Characterisation of University-Industry Linkages for SMEs in Emerging Economies: A Zimbabwean Perspective

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Abstract

The increasing demand for universities to be more relevant to the society by commercialising their academic knowledge has spurred the relevance of university-industry linkages. While significant literature has been produced in this area, the nature of these linkages in emerging economies, particularly between SMEs and State Universities, remains poorly understood. This study empirically explores the nature of University-Enterprise(U-E) linkage between State Universities and SMEs in the manufacturing sector of Zimbabwe and the factors hindering such collaborative arrangements. The study relied on personal interviews to collect data from five purposively selected industry liaison officers / directors of state universities' industrial parks and innovation hubs and 25 owners/managers of SMEs in the manufacturing sector. The four-step procedure to content analysis was employed and this included decontextualization, recontexualisation, categorisation, and compilation to analyse data. The study found the university-initiated linkage was more formalised and represented the university's way of aligning its curriculum to the demands of the national government and mostly pursued mainly to comply with the government's performance indicators. In contrast to the above, enterprise-initiated collaborative engagements were found to be more opportunistic and formed to solve immediate challenges. Limited trust in government-sponsored programmes and the fear of exposing themselves to regulatory authorities emerged among the main factors hindering SMEs from collaborating with state universities. The study recommends the crafting of a university-industry collaboration policy with incentives to attract SMEs.

Keywords: University-industry collaboration, State universities, work-related learning, Emerging economies, linkages

Introduction

University-industry collaborations (UICs) have spawned a huge literature in recent years. These linkages marry the specialised knowledge from universities and production and market knowledge from industrial actors (Rajalo & Vadi, 2017). Under these collaborative arrangements, the industry is not only a recipient of university innovation and technology but also an active participant in its creation (Giones, 2019). The current study has been motivated by the recent growing interest in university-made innovations by the Zimbabwean government. The authorities of this country widely known for experiencing never-ending economic, political, and social challenges have recently moved and reconfigured the country's Higher and Tertiary education system to enhance its relevance in society. Through the new educational model called Education 5.0 launched in 2009, the Zimbabwean Government demands the Higher education sector not only to teach, research, and serve the community but to also innovate and industrialise the country to enable it to attain a middle-

income economy status by 2030 (Government of Zimabwe, 2018). Higher and tertiary institutions in Zimbabwe have been urged to desist from being degree factories but rather institutions, where homegrown research-based solutions to the country's socio-economic challenges, are churned.

The government has channelled significant investment in State Universities for the development of innovation support infrastructure in the form of innovation hubs and industrial parks to date. The innovation infrastructure now in place at major State universities has shown great potential in promoting knowledge sharing that could transform the economic fortunes of the country. Empirical evidence has however, shown that for the faster transition of discoveries from the lab bench to the marketplace, universities and the industry must interact (Giones, 2019). Collaborative arrangements between the university and the industry have been found to be profitable to every organisation regardless of the size or existence of sector-related and cultural differences (Deschamps et al., 2013). Sadly, the majority of universities however tend to prefer entering into collaborative relationships with large and established companies as opposed to SMEs (Apa et al., 2021; Caloghirou et al., 2001). University-industry linkages involving SMEs, often referred to as university-enterprise linkages (U-E linkages), are less prevalent but in instances where they exist, past research has shown that the quality of such interactions is higher than those of large corporations owing to SMEs' proximity to Universities (Corral de Zubielqui et al., 2015).

SMEs in many countries both developed and developing have emerged as engines of economic growth (European Commission, 2017). This, therefore, underscores the need for their capacitation through fostering linkages with higher learning institutions such as State universities. In emerging economies like Zimbabwe, these enterprises continue to play a significant role in economic growth, poverty eradication, job creation, urban and rural development (Bomani et al., 2015). In the year 2016, SMEs' employees constituted 70% of the Zimbabwean Revenue Authority's taxpayer database. Sadly, Zimbabwe lacks a clear policy for university-industry linkages (Ngwenya, 2018). Moreover, past research on U-E linkages have tended to be biased towards technologically developed nations like the UK, Spain, China, USA among others (Gordon, 2013; Gordon et al., 2012; Gordon & Jack, 2010; Johnston & Huggins, 2017; Luengo-Valderrey et al., 2020; Manville et al., 2019). The bias towards these developed nations is understandable given the general belief that universities in developing nations like those in Africa lack advanced research and innovation to actively engage with firms (Creso, 2015). It has also been argued that even the literature on university-industry linkages in Africa, it comprises largely of grey literature from regional and international organisations (Adegbile et al., 2023).

