Innovation Hubs and Research Centres for Modernisation by Universities and the Devolution Agenda in Zimbabwe

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Abstract

Zimbabwe's academic institutions are at a vital juncture, with an increasing acknowledgment of the value of science and its application in society, and associated attempts to strengthen scientific, technological, and innovation initiatives on the continent. Tertiary institutions should be the nerve centres of the push to expedite modernisation and industrialisation by developing inventions and answers to economic difficulties. Under the devolution agenda, universities in Zimbabwe are concentrating on modernisation and using innovation centres and industrial parks to develop goods and services that influence all economic sectors. The Zimbabwean government has established numerous organisations to hasten the development of institutions' roles in the devolution agenda. For methodology, the study engaged qualitative research methods drawing literature from books, journal articles, statutes, the constitution, and other publications. For data analysis, the study engaged in textual analysis. Africa's contribution to research and development (R&D) was 1.3% in 2015, compared to its around 5% share of the world gross domestic product (GDP). Despite this poor performance, rigorous study on the function of innovation hubs and

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research centres within the framework of the larger innovation system and sustainable development in Africa, particularly Zimbabwe has been limited. It is concluded that science, technology, and innovation are important catalysts to realise a high quality of life for people. As such, the setting up of innovation hubs and research centres in institutions of higher learning is key in this respect. The government should create policy guidelines and guides to help with devolution implementation.

Keywords: *Tertiary institutions; Devolution; Innovation; Industrialisation; Science and Technology*

INTRODUCTION

The history of African science is intertwined with the history of colonialism, with universities in African countries frequently being established and organised using Western educational practices (Mamdani, 2018). Since the 1980s, the establishment of ministries of science, technology, and innovation, or their incorporation into other allied ministries (Mouton *et al.,* 2015), such as Zimbabwe's Ministry of Higher and Tertiary Education, Innovation, Science, and Technology Development, and the formation of the African Academy of Sciences (AAS), has provided a starting point for a new history of African science. As the importance of science, technology, and innovation (STI) as vehicles for economic and social development became more widely recognised, such ministries were established. In the 1980s and 1990s, there was a growing interest in understanding how newly industrialising East Asian countries had progressed through industrial policies and strong state institutions (Chang and Woo-Cummings, 2010; Booth, 2015). The African Union has adopted the Science, Technology, and Innovation Strategy for Africa 2024 (STISA-2024), which aims to ensure Africa's transition to an innovation-led, knowledge-based economy (Hanlin *et al.,* 2021). The strategy is based on the African Union (AU) Agenda 2063, which includes STI as tools and enablers to drive the continent's manufacturing, industrialisation, and economic development activities.

Since the beginning of the twenty-first century, there have been global attempts to meet the United Nation's Millennium Development Goals by

2015, recognising the importance of Science, Technology, and Innovation. This was followed by the Sustainable Development Goals, which included a particular objective on industrialisation with innovation (Goal 9) and several other goals that relied on STI solutions to be achieved. Without exception, Zimbabwe's academic institutions are at a vital juncture, with an increasing acknowledgment of the value of science and its application in society, and associated attempts to strengthen scientific, technological, and innovation initiatives on the continent. Tertiary institutions should be the nerve centres of the push to expedite modernisation and industrialisation by developing inventions and answers to economic difficulties. Science organisations are required to do science "for the public good" and to ensure that "the course of science is formed and steered by a nation's most pressing socioeconomic requirements" (Mouton, 2018:4).

According to the 2018 Global Innovation Index, no African nation is listed among the top 50 for innovation achievement (Cornell University, INSEAD, and WIPO, 2018). Africa's contribution to research and development (R&D) was 1.3% in 2015, compared to its around 5% share of the world gross domestic product (GDP). Additionally, just 2% of global research outputs and 0.1% of global patents are produced in Africa (Pavel *et al.,* 2015). African countries are said to have "poor STI infrastructure, a small pool of researchers, low patronage of science and engineering programmes, weak intellectual property frameworks, and minimal scientific output relative to the rest of the world" (African Capacity Building Foundation (ACBF, 2017:6). Despite this poor performance, rigorous study on the function of innovation hubs and research centres within the framework of the larger innovation system and sustainable development in Africa has been limited (Mouton *et al.,* 2015). The time for higher education institutions to lead this research is now. This article's goal is to add to the limited body of knowledge about Africa by focusing on Zimbabwe in sub-Saharan Africa.

BACKGROUND TO THE STUDY

The devolution agenda in Zimbabwe has strong foundations upon which to build on. Decentralisation efforts in the nation, that date back to 1883

(Dube and Chigumira, 2020), had already advanced to an impressive degree. Each of the ten provinces currently has at least one higher education institution, demonstrating the decentralisation that has been implemented in the educational system. The National Development Strategy1, the Fiscal Policy, and the Presidential Policy Guidelines on Devolution all outline the nation's devolutionary strategy. The need by residents for the government to solve economic imbalances in the nation has increased the motivation to focus on this devolution. To turn provinces and districts into economic hubs and increase local Gross Domestic Product (GDP), the devolution agenda seeks to develop innovation hubs in all institutions of higher education.

