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# The significance of university-industry collaboration in developing knowledge-based economies: the SADC perspectives

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**Abstract**

This paper assesses the influence of university-industry collaborative efforts in developing knowledge-based economies. Due to the great persistence and demands on Sustainable Development Goals (SDGs), the SADC region is challenged to move from being resource-based region to creating knowledge-based economies. Lack of knowledge is a major stumbling block. Based on this problem, the purpose of this study was to identify and evaluate possible university-industry collaborations that can benefit the region. The primary objective was to identify the contribution of industry in shaping the university curricula. Review of related literature indicated that SADC universities and industry are parallel segments of the economy. The literature acknowledges that the universities do a commendable job in educating nations, notwithstanding that progress and the necessity to transform knowledge are long overdue. A critical document review process was adopted as a means of collecting the required data. A purposive sample of 16 universities amongst 66 in the region was included, and a detailed analysis of their strategic plans was done. Key findings revealed that, so far there is insignificant evidence of university-industry collaborations. It was concluded that SADC is yet to utilize university-industry collaborations in developing knowledge-based economies. Therefore, it was recommended that the region must embark on robust integration of the university and industry fraternities to realize the full potential of the region.

**Key Words:** Knowledge-based economy, SADC, SDGs, University-industry collaboration.

## INTRODUCTION

According to Ssebuwufu, Ludwick and Béland (2012) universities are regarded as a source of knowledge, innovation and technological advances. The creation of a knowledge economy depends upon the effectiveness of the universities in creating and disseminating the knowledge amongst all the economic players or stakeholders. More so the development of the economy hinges greatly on knowledge acquired and shared by the economic participants. The universities' role of being knowledge centres makes them a strategic and inseparable determinate of economic development. Ssebuwufu, et al. (2012) attest that, due to such a strategic role, there is a great transition, across the globe, in regarding the universities as strategic assets in building innovation and economic competitiveness.

The key roles of universities are to; research, teach and outreach. These basic mandates lay foundation on the duty of universities to create knowledge based economies. However, their impact is primarily affected by the level of university-industry collaboration (UIC). The general trend shows that UIC is intensified in developed than in developing countries (Sá, 2014; UNESCO, 2000; AAU, 2000, 2012; Massaquoi, 2002; Kruss, et al., 2009; The World Bank, 2009; 2010). Africa, and in particularly the SADC region, is a victim of insignificant UICs. The university-industry collaborations are a critical pillar for success and development of economies. The initiative is primarily

important for sharing knowledge and enhancing synergies. The collaboration is also vital in creation of new knowledge and skills. SADC is a developing region and faces severe challenges in integrating the academia and the industry contexts. Sá (2014) states that very little is known about UIC in Africa. This researcher attributes this scenario to lack of higher expectations (benefits) from the UIC (Sá, 2014).

## LITERATURE REVIEW

Creation of a knowledge-based economy is a major step towards achieving competitive advantage and sustainable development. The huge differences between a traditional and knowledge-based economy justifies the importance and the urgent need of a knowledge-based economy. According to Tocan (2012) major differences between a traditional and knowledge-based economy include;

- Elimination of the economic problem of *scarcity* – information is shared and becomes better and abundant as more people participate.
- More knowledge-embedded (hi-tech) products fetches a premium market value than the traditional products
- Prices depend on contexts – same information can be of different value to different people in different contexts
- Knowledge is locked in systems and not allowed to 'walk out of door' in people's heads
- Human resources becomes a key capital asset

A basic comparison of traditional economic paradigm and the knowledge-based economies (KBE) clearly proves that KBE is the ideal approach to sustainable development (Tocan, 2012). Africa in general, faces a great challenge in shifting to KBE due to a number of constraining factors. These factors include; lack of support policies, lack of funding and unavailability of enabling environment.

