



Assessment of the Performance of Innovation Support Programmes in Agriculture Small and Medium Enterprises in Tanzania

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List of Abbreviations

IT – Innovation Theory

DOI – Diffusion of Innovation

KIIs – Key Informant Interview

TIS – Technical Innovation System

GDP – Gross Domestic Product

SIDP – Sustainable Industrial Development Policy

SMEs – Small and Medium Enterprises

TIRDO – Tanzania Industrial Development Organisation

CAMARTEC – Centre for Agriculture Mechanisation and Rural Technology

TEMDO – Tanzania Engineering and Manufacturing Design Organisation

TBS – Tanzania Bureau of Standards

SUGECO – Sokoine University Graduate Entrepreneurs Cooperative

SUA – Sokoine University of Agriculture

UDOM – University of Dodoma

UDIEC – The University of Dar es Salaam Innovation & Entrepreneurship Centre (UDIEC)

KIs – Key Informants

GEP – Graduate Entrepreneurship Programme

Abstract

This study was conducted to assess the performance of innovation programmes for the effectiveness of agriculture's small and medium enterprises (SMEs). The study aimed to address the following four questions: (i) How effective and efficient are innovation support programmes for enhancing agricultural SMEs in Tanzania? (ii) How is the linkage between governmental organisations, innovation agencies and innovation support programmes responsible for supporting agriculture SMEs towards reaching entrepreneurs for social impact? (iii) What are the barriers and enablers impacting innovation agencies in facilitating the growth of agriculture SMEs in Tanzania? And (iv) How could networking among organisations and the implementation of innovation policies be improved to improve agriculture SME services?

The study was guided by the Innovation Theory of Entrepreneurship and the Diffusion of Innovation Theory. The target populations in this research were various actors involved in innovation related to SMEs. These included university innovation centres, government institutions and agencies, and agriculture-related SMEs. The study employed qualitative data collection approaches and techniques, particularly key informant interviews (KIIs), using an interview guide as a data collection tool. The data for this study was analysed using the content analysis method.

The findings of this study showed that most of the innovation centres mandated to support agriculture-related SMEs work in isolation without networking with other organisations. It is recommended that policies should be strengthened to enhance the collaboration of innovation centres with industries and entrepreneurs. Similarly, despite the existence of various organisations with innovation programmes, SMEs import machines from abroad. This is an appeal to government agencies, particularly those with innovation programmes. These agencies should improve their technology and skills in order to better cater to the needs of SMEs. The findings suggest that the government should revisit the relevant policies for SMEs and develop a strategic plan to facilitate agencies with innovation programmes for them to become more effective in supporting SMEs.

1.0 BACKGROUND

Agriculture Small and Medium Enterprises (SMEs) is a broad concept entailing a range of components. However, in the context of this study, the focus is on two SME components, namely: i) inputs and technology providers that essentially deal with the designing, assembling or manufacturing of key inputs or equipment for use in agriculture; and ii) processors who process and/or package agricultural products to sell to consumers or traders (Eskesen et al., 2014), and employ five or more people (Sallem et al., 2017). In general terms, innovation is defined as an iterative process, from discovery and invention to commercialisation and diffusion, with many feedback loops through interactions with external partners (Arbo and Benneworth, 2007). Thus, in the context of this study and the agricultural sector, we refer to innovation as the increase of productivity in the agricultural sector through promotion and dissemination of modern technologies/practices in the cereals (wheat, maize and rice) and horticulture (fruits and vegetables) sectors, as well as enhancing quality of produce, production process and growing conditions (Van Der Veen, 2010). A study by Diyamett (2012), identified four major types of innovation, namely product innovation, process innovation, market innovation and organisational innovation.

On the other hand, this study also focused on the Tanzanian University Innovation Centres/Hubs, regarded as part of the Tanzania National Innovation System (Hanlin and Khaemba, 2017). The rationale to focus on universities as research institutions is based on the fact that innovations are triggered by basic research in science, thus resulting into wide spread marketing of new products and adoption of new processes (Coombs and Miles, 2000).

About 50% of Tanzania's Gross Domestic Product (Nyingo, 2020), emanates from SMEs. Nyingo further points out that nearly 50% of these SMEs are involved in the agricultural sector. These statistics suggest that adequate and better innovation support and services to SMEs in Tanzania would contribute significantly to the growth of the Tanzania's SMEs and the agricultural sector in general. This is arguably so, because Tanzania hosts more than one million entrepreneurs undertaking micro (informal), small to medium businesses (Nyingo, 2020).

However, SMEs face difficulties in growing due to poor policy and innovation agency coordination, hence impacting the actors' initiatives in improving their earnings and the national economy (Hutchenreiter & Weber, 2019; Kaufmann & Tödting, 2002; Mahemba & Bruijn, 2003). Governments around the world have realized the importance of SMEs to the future growth of the economy, since they have a critical role to play in the economic development of the poorer nations of the world (Calvin, 2002).

SMEs are viewed as a major source of employment, wealth creation, and poverty alleviation in developing countries, including Tanzania (Manzoor et al., 2021). However, other studies contend that despite the critical role that they play, SMEs, particularly in Sub-Saharan Africa, have lacked access to specific innovations, something that hinders the growth of such sectors (Gatimu, 2011; Ndalira, Ngugi, & Chepkulei, 2013).

Consequently, generating practical experiences and knowledge on the challenges on the performance and distributional impacts of SMEs support programmes and policies is critical for key players, especially in growth creation of enterprises and becoming aware of the real situation in forming a base of evidence for lower-income countries. A number of factors need to be addressed to ensure the successful implementation of innovation culture in many SMEs in Tanzania. Studies (Nkwabi and Mboya, 2019) indicate a variety of factors that affect the growth of SMEs in Tanzania, including lack of business training, capital constraints, lack of finance, poor infrastructure, and lack of collateral. Other factors are poor production, poor technologies, tight regulations, corruption, poor market accessibility, the motivation of the business owners, limited access to information, a lack of human competencies, and inadequate raw materials (ibid.). These factors are further aggravated by the SMEs' low acquisition of new innovation (Arinaitwe, 2006). This situation calls for the formulation of policies that support growth in creativity within and outside the SMEs (Anderson, 2017; Kweka, 2018).

The policies formulated require taking into consideration the heterogeneous properties of the SMEs operating in the country to ensure generalisation.

2.0 STATEMENT OF THE PROBLEM

The networking of researchers (academia), innovation centres, public agencies, and agriculture SMEs is not well documented in Tanzania. Yet, networking is important, since these associations are a platform for sharing innovations (skills and knowledge) and establishing the state of innovation support programmes towards the growth of agriculture SMEs. Furthermore, diverse players in the growth and creation of agri-business enterprises need inclusive support programmes and equitable policies (Guidi, 2011). Studies indicate that small and medium-sized enterprises (SMEs) experience difficulty in growing due to inadequate policy and innovation agency coordination, hence impacting actors' initiatives in improving their earnings and the national economy (Turner et al., 2016). This study aimed to inform policy makers about the potential approaches and basic management practices for establishing policies that are needed to guide the innovation flow and sharing from governmental organisations, researchers, and innovation agencies to SMEs. The aim was also to provide input to the innovation institutions supporting SMEs to provide innovations (skills and knowledge) that are relevant to SMEs in improving the quality of their products. The assumption underlying this study is that successful innovation programmes for SMEs will depend on a strong tri-partite relationship between the government, academia and the private sector (li et al., 2018).

3.0 RESEARCH OBJECTIVES

3.1 The Overall Objective

To assess the barriers that agriculture SMEs face in accessing innovation support, as well as to investigate the challenges encountered by innovation support programmes in providing services to SMEs.

3.2 Specific Objectives

- i. To assess innovation support programmes' impact on enhancing agricultural SMEs in Tanzania.
- ii. To study the linkages between governmental organisations, innovation agencies, and innovation support programmes in supporting agriculture SMEs in Tanzania.
- iii. To explore effective ways to implement innovation policies for inclusive agriculture SMEs in Tanzania.
- iv. To identify barriers impacting innovation agencies in facilitating growth of agriculture SMEs in Tanzania.

Therefore, the proposed study aimed to answer the following questions:

3.3 Research Questions

- i. How capable are the innovation support programmes in enhancing agricultural SMEs in Tanzania?
- ii. How does the linkage between governmental organisations, innovation agencies and innovation support programmes support agriculture SMEs in Tanzania?
- iii. How could innovation policies be improved and implemented for the inclusion of agriculture SMEs in Tanzania?
- iv. What are the barriers and enablers impacting innovation agencies in facilitating the growth of agriculture SMEs in Tanzania?