Under the devolution agenda, universities in Zimbabwe are concentrating modernisation and using innovation centres and industrial parks to develop goods and services that influence all economic sectors. Since November 2017, Zimbabwe has been actively working to restore its economy, which was on the verge of collapse, through enormous infrastructure projects taking place throughout the nation and the stabilisation of both the economy and the local currency. There is a need for government to acknowledge the potential role played by universities and research institutions in providing research support to the implementation of devolution (Dube and Chigumira, 2020).

The Zimbabwean government has established numerous organisations to hasten the development of institutions' roles in the devolution agenda. To transform the manufacturing sector into a technologically advanced, competitive, and diversified industry by 2030, the nation announced the Zimbabwe National Industrial Policy (ZNIDP) and the Local Content Strategy in 2019. It will be founded on investment and industrialisation that is driven by innovation and focuses on producing goods primarily for export so that the nation may earn foreign cash. To create a supportive environment for innovation that has a favourable influence on the economy, the government has taken steps to build innovation hubs, industrial and technical parks. By accomplishing this, Education 5.0 aims to close the gap left by the previous educational system, which produced goods that were insufficient for transforming the economy innovatively.

The existing system now offers a platform that is suitable for providing answers through the transmission of information with actual use in the sectors. If action is not taken to correct the issue, developing nations like Zimbabwe will continue to suffer from their inability to keep up with innovation. Only if efforts are based on innovation and the use of locally accessible natural resources with local beneficiation can the Zimbabwean story be transformed.

The country has demonstrated its ability to come up with locally produced goods. Part of the economic revival agenda involves industrialisation and modernisation of the economy through the adoption of modern technology and innovation through local institutions (like universities) and harnessing local skills from the country's tertiary institutions, hence the signing into law of the Centre for Education, Innovation, Research and Development Act in September 2021. The key pillars of the policy include the development of industrial value chains, agro-based industrialisation, beneficiation of minerals, commercialisation of intellectual property, the establishment of linkages with Small and Medium Enterprises (SMEs) and the creation of industrial parks and innovation hubs.

The Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development's Education 5.0 becomes a legislative necessity with the passage of the Act, changing it from a policy. Under the new section 16A of the Manpower Planning and Development Amendment Act 2020, all higher education institutions will be expected to innovate, and the Ministry of Finance and Economic Development will support the programme through the Innovation and Industrialisation Fund. Higher education institutions in Zimbabwe must prioritise the filing of patents, research output, creation of working prototypes, and ongoing development of acceptable goods. "... networks of institutions, public or private, whose activities and connections begin, import, modify, and disperse new technologies" is how Freeman (1987:1) described innovation systems. As a result, an innovation system includes a variety of players, such as businesses, universities, colleges, and government agencies, and their interactions. It also includes institutions, such as laws,

customs, and routines, and infrastructure that supports innovation activities. By 2025, the nation is expected to abandon its outdated, traditional methods of education in favour of creating an innovative, knowledge-based economy, as outlined in its National Development Strategy 1 (NDS1). The transition from Education 3.0 to Education 5.0 should serve as a motivating force for us to produce and export rather than look to people outside the country as our saviours. Zimbabwe should lead the world in innovation, ideas, and solutions that hasten modernisation, industrialisation, and the establishment of strong rural industrial systems. In this sense, it is important not to overstate the significance of regional universities and other higher education institutions. Higher education institutions are crucial in addressing issues that are jeopardising the industrialisation and modernisation of Zimbabwe's Second Republic.

CONCEPTUAL FRAMEWORK

The study hinges upon the Big Push Theory devised by Rosenstein-Rodan (1943) which asserts that underdeveloped countries require large amounts of investments to come out of the problem of backwardness and launch policies for economic development. In this respect, there is need for developing countries like Zimbabwe to invest in innovation hubs and research centres as part of the devolution and modernisation agenda in the country. This can be accelerated when the country takes the avenue of innovation through institutions of higher learning. Figure 1 shows a diagrammatic representation of the conceptual framework that hinges upon the fact that for a developing country to industrialise, it should modernise first. This needs a big push through investment in research and innovation as part of the devolution agenda.