In this study's context, the researchers explored a unique scenario in an emerging economy, where the generally underfunded State universities have received specific grants and have developed innovation infrastructure to enhance knowledge transfer between the industry and higher learning institutions. The major aim of the study is thus to explore the various ways in which either State universities or SMEs in the manufacturing sector connect to attain joint or individual objectives as well as the factors that hinders such relationships. This will help in bridging the gap in knowledge between universities and SMEs as Pereira & Franco (2022) argued that the majority of SMEs are unaware of the different university programmes that can assist them and the requirements for engaging with the universities.

Theoretical Background

The Triple Helix Model of Innovation.

This study is informed by the Triple Helix Model of innovation by Etzkowitz & Leydesdorff (1995). The model advocates for the strengthening of collaborative relationships between Academia, government, and the industry. According to Leydesdorff (2012) the Triple Helix Model is very effective in understanding the dynamics of innovation since it provides a framework for understanding the main actors, mechanisms for interactions as well as the enabling conditions for interactions in an innovation process at regional, and national or international level. From this model, the UILs exist as the different ways in which the major players in the innovation process interact to improve the success of the innovation process. Similarly, Etzkowitz & Klofsten (2005) argued that collaborative relationships from the perspective of the Triple Helix Model yield effective innovation policies which are an outcome of the interactions of the major three players as opposed to prescriptions from the government. Moreso, Leydesdorff (2012), opined that these collaborative relationships are a way of promoting synergies among the three spheres/helices. The Triple Helix model does not rule out concentrating on two of the three actors by studying, for instance, the university-industry relations (Clark, 1998). The authors in this study argued that through the characterisation of UILs involving SMEs in the manufacturing sector and the State universities in Zimbabwe, policymakers and other stakeholders will widen their scope of consideration in the quest of improving the success of innovation performance of SMEs and also the relevance of universities to the community in line with the Education 5.0. The knowledge of university-industry linkages would not only enhance policies but would also enhance the revenue generation capacities of State universities in Zimbabwe.

Types of University-Enterprise (U-E) Relationships

U-E relationships may come in various forms. A common theme that emerges from a variety of contributors is that these relationships can be formal or informal. Apa et al., (2021) expressed the view that informal U-E relationships are non-contractual in nature where the agents involved have underlying social ties and mutual trust which leads them to mutually beneficial interactions. In contracts to the above, formal U-E relationships are guided by contractual agreements and mostly stimulated by formal university programmes (Apa et al., 2021). Perkmann et al., (2013) focuses on academic engagements which are inter-organisational collaborations that usually involve person-to-person interaction connoting the university and firms. Such forms of engagement include consulting, sponsored research, contract research, patenting, and academic entrepreneurship. Moreover, academic engagements can be through formal or informal activities like providing ad hoc advice and networking with practitioners (Abreu et al., 2009; Perkmann & Walsh, 2007). On specific U-E linkages Apa et al., (2021) provides that SMEs and universities can engage in both personal informal as well as personal informal relationships. Personal informal relationships include individual consultancies, academic spin-offs collegial among others exchanges among others. Personal formalities include student internships, scholarships, use of university of industrial facilities among others. Apart from the above, the authors further argued that U-E relationships may take the form of formal non-targeted and also formal targeted relationships. Formal non-targeted encompassing linkages like funding of university posts, endowed chair and advisory boards, and research grants among others while formal targeted agreements include contract research, patenting and licensing agreements, and joint training programmes among others. Furthermore, D'Este & Patel (2007) opined that university-industry collaboration can take several forms of formalised activities like the creation of joint research

facilities, shared publications, research contracts consultancy agreements, training and secondment of students to industries.

Barriers to University SMEs Collaboration

Collaborative relationships between universities and SMEs are less common not only in developing countries but even in developed countries too (Apa et al., 2021). A myriad of challenges have been noted which continue to hamper efforts by SMEs to engage in fruitful relationships with universities. SMEs lack a scientific approach to problem-solving a feature which makes a majority of these enterprises see no reason to collaborate with universities in their operations (Messeni Petruzzelli & Rotolo, 2015). In most instances, however, universities are reluctant to create relationships with SMEs preferring large corporations (Caloghirou et al., 2001). In fact Han (2017) believes that the major reason why universities prefer large-scale corporations to SMEs is because small enterprises are less likely to patent. It has also been discovered that the Involvement of SMEs in collaborative relationships with universities is greatly hampered by the lack of knowledge among SMEs of different programmes that can assist them and the requirements for accessing them (Pereira & Franco, 2022). Similarly, Luengo-Valderrey et al., (2020) highlighted that SMEs find it very difficult to establish cooperation as they have limited knowledge regarding resources that can be provided by universities and how they can be accessed. Apart from the above factors, Apa et al.,(2021) noted that the lack of formalisation of internal activities by SMEs while it may not impact the initial establishment of UILs , may in the long run impact exploitation of such relationships.