4.0 LITERATURE REVIEW

4.1 Theories Underpinning Innovation

This study was guided by two theories, namely the Innovation Theory of Entrepreneurship (ITE) propounded by Joseph Alois Schumpeter (1883-1950), and The Diffusion of Innovation Theory (DOI).

4.1.2 Innovation Theory of Entrepreneurship (ITE)

The ITE was first developed by Schumpeter in 1949 and it stands uncontested and unchallenged to-date (Upadhyay & Rawal, 2018). Schumpeter believed that an entrepreneur could earn economic profits by introducing successful innovations. This theory was the first to equate entrepreneurs to innovators and professed the contribution of the innovative mindset of entrepreneurs. Upadhyay & Rawal (2018), further note that innovation is simply a "new idea, device or method". Nevertheless, innovation is also often viewed as the application of better solutions that meet new requirements, unarticulated needs or existing market needs. This is accomplished through more effective products, processes, services, technologies or business models that are readily available to markets, governments and society (ibid.). Schumpeter provided the basic nature and scope of innovation, noting these following aspects:

- The introduction of a new product that consumers are not yet familiar with or introduction of a new quality/modification of an existing product which changes the product or its usability for customers.
- The introduction of new ways of production that is not yet used/experienced.
- The opening of new markets, either by developing a brand new market or revamping the old market with huge potential.
- Developing a new source of supply of raw material.
- Carrying out of new organisation structure of any industry.

Of interest, Schumpeter presented the difference between innovator and inventor, the terms that may sound similar, but are not. According to him, an inventor is one who discovers a new way of doing something or discovers a new product/technique/application of factor of production in a new way. On the other hand, the innovator is one who uses those discoveries and creates something new, in terms of a product or service. An inventor is concerned with the technicality of the product, whereas the innovator is more concerned with the economics and tangibility of the product (Schumpeter, 1947). Suggestively, the foregoing contentions underscore the relevance of innovation in the context of Tanzanian agriculture SMEs, which are the focus of this study. Contextually, Schumpeter's theory provides a *modus operandi* for the

innovation hubs/centres and agriculture SMEs in Tanzania. The extent to which such relationships exist is what this study sought to understand.

In addition, Schumpeter presents what he refers to as the traits of entrepreneurs to be part of the innovation process. That, an entrepreneur should:

- Have the energy and will to apply newer methods/processes in the production of a new product or in looking for newer markets.
- Have the ability and will to withstand sharp criticism from society for thinking 'out of the box.'
- Have imagination and foresight which enable them to see the unseen future and rely on their innovation.
- Have the ability to accept failure and move on to the next big thing (innovation).
- Never shy away from taking the first step towards trusting the innovation and then inspiring others to believe in it too.

Putting the above traits in the context of agriculture SMEs in Tanzania, the important question is: "Do actors from these SMEs possess these traits or how do the responsible innovation centres and organisations strive to develop and nurture such traits among SMEs?" Despite being something of an 'eye-opener,' this theory is also subject to criticism. For instance, it is argued that this theory only focuses upon the innovation function of entrepreneurs, without touching on other important aspects of entrepreneurship, such as organisational and management skills. It also ignores the element of uncertainty. Similarly, the theory seems to ignore the concept of risk-bearing. Yet, several experts argue that entrepreneurship is all about risk-bearing and assessing uncertainties and devising strategies to avert their impact (Upadhyay & Rawal, 2018). These criticisms are essentially relevant in the context of Tanzanian agriculture SMEs. The shortcomings of the ITE rationalised the study to adopt other theories, namely the Diffusion of Innovation (DOI) Theory and Technological Innovation System (TIS) Framework.

4.1.3. The Diffusion of Innovation Theory

The Diffusion of Innovation (DOI) Theory was developed by E.M Rogers, a communications theorist at the University of New Mexico, USA, in 1962. The theory explains the passage of an idea through stages of adoption by different actors, including innovators, early adopters, early majority, late majority, and laggards - the people that lag behind the general population in adopting innovative products and new ideas. They are risk-averse and are usually set in their ways of doing things. In other words, they are typical late adopters who prefer to wait and see results from others before choosing to engage. In simple terms, the diffusion of innovation refers to the process that occurs as people adopt a new idea, product, practice, philosophy, and so on. This theory is relevant to this study as it addresses some of the shortcomings identified in the ITE. To a great

extent, the actors described above relate to actors in agriculture SMEs. Moreover, within agriculture SMEs, there should be actors who are risk-averse and will always be adamant to adopt an innovation.

According to Rogers (1962), there is a range of factors that affect the rate of innovation diffusion. These factors include, but are not limited to, the mix of rural and urban within a society's population, the society's level of education, and the extent of industrialisation and development. These factors are relevant in the context of Tanzania agriculture SMEs, since the Tanzania population is a mix of rural and urban and the majority of agricultural activities are carried out in rural areas; SME levels of education influence the adoption of innovation in Tanzania and more so, the level of industrialisation and development is still low and it therefore affects the rate of innovation adoption, as substantiated by other studies that inadequacies in extension intervention, lack of technical training and information sharing, poor educational competencies constrain innovation adoption (Silva and Broekel, 2017).

The theory identifies five main elements for innovation propagation. These include innovation itself, which refers to any ideas, practices or products that are seen as new. Communication channels, which are the second element predominantly used to spread an innovation. These channels may include mass media and digital media as well as word of mouth. The other element is the social system, which is a set of people and organisations having a common objective. This group has great power to influence its members and can make it easier or more difficult to adopt innovation. Time is another important element, since the passing of time is necessary for innovations to be effectively adopted, and the last element is rate of adoption. This is the indicator that shows how fast a product can reach a certain percentage of consumers. In other words, it shows the rate at which consumers obtain and use an innovation. Typically, Rogers' theory of Diffusion of Innovations helps in seeking reasons and explanations behind the spread of innovative ideas and technology (Xue, 2017). This theory is largely relevant and applicable to agriculture SMEs in Tanzania, especially in terms of innovation propagation. However, it goes without saying that innovation practices are yet to be significantly robust and widespread in Tanzania. Similarly, although a variety of communication channels exist in Tanzania, they experience a range of challenges, including limited access to the majority of agriculture SMEs in rural areas. The existing social system as defined by Roger's theory exists in Tanzania. However, its effectiveness in influencing agriculture SMEs to adopt new innovations can be affected by various factors, including lack of adequate human and other resources to quickly and timely reach potential beneficiaries and vice versa.

4.2 Overview of the SME Sector

4.2.1 SME Sector in General

Globally, there is a common acknowledgement of the role of Small and Medium Enterprises (SMEs) in economic development. Weerakkody (2021), notes that SMEs account for the majority of businesses, especially in developing countries, where they are major contributors to job creation. They represent about 90% of businesses and more than 50% of employment, worldwide (Weerakkody, 2021). Weerakkody (2021), further observes that about 600 million jobs will be needed by 2030 to absorb the growing global workforce. This situation makes SME development a high priority for many governments around the world (ibid). Of more interest, is that in emerging markets, most formal jobs are generated by SMEs, which create 7 out of 10 jobs (World Bank, 2020). Other studies support the foregoing contention asserting that although they encounter numerous barriers, SMEs are crucial for local economic development, as they play a noteworthy role in job creation, poverty alleviation and economic growth (Gherghina et al., 2020, Eskesen et al., 2014).

A study by Herr & Nettekoven (2017), in Germany, points out that German SMEs are considered the backbone of the German economy. The study highlights major SME success factors to include access to finance, given the fact that SMEs have less access to formal loans than larger enterprises. The study also names education systems as a success factor, stating categorically that in Germany, vocational education and training systems play a significant role as they maintain and develop highly specialized and skilled labourers, particularly for SMEs. The other factor is social capital - a reciprocity network whose members have formally or informally established relationships. Social capital is frequently associated with trust between the members of a group (Akçomak and Ter Weel, 2009, Chou, 2006). Social capital is also considered an important factor for promoting innovation and can indeed promote SME growth (Nichter and Goldmark, 2009, Akçomak and Ter Weel, 2009).

Describing SMEs in the Sub-Saharan Africa context, Endris & Kassegn (2022), disclose that small-scale enterprises employment has absorbed over 49% of the increase in the labour force in five countries, namely Botswana, Kenya, Malawi, Swaziland and Zimbabwe, while about 80% of the employment growth in Tanzania is accounted for by informal enterprises (Diao et al., 2018). However, despite these significant contributions by SME development in SSA, the sector has been confronted by a myriad of challenges, including lack of access to finance, weak entrepreneurial attitudes, weak government policies, regulations and practices for entrepreneurs, and lack of adequate training (Achtenhagen and Brundin, 2016, Herrington and Coduras, 2019).