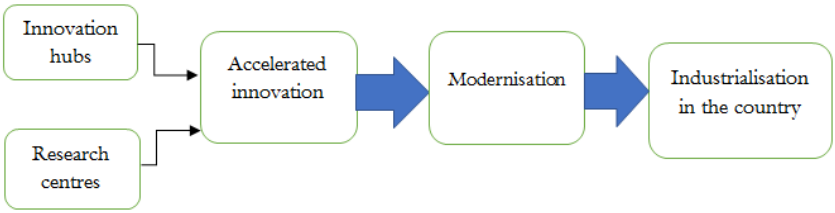

Figure 1: *The conceptual framework* (Author's compilations)

INNOVATION HUBS

Innovation hubs or centres work to increase the innovative talents of universities in a variety of ways, such as by creating new products that can compete in new markets, cheaper commodities, encouraging the value addition of raw resources, or creating new technologies to enhance service delivery. Radical innovation brings new difficulties and demands new skills, some of which may be in opposition to current best practices for incremental innovations. Universities have employed innovation hubs, a sort of organisational structure devoted to radical innovation projects, to manage these issues by keeping some distance from the norms and culture of the main organisation. Innovation hubs are separate organisation supported by corporate finances that are required to have capabilities for idea generation, recognition, and evaluation (Leifer *et al.,* 2000). It is a physical location where researchers, policy makers, and innovators come together to foster ideas into products and services that could revolutionise an industry and modernise the economy.

RESEARCH CENTRES

A research centre is a facility established for conducting research. Research institutions may focus on applied research or have a basic research focus. There are many research institutions in the social sciences as well, particularly for sociological and historical research goals, despite the term's frequent association with natural science study. The advancement of intellectual activity through collaborative research, research training, research dissemination, or creative endeavours is the primary goal of research centres, which are formally constituted units within universities rather than departments or schools. Centres are meant to give students special opportunities for inquiry-based learning and to participate actively in relevant academic fora and community outreach. Centres often promote the multidisciplinary study and encompass activities that go beyond the purview of one subject.

MODERNISATION BY UNIVERSITIES

The new policy of higher education known as Education 5.0 was announced by the Ministry of Higher and Tertiary Education, Science and Technology Development (MHTESTD) in 2019. According to this new

policy, universities, in particular, are required to go beyond their conventional roles by embracing industrialisation and innovation. Higher education institutions are now expected to place a greater emphasis on innovation and industrialisation to assist the creation of goods and services, in addition to teaching, research, and community engagement. The Government of Zimbabwe's higher education programme of Education 5.0 is based on the principles of industrialisation and modernisation. Innovation and industrialisation were added as new university activities by the Zimbabwean government to this programme. The transition from a traditional, rural, agriculturally based society to an urbanised, industrialised, and secular society is sometimes seen as modernisation. The focus on innovation and industrialisation by the Ministry of Higher and Tertiary Education, Science and Technology Development is primarily intended to speed up modernisation in colleges and universities through innovation and industrialisation.

THE DEVOLUTION AGENDA IN ZIMBABWE

Accelerating science, technology, and innovation is still essential for promoting sustainable development, constructing modernised economic systems, and fostering changes across all sectors in the context of rapidly changing national and global realities. The act of putting an idea into practice to create new products and services or to enhance those that currently exist is known as innovation (Schumpeter, 1983). Over time, innovation acquired new meanings (Godin, 2015). Through numerous inventive projects, the Zimbabwean government has sought in vain over the years to increase creativity. These include the Minimum Bodies of Knowledge, the Updated Curriculum Framework, Education 5.0, among others, and Science, Technology, Engineering, and Mathematics (STEM) and Science, Technology, Engineering, Arts, and Mathematics (STEAM). These initiatives have produced conflicting results. Despite receiving significant financing, STEM was abandoned. Three further projects are being carried out, although their chances of success are slim.

Devolution is cited by the Zimbabwean government as a crucial component for reaching upper middle-income status by 2030. The devolution agenda aims to have the nation's residents set development

goals for their local communities. Section 264 of the Zimbabwean Constitution and other ancillary laws like the Urban Council Act (Chapter 29:15), Rural Councils Act (Chapter 29:13), Regional and Town and Country Planning Act (Chapter 29:12), and the Provincial Councils and Administration Act (Chapter 29:11) establish the framework for devolution (Dube and Chigumira, 2020). The Intergovernmental Fiscal Transfer (IGFT) aim of at least 5% of National Revenue in any Financial Year as provided in Section 301(3) of the Constitution allows for the financing of the devolution agenda. Public consultations on devolution implementation and other modalities will be guided by presidential devolution guidelines created by the president's office. To submit preliminary suggestions for the IGFT framework, the Zimbabwean government also established the inter-ministerial taskforce, which consists of the Ministry of Finance and Economic Development and the Ministry of Local Government and Public Works.

It is important to consider innovation since it plays a crucial part in the government's plan for devolution. Innovation is the introduction and application of new or enhanced goods, services, practices, policies, and business models in novel contexts (Blind, 2012). A general definition of innovation views it as the process of developing, gaining access to, adapting, assimilating, and exploiting knowledge, information, or technology to develop new goods, processes, services, methods, and strategies that meet market demands. Most people (governments, organisations, societies) believe that innovation drives economic growth (Verspagen, 2004). Additionally, innovation is offering solutions to urgent sustainability problems like poverty, desertification, global warming, climate change, and all forms of pollution, among others. Projects in the fields of science, technology, and innovation (STI) are also implemented progressively as a cross-cutting strategy and instrument for ensuring equitable and sustainable growth (AUC, 2014).