The outreach mandate of universities requires them to interact with the societies and communities in which they operate. This involve them participating and shaping the society through imparting knowledge and engagement in development programmes. UIC is one of the significant ways in which the universities reach out to the society. There are a lot of benefits that can be derived from such collaborations that accrues both to the society and the universities. The World Economic Forum (2011) identifies benefits of UICs including;

*'providing alternative funding channels in an era of constrained financing; access to/or acquisition of state-of-the-art equipment; improved curriculum and training in technology-oriented programmes and problem-solving; enhanced employment prospects for students; supplemental income for academic staff; and clearer contribution of universities to the economy, among others'* (World Economic Forum, 2011). See also Martin (2000).

## UNIVERSITY-INDUSTRY COLLABORATIONS AND KNOWLEDGE-BASED ECONOMIES

There are various outcomes on the implementation and achievement of UICs in different regions of the world (Peng, 2007). Notably, there is a huge progress distinction between the developed and developing economies. The USA is a role model in the implementations of UICs (Peng, 2007). According to Peng (2007) building a successful KBE requires; strength in ability to acquire knowledge, creating knowledge, communicating knowledge, and using knowledge. These

key requirements are all the core functions of universities. Ideally, universities take a leading role in developing and driving knowledge in any country. However, the universities' core business may not allow them to fully use the knowledge they produce hence the need to partner the industry in order to ensure that the produced knowledge is put to full utilisation.

China is currently the second largest economy in the world, but the country is under pressure to conserve the resources, for sustainability (Peng, 2007). This calls for great innovative initiatives, i.e. the creation and use of knowledge use of new knowledge. This scenario puts the universities in the context of the industries progression. Universities in China have a significant role to play, creating and sharing the new knowledge with the industries in China. Zyl, Amadi-Echendu and Bothma (2007) suggest nine critical drivers for effective sharing of knowledge between the universities and the industries. The critical amongst these include;

- the need to extract appropriate knowledge at the right time to make critical decisions
- the perception that knowledge is a valuable resource
- the emphasis on getting a return on investment in research
- the need to protect knowledge for competitive advantage
- the need to close the knowledge gap
- the need to protect intellectual property such as patents and trademarks
- geographic proximity between the knowledge source and recipient

*Source: Zyl, Amadi-Echendu and Bothma (2007)*

These drivers set a platform for pursuing strategic partnerships. Particularly, they outline major considerations that both the universities and the industries must take into account. Major drivers relate to creation of relevant knowledge at the right time. This technically refers to critical thinking for problem solving. Universities need to be familiar to the industries in their country and be ready to provide solutions to the problems they face as well as improving their operational systems through innovations. In sharing this knowledge, a balance must be achieved in protecting the intellectual property rights as well as closing the knowledge gap. The collaborations must create mutual benefits for the partners, ideally funding the university research facilities and creating competitive advantage to the industry partners.

## THE ORETICAL FRAMEWORK

There are three distinct theories that explain the university-industry collaborations. These include Michael Porter's 'Cluster' or 'Diamond' model (1990), 'Triple-Helix Model' of university–industry-government interactions by Etzkowitz and Leydesdorff (1997, 1998, 2000) and lastly the National Innovation Systems by Freeman (1987) and Lundvall (1992). While these theories are founded on diverse premises, they generally share the common explanation that creating a knowledge-based economy is a collaborative effort of key economic participants (Edgar & Kharazmi, 2011).

Notably, the National Innovation Systems and Triple Helix theories share the arguments that creation of knowledge is a shared responsibility. In contrast Michael Porter's 'Cluster' or 'Diamond' model identifies the government as the key player in creating knowledge. Porter (1990) argues that the creation of knowledge is prudent

when the government seizes the 'chances' that arise in the economy. Porter (1990) notes that developing an effective strategy, creating the suitable conditions, availing support structures and understanding the demand are key to promotion of innovation and creation of knowledge. Porter's model does not place importance on the collaboration of key stakeholders.