Research methodology

The study relied on personal interviews to collect data from five purposively selected industry liaison officers / directors of state universities' industrial parks and innovation hubs and twenty-five owners/managers of SMEs in the manufacturing sector. The qualification criteria for participation in the study was that the university ought to be state owned with industrial park and innovation while for SMEs were that (1) enterprise ought to be at least five years of existence, (2) enterprise ought to be in the manufacturing of physical products and (3) enterprise ought to fall within the category of the SME definition by Zimbabwe's Ministry of Small to Medium Enterprise and Development Corporation. Following the logic of informational redundancy by Lincoln and Guba (985) as well as the saturation principle, a total of 30 unstructured interviews were conducted and this number exceeds the minimum number recommended in literature (Channell, 2019; Cobern & Adams, 2020; Vasileiou et al., 2018).In conducting the interviews, researchers adopted the doxastic approach by Brinkmann (2022) as this allowed for capturing the shared experiences and opinions of SME owners/managers and those of the industrial liaison offices of the state universities. Researchers employed a multi-case study design based on the cross-sectional survey where data collection were between October and November 2023. Researchers prepared an interview guide which consisted of four sections namely opening questions, transition questions, key questions, and closing questions as recommended by (Castillo-Montoya, 2016). To guarantee reliability, trustworthiness and rigour were employed following the dictates of Lincoln and Guba (1985) to ensure credibility, dependability, transferability, and confirmability as this is the norm in qualitative studies. To analyse data, the four-step procedure to content analysis was employed and this included decontextualization, recontexualisation, categorisation, and compilation (Bengtsson, 2016).

Results and discussion

The Nature of University-Enterprise Linkages

The study revealed that university-enterprise linkages manifest in a wide range of programme of activities. The study revealed that state universities and SME understudy get connected through a variety of programmes of activities including consultancy, internship, tailored SME degree programmes, patent licensing, and joint programme supervision among others, as would be noted in the following sections. Two major broad categories of collaborative relationships emerged based on the actor initiating the relationship. These linkages were grouped into university-initiated relationships and enterprise–initiated relationships. It was also interesting to note that while the linkages emerged in different arrangements, the university-initiated and the enterprise-initiated linkages were quite distinct from each other. The study established that university-initiated linkages were mostly moulded as part of the national innovation systems with the national government being actively involved in both policy and infrastructural development. On the other hand, enterprise-initiated linkages were largely informal and to a large extent meant to solve immediate enterprise problems.

University-Initiated Linkages

The study established that State universities made several deliberate efforts to link with SMEs. One such targeted initiative is through infrastructure support. The study uncovered an interesting development where resource-constrained State universities are playing a fundamental role in alleviating resource challenges of SMEs. State universities in emerging economies such as Zimbabwe have been acknowledged in previous studies (Nyerere & Friso, 2013) as lacking resources to pursue their missions. However, from the sentiments gathered from the study informants, it emerged that while state universities are indeed incapacitated due to a lack of resources, they are playing a pivotal role in nurturing startups through government-donated incubation hubs, Innovation hubs, and Industrial parks. '*…we have received funding from the government as part of its thrust on promoting homegrown solutions to our national problems and we often share these facilities with SMEs in surrounding communities……we have the structures, skills, and capacity to support SMEs to commercialise and even patent their innovation under the auspices of the education 5.0'.* Sentiments of this nature suggest that some university-enterprise linkages are largely supported by the government and are part of a wider national innovation system. It can also be noted that through these linkages, not only are State universities capacitating SMEs but are also helping in the establishment of new ventures. University–enterprise linkages anchored by the government and also part of the wider national innovation systems have been acknowledged in past research (Pereira & Franco, 2022). Previous studies (Nyerere & Friso, 2013) have however queried the capacity of universities in emerging economies like Zimbabwe to attain their missions given their limited funding.