4.2.2 Agricultural SMEs and Innovation

Arguably, agriculture and SMEs are two pillars of utmost importance, as they both contribute to creation of jobs and income that help alleviate poverty and improve the quality of life. These two sectors are interrelated, since agricultural activities primarily take place in the rural areas, while SME activities are dispersed through both rural and urban areas (Banerjee and Rahman, 2019). Eskesen et al., (2014), argue that the needs of SMEs in agriculture may vary by the role they play in the value chain. While an SME that focuses on production may need financing for purchasing of inputs at the beginning of a harvest cycle. Therefore, in processing for harvest, SMEs may need this capital at the end of harvest, to purchase produce for processing (Eskesen et al., 2014). Similarly, in agricultural inputs and technology, SMEs may need laboratory testing facilities to test and validate their products, whereas those in processing or trading may need access to high-value markets (ibid.). It should be noted that the Tanzania SME sector is not an exception in the context of the preceding elucidation.

In what connotes the importance of innovation practices, Bello & Saidu (2015), when discussing agriculture and SMEs in Nigeria, note that the climax of farming is the harvest of good quantity, quality products and that in order to reduce post-harvest losses of products, the farmers should adopt adequate preservation technologies. Similarly, it is the role of government to establish more agro-processing centres/storage facilities in rural areas, with high-capacity production of agricultural produce, and basic infrastructures in areas where the bulk of the produce comes from. In contrast, Aouinait et al. (2017), underscores a need for better coordination between agricultural stakeholders and research institutions, further pointing to the need for knowledge transfer and sharing in the network with greater efficiency, whereby interactions and involvement of stakeholders are observed earlier in the innovation process (Aouinait et al. 2017). In the process, the producers, transformers and retailers should share their prioritized needs with research actors in order to be involved in the innovation process (ibid.). The extent to which this kind of important collaboration is practised by the relevant innovation and SME stakeholders in Tanzania is not apparent and therefore, it is an issue worth exploring. This is important to understand, given the argument put forward by Aouinait et al. (2017), that agricultural innovation is collectively managed and framed by an atomization of farms, a concentration of upstream and downstream enterprises and the existence of knowledge brokers and centres that produce research, development and training. Essentially, research centres act as intermediaries, use their internal skilled labour and absorb new knowledge and technologies that SMEs would use to develop innovations (Tanguy, 2016).

4.2.3 The Tanzanian SME Sector

Tanzania is estimated to have more than 3 million SMEs, employing more than 5.2 million people, 45 percent of whom are located in urban and peri-urban areas and 55 percent in

rural areas (Oyen and Gedi (2013) in Gamba (2019). The annual contribution of the SME sector to the Gross Domestic Product (GDP) in Tanzania is estimated to be between 30 and 35% (Ndesaulwa et al. 2017). Thus, besides being an engine for economic development, SME entrepreneurs are crucial stakeholders of poverty reduction, as they form a large tax base and their revenue contribution is important for government, as it allows for high taxable capacity that in turn enables the government to provide services to the public (Kibassa, 2012).

One important observation that characterises the Tanzania SME sector is that it was not designed, but rather an outcome of the structural adjustment policy (ibid.). It is said to be a product of the failure of African socialism. In a socialism framework, the private business sector was actively discouraged to promote public enterprises, which were either government-owned, community-based, or cooperative-owned ventures (Rugumamu and Mutagwaba, 1999). It is also contended that during that time, almost all educated people were members of the civil service. As a result, business activities (within a centralised framework) were left to people who lacked education (Kibassa, 2012), and as a result, businesses came to be mostly dominated by people who were uneducated or inadequately educated. Likewise, the top-down approach of decision making was common and largely left to the Government. Consequently, the culture of most Tanzanians being dependent on the Government was inculcated and it still hovers in people's minds to-date (Rugumamu & Mutagwaba 1999). Subsequently, this culture suppressed the development of entrepreneurial values such as personal initiative, creativity, willingness to take risks, and related behaviours (Olomi, 2009). This state of affairs possibly contributed to making the SME sector in Tanzania relatively weak.

4.3. Policy and Regulatory Framework Governing SME and Agriculture Innovation

The agriculture sector and SMEs are governed by a range of policies and laws. Many of the policies governing these sectors underpin the Tanzania Development Vision (TDV) 2025, whose objective is to transform the predominantly agricultural economy to a semi-industrialised one (Moyo et al., 2012). The TDV vision underscores the role of research and innovation; local entrepreneurship and technological development to transform the country from a low productivity agricultural economy into a semi-industrialised economy (Mwantimwa et al. 2021). To contribute to the achievement of TDV, the Government has since put in place the Tanzania Five Year Development Plans (FYDPs). The objective of these plans is to strengthen capacity-building in the areas of science, technology, and innovation (STI), to enhance competitiveness and productivity in all sectors, especially the productive, manufacturing and services sectors, to enable Tanzanians benefit from the opportunities available within the country. These policies are enunciated hereunder:

4.3.1 The SME Development Policy, 2003

The overall objective of the SME Policy is to foster job creation and income generation, through promoting the creation of new SMEs and improving the performance and competitiveness of existing ones, to increase their participation, and contribution to the Tanzanian economy. The policy acknowledges the potential of the SME sector in terms of economic development and providing employment opportunities. The policy further acknowledges that this potential has yet to be tapped into and it associates this situation with a variety of constraints, as stated in the preceding sections, including the unfavourable, legal and regulatory framework. Nevertheless, despite having impressive and ambitious overall objectives, the policy document lacks any mention of innovation issues in the agriculture sector.

4.3.2 The Sustainable Industrial Development Policy, 1996 – 2020

Section 3.4.13 of the Sustainable Industrial Development Policy (SIDP), highlights science and technology, which, ideally, should also consider innovation issues. The section states that the success of the industrial sector would depend largely upon the degree at which Tanzania develops, consolidates, and strengthens basic scientific, technological as well Research and Development (R&D) activities. This policy also confirms the existing weak link between R&D institutions and the productive sector in Tanzania. It also points out industrialists' lack of appreciation of the role of R&D, while R&D also not addressing the actual needs of the productive sector. The policy underscores the need to bridge this gap but again it is almost silent on the issues of innovation in the agriculture sector. On the other hand, based on the SIDP, the Tanzania Integrated Industrial Development Strategy (IIDS) 2025, developed in 2011, envisions, among other things, to promote rural industrialisation through an 'Agricultural Development Led Industrialisation' strategy as well as provide growth opportunities to all growth-oriented micro, small and medium scale enterprises and entrepreneurs. This could be done through provision of attentive supporting measures appropriate to each of the specific developmental stages that local enterprises and industries pass through as they up-grade and graduate from the bottom upwards. Similarly, like the SIDP, the IIDS is mostly silent on technological innovation issues.

4.3.3 The National Science and Technology Policy, 1996

The National Science and Technology Policy includes a variety of broad objectives, one of which is to promote scientific and technological self-reliance support activities through the upgrading of R&D capabilities, by the creation of an environment conducive to scientific and technological creativity, and improvement of relevant scientific infrastructures. The policy declared allocation of 1% of GDP as funds for scientific research and technology development. Of critical observations presented in paragraph 97 of this policy, which touches on the SME sector, is the lack of adequate financial resources,

trained science and technology personnel, and research facilities that research and development institutions encounter. Indeed, lack of strong linkages among these institutions with the potential users of their findings, include the SME sector. A variety of studies put emphasis on the importance of linkages between research institutions in search of competitive results, through guiding a range of supporting mechanisms in an innovation generation system (Henriques, 2006, Pickernell et al., 2009). However, studies also point out the existing gap in establishing effective communication channels and as a result, SMEs lack necessary knowledge about university programmes that can support them and about how to access such programmes (Pereira et al. 2022).

4.3.4 Agriculture Policy and Strategy, 2013

The Agriculture Policy comprises a range of objectives. These objectives that relate closely to SMEs, include; i) to improve agricultural processing with a view to adding value to agricultural produce and creating jobs; ii) to enhance production of quality products in order to improve competitiveness of agricultural products in domestic, regional and international markets. There is also an Agricultural Sector Development Strategy (2015/2016– 2024/2025), in place that, among other critical issues, it underscores the importance of SMEs. The strategy highlights the importance of science-based innovations and makes it clear that SME support services should be improved and extended to cover all commercial agricultural operators.