Arguably, the National Innovation Systems theory attribute innovation and creation of knowledge to complex set of relationships among actors in the system, which includes enterprises, universities and government research institutes (Lundvall, 1992). While the National Innovation Systems acknowledge the roles played by key stakeholders, Sheehan et al. (1995) downplays the theory stating that studies conducted in 1994 across Australia conclude that;

'*Government laboratories, private research institutes and higher education institutions were considered relatively unimportant, indicating that insufficient collaboration between businesses and both public and private sector research agencies problem'*

The weakness is attributed to lack of clear roadmap in defining the health and effective links that the industry, government and the universities must forge to promote innovation and knowledge creation (MERIT, 1995). Nonetheless the National Innovation Systems is a founding ground of the Triple Helix model (Edgar & Kharazmi, 2011). This is disregarding that the National Innovation System is challenged by excess broadness that makes it fail to address with precision the legit roadmap that the three economic players must adopt to create a successful knowledge-based economy.

The Triple Helix theory provides a founding basis for this study. The theory as propounded by Etzkowitz and Leydesdorff (2000) states that innovation is a product of the interconnectivity of the three agents; the government, universities and the industry. The industry is considered to include the buyers, suppliers and firms. Hakansson and Snehota (1995) relate that the relationship of these three agents hinges on the following links; activity, resources and actors.

Hakansson and Snehota (1995) argue that the government, universities and the industry can establish and strengthen their relationship if they can find significant technical, administrative, commercial and other activities that link them up. Intrinsically, Etzkowitz, Gulbrandsen and Levitt (2000) argue that for the relationship to be worthwhile, the activity links must be value adding to all the participants. Even though the government does not derive material benefits in the Triple Helix matrix but it is fundamental that they should create an accommodative system that enhances the other two agents; the industry and the universities to relate well.

The Triple Helix theory is a development of the National Innovation Systems model that postulates that innovation is an achievement of the integrated effort of key economic agents (Lundvall, 1992). The Triple Helix theory distinctly connects the roles of the government, industry and the universities as fundamental to national innovation and building knowledge-based economies. However, Edgar and Kharazmi, (2011) argue that the government has a champion role to set the 'rules of the game' that governs the relationships and interactions that must prevail between the participants. Notably the key matters related to effective functionality of university-industry collaboration is the culture and trust amongst the players (Cooke & Morgan, 1998).

Cooke and Morgan (1998) and Lee (2011) recognise the vitality of culture in developing effective university-industry collaborations. Malerba (2003) advocates

for universities and industries to change their perception towards the roles and significance of each other. Lockett and Knockaertd (2008) state that the industry must trust that universities can create and transfer technology that can successfully transform their operations. In a reciprocal manner, the universities also need to believe that there are several inputs that the industry can provide to the functionality of a university. The role of the government, as stated by Perkmann et al. (2013) is to create the ideal linking ties between participants through encouraging policies and regulations that ensure fairness and growth of trust amongst participants.

The Triple Helix model provides that collaborations can only be fuelled by motivations. Thus the theory identifies two way forms of benefits between the industry and university communities. Liu and Jiang (2001) identify the following among the factors motivating the motives behind individual university staff working with industry; recognition need for promotion, personal accomplishment, better welfare, and more opportunities for grants and research funding. At large, the universities are motivated to collaborate with industry because of new funding, increased new research output, education programmes and student recruitment and placement (Muscio, 2013). On the other hand, the industry is motivated by high value research projects, access to subsidised research access to intellectual property, access to students and a better position in society among other factors (Muscio, 2013).

## PROBLEM STATEMENT

SADC, like the rest of Africa, faces a great challenge in forging beneficial UICs. This challenge exposes the region to major problems such as; emerging high graduate unemployment and under-employment in many parts of Africa (Pauw et al, 2008). These mishaps coupled with other pressing issues related to the underdevelopment of the region makes UIC a dearest sustainable solution. More so, the industrial operations in regional countries lack state-of-art technological advancement. This is a clear lack of knowledge sharing between the universities and industries in SADC. Several other researchers share the same insight, for instance; Ssebuwufu, et al. (2012), Afuwoqi and Wu (2009) and, Blankley and Booyens (2010).

## RESEARCH QUESTIONS

1. What measures do SADC universities take to forge UICs?
2. How effective are the strategies used to pursue UICs?
3. How effective are the current university-industry synergy initiatives.
4. What support structures are in place to promote UICs in SADC region?