Apart from the above, the study also found that some university-initiated linkages are characterized by some modifications to the university curriculum or some modifications to faculty structures to facilitate effective linkages with SMEs. '*As part of our community engagement initiatives, our department conducts out-reaches aimed at capacitating SMEs with relevant skills…We recently established a Center for Entrepreneurship under the faculty of Business Sciences, and we also have degree programmes at the undergraduate level which major in entrepreneurship.* Innovation support programmes through coaching and imparting

relevant skills were acknowledged in previous studies (Hendri & Tu, 2023; Kurdve et al., 2020).

The need to solve university, national, or other contemporary challenges emerged as another feature that characterizes university-initiated linkages with SMEs. These challenges include brain drain, violation of intellectual property rights as well a shortage of funds for universities' various activities. In this information age characterized by rampant violation of intellectual property, the study established that universities in emerging countries have also established initiatives to curb such violations, especially from entrepreneurs. Through the university Patent offices, the study established that universities have assisted would-be entrepreneurs and established ones to register and protect their innovations. '*We have structures to support SMEs right through the innovation cycle, we help them not only to commercialise their inventions but to protect their intellectual property rights from violation…. In pursuit of our added new missions of industrialisation and innovation, we have patented and licensed some innovation projects from SMEs'*. Participants under study, particularly from the SMEs side, expressed the view that through the protection of their intellectual property rights stood more chance of finally benefiting from their work. Pittayasophon & Intarakumnerd, (2017) however queried the value that patenting can benefit SMEs which are mainly concerned about immediately increasing their competitive advantage.

In an interesting development, the study also established that SMEs have emerged as a 'hunting -ground' for temporary skills by universities to curb rampant brain drain which has become a challenge among State universities as more and more skills leave in search of greener pastures. This view was captured by one of the interview excerpts '*Brain drain has affected the smooth running of the university, we are now relying on outsourcing some of the required skills from these enterprises like the repair and maintenance of our IT infrastructure……some of our employees have left us and have established their enterprises and given us low salary budgets, We have no option but to hire them to cover some short-term demands'*.

In addition to the above, the study also established that state universities through their fundraising committees have formal and informal linkages with SMEs especially those run or owned by members in their Alumni databases. These linkages play a pivotal role in alleviating funding and other resource challenges that characterises most State universities. Informants expressed the views that SMEs play a pivotal role in heading universities' calls for donations to special university events or other general donations to the State universities. Apa et al. (2021) have underscored the role of SME donations as a vital initiative contributing immensely to the continued survival of resource-constrained State universities.

Enterprise-Initiated Relationships

In contrast to the above relationship category, the study also established that SMEs under study in some instances reach out to State universities intending to establish collaborative initiatives. Many of the collaborative relationships are largely aimed at solving immediate problems and a majority are not formalised and are not visible. From sentiments expressed by the informants, it was found out that the enterprise-initiated relationships can start as social relationships that are established by the enterprise owners/ managers with university personnel which can result in knowledge sharing as well as other benefits flowing towards the SMEs. For instance, the study established that some manufacturing enterprises under

study have created direct linkages with academic staff to gain direct access to graduates to fill their vacant posts, more so the study also found that SME owners/managers often reach out to university lecturers for informal consultancy. More so, some SMEs understudy confessed to appointing university staff to their Boards. These views are depicted in the following excerpts: *We have a cordial working relationship with graduate placement offices from local universities to the extent that we have never utilised third parties for all our graduate trainee vacancies and attachment vacancies…I often reach out to my friends in academia for guidance in some areas like our recent strategic planning workshop'.* These findings concur with those by Ankrah & AL-Tabbaa (2015) as well as Nyerere & Friso (2013) who cited student attachment as one of the common traditional methods that bring the industry and the university together. Furthermore, formal and informal consultancies are forms of university-industry linkages (Ankrah & AL-Tabbaa, 2015; Apa et al., 2021).

Hindrances to U-E Linkages

Some study informants, particularly enterprise managers expressed the view that formally collaborating with universities exposes them to regulatory authorities as most of their enterprises are informally operating and evading tax. These views were captured in the following interview excerpts: *I support the idea of collaboration, in many instances however these universities invite tax authorities, local government authorities, and ministry officials to these events, something which at times scares some of our members who are yet to regularize their papers.* Apa et al., (2021) noted that the lack of formalisation of internal activities by SMEs while it may not impact the initial establishment of UILs, may also in the long run impact the exploitation of such relationships.