STI is being more and more integrated into national development programs in African nations. Many African nations have established numerous national STI financing organisations, which we generally refer to as Science Granting Councils (SGCs), as a means of improving STI and

research capacity. The African Union's Science, Technology and Innovation Strategy for Africa 2024 (STISA-2024) and Agenda 2063, encourage sustained investment in scientific research and innovation in important sectors (AUC, 2014, 2015), and national STI policies in numerous nations, support the claim that STI is receiving more attention on the continent. Many African nations have established numerous national scientific financing organisations, hereinafter commonly referred to as Science Granting Councils, to improve STI. SGCs have played a crucial role in supporting local research and administering grants following aspirations for national development (Mouton, Gaillard and van Lill, 2014; Chataway *et al.,* 2019). Sub-Saharan African (SSA) nations are increasingly appreciative of independent financing sources for research and innovation (Mouton *et al.,* 2014). SGCs in Africa are gradually becoming recognised as the primary players among a group of individuals and organisations engaged in the creation and dissemination of innovation systems (Mouton *et al.,* 2014; 2015)

RESEARCH METHODOLOGY

Methodology-wise, the article engages an array of sources (documents and statements) that have emerged since the inception of the approach. The study was done through the use of desk research and involved personal observation and the reviewing of relevant competing literature on devolution and innovation, drawing useful insights from other available innovation and education studies from Zimbabwe and the rest of the world. In addition, we also carried out extensive and detailed document analysis. This in a way provided us with a good framework for properly analysing the study issues. The desk research therefore mainly included a literature search and review of existing academic and non-academic documents that include written unpublished papers, journal articles, reports, and case studies. Documents for the literature review were identified mainly through searches on various websites of international publishers and organisations. The study employed the triangulation method through the use of several techniques or data sources in qualitative research to create a thorough understanding of a phenomenon.

LITERATURE REVIEW

There are three definitions of an innovation cluster. The first is associated with regional innovation hubs (Florida, 1995) and is related to the integration of local and external allies who are interested in the development of the region, such as the university, NGOs, businesses, and government. Another definition of the concept is related to the understanding of the university as an innovation hub that integrates other agents under its leadership into the activities it carries out (Youtie & Shapira, 2008). The third refers to a small physical location with meeting spaces, technological support, and specific characteristics that promote social innovation (Toivonen & Friederici, 2015), technological entrepreneurship (InfoDev, 2014), business innovation (Bell *et al.,* 2014; Wire *et al.,* 2016), or prototype development (Gascó, 2017).

Innovation is a key driver of technological growth, and it is supported by a country's human capital (Momete, 2015). Science policy has historically not been regarded as a "legitimate policy target of devolution and regionalisation processes," but the allocation of responsibilities for innovation and technology policy appears to be more difficult (Perry and May, 2007). The processes of and the "hollowing out" of the state, in tandem with the rise of the knowledge-based economy and the growing importance of locality and physical proximity in economic development and innovation processes, have piqued the interest of both policymakers and academics (Huggins and Izushi, 2007). According to Etzkowitz (2002a, b), the interaction of universities, industries, and governments is a step toward a new global model for the management of knowledge and technology, in that an internationalisation strategy evolves inside local policy institutions. Universities have the potential to be significant participants in accomplishing economic transformation; nevertheless, from a policy standpoint, they are frequently underutilised (Huggins and Kitagawa, 2009).

Kenya School of Government (2015) provides a glimpse of this arrangement using Kenya as an example. The Kenyan law provides for a legal and institutional framework for a coordinated transition to the devolved system of government while ensuring continued service delivery

to citizens (Bosire, 2014). Principally, it provides for the establishment and operations of a Transition Authority. The Transition Authority (TA) is established under section 4 of the Act as a statutory body with the mandate of facilitating and coordinating the transition to the devolved system of government (the Republic of Kenya, Ministry of Devolution and Planning, 2016).

DECENTRALISATION AND DEVOLUTION

Decentralisation was a normative priority for the government and was given some direction by the 1984 Prime Minister's Directive on Decentralisation and Development (PMDDD). The directive guided the establishment of grassroots participation and government coordination especially in rural development at villages (Village Development Committees – VIDCOs), ward (Ward Development Committees-WADCOs) and district (District Development Committees-DDCs) and Provincial Councils (PCs) and Provincial Development Committees (PDCs). There was a clear hierarchy established by the PMDDD as a way of channelling local aspirations into both subnational and national development planning. Nonetheless, the hierarchical nature of the structures continued the trend toward upward rather than downward accountability that the introduction of Provincial Governors in 1985 in all the provinces except in Harare and Bulawayo had intended. Provincial Governors for Bulawayo and Harare were later introduced despite the initial instating of Executive Mayors in 1997 and their later abolition.