## RESEARCH METHODS

The study adopted a qualitative approach. A qualitative paradigm was ideal and fundamental in helping the researcher to explore the universities in order to develop a detailed discussion. Subsequently a purposive sampling technique was performed. The study sought to deliberately include diverse universities, small, huge, new and old universities. This was fundamental to produce a balanced and broadly inclusive discussion. A total of 16 universities from 10 SADC countries were covered. The universities are all members of the Southern Africa Region University Association (SARUA). The study findings were obtained through document review. The researcher reviewed the universities' strategic plans. Certain sections of these strategic plans were significant for the purpose of this study. Main focus was on the situational analysis, key focus areas and

the objectives of each studied university. The situational analysis was important for understanding the past and current circumstances surrounding these universities, strategic key focus areas and objectives of the universities were important for establishing the future plans of these universities. Other supplementary documents including the research policies and annual reports were also reviewed.

## FINDINGS

For objective analysis of the study sample, strategic plans, research policies, annual reports and the research strategies were reviewed in order to obtain the insights about each university's approach in forging external collaborations with the industry and society in general. Table 1 below summarises the sample distribution.

***Table 1: Sample Distribution***

| University Names | Country | Term | Reviewed Documents |
|---|---|---|---|
| University of Zimbabwe | Zimbabwe | 2016-2020 | Strategic Plan |
| University of Dar es Salaam | Tanzania | 2014-2023 | Strategic Plan |
| University of Mauritius | Mauritius | 2015-2020 | Strategic Plan |
| University of Free State | RSA | 2015-2020 | Strategic Plan |
| University of Seychelles | Seychelles | 2017-2021 | Strategic Plan |
| University of Swaziland | Swaziland | 2016-2021 | Strategic Plan |
| University of Cape Town | RSA | 2016-2020 | Strategic Plan |
| Copperbelt University | Zambia | 2014-2018 | Strategic Plan |
| University of Johannesburg | RSA | 2015-2025 | Strategic Plan |
| University of Stellenbosch | RSA | 2013-2018 | Strategic Plan |
| University of Malawi | Malawi | Approved 2016 | Research Policy |
| BIUST | Botswana | 2016-2022 | Strategic Plan |
| Central University of Technology | RSA | 2016-2020 | Strategic Plan |
| University of Namibia | Namibia | For the Year 2016 | Annual Report |
| University of Botswana | Botswana | Approved 2008 | Research Strategy |
| University of Zambia | Zambia | 2013-2014 | Strategic Plan |

Sixteen (16) SADC universities were studied. Five (5) were from South Africa. Zambia and Botswana had two representatives each. Malawi, Seychelles, Swaziland, Namibia, Tanzania, Mauritius and Zimbabwe, a single representative each. All universities selected in this study are members of the Southern African Region University Association (SARUA). The table illustrate the tenure and nature of the documents reviewed for each institution. Ideally the Strategic plan was

central to the objectives of this study. However, where the strategic plan was not accessible relevant documents were used, for example in cases of University of Malawi, University of Namibia and University of Botswana, Research Policy, Annual Report and Research Strategy were used.

The preliminary investigation of the universities' strategic documents reveals the nature of strategic objectives and the priority of UICs in the institutions. Majority of the universities have the subject on their key focus objectives and is equally treated as a high priority objective in their plans. However, the nature of the objectives differs. In most cases it emerged that universities correlate the collaboration and partnerships to matters of research and innovation. While this is quite relevant to creating a knowledge-based economy, most universities overemphasise the creation of new knowledge, through research, but with limited to no intention to share the accumulating knowledge in the repository. For example, University of Cape Town, University of Zimbabwe, University of Botswana and University of Johannesburg aim to be world class centres for research. Their main thrust is to furbish the university to foster academic research which has no specific and immediate problem-solving implication in the industry. The table 2 refers.

In most cases, the universities' research aims to increase the published output. While this is equally significant, the substantive role of universities in creating KBE challenges them to focus on increasing the intellectual properties and patents which they commercialise or partner in commercialisation. The implication of this approach produces more Mode 1 Knowledge than Applied Knowledge (Mode II Knowledge). The universities have solid plans on academic research output but very little is planned on how their initiatives will benefit the industries within their catchment area, besides producing learned graduates.

