will get even worse over the coming years. This report highlights key statistics depicting trends in the number of technician graduates entering in the labour market. The report also sheds light on some of the causes for the skills mismatch, and unpacks what employers mean when they say graduates are not "employable." It is our sincere hope that this report will contribute to our knowledge on formulating strategies that will minimize the impact of skills shortages and reduce skills gaps. In addition to the data gathered through questionnaires and secondary sources, this study also benefited from series of consultative meetings with key stakeholders, drawn from; government ministries and agencies, regulatory bodies, private employers and their apex unions.