In the early 80s, Zimbabwe immediately introduced black participation in local governance. This involved removing the racialised policies in councils through legislative reforms in 1980, that incorporated African townships into urban councils and amalgamated 1988, the former native councils (African District Councils) with rural councils (Madhekeni & Zhou, 2012). As de-racialisation was achieved, post-independence reforms had two effects. The de-racialisation and reorganisation of local governance gave significant control and powers of local governance to the central government (Mapuva, 2014). The government was thus de-racialised and the functions of the state decentralised via deconcentration. This did little for the fiscal autonomy of local government institutions and

did not augment effective citizen participation at scale. It, instead, strengthened the upward accountability of local authorities to the executive and central government with limited downward accountability of the local authorities to citizens.

Suffice it to say that despite the reforms in local governance in the 1980s and 1990s, the sector was not sufficiently transformed to meet the aspirations of accountability, effective service delivery and ensured effective citizen participation on local developmental issues. These deficiencies spurred further government action in 1988 through a cabinet committee on decentralisation. Post-2018, with the election of Emmerson Mnangagwa as President of Zimbabwe, the government moved towards implementing the devolution provisions. Steps have included a budget allocation of close to 3 billion dollars in the 2020 National budget and Cabinet approval of the National Devolution and Decentralisation (NDD) policy on 21 July 2020. The NDD policy seeks

> …to guide the process of removing ambiguities, gaps, inadequacies and impractical provisions, that might be inherent in the Constitution, particularly with regard to the modus operandi of Provincial and Metropolitan Councils.

RESULTS

The idea is to get the products that are produced in these hubs to benefit the entire economy; therefore building industrial parks and innovation hubs is not the final objective. All universities were advised to file patent applications and follow the example of the University in Zimbabwe, which was already reaping the rewards of the initiative. Innovation hubs are a problem that has been for some time, yet they require skilled individuals to grow and succeed. Industrial parks will function as commercial wings that will produce cash to bolster their working capital in addition to serving as laboratories for students to study realistically.

Zimbabwe has developed innovation hubs and technology parks at several institutions of higher learning to provide solutions to the country's pressing problems and to achieve the aims of the National Development Strategy 1. One of the primary goals of this blueprint is to provide economic opportunities by cultivating a new generation of young people with entrepreneurial mindsets. Universities play a critical role in retaining

local jobs, diversifying the local economy, and attracting inward investors. Universities, as knowledge infrastructures, have an impact on knowledge flows between themselves and other institutions and actors at various geographical scales (Huggins and Kitagawa, 2009). The Zimbabwean parliament passed a bill for the Centre for Education, Innovation, Research, and Development into law. The main goal is to establish a technological hub that will harness and organise research and innovation at institutions of higher learning such as universities and colleges, and in industry. According to a 2019 report by the Global Special Mobile Association (GSMA), Zimbabwe has 12 innovation clusters. The University of Zimbabwe (UZ) is one of the universities in the country that has innovation clusters. National University of Science and Technology, Midlands State University, Harare Institute of Technology, Zimbabwe Defence University, and Chinhoyi University of Technology are among them.

CENTRE FOR EDUCATION, INNOVATION, RESEARCH AND DEVELOPMENT ACT IN ZIMBABWE.

In September 2021, the Centre for Education, Innovation, Research, and Development Act was ratified. The Act's main components are the formation of industrial value chains, agro-based industrialisation, mineral beneficiation, commercialisation of intellectual property, links with SMEs, industrial park development and innovation hub development. This is yet another major step in the direction of the nation's industrialisation and modernisation drive, which will see domestically produced goods fuel the economy and development of the nation. To address national concerns for Zimbabwe's modernisation and industrialisation, the centres will coordinate programme-based synergies across universities, teachers' colleges, polytechnics, industrial training colleges, vocational training centres, and innovation institutes.

The Centre for Education, Innovation, Research, and Development will help to develop and demonstrate technological goods, processes, and services. It was designed to develop technical positions across the economy for graduates of Zimbabwe's higher and tertiary education institutions. It will also generate revenue by providing technical and

technological solutions to industry and society. In terms of education, the centre will promote and encourage higher and tertiary education institutions, and industry and community partnerships in engineering, technology, and innovation. With this programme, an enabling environment that fosters innovation and technology business companies and connects the Zimbabwe economy to the global innovation sector would be built. It aspires to boost productivity across all of Zimbabwe's productive and social sectors through innovating in Science, Technology, Engineering, and Mathematics.

Furthermore, it establishes satellite institutes in all provinces of Zimbabwe, focusing on priority programs for strategic sectors with an impact on the economy and society, such as health and environment, security and protection, mobility and transportation, production and supply services, information and communication technologies, energy and natural resources, geospatial, aeronautical and space sciences, food technology, electronics, and information technology. The centre coordinates and houses program-based synergies among universities, teaching colleges, polytechnics, industrial training colleges, vocational training centres, and research and innovation institutions in addressing Zimbabwe's national issues for modernisation and industrialisation. Finally, it was established to better Zimbabwe's economic situation through the production and export of intellectual property.