Evidence shows that the universities' primary focus is on achieving excellence in academic provision. Several universities strive to improve the quality and quantity of published literature output. This is a significant input in creating a knowledge-based economy, but makes a little impact in improving the performance of the corporate industry if there are no effective means by which that knowledge will be shared with the corporate world.

University of Dar es Salaam, University of Zambia, Central University of Technology and Copperbelt University have more solid strategic perspectives regarding forging UICs. This is commendable, especially noting that this is their top level strategic focus. Nonetheless, the universities do not have a clear structural procedure planned for achieving these objectives. BIUST, for example, has a clearer approach to preparing the institution for UICs; the university shall pursue their aim through sustainable research staffing and infrastructural development to support strong linkages. The Zambian universities (University of Zambia and Copperbelt University) adopt a unique approach to UICs concept their strategic focus has a more practical essence in terms of incorporating the industry.

**Table 2: Strategic Objectives**

| University Name | Strategic priority (NO/YES) | Nature of Objective |
|---|---|---|
| University of Zimbabwe | ✓ | To lead in utilisation-focused research through patenting and intellectual property protection and revenue generation |
| University of Dar es Salaam | ✓ | The university will establish partnerships with the private sector |
| University of Mauritius | ✓ | To drive research based on industry and societal needs |
| University of Zambia | ✓ | Promote Beneficial Partnerships in the Knowledge Economy. |
| University of Free State | **X** | Not applicable |
| University of Seychelles | **X** | To disseminate the output of the research to the general community |
| University of Swaziland | ✓ | Large capital projects may be financed through public-private partnership arrangements. |
| University of Cape Town | ✓ | To advance UCT as a research-intensive university that makes a distinctive contribution to knowledge, locally and globally |
| BIUST (Botswana) | ✓ | To ensure that research is institutionalised as a strategic priority with strong industry linkages supported by sustainable research staffing and infrastructure |
| University of Johannesburg | ✓ | Promote the culture of innovation and entrepreneurship by providing a stimulating and supportive environment, especially in its technology stations, for problem-solving research projects that can be commercialised, and applied technology-driven research and development with the potential to lead to patents and technology transfer. |
| University of Stellenbosch | ✓ | Align our research with a wide-ranging spectrum of challenges facing the world, Africa, our country and the local community |
| Copperbelt University | ✓ | Collaborations and Strategic Partnerships |

| | | |
|---|---|---|
| University of Malawi | ✓ | To provide a framework for establishing research partnerships by staff of the University. |
| Central University of Technology | ✓ | Forge strategic partnerships that are mutually beneficial |
| University of Namibia | **X** | NOT INDICTAED |
| University of Botswana | ✓ | To increase international collaborative research |

The Zambian universities aim to forge strategic relationships with the private sector organisations. It is such kind of relationships that have a huge positive implication on creating a knowledge-based economy. University of Seychelles also has an ideal approach to this subject, although this is not regarded at their strategic level. The university aims to disseminate their research output into the society. The priority of pursuing this objective remains a major worry in their case, but their approach is the best and effective in creation of a knowledge-based economy.

University of Swaziland has a unique perspective regarding the subject. The university indicates that the major projects in their university business shall be financed through private partnerships. The university further confirms that it has received some tenders form the international community. It is greatly appreciable that the university is pursuing partnerships with the private corporate world; however, the partnerships do not have a great impact on the dissemination of knowledge they create rather they have great financial benefits.

A notable private university, Stellenbosch aims to align their research to several problems that face the world. A great stance to solving the issues of sustainability the corporate world currently face. Also this approach is likely to shift the universities approach from emphasising basic research to applied research, although this would yield more benefits if the university further pursue mutually beneficial collaborations with the corporate world.

Free State University does not have any objective that relate to forging any collaborations with the industry. While this clearly does not appear anywhere in their strategic plan, this is not the only university from this sample that does not have a specific objective to purse UICs. Several other universities do not directly indicate their plans in pursuing UICs, rather they emphasise innovative research and lean more on aiming to produce the research output which the wish to commercialise.