There was also a growing sense of inferiority among enterprise managers who felt insecure in entering into a relationship with university staff whom they felt to be superior in knowledge. This emerged as one of the major factors hindering U-ELs. The study results showed that the majority of SMEs were reluctant to enter into a collaborative arrangement with universities largely because they felt inadequate compared to university counterparts in areas of knowledge on how to run a business and other best practice in their chosen field. *I got these skills through observing my father, most of our parents did not value formal education which explains why I find it very difficult to interact with those professors from universities… it's more comfortable to collaborate with partners in the same industry and do the same area of business unlike interacting with academics that may even affect current control structures'* Enterprise managers interviewed appeared to be threatened by the idea of associating with university personnel.

The study revealed that normally U-E collaborations are hindered by conflicting expectations between the Universities and SMEs. Enterprise managers expressed the view that normally academic knowledge is not market-ready, yet they need quick and market-ready solutions which help them to have a competitive edge on the market. On the other hand, informants from the university side expressed disappointment with the reluctance of the majority of SMEs in the manufacturing sector to patent their work relative to large corporates.

Our contributions have often been played down because they are said to be too academic and difficult to apply in the industry setup…. While Education 5.0 expects us to embrace the industry, most SMEs are reluctant to patent their innovations yet on us as universities, patenting is a key performance indicator that has a huge bearing on our rankings. Conflict in research goals has emerged in previous studies as a barrier to collaboration between

universities and SMEs (Perkmann et al., 2013). Additionally, (Yee Whah & Ka Tiek, 2013) found that incompatibility between firms and universities hinders cooperation.

Lack of trust emerged as another impediment to university U-Els. The study results showed that some SMEs do not trust bringing their innovations to universities for fear of intellectual property theft and also lack trust in government-initiated programmes. *'I don't feel comfortable in sharing our lab discoveries at these Hubs with a lot of other unknown people……. remember you are to share your ideas in a panel of unknown academics ……unless there is a guarantee, there are a lot of policy inconsistencies in the government… their priorities may shift before completion of these projects.* Trust has been identified as very vital in consolidating university SME cooperation (Gordon et al., 2012; Johnston & Huggins, 2017).

A lack of knowledge regarding opportunities offered by universities emerged as another factor hindering SMEs from collaborating with universities. *Was not aware that this university could assist me in nature and patent innovations……my idea of a university is that of an institution for students after form 6, I had no idea that it can help us to make money out of our ideas and prevent them from being stolen…….I heard of these university innovation hubs and industrial parks at a Political rally, but I have no idea how I can benefit from such infrastructure.* Sentiments of this nature suggest that universities have a huge task of creating awareness of their role in communities, particularly SMEs. The lack of knowledge on how universities can support SMEs has been confirmed in previous studies (Luengo-Valderrey et al., 2020; Pereira & Franco, 2022)

Conclusion and recommendations

The study sought to examine the various linkages between SMEs in the manufacturing sector and State universities to attain their respective missions. Additionally, it sought to find out the factors which are or may hinder such collaborative arrangements. The major observation was that the University linkages varied depending on the actor initiating the collaborative arrangement. State university-initiated linkages manifested in a myriad of programmes and activities including consultancy, internship, tailored SME degree programmes, patent licensing, and joint programme supervision among others. The key feature of these forms of linkages is that they were mostly molded as part of the national innovation systems with the national government being actively involved in both policy and infrastructural development. To State universities, the linkages appeared as a way of aligning themselves with the expectations of the national government and meeting the performance indicators set by their parent Ministry. In contrast to the above, SME-Initiated collaborative arrangement appeared to be molded along the shareholder theory perspective, where the programme of activities was targeted at maximizing the wealth of the owners. The collaborative arrangements were largely informal and aimed at solving immediate SME challenges given the informal nature of SMEs in developing nations, fear of being exposed to regulatory authorities emerged as one of the hindrances for SMEs linking with the Government-owned universities. Additionally, limited trust in government-sponsored programmes also hindered SMEs from collaborating with state universities. The study revealed that constant shifting in priorities away from Higher education needs and policy inconsistencies often exhibited by the government has resulted in SMEs losing faith in government-sponsored programmes.

The study advocates for a shared understanding among the triple helixes players on the mutual benefits that can arise as a result of collaboration. More importantly, engaging in

these collaborative arrangements, especially by State universities, must not be viewed only as a way of simply meeting performance indicators imposed by the government. The authors thus recommend the establishment of U-I linkage policy framework that promotes equal engagement among partners. The relationships must not be heavily influenced by the State and where necessary, overlapping support must be extended to SMEs. More importantly, SMEs need to be acquainted with the universities and the programmes available for their capacitation. These enterprises can start creating networks with academics tasked with the supervision of university students on attachment.

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