MANPOWER PLANNING AND DEVELOPMENT ACT IN ZIMBABWE

The Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development's Education 5.0 becomes a legislative necessity with the passage of the Act, changing it from a policy. Innovation will be required for all institutions of higher education under the new Section 16A (1) of the Manpower Planning and Development Amendment Act 2020 which says,

> "…every university, research institution, teacher's college or technical or vocational institution shall on its own or in partnership with another establish a fund to be known as an Innovation and Industrialisation Fund."

The Ministry of Finance and Economic Development will provide funding for the programme through the Innovation and Industrialisation

Fund. Each university, research institution, teachers' college, or technical or vocational institution may use the Fund for any of the following goals:

> To support the development of start-up businesses and/or technological solutions within its purview;
> To promote synergies partnerships in engineering, technology and innovation between the specific university, research institution, teachers' college, or technical or vocational institution and industry and the community.

The Zimbabwe National Geospatial and Space Agency (ZNGSA) is housed in a facility that was inaugurated by President Mnangagwa in the University of Zimbabwe Science Park. The ZNGSA, which is led by scientists from Zimbabwe, will be used to deploy earth observation satellites, global navigation satellite systems, unmanned aerial vehicles, geospatial and space technologies, among other things, for world-class agriculture, cutting-edge mineral exploration, and disease surveillance in various provinces in the country, thus promoting devolution. A production facility in Mutare (Manicaland province) that produces industrial gas and medicinal oxygen was also inaugurated by President Mnangagwa. The Zimbabwe National Industrial Policy (ZNIDP) and the Local Content Strategy were introduced in 2019, with the goal of, among other things, making the manufacturing sector a technologically sophisticated, competitive, and diverse sector by the year 2030. The President of the Republic of Zimbabwe, Emmerson Mnangangwa, declared in September 2018 that the government had transferred 1% of the nation's GDP to R&D (Nyoni, 2018), which is less than half the global average of roughly 2%. Africa's contribution to research and development (R&D) was 1.3% in 2015, compared to its around 5% share of the world gross domestic product (GDP). Additionally, just 2% of global research outputs and 0.1% of global patents are produced in Africa. In Zimbabwe, the Intergovernmental Fiscal Transfer (IGFT) aim of at least 5% of National Revenue in any financial year as provided in Section 301 of the Constitution allows for the financing of the devolution agenda.

CASE STUDIES

After independence, the histography of Zimbabwean cities extolled more on Harare. Harare became the leading administrative city and it became

the regional diplomatic hub for Southern African countries (Kaarsholm, 1994). Zimbabwe has 12 innovation hubs. The University of Zimbabwe is one of the universities in the country located in Harare that has an innovation hub. National University of Science and Technology, Midlands State University, Harare Institute of Technology, Zimbabwe Defence University, and Chinhoyi University of Technology are among the twelve. This section will discuss four cases of Zimbabwean universities that have ventured into innovation recently. These are the University of Zimbabwe, Harare Institute of Technology, Midlands State University and Great Zimbabwe University.

UNIVERSITY OF ZIMBABWE

The University of Zimbabwe (UZ) is a public university that is situated in Harare, Zimbabwe's capital. The University of Rhodesia, which was first established in 1952 as the University College of Rhodesia and Nyasaland, was initially a member of the University of London. When Zimbabwe gained independence in 1980, it later assumed its current name, the University of Zimbabwe. It is both the oldest and top-ranked university in the nation. The university also houses many institutes and specialised research centres. It is overseen by the Ministry of Higher and Tertiary Education's National Council for Higher Education. The University of Zimbabwe intends to start producing cooking oil and adding value to most of its farm products. The Ministry of Higher and Tertiary Education provides funding for innovation, science, and technology development at the University of Zimbabwe. The institution is dedicated to the pursuit of novel, unexpected, and fundamentally beneficial discoveries. The UZ also strives to produce and share knowledge without concern for failure.

The Future Grains for Africa programme was launched by the University of Zimbabwe to promote heritage-based science for industrialisation. The goal is to generate new products from small grains like finger millet, pearl millet, and sorghum that are food, feed, or non-food to open a channel for promoting their consumption for food security. A research strategy plan that aims for excellence in research has been adopted by departments under the Faculty of Veterinary Science. Additionally, by using this approach, new scientific data will be produced and answers to current and

anticipated issues with animal welfare, production, and health. After creating a smart blind stick and a drugstore location application in 2021, the University of Zimbabwe's innovation cluster created two products that are aimed at social protection. The smart blind stick uses technology for object avoidance in addition to detecting obstructions. This offers effective navigational aids for people who are blind. To find drug stores or the closest pharmacy, the geographic information system (GIS) and Google Maps are integrated into a pharmacy locator programme. Innovative research trainees are being produced by the university's innovation hub. A pharmacy location web application software was recently created by a research trainee from the Hub to assist the public in more easily locating pharmacies and medicine centres dispersed throughout towns, cities, and some rural portions of the nation. The goal of this innovation is to simplify the process of finding drugs in Zimbabwe. As a specially designed solution for the Zimbabwe Electricity Supply Authority (ZESA) and other electricity organisations, the University of Zimbabwe is offering an invention that makes use of microcontroller-based technology that automatically detects defects. It aims to address problems with transformer failures, theft, and vandalism that cause losses of millions of dollars.