## PROGRESSION IN PURSUING UICS

Further than mere objectives as outlined in the strategic plans, the researcher also examined the implementation level of these strategic objectives. This was meant to establish the priority accorded to the objectives. Moreover, the researcher identified the strategies used to pursue their objectives. Table 3 below provides a summary on the observations.

*Table 3: Implementation Strategies*

| Strategy | Implementation Level | Frequency |
|---|---|---|
| Research Partnership | Strategic and Policy | All (16) |
| Curriculum Development | Strategic and Policy | All (Consultative basis) (16) |
| Incubation Centres | Strategic | UNAM, UZ, CBU, UCT, UJ (5) |
| Students Attachment | Operational | All (16) |
| Workshops and Trainings | Operational | All (16) |

## RESEARCH PARTNERSHIPS

All the universities studied have strategic interest in pursuing research partnerships. This is pursued at strategic level. While this is a great stride towards successful collaborations, the most common partnerships identified involve mostly the sponsorship and funding of the universities research projects. Few cases involve applied research, for instance, in 2014/5 the University of Zimbabwe was consulted to conduct an applied survey by a parastatal. Also, the Copperbelt University (CBU) carries continuous studies for the Copper mining in Zambia.

## CURRICULUM DEVELOPMENT

As a norm, and a requirement by several national education frameworks, all universities consult with the industries when developing their curricula. This is done at a strategic level, but does not allow the industry to fully influence the learning programmes that the universities develop, instead in most cases they may be required only to endorse the programmes already developed. This form of interaction opens the doors for the universities to interact with the industry but it is not fully utilised in the SADC region.

## INCUBATION CENTRES

The least number of universities have successful incubation centres. This is a major endeavour by the universities and industries in sharing the knowledge. Successful examples include the UNAM's Centre for Innovation and Development, University of Zimbabwe's Parirenyatwa Medical School, UZ School of Social Work and Copperbelt University Africa Centre of Excellence for Sustainable Mining (CBU ACESM) among other cases in the Republic of South Africa.

## STUDENTS ATTACHMENT

All contemporary universities introduced the students' attachment programmes. The attachment programmes vary from one university to another but at most students spend a year in a work-related learning environment. The attachments are a critical tool for sharing knowledge between the universities and the industries, however, the evaluation of the attachment programmes indicate that the learners face a great challenge reconciling the industry and academic experience (Sa, 2014). This is partially explained by lack of synchronisation of the academic programmes to the ever-changing demands of the industry.

## WORKSHOPS AND TRAININGS

These involve a formal short term learning services that are provided to industry members by the academia as well as interactive sessions between the academia and the industry. Trainings and workshops benefit the industry most. The industry successfully absorbs knowledge from the academia but the academia may not be able to learn from the industry trainees. This creates an unbalanced situation where knowledge flows only from one side. However, this is appreciable because it allows the industry trainees to gain more knowledge from the academia which mostly has the freshest knowledge obtained through continuous basic research.

## DISCUSSION

SADC universities are playing a fundamental role in educating their nations, but their mandate is restricted to their campuses. This is a peculiar challenge that is attributed to lack of the enabling policies and environment by governments in SADC. Tocan (2012) relates this to lack of support policies that enable the universities to collaborate with the industry and the government research institutions. Ideally, Tocan (2012) argues that the lack of such an enabling environment stifles the full utilisation of the universities' roles of outreaching. More so, it results in knowledge being locked up in the universities when the industries suffer stunted growth.

Nonetheless, the universities play a pivotal role in attracting and educating learners in various learning fields but the impact of this education is less evident in their societies especially considering the low rates of development, high levels of unemployment and unsustainable production systems in the region. Also as noted by Tocan (2012) where a successful knowledge-based economy is created, there will be changes in the nature of jobs in the economy, thus a shift from blue-collar jobs to white-collar jobs. The study generally observes insignificant change in the nature of jobs.