4.3.5 Agricultural Marketing Policy

The Agricultural Marketing Policy is yet again a policy with relevance to the agriculture SMEs in Tanzania. The overall objective of this policy is to facilitate strategic marketing of agricultural products, while ensuring fair returns to all stakeholders, based on a competitive, efficient, and equitable marketing system. Of the many policy statements put forward by this policy include the Government to support and promote training in entrepreneurial and marketing skills for agricultural marketing stakeholders.

Other policies touching the agriculture sector and SMEs include: the Agriculture and Livestock Policy (ALP), 1997; the Cooperative Development Policy (CDP), 2002; the Rural Development Policy (RDP); the National Trade Policy 2003; (SMEDP), 2003; the National Livestock Policy, 2006; and the Agricultural Sector Development Programme (ASDP), 2005.

4.4 Organisations with Innovation Support Programmes in Tanzania

There exists a range of organisations that could be instrumental in supporting innovation through linkage with SMEs, as they perform a range of functions that have direct relations to the roles of the SMEs. These organisations are explained hereunder.

4.4.1 Small Industries Development Organisation (SIDO)

SIDO was established as a parastatal organisation under the now Ministry of Industry and Trade. The primary objective in establishing SIDO was to develop the small industry sector in Tanzania. It was expected to fulfil a very wide range of functions, from policy formulation to direct support to industries, to hands-on involvement in the establishment of the SMEs in both rural and urban areas. SIDO is governed by the SIDO Act of 1973. This Act enlists a wide range of functions of this organisation, including but not limited to, promoting the development of small industries in Tanzania; planning and coordinating the activities of small industry enterprises in Tanzania and providing technical assistance to persons engaged in small industries.

4.4.2 Tanzania Industrial Research and Development Organisation (TIRDO):

This organisation is mandated to assist the Tanzania industrial sector by providing technical expertise and support services to upgrade their technology base. Likewise, its other duty is to carry out applied research for the development of suitable technologies and value addition to indigenous resources, through industrial processing.

4.4.3 Centre for Agricultural Mechanisation and Rural Technology

The Tanzania Engineering and Manufacturing Design Organisation (TEMDO) is an applied Engineering Research and Development institution established through Parliament Act No. 23 of 1980. According to this Act, TEMDO performs a wide range of functions, including but not limited to, designing and promotion of products and processes for Tanzanian industry in accordance with the National Industrial Policy; to manufacture and develop prototypes and spares based on the designs produced by the organisation, as well as those which may be brought to the organisation and either alone or in co-operation with other bodies, to assist the industries sector in addressing production bottlenecks for purposes of increasing productivity, capacity utilization and quality of products. Generally, TEMDO's mission is to promote engineering design, technology development and enhancement of the competitiveness of local manufacturing enterprises through provision of quality technical support services.

4.4.4 Tanzania Bureau of Standards (TBS)

This is the national standards body for Tanzania, established by the Government to strengthen the supportive infrastructure for the industry and commerce sectors across the economy, within the country. The Bureau was established by Parliamentary Act No. 3 of 1975, and it was initially named the National Standards Institute. Subsequently, it was renamed Tanzania Bureau of Standards, under Act No. 1 of 1977. In 2009, the Standards Act No. 3 of 1975 was repealed and replaced by the Standards Act No. 2 of 2009. Like many other organisations, the Bureau performs a variety of roles and functions, including

but not limited to, undertaking measures for quality control of commodities, services and environment of all descriptions and promoting standardisation in industry and trade, making arrangements or providing facilities for the examination and testing of commodities and any material or substance from or with which, and the manner in which, they may be manufactured, produced, processed or treated; approving, registering and controlling the use of standard marks in accordance with the provisions of the Standards Act.

5.0 RESEARCH METHODOLOGY

5.1 Study Area & Rationale

This study was conducted in Morogoro and Dodoma Regions. Initially, the idea was to conduct the study only in Morogoro. However, we deemed it necessary to include Dodoma because this region hosts numerous agricultural-related SMEs and SIDO Dodoma's priority focus is on value addition and food processing. This factor was compelling in terms of capturing information from relevant SMEs, which included those dealing with grape production, maize flour processing factories, wine production enterprises, sunflower seeds and peanut processing factories. Moreover, the Government recently directed the SIDO management to establish a development centre in Dodoma. The presence of the University of Dodoma (UDOM) as the hotspot for future technologies such as artificial intelligence, was also a crucial push factor towards soliciting more relevant information for this study (Mtambalike, 2021). Both regions were selected as pilot study areas to represent Tanzania. The study involved both small and medium enterprises (SMEs) and micro-medium enterprises (MSMEs). SMEs in this context are enterprises with 5 or more employees, and Micro, Medium Enterprises (MSMEs) are enterprises with 1-4 employees.

5.2 Target Populations

The target populations in this research were in various categories, involving several actors. They included innovation support programmes, notably Tanzanian university innovation hubs/centres, relevant Government institutions and agriculture SMEs, as enunciated in the subsequent subsections.

5.2.1 University Innovation Hub Centres

In the context of innovation, the study focused on innovation centres hosted at the innovation hub of the Sokoine University of Agriculture (SUA), the Sokoine University Graduate Entrepreneurs Cooperative (SUGECO), the University of Dar es Salaam (UDSM) and particularly its Innovation & Entrepreneurship Centre (UDIEC), and the University of Dodoma (UDOM). Much of the innovation practices conducted at SUA focused on agriculture, while the ones at UDSM and UDOM were general, cutting across various innovation aspects, including agriculture. These centres were therefore, pertinent sources of information for this study.

5.2.2 Government Institutions and Agencies

As shown in Table 2, these Government institutions and agencies were involved in this study since they provide support to SMEs in terms of capacity building, through training in specific areas.

5.2.3 Agriculture-Related SMEs

Agricultural SMEs were the main target of this study. Thus, large chunks of information were solicited and captured from actors in these enterprises, both in Morogoro and Dodoma. Similarly, SMEs were important to inform this study, based on their activities and views and ideas they could provide with regard to their access to innovation support from various agencies and institutions, as well as potential opportunities and challenges they encounter. They were also the pertinent sources of information relating to the policy and regulatory framework governing the day-to-day execution of their activities. The list of SMEs (Table 1) was obtained from SIDO offices in Morogoro and Dodoma, while relevant governmental organisations were identified during an in-depth interview with actors from SMEs. The sample size of SMEs' representatives was determined by the saturation point, which occurs when no new information emerges from subsequent data collection efforts. (Francis et al. 2010, Hennink et al. 2017). This is due to the fact that the qualitative study for key interviews must attain saturation (Guest et al. 2006).

Table 1. List of SMEs Involved as Key Informants

Type of SMEs	No. of Kis	Location
Maize flour processing and value addition	2	Morogoro & Dodoma
Cassava flour processing and value addition	2	Dodoma & Morogoro
Groundnut jam processing	2	Morogoro & Dodoma
Breadfruit flour processing	1	Morogoro
Milk processing	1	Morogoro
Honey processing	1	Dodoma
Metal fabrication	2	Morogoro & Dodoma
Sweet potatoes and millet flour processing and value addition	2	Morogoro & Dodoma
Vegetables production and value addition	2	Morogoro
Sugarcane juice processing	2	Dodoma & Morogoro
Vegetable drying and value addition	1	Dodoma
Spices processing (garlic, cloves and hot paper processing) and packing	2	Dodoma & Morogoro
Leather processing and shoes/ bags making	2	Dodoma
Drying of fruits by using solar dryers and packing	2	Dodoma & Morogoro
Grapevine processing (wine)	2	Dodoma
Rosella Jam processing	2	Dodoma
Sunflower oil processing	2	Dodoma
Rosella processing (Jam and wine)	1	Dodoma
Total	31	