HARARE INSTITUTE OF TECHNOLOGY

An oxygen plant, created by the state-owned company Verify Engineering, a unit of the Harare Institute of Technology (HIT), will help Zimbabwe and Africa's efforts to combat the COVID-19 pandemic. Three production facilities make up the Verify Gases Oxygen Plant. After viewing the Institute's start-up ventures, President Mnangagwa officially opened the Harare Institute of Technology (HIT) Innovation Hub. He praised the Institute for helping the fight against Covid-19 by producing prototype ventilators and other personal protective equipment. The launch of the Innovation Hub is evidence of his administration's persistent commitment and resolve to realise Vision 2030 by advancing Education 5.0. To give technical solutions to numerous economic sectors, HIT has started and exhibited projects that embrace the Internet of Things (IoT), big data, and artificial intelligence.

The institution created Local Authorities Digital Systems (LADS) that aim to improve service delivery. LADS gives the devolution and equalization agenda more traction by serving as a performance yardstick. The mission to produce high-end domestic medical equipment will be advanced by the trajectory and inventions made by HIT together with continued efforts of their Biomedical Engineering degree. In response to the unique technological requirements of various government agencies and institutions, the Harare Institute of Technology has been creating a variety of locally produced information communication technology applications, systems, and start-ups. The national fuel management and smart card system, the Bureau de Change payment system that enables the RBZ to monitor foreign currency trade in real time, and the digital system for local authorities to improve service delivery are all products of HIT. The production of transformers by HIT propels our initiative to expand community access to energy, especially for those living in rural and recently resettled areas.

The universities should take advantage of the highly skilled machine designers working for instance at HIT to produce technologies that are suitable for every sector of the economy. Institutions are carrying out the objective of educating people to develop goods and services so that the nation can reach upper middle-income status. One of the completed initiatives was the adoption of the Hi-Tech Development Valley, a deliberate strategic initiative associated with the institute's innovation and commercialisation agenda.

MIDLANDS STATE UNIVERSITY

Established in July 2017, the Midlands State University Innovation Hub (MSU Hub) is dynamic and progressive. The Hub is passionate about creating physical and virtual platforms that support entrepreneurs, SMEs and the community to develop sustainable business ventures. The hub was established in line with the call by the Government of the Republic of Zimbabwe to invest in research and innovation for the attainment of Education 5.0. It gives funds to support innovations ideally to bring up Industrialisation & Entrepreneurship. The Midlands State University (MSU) boarded a Research programme on the Value of Indigenous Trees

and Herbs in pharmaceuticals and other products. Heritage-based education is meant to use Zimbabwe's available agricultural, climatological, and mineral heritage for national development (Tirivangana, 2019).

The Midlands State University's Innovation Hub in Midlands province, went beyond national boundaries to become the first Zimbabwean university research unit to be accepted to participate in the annual "Teknofest" competition on Unmanned Aerial Vehicles (UAVs) held in Samsun, Turkey in September 2022. An infusion of seven students from the Departments of Telecommunications Engineering, Information Systems, Materials Engineering, Aircraft Engineering and Physics and Instrumentation made up the team. The team used the Innovation Hub facilities for design work, research, prototype development and technology transfer.

GREAT ZIMBABWE UNIVERSITY

The university is in Zimbabwe's Masvingo province. In the semi-arid Chivi area of Masvingo province, the university is now building a dryland agriculture research facility. The institution is also building a medical school, and much ground has already been covered in that project. A radio station at the Great Zimbabwe University (GZU) has a significant social impact. The radio station assisted in encouraging virtual learning and educating listeners about the pandemic by collaborating with sanitizer manufacturers to try to prevent the impacts of COVID-19. The Science Park is a purpose-built office complex that offers laboratories, workrooms, and meeting spaces to support research and development in a variety of fields, including biotechnology, information technology, artificial intelligence, machine learning, the Internet of Things, robotics, and virtual and augmented reality. A $10 USD million textile factory was inaugurated by President Mnangagwa at the Masvingo industrial park of the Great Zimbabwe University. Additionally, the park has been reserved for a preservation factory that will house a bottling and sanitiser production facility. The textile plant has played a key role in the production of face masks used in the fight against the COVID-19 epidemic and personal protective equipment for health workers in the province of Masvingo.

DISCUSSION

African nations usually create and operate their universities according to Western educational standards. The creation of ministries of science, technology, and innovation became common in the 1980s. Such ministries were founded as the significance of science, technology, and innovation (STI) as engines for economic and social development became more widely acknowledged. Recognising the significance of science, technology, and innovation, efforts have been made on a worldwide scale to meet the United Nations' Sustainable Development Goals by 2030. All academic institutions in Zimbabwe are at a critical juncture, with a growing appreciation for the importance of research and its applications in society, and efforts to support scientific, technological, and innovation activities on the continent. The drive to hasten modernisation and industrialisation should be centred on tertiary institutions because they can create innovations and solutions to problems in the economy.