While this study observed that irrespective of the pivotal role that the universities play but their mandate for outreaching remains needing. This is evident as Sá (2014) attests that the universities in africa are yet to explore on collaborations with the industry. Lack of trust between potential partners and indefinite benefits from such collaborations underscores the will to purse them (Gulbrandsen & Levitt, 2000). This implies that transformation stagnates in the region

pushing further the dream to create knowledge based economies in SADC region. The region is challenged by lack of concise and definite roadmap and disseminating benefits of UICs (Gulbrandsen & Levitt, 2000).

The outreaching role of the universities challenges them to participate and interact with the societies. This remains an uncompleted task in the SADC. According to Ssebuwufu, et al. (2012) the university-industry collaborations are a major step towards transforming Africa. In the same study sponsored by the Association of African Universities (AAU) and the Association of Universities and Colleges of Canada (AUCC) it is reported that there is very little data on what has been done by the universities in forging these collaborations. Their strategic approach is very positive yet the communities and societies lack positive appreciation of such collaborations.

As argued by Ssebuwufu, et al. (2012), the African continent is yet to establish a systematic way in which their higher and tertiary education institutions can relate with the industry and other governmental research institutions. This is in contrary to the Triple Helix Model, which anticipated that for effective collaborations, partners should define the course of their interaction as well as outline and agree on the benefits to accrue to each party of the collaboration. In addition, for such collaborations to be functional, the government must play a critical role of administering governing policies that create and enable formality and development of trust between the collaborating partners (Saad & Zawdie, 2005)

The findings of this study reveal that strategic plans of the universities do no directly address the matters of UICs, rather they emphasise more on improving their research capacities. This ideology is critical as Zyl, et al. (2007) who argue that for effective knowledge creation, there must be a strong perception that knowledge is a valuable resource support it. A notable observation of the study is that universities do emphasise the need and importance of information in their countries but the cycle is not completed by ensuring that the gathered information is shared in ways that makes it valuable and make economic essence. The study found that universities do create knowledge and places great value on the information they gather. However, the SADC governments have not invested a considerable effort in ensuring that the information output is converted into economic prospect for their respective countries as suggested by Zyl, et al. (2007) when he argues that for success knowledge fountains need to emphasise on getting the return on the investment on research.

Failure to build capacity on information utilisation weakens the potential of SADC region. It is evident that SADC universities amass volumes of research output and intellectual properties, which if they were fully utilised could have expanded the industrialisation in the region (AAU, 2012). Information utilisation remains an important aspect in the knowledge-based economy and indeed Massaquoi (2002) emphasises that the most fundamental way of creating a knowledge economy is through dissemination of the information. Information dissemination therefore ought to be a top priority for SADC region since currently there are quite very few higher learning institutions which have clear roadmap on how to disseminate the knowledge they create.

Research partnerships emerge to be the common target of all universities in the SADC region. This is particularly for benefits that Liu and Jiang (2001) attribute UICs. However, while partnerships are developing to be a strong approach to capacitate the universities' research roles, the region may remain underdeveloped and struggles to transform to a knowledge-

based economy if their research output is not mutually beneficial with the industry and the rest of the society. Apparently, as the Triple Helix model proposes, the government is the key controlling stakeholder hence must ensure that there are clear dimensions of interactions that define benefits of UICs (Muscio, 2013). Most SADC universities aim to commercialise their research output merely for revenue generation. This approach is income-oriented and mostly likely to benefit the region in short run terms. In the long-run commercialising research output, must be coupled with the industry partners for they are resource capacitated to put the concepts into practice.

A mere aim by the universities to commercialise their research output has a little impact on creating a knowledge-based economy. Firstly, because the universities in SADC region have limited resource endowment to fully commercialise economic ideas. Secondly, because a university commercialising its economic idea means that the created knowledge revolves in the same institution, which in essence is resource, crippled to fully develop the idea into a realistic product (Peng, 2007). The hand-glove and underutilised relationship ties that the universities have with the industry fails to explore the countries' economic possibilities (*ibid*).