Table 2. List of Organisations Involved

Name of institution	No. of Kis	Function
Small Industries Development Organisation (SIDO)	2	Hands-on involvement in the establishment and promotion of SMEs in both rural and urban areas.
Tanzania Industrial Research and Development Organisation (TIRDO)	1	Assisting the industrial sector, including SMEs by providing technical expertise and support services to upgrade their technology base. It evolves also in carrying out research, for the development of suitable technologies, and value addition to indigenous resources through industrial processing.
Centre for Agricultural Mechanisation and Rural Technology (CAMARTEC)	1	The core function is to promote agricultural development and agro-based industrialisation including agro-processing SMES, through improved agricultural Mechanisation and agricultural processing technologies.
Tanzania Engineering and Manufacturing Design Organisation (TEMDO)	1	Promoting engineering design, technology development and enhancement of the competitiveness of local manufacturing enterprises through provision of various technical support services.
Tanzania Bureau of Standards (TBS)	1	Provide training to SMEs on quality control of agro-processed products.
SEGUCO Innovation and incubation center	1	The core function is to enhance agribusiness skills through capacity building and training, internship and incubation programmes.
The University of Dodoma Innovation spaces and incubation center	2	Initiation of new technology through action research and demonstration of innovation conducted by students and academic staff.
The University of Dar es salaam Innovation & Entrepreneurship Centre (UDIEC)	1	Process machinery specifications, design and selection, to provide incubation services to SMEs and other entrepreneurs and to collaborate with various experts in innovation and

		technology transfer world-wide to nurture innovation, entrepreneurship, intellectual property rights and technology evaluation
The Sokoine University of Agriculture (SUA) Innovation Hub	1	Hosting a variety of innovative projects and initiatives including Research and Innovation programmes, provide adequate capacity in terms of skills and expertise to carry out relevant research that translates into innovative projects and to facilitate demand-driven researches from the agriculture SMEs through which they carry in collaborative hub.
Total	10	

5.3 Data and Type of Data Collected

The study was qualitative and therefore it adopted qualitative data collection approaches and techniques, particularly Key Informant Interviews (KIIs), using an interview guide as a data collection tool. The SME respondents' data collected related to the main activities of their enterprises; knowledge and skills related to their enterprises; access to new innovation, skills and technology; quality of their products and services; innovation support secured from innovation centres and other relevant institutions and agencies; opportunities and challenges in accessing innovation and collaboration with other stakeholders, including government institutions. In contrast, information solicited from innovation centres included, but was not limited to, the type of agricultural innovation they were providing, customer satisfaction with the innovation service, collaboration with relevant ministries and agencies such as SIDO, TEMDO and COSTECH, challenges encountered and opportunities. As for organisations such as SIDO, the study solicited information related to the type of service offered to agriculture SMEs, customer needs assessment, collaboration with SMEs and other stakeholders, such as relevant ministries, SIDO, TEMDO and COSTECH, and opportunities and challenges encountered while supporting SMEs. Relevant policies and laws were reviewed to identify the provisions supporting SME innovation and their effectiveness. The audio recording of most of the KIIs upon requesting their consent was among the most useful data collection methods. The method was useful in supporting in-depth, open-ended interviews of key informants and ensuring that all details from the respondents were captured. These techniques were supplemented by field observations and documentary reviews. Data collection activities

commenced in January and ended in May, 2022, having interviewed a wide range of key informants.

5.4 Data Analysis

The information for this study was analysed using the content analysis method (Morgan et al. 2009). The process of data analysis commenced right from the data collection stage. This was important for assessing the effectiveness of the data collection strategy and enabled the researcher to think over the already collected data (Huberman and Miles, 1994). The technique was appropriate for examining the views, ideas and perceptions of the respondents on various issues related to innovations and technologies that were relevant to agriculture SMEs. Transcription of the field notes and the audio-recorded information was done regularly as the study progressed to subsequent analysis. Eventually, during data analysis, the audio records were transcribed, and keywords, trends, themes and relevant quotes from the respondents were identified and used in the discussion of the findings. Key Informant (KI) data was analysed based on the individual KI transcripts. Generally, the analysis process of KIs involved reading and re-reading the written transcripts and listening to the recorded interviews. In the course of doing so, relevant themes, concepts, keywords and important quotations related to SME innovation practices, opportunities, and challenges, among other key study issues, were identified. These were subsequently used in outlining and writing the report.

6.0 RESULTS AND DISCUSSION

6.1 Agriculture-Based SMEs

KIs were conducted with a range of representatives from a variety of agriculture-related SMEs, both in Morogoro and Dodoma. Generally, these SMEs were engaged in the production, processing and value-adding of various agriculture-based products and crops such as maize, beans, groundnuts, grapes and wine, respectively. The findings from these interviews revealed some commonalities among SMEs in their access to innovation services, effectiveness and efficiency of the innovations, costs, opportunities, as well as challenges associated with their operations. The KIs reported varying degrees of access to innovation-related services provided by various stakeholders, including state-owned organisations such as SIDO and TBS, which provide training on a variety of topics such as marketing, value addition and product certification. Moreover, in terms of access to technology, all the SMEs mentioned purchasing processing machines from both SIDO and importing them from other countries, mainly China. For instance, at the time of this study, StarRose, an enterprise based in Morogoro which was engaged in producing peanut butter, had five different small machines. Of these, four were imported from China, upon realizing that the Chinese machines were of high quality and good for multitasking. (Fig 1).



Figure 1. 1 The appearance a machine produced in Tanzania (left), and one imported from China (right), as captured at StarRose Co. Ltd

Most of the KIs from the SMEs said they preferred importing their machines from China, despite the cost being a little higher when compared with the same machines produced by SIDO and other entities within Tanzania. This observation was noted across study

areas in Morogoro and Dodoma, as it was also substantiated by a KI from an SME dealing with wine production in Dodoma:

"I intend to purchase a wine processing machine from China, just like what my fellow entrepreneurs have done. This is because the Chinese machines are more efficient and can produce high-quality wine."

(KI with an entrepreneur running wine production small enterprise in Dodoma)

This situation represents a critical challenge to SIDO and other Tanzanian organisations working to advance innovation and technology in the agricultural sector, such as TEMDO and CAMARTEC. Other organisations that were mentioned to have links with these SMEs included the Tanzania Chamber of Commerce, Industry and Agriculture (TCIA) and private companies such as the Global Alliance for Improving Nutrition (GAIN).

6.2 Opportunities and Challenges Facing Agriculture SMEs

Overall, the findings showed that SMEs were generally progressing well. Many of their representatives were optimistic, given existing opportunities and especially in terms of markets for their products. This was as enunciated in the following quote:

"Food is never an outdated product. The Tanzanian population is now in the tune of 60 million people, thus implying more mouths to feed. The number of children and pregnant mothers will obviously increase. These are the main customers of our products."

(Interview with a representative from Sanalita Co. Ltd, Morogoro)

The foregoing remark from an SME practitioner points to a promising SME sector. More importantly, it emphasizes the critical role that SMEs can play as economic catalysts in developing economies, including their ability to create job opportunities and promote a healthy business climate, economic efficiency and power for economic development (Manzoor et al. 2021, Erdin and Ozkaya, 2020). This underscores the need for SMEs to be supported judiciously in terms of capacity development and improved innovations and technology. Although SME practitioners were optimistic as they see opportunities for growth in their businesses, particularly in terms of market availability for their products, they have been encountering a host of challenges that turn out to be stumbling blocks to their businesses. These challenges include protracted certification of their products by TBS. Reportedly, this process could take 3-6 months to be completed; lack of quality processing machines produced in Tanzania; Tanzanian-based technology and innovation organisations not being known by some of the SME practitioners; hence lack of access to services offered by these organisations; lack of comprehensive business assessment and information (education); and business assessment costs and exorbitant taxes by the Tanzania Revenue Authority (TRA), as

depicted in the following quote:

'When I was establishing this company, I asked TRA to assess my business. But they never provided detailed information about other requirements apart from asking me to apply for a Tax Identification Number (TIN). But later, they came and asked for returns. I was confused because I did not know what "returns" were. I had to engage an accountant to explain it to me. I ended up paying a penalty of TZS 1,000,000. I was irritated and discouraged.'

(Interview with a representative from Sanalita Co. Ltd, Morogoro)

The dismay expressed above by an SME practitioner reflects the concerns of many entrepreneurs in the study areas and acts as a deterrent to small businesses. One of the KIs lamented, saying it was unfortunate that some of the business regulatory authorities in Tanzania seemed to embark on policing as opposed to facilitating SMEs to flourish. These concerns are in line with scholars' assertions that most SMEs in Tanzania have remained at the micro level, a phenomenon referred to as the 'missing middle,' which implies a lack of medium-sized enterprises (Agyapong, 2010, Olomi and Chijoriga, 2001, Kinunda and Rutashobya, 2008).