Strong foundations exist upon which Zimbabwe's devolution plan may be built. Decentralisation initiatives have been ongoing in the country since 1883, and they have come a long way. The nation's devolutionary plan is outlined in the National Development Strategy 1, the Fiscal Policy, and the Presidential Policy Guidelines on Devolution. Universities in Zimbabwe are focusing on modernisation as part of the devolution goal and employing innovation hubs and industrial parks to generate products and services that have an impact on all economic sectors. There is a need for the government to recognise the potential contribution made by academic institutions and other research organisations in supporting the implementation of devolution through research. To speed the establishment of institutions' responsibilities in the devolution programme, the Zimbabwean government has founded many organisations. The government has taken action to develop innovation centres, industrial and technical parks to foster an environment for the invention that benefits the economy. In doing so, Education 5.0 hopes to fill the gap left by the previous educational system that produced insufficient products for creatively reshaping the economy. The Zimbabwean story can only be changed if efforts are focused on creativity and the exploitation of locally available natural resources with local

benefit. All schools of higher learning will be required to innovate as provided under Section 16A of the Manpower Planning and Development Amendment Act 2020, and the Ministry of Finance and Economic Development will assist the initiative through the Innovation and Industrialisation Fund.

The production of functional prototypes, research output, patent applications, and the continued development of respectable commodities must be given top priority by Zimbabwe's higher education institutions. A multitude of entities, including enterprises, colleges, universities, and government organisations, and their interconnections, make up an innovation system. Institutions such as rules, traditions, and routines are also a part of innovation, as is the infrastructure that makes these activities possible. Instead of looking to individuals outside the country as saviours, the shift from Education 3.0 to Education 5.0 should serve as a driving force for people to produce and export. Zimbabwe should provide an example for the rest of the globe in terms of innovation, concepts, and approaches that speed up modernisation, industrialisation, and the development of robust rural industrial systems. In this regard, it's crucial to avoid exaggerating the importance of regional universities and other institutions of higher learning. Innovation is the process of putting an idea into action to develop new goods and services or to improve those that already exist. The Zimbabwean government has tried in vain over the years to foster creativity through several innovative schemes. Among these are Education 5.0, the Updated Curriculum Framework, the Minimum Bodies of Knowledge; Science, Technology, Engineering, and Mathematics (STEM); Science, Technology, Engineering, Arts, and Mathematics (STEAM).

CONCLUSION AND RECOMMENDATIONS

The paper set to establish the role of innovation hubs and research centres for modernisation by universities and the devolution agenda in Zimbabwe. The study found that universities are playing a key role in taking the lead to establish innovation hubs and research centres in the country. A review of case studies of universities that have already taken the initiative was done in the study. Through this review, the study

concluded that science, technology, and innovation are important catalysts to realise a high quality of life for the people in Zimbabwe. As such, the setting up of the Zimbabwe National Geospatial and Space Agency and Science Park are important building blocks for addressing these realities and achieving the outcomes set out in the National Development Strategy 1 (NDS1) and, ultimately, Vision 2030. Some recommendations were made to help the country accelerate the role of innovation hubs and research centres for modernisation in the country.

The government should create policy guidelines and guides to help with devolution implementation. There should be co-creation of research studies with government officials who are familiar with the policy issues surrounding devolution. There is wneed for increasing institutional capability for devolution implementation. This comprises developing capacity-building/training programmes in regions where necessary skills are lacking.

Communities surrounding universities must be able to absorb and use the science, innovation, and technology generated by the universities for regions to operate through global network nodes as part of a global-regional innovation system. Universities have an essential role to play at the regional level in the development of the knowledge economy within devolved policy structures. However, strategic balance is equally vital for universities. The benefits to universities of linking the outcomes of knowledge transfer operations to the primary mission of teaching and research in their respective institutional settings and tactics must be assessed.

Devolution and local government amendment bills must give full expression to the constitution's intent on effective citizen participation in Section 264. Amendment bills must have clear definitions and mechanisms for citizen participation in local governance beyond consultation that should be legally guaranteed with clear sanctions for errant local authorities. Amendment bills must introduce clear mechanisms for local communities to be engaged in participatory budgeting, policy and development plan formulation and monitoring at local levels to ensure vertical and horizontal accountability.

The local government amendment bills must align with Section 62 of the Constitution and democratise devolution by acknowledging and providing practical mechanisms around residents' rights to access local government information on- and off-site and on and offline.

The national government must support and strengthen the capacity of local government to manage their own affairs, exercise their powers and perform their functions. The national government must be committed to cooperating with other key institutions like the Zimbabwe Local Government Association (ZILGA) and local resident's associations that are doing work to transform local government. Also, the national government must develop a comprehensive framework to support an equitable share of resources, consult and agree on a list of exclusive competencies and expenditure responsibilities.

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