The study further discovered that the SADC universities do a commendable job in consulting with the industry stakeholders when developing their curricula. This, as noted particularly in countries such as South Africa and Botswana where learning programmes' accreditation must be accompanied by the needs assessment report, has helped in enhancing relevance of the study programmes and increase the employability of the graduates (WEF, 2011). However, this does not yield as many benefits as the approach is potential of since the industries are not involved in the subsequent stages of the implementation of those curricula. Apparently the industry's roles is only limited to endorsing the curricula but not involved in the implementation and inputting of the process.

The challenge of limited involvement also challenges the other forms of interactions that take place between the universities and the industry such as the attachment programmes and trainings and workshops (WEF, 2011). The attachment programme does not have an ideal platform that may allow the industry to feed into the academic system, hence only allows the students to learn the industries' norms. Tocan (2012) notes that training and workshops are restricted to specified areas of learning and do not allow the academic system to expand the platform to share their knowledge in other critical areas unless the companies have special interest and can afford to be engaged in those areas.

This is contrary to the premises of National Innovation Systems that advocates for the full involvement and participation of all key stakeholders (Martin, 2000). The study found out that the interactions that take place between the universities and the industries are one way, in which information basically flows only from the universities and little is learnt about the industry by the universities.

Incubations centres represent the most effective ways for UICs. However, this remains a dream target if the centres do not allow the corporate world to play an active role. Most incubation centres reviewed for the purpose of this study concentrate on grooming the leaners on theoretical concepts in the curricula except for medical schools. This limits the effectiveness of their purpose in creating and sharing knowledge. The centres should adequately interface with the corporate world and allow the industry to input their

ideas which the academia must challenge and in turn refine.

## CONCLUSIONS

This study reflects on the role and influence of UICs in creating KBE. The reviewed literature signifies the potent role that UICs play in developing KBE. The universities are charged with the roles of creating and sharing knowledge while partaking with the industry. SADC region is still in the preliminary phase of creating UICs. Main focus of the SADC universities is on improving their research-centre functionality. The theoretical framework of the study confirms the critical role of the UICs in creating KBE, but evidence gathered in this study indicates that SADC universities are yet to play this critical role. It is, however, appreciable that the universities are taking a step towards the right direction even though they still remain challenged to accomplish the task.

The strategic outlook of SADC universities is geared towards creating knowledge, but in isolation of the industry. A few universities aim to model their research paradigm towards solving the national and international problems. This initiative may not be fully effective if the universities and the industry remain isolated in their operations. The available evidence for the strategic planning of universities solidly reflects that the industry and the universities operate two different philosophies. Their philosophies are not reconciled and their operations are yet to reflect that complimentary work can expand the knowledge horizons by a wide margin. This basically reflects that attaining KBEs is still a raw subject in the region.

While regular problems of developing nations continue stumbling progress on this agenda, Ssebuwufu, et al. (2012) identify matters of funding, policy alignment and lack of expectation for fundamental benefits as the major challenges to effectiveness of UICs in developing KBE. It is identified that the governments do not provide for appropriate structural policies and procedural approach to promoting the UICs in SADC. Funding of UICs in SADC is inconsistent and not provided for by the governments. The government structures do not have funding support for UICs. The issue remains the aspect between the universities and the industries, yet they always have financial challenges. This cripples the development and progress of UICs in SADC.

Lack of specific and objective data on what the universities have done so far in forging the UICs challenges effective evaluation of their role in creating KBEs. However, gathered evidence clearly shows that their universities are yet to record successes in this regard. An analytical study to find out what SADC universities are currently doing in creating KBE represents future research direction.

## RECOMMENDATIONS

Based on the conclusions made in this study the following recommendations are made;

a. SADC governments should align the economic policies to promote and facilitate the interaction between the government research bodies, the industry and the universities. The policy alignment is a fundamental prerequisite; it helps to create a cultural paradigm shift. Facilitative policies will build the trust amongst the players because it acts as the point of reference and a governing tool during the interactions and relationships of the participants. The policy alignment should focus on eliminating bureaucracy that cripples the interaction efforts between the universities and the industry.

b. Alternative self-sustainable funding mechanisms must also be sought to

avoid overreliance of universities on government funding. This calls for universities to initiate strategic relationships with the industry that earns them income on long term basis. Such relationships should be founded on grounds mutual benefit and reciprocity.

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