Other KIs mentioned a lack of implementation of relevant policies, particularly the SME Development Policy. At the outset, the policy states that the full potential of the SME sector has yet to be tapped into and it acknowledges that SMEs play a crucial role in employment creation and income generation in Tanzania. The policy further notes that strategies for implementing the SME Development Policy focus on three main areas, namely, the creation of an enabling business environment; the development of financial and non-financial services; and putting in place supportive institutional infrastructure. KIs noted that despite these impressive policy commitments, what the policy declares is not precisely what is implemented on the ground. On the contrary, there are cases where the Government has turned out to be a competitor of the private sector or SMEs. A KI from a maize processing enterprise in Morogoro gave an example of the Tanzania Cereals and Other Products Board (CPB), perceiving it as a competitor to the SMEs in the food processing sector. He said the situation was impeding the SME sector's innovation and growth. Supporting this KI's concern was the fact that in the recent past, CPB declared its intention to construct three new maize flour and paddy processing and milling plants to strengthen its competitiveness and explore the emerging trade opportunities in the East Africa Region (Food Business Africa | Tanzania Grain Board to spend US\$8.7M on construction of processing and milling plants).

6.3 Innovation Support Institutions and Programmes

As pointed out earlier, this study involved various KIs from several innovation institutions, notably public universities, and other Government organisations. The findings showed that these institutions and programmes were hosting various research and innovation projects. They were carrying out demand-driven research and innovation initiatives emanating from their linkages with agriculture SMEs. For instance, SUA, in collaboration with a Morogoro-based SME called Morogoro Food Processing Initiatives, implemented a breadfruit research project. The outcome of this project was the eventual production of breadfruit flour. Research shows that breadfruit flour is much richer than wheat flour in lysine and other essential amino acids. Reportedly, this product has a good market within and outside Tanzania. Similarly, SUA supported the Morogoro Engineering Cluster to research and produce solar dryers for drying vegetables, fruits and mushrooms, which can be used in the preparation of soups, stews and sauces.

Moreover, at the time of this study, SUA, in collaboration with the Tanzania Engineering & Manufacturing Design Organisation (TEMDO), was designing a bioreactor for producing enzymes to be used in laboratories to control and speed up reactions. SUA was also found to have been collaborating with various government organisations such as COSTECH and TIRDO, in carrying out innovation studies and project implementation but also providing training to SMEs on technical and business-related issues. Also, SUA is hosting SUGECO—the Sokoine University Graduate Entrepreneurs Cooperative. SEGECO supports SUA graduates and other Tanzanian youth to implement agriculture enterprises. During discussion, one key informant highlighted the following:

"The majority of the youth are not in the agriculture sector. But we believe that they have the knowledge required in this sector and by the Tanzanian community at large, to transform this sector. Most of the youth complain about lack of access to financial support, access to land, and so on. But those are not the real underlying causes. Mindset is the main obstacle. Largely, the youth perceive agriculture as a punishment and not as a worthwhile occupation. That is why it is not uncommon to hear a youth saying, 'I have no job; I am just farming.' We, thus, thought we had the responsibility to change this negative mindset."

(KII with a senior official at SUGECO, Morogoro)

For instance, through DANIDA funding, SUGECO implemented a project called "Growing Innovative Entrepreneurs Through Action Research in the Agribusiness Value Chain in Tanzania". Through this project, SUGECO trained youth in various innovative technologies such as using drip irrigation systems, making of charcoal coolers and solar dryers.

Similarly, it was found that SUGECO runs a capacity building programme to empower youth in agricultural entrepreneurship, technological transfer, technology testing, as well as supporting innovation and creativity. Also, SUGECO runs an internship programme involving sending Tanzanian youth to Israel and the United States of America for one year

to attend training through agriculture-related courses, including but not limited to, veterinary, horticulture and agri-business. By the time of this study, 325 Tanzanian youth had already benefited from the internship program since 2015 (Figure 2).

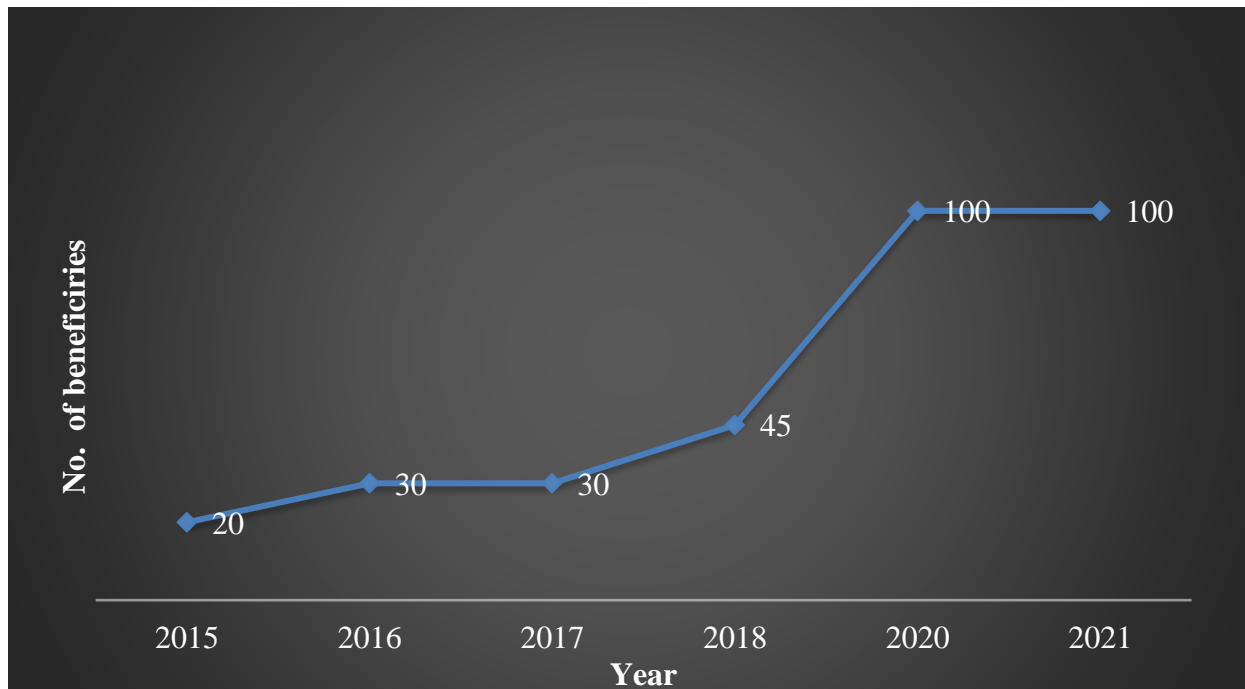


Figure 2. 1 Tanzania Youth Benefited From SUGECO Internship Programme, 2015-2021

Moreover, SUGECO runs an 'after internship programme.' The programme aims at encouraging interns returning from the US and Israel to establish enterprises based on the knowledge and skills they gained as captured in the following quote:

"On their return from the US and Israel, we invite the beneficiaries for feedback and discussion. We show them how they can use their skills and knowledge to establish their own enterprises. There are those who struggle to make progress for various reasons, including lack of start-up capital. However, we are pleased that others have managed to establish their own agro-based businesses. We also link them with some financial institutions to explore the possibility of securing loans."

(KII with a senior official at SUGECO, Morogoro)

During an interview, one of the SUGECO internship programme beneficiaries confirmed what the KI from SUGECO had narrated. He said that a graduate from SUA with a Bachelor of Food Science at SUA in 2016 got an opportunity to attend a one-year course on poultry in Israel. On his return, he established his own poultry project which is running smoothly. He said that the project was yet to be more productive and beneficial to him because it was still small in size with only about 700 chickens. He further noted that he had managed

to purchase a two-hectare piece of land because his long-term plan was to scale up the project and apply the skills and knowledge he had acquired in Israel. The following quote captures the highlights of the course he attended:

"The course I attended in Israel was quite useful. I learned a lot of things and new skills, including poultry food preparation, timely and adequate chicken feeding, bio security, as well as commitment and business management. This is an asset that will definitely help me in the future as I strive to expand my project."

(KII with a beneficiary of the SUGECO internship programme)

In terms of collaboration, a KI from SUGECO said they were collaborating with Government innovation and technological organisations such as SIDO, TEMDO and TIRDO. However, the KI pointed out that this collaboration was not very strong because, to a large extent, SUGECO had engaged with SUA graduates. These graduates were supporting SUGECO in running 'hands-on' training in various agricultural aspects, such as agricultural engineering, drip irrigation and agricultural enterprises. SUGECO was also collaborating with relevant ministries. For instance, at the time of this study, SUGECO, in collaboration with the Ministry of Labour, Youth, Employment and Persons with Disability, was implementing a technology transfer programme involving the installation of green houses in all District Councils in Tanzania. It was reported that through this programme in each District Council, 20 youths had been trained on how to construct green houses. Subsequently, the 20 and 80 other youths from each council were trained on how to use the green houses to produce various products/crops. It was interesting to note that by the time of this study, 126 greenhouses had already been constructed in the respective District Councils.

While that is an initiative with the potential to support small enterprises in the respective District Councils, its sustainability could be at stake. The KI noted that the cost of constructing one greenhouse sized 240 square metres could be in the tune of TZS 16,000,000/-, which is equivalent to US\$ 6,800. On a practical level, very few individuals could afford such a cost. Conversely, it was revealed that using the same knowledge, one could construct a greenhouse using local materials, notably wood, which is relatively cheap.

As for the University of Dar es Salaam, UDIEC—the University of Dar es Salaam Innovation and Entrepreneurship Centre—oversees technology and innovation affairs. The centre offers various training programmes for SMEs. The programmes were customized by considering the SME's capacities, level of knowledge and the nature of their businesses. Many of these trainings are demand-driven. However, at times, they are crafted based upon UDIEC's identifying needs for particular training. The training focuses on a range of areas, including but not limited to, business planning and legal issues. The KI from UDIEC noted that the centre was addressing the University Vision 2061, particularly in the context

of entrepreneurship and innovation. In so doing, the centre was undertaking a range of activities, including providing training and addressing challenges related to imparting practical entrepreneurship skills to students, academic staff and SMEs in the country. The aim was to form new start-ups and increase the competitiveness of existing companies and enterprises. Further, UDIEC was seeking to enhance stakeholders' engagement and collaboration with other institutions, including relevant ministries, to establish and strengthen innovation incubators. UDIEC, through the incubation process, was supporting university students and potential actors from outside to develop their innovation ideas. Also, UDEIC was supporting candidates with innovation ideas to secure Intellectual Property (IP) protection through applying for copyrights, trademarks, trade secrets or trade patents.

The KI further reported that a significant number of students and actors were developing interesting project ideas. However, in many cases, the conceptualization of their ideas lacked elements of marketability. Consequently, many enterprise projects were bound to fail not at the product development but at the market level. UDEIC, therefore, was taking into consideration and assessing the market aspect right from when prospective participants were making their applications. Thus, UDEIC had coordinators for innovation and entrepreneurship issues respectively. Moreover, UDEIC was running a Problem-Based Learning (PBL) programme. Through this programme, various institutions in Tanzania, including Tanzania Electric Supply Company Limited (TANESCO), Dar es Salaam Water and Sewerage Authority (DAWASA) and the Tanzania Meteorological Authority (TMA), were engaged to share insights and their experiences in marketing affairs.

This led to a decision to mainstream PBL in learning and teaching by the university colleges so as to instil in students the knowledge to identify challenges and potential market opportunities for their products.

Moreover, UDEIC was linking various enterprises with Local Government Authorities (LGAs) across the country. LGA officials were being invited to share potential business opportunities in their areas of jurisdiction with entrepreneurs through this initiative. They were also giving insights regarding guidelines and procedures to access the funding allocated by the LGAs for women, youths and people with disabilities. The rationale for this initiative emanated from the fact that majority of the youth and entrepreneurs were not aware of this funding, and some of those who were aware of the fund, did not know how they could access it.

At the University of Dodoma, it was observed that existing innovation spaces and incubation centres became operational in 2018. The aim of establishing them was to generate skills and knowledge that would assist the community to address their current challenges. The innovation hub involved students, staff and COSTECH and accesses funds

both internally and, in some cases, from COSTECH. The internal source of funds is UDOM and COSTECH is the external source of funds. Since the role of COSTECH is to enhance public engagement in science, technology and innovation, it provides funds for innovative projects to the University Innovation Hub. Several innovation projects were underway, including an optical water meter reader, improved agricultural productivity, fish ponds and aquarium water quality monitoring and management systems, as well as other projects. However, these innovation projects are not progressing well due to limited funds to facilitate collaboration with other organisations to sharpen innovation and to secure intellectual property (IP). It was also noted that most of the innovations were not demand-driven due to poor networking with entrepreneurs to identify their needs.

6.4 Opportunities and Challenges Facing Innovation Institutions

The respondents from all the innovation institutions talked about opportunities being presented to their institutions by the availability of students and researchers, as well as the demand for innovation services from SMEs and other businesses. Such opportunities were enabling these institutions to make headway in terms of hosting, undertaking more innovative research and nurturing a range of innovative initiatives, including agriculture-based ones. However, the KIs also talked about various challenges they were facing in the course of implementing innovation projects. One of the critical challenges reported at SUA was related to the difficulties with commercialisation of the innovations. The KIs pointed out that, despite notable success in developing numerous prototypes, commercialising them was found to be difficult due to lack of adequate funding. This was because commercialisation of the prototypes was a costly process, requiring more funding to support mass production. Moreover, innovation institutions did not have policies to support the prototype commercialisation process. Encouraging however, is that at the time of this study, SUA was in the process of developing a university-industry linkage policy. The KIs were hopeful that the completion of this policy would be a significant milestone. This is because it would serve as a tool to facilitate the commercialisation of innovation prototypes. Believably, the policy would also foster collaboration between SUA and industries across Tanzania. This in turn would be an entry point for the SUA innovation hub to secure funds from respective industries.

In the meantime, the SUA innovation hub was found to mainly depend on funding from COSTECH and funds allocated by the University for Research and Development (R&D). However, funds from COSTECH and universities were not sustainable and sufficient. The shortage of funds was reported to affect the university's innovation implementation plans and effective collaboration with organisations such as SIDO, TEMDO and CAMARTEC. In the 2021/22 financial year, the SUA management allocated TZS 1 billion for R&D, in anticipation that this amount would increase with time.

6.5 Collaboration Between SMEs and Innovation and Technological Organisations

The study findings showed that the SMEs involved in this study were collaborating with both Government institutions and private organisations. Some of the Government institutions that were named by the KIs included COSTECH, SIDO, TEMDO and TIRDO, while some of the private organisations and companies named were CAMARTEC and Intermech Engineering Limited. For instance, a KI at Intermech Engineering Limited, a medium-sized enterprise based in Morogoro, named their fundamental collaboration with COSTECH. Intermech Engineering Limited was dealing with machinery installation commission, modification and upgrading, manufacturing of machines and training. Recently, COSTECH financed Intermech Engineering Limited to design a cassava processing machine that was the first of its kind in Tanzania. The KI reported that the model of the machine was the latest at the global level for small-scale processing enterprises. The Tanzania Engineering and Manufacturing Design Organisation (TEMDO) was also named as a government organisation that was collaborating with SMEs, especially ones dealing with processing of foods such as milk, honey, maize, and cassava. TEMDO has been promoting engineering design and technology development to enhance the competitiveness of local manufacturing enterprises through the provision of quality technical support services, by promoting value addition and quality processing of agricultural products. Similarly, TEMDO has been supporting SMEs by designing various machines and providing training on the use of such machinery. Despite the big role that TEMDO was playing, some KIs from the study SMEs were not satisfied with the quality of TEMDO products/machines, and they were consequently often opting to import machines from China. The following quote by one of the SME respondents reveals this scenario:

"We prefer to import machines from China, since our local manufacturers do not design machines that accommodate our quality and efficiency needs. I once ordered a double refining machine for processing sunflower oil from TEMDO, but I could not get one with my specifications. Therefore, I am thinking of importing such a machine from China".

(KI with a senior official at Intermech Engineering Limited, Morogoro)

The above quote underlines the need for the Government of Tanzania to enhance the capacity of its own organisations such as such as SIDO, TEMDO or CAMARMETC which are mandated to promote engineering design and eventually support SMEs.

6.6 Policy Implementation to Support Agriculture SME Innovations (Enablers)

In the previous sections, several policies that govern agriculture, SMEs and innovations were presented. It is deemed important to understand the extent to which such policies are implemented to support SMEs. The KIs at different levels were concerned with the

lack of implementation of what these policies declared, further noting that although Tanzania has good policies, the biggest challenge is that many of the policy provisions are not being implemented and monitored.

Principally, innovation and technological development issues in Tanzania are governed by the National and Technology Policy of 1996, while SMEs are governed by the SME Development Policy of 2003. There were, however, some concerns that these policies were too old to be relevant. This is similar to the existing laws that support policy implementation. For instance, the Law that governs SIDO businesses was enacted in 1973 and it is still in place 49 years down the line. This fact points to a significant mismatch between the existing policy and regulatory framework to support innovation and SMEs under the prevailing socio-economic conditions. The policy on the other hand, discloses that the full potential of the SME sector in Tanzania has yet to be tapped into due to the existence of a number of constraints hampering the development of the sector. In this context, one of the KIs from SIDO had the following comment:

"It is indeed very difficult to imagine that we discharge our day-to-day responsibilities under a law which is older than I am."

(A KI during KIs at SIDO, Morogoro)

The foregoing remark represents the need to review or completely revoke the 1973 SIDO Act, also review the SME Development Policy to reflect current realities. This is even more relevant since the SME Development Policy seeks to facilitate attainment of the objectives of the National Vision 2025 of transforming the predominantly agricultural economy to a semi-industrialised one. It also underscores the crucial role that SMEs play in employment creation and income generation in Tanzania.

A KI at UDIEC pointed out that while SME Policy is the most critical policy to support SMEs, it lacks a section defining 'start-ups' (newly established businesses). As a result, even entrepreneurs who establish businesses for the first time are subjected to various taxes. Yet, studies (e.g., Aribaba et al. 2019), show a negative significant effect between multiple taxation and sustainability of entrepreneurship. Thus, taxes have always acted as stumbling blocks to new and upcoming entrepreneurs. However, the common practice in other countries is that new enterprises are offered a tax holiday or incentive for a certain period of time to give them time to grow before being subjected to taxes. This is done to make them progress. For instance, a study (Twesige et al. 2020), in Rwanda demonstrated a strong positive and significant relationship between tax incentives and growth and sustainability of SMEs. Conversely, in Tanzania, studies have shown the adverse impact of existing tax policies on the growth of SMEs and suggested for reformation of such tax policies and decrease of the tax rate to SMEs, so as to

encourage them to grow (Tee et al. 2016; Mkembe, 2019). It would seem the tax regime in Tanzania is not friendly. As a result, the survival rate of new businesses ('start-ups'), is low.

Additionally, it was pointed out that SME policies currently lack a provision that promotes enterprises and companies that have Corporate Social Responsibility (CSR) programmes going beyond philanthropy and environmental issues. But instead, they should also promote enterprises and businesses that support innovation and technological initiatives that are critical in fostering the growth of SMEs and economic development in general.

The respondents also pointed out that the Tanzanian SME Policy lacks provisions that enable and promote SMEs to compete in tendering processes. When opportunities arise in Government institutions, little priority is given to SMEs when applying, despite their capacity to deliver, as oftentimes such opportunities are offered to larger entrepreneurs. This is contrary to the Tanzania National Multisectoral Local Content Guidelines (URT, 2019). These regulations require Local Content Legal and Regulatory Frameworks to ensure Tanzanians are afforded the opportunity to participate in investments and strategic projects taking place in Tanzania. Likewise, the current practice is contrary to the National Economic Empowerment Policy, 2004, whose main objective is to ensure that majority of the citizens of Tanzania have access to opportunities to participate effectively in economic activities in all sectors of the economy.

Above all, the respondents perceived the SME Development Policy of 2003 as relatively old, making it challenging to implement under the evolved socio-economic environment. For instance, one of the strategies that the policy promotes is the establishment of incubators. However, it lacks policy provisions that support such an initiative. This hinders the whole process of supporting business incubation.

In this regard, a KI from TEMDO made the following remarks:

"The national incubation policy provision could facilitate an innovation day, during which innovators share their innovations with various investors, businessmen, and other stakeholders for purposes of marketing and to establish collaborations. However, this cannot be executed since it is an issue that lacks policy support."

(KII with a TEMDO representative)

6.7 Barriers to Innovation and SMEs Effectiveness in Tanzania

It was noted that the innovation and technological organisations discussed in the preceding sections have been encountering a range of barriers that affect the performance of agriculture SMEs. For instance, a recent study (Elia, 2020), in Arusha revealed that SIDO has a partial computerised system for data keeping, marketing, and sharing of information. About 42% of the respondents in this study said SIDO has been experiencing a shortage of SME trainers. Again, about 46% of the respondents said the organisation's employees were not motivated to institute services to SMEs (Elia, 2020). The disclosure of Elia's (2020), study corresponds with the findings of the current study. For instance, during fieldwork in Morogoro, it was noted that SIDO Morogoro had only four technical staff (training officer, trade and marketing officer, credit officer and accountant), that were responsible for providing services to SMEs within the whole region. SIDO was also experiencing a lack of financial and other resources, such as inadequate transport facilities. In this regard, one of the KIs at SIDO made the following remarks:

"Morogoro is a regional office for SIDO, but we do not have our own office building. In terms of staffing, we are almost a handicapped."

(Remarks by one of the KIs at SIDO, Morogoro)

The foregoing observation was supported and confirmed by respondents from other organisations, including SUGECO and Intermech Engineering Limited (IFL). The KI from IFL, for instance, pointed out that SIDO was a "staff-starved" organisation, as it lacked key personnel, especially engineers and technicians. The KI added that for years, SIDO had only two registered engineers across Tanzania, and it was just until recently that it recruited about 10–12 registered engineers.

Similarly, it was noted that although organisations such as TEMDO support incubation businesses for youth with various innovative ideas, the organisation can only support the process during, but not beyond the incubation period.

Moreover, KIs noted that there was lack of collaboration among organisations that could foster linkages with innovation programmes (TEMDO, SIDO, and CAMARTEC), university innovation centres and the private sector. This situation was inhibiting development, improvement, innovation and technology transfer to various SMEs and other potential beneficiaries. This finding underlines the argument by Ouyang et al. (2014), who emphasize three pillars, namely institutions, academia and entrepreneurs, to enable the sharing of resources, in-demand skills and innovation transfer.

7.0. POLICY CONCLUSIONS AND RECOMMENDATIONS

This study assessed challenges that agriculture small and medium enterprises (SMEs) encounter in accessing innovation support and services from relevant institutions, as well as investigated challenges that innovation support programmes encounter. The findings showed that most of the innovation centres mandated to support agriculture-related SMEs have been working in isolation without networking with other organisations. This practice, has been affecting the transfer of innovation to SMEs. However, it was revealed that those innovation centres that had networked with others performed well and improved technology for SMEs. Good examples are the SUA innovation hub and the University of Dar es Salaam Innovation and Entrepreneurship Centre. These entities were revealed to have collaborated with several stakeholders, hence improved the capacity of SMEs. Despite their performance, expanding networking was noted as an important aspect to accomplishing their goals, particularly linking them with industries. However, policies that enhance collaboration of universities with industries are lacking. The policy will be geared toward the transfer of innovation to entrepreneurs.

It was noted that most of the universities have been struggling to develop innovation projects through students' and supervisors' ideas. However, those innovations are not demand-driven, thus not useful to SMEs. This was noted as a result of poor networking with entrepreneurs to identify their needs.

Several agricultural SMEs are emerging, but one of the major challenges is a lack of funds. The challenge was exacerbated by the huge sums of money demanded by TRA, even for the newly established enterprises. Therefore, it was revealed that the SME Policy lacks a provision that defines "start-ups" (newly established SMEs), that should be exempted from tax for a certain period. It was further found that, despite the existence of various organisations with innovation programmes (SIDO, TEMDO and CAMARTEC), SMEs have been importing machines from abroad, particularly China. This is a horrifying message to the Government, particularly those organisations with innovation programmes to improve their technology and skills to capture the needs of the SMEs. This will further improve the economy of the country.

SMEs are supported by a number of organisations. However, it was noted that their responsibilities to SMEs are not well defined, thus generating confusion among SMEs. It was difficult, for example, to separate the tasks of TEMDO and SIDO, and that caused confusion for SMEs. It was therefore proposed by members of SMEs that since SIDO coordinates innovations to be transferred to SMEs, TEMDO and other organisations such as CAMARTEC should be departments under SIDO to avoid a confusion for SMEs. It was noted that, while Tanzania has an SME Development Policy since 2003, this policy is relatively old and perhaps implementing it in the current evolved socio-economic

environment is becoming a challenge. For instance, one of the strategies that the policy promotes is to facilitate the establishment of incubators. However, lack of policy provision supporting such an initiative hinders the whole process of supporting business incubation.

Recommendations

- The findings suggest that the Government should revisit policies, particularly those aimed at empowering Tanzania's small development industries, and develop a strategic plan on how to facilitate them to be able to manufacture machines of good standards.
- The findings imply that innovation transfer will be improved through networking, which will be facilitated by policies that link innovation to enterprises or industries.
- In order to improve innovation for SMEs, innovation centres should work closely with SMEs to identify their needs. This will lead to innovations that are demand-driven and useful to SMEs.
- SMEs are supported by a number of organisations. However, their responsibilities towards SMEs are not clearly stated. Therefore, it was suggested that the functions of each organisation be well articulated to avoid confusion among SMEs.

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