

## **INDUSTRY-UNIVERSITY COLLABORATIONS IN EMERGING ECONOMIES: A LEGITIMACY PERSPECTIVE**

### **ABSTRACT**

*The need for universities to increasingly commercialise academic knowledge in addition to the two traditional core missions of research and teaching, has increased the relevance of industry-university collaboration (IUCs). Although research on IUCs has produced a significant body of knowledge explaining different factors that can enable or inhibit the success of IUCs, the nature of IUCs continues to remain poorly understood in emerging economies. The primary purpose of this paper was to extend our cumulative understanding of IUCs and how universities in emerging economies, can successfully make a transition to entrepreneurial universities. We drew upon insights from two streams of literature – legitimacy and industry-university collaboration (IUCs) – to develop an informed understanding of the phenomenon of IUCs and entrepreneurial university emergence in emerging economies of Africa. In particular, we apply the four typologies - personal, consequential, structural, and procedural - of the moral legitimacy perspective to IUCs and entrepreneurial university emergence. We propose how they can yield insights about the antecedents for successful IUCs in Africa emerging economies and the processes that can lead to the emergence of legitimate entrepreneurial universities. In highlighting the paper's contributions to theory and practice, we suggest that just as research on IUCs benefits from applying organisational legitimacy perspective, so is organisational legitimacy informed by research arising within the field of IUCs studies.*

### **MANAGERIAL RELEVANCE STATEMENT**

*The paper extends our understanding of the phenomenon of IUCs and entrepreneurial university emergence in emerging economies. Focussing on the Africa region, we suggest that just as research on IUCs benefits from applying organisational legitimacy perspective, so is organisational legitimacy informed by research arising within the field of IUCs studies. As such, the paper offers solutions to how universities can resolve the hindrance to a successful collaboration with industrial firms and offers guidelines on how universities can become entrepreneurial. In this regard, the paper highlights the need for universities to create a perception of legitimacy across levels – individual, organisation, the environment, and the process - as industry firms will consider them to be more meaningful, more predictable, and more trustworthy, and thus more likely to collaborate with them. In short, legitimacy can provide the means by which IUCs increases and a university becomes entrepreneurial in African emerging economies. This can, in turn, be a powerful engine for open innovation and socio-economic development of African emerging economies.*

## I. INTRODUCTION

The need for universities to increasingly commercialise academic knowledge in addition to the two traditional core missions of research and teaching, has increased the relevance of industry-university collaborations (henceforth, IUCs) [76], [103]. By collaborating with industrial firms, universities gain access to additional funds, particularly for research [120], test the practical applications of their research on real-world problems, foster links with knowledge users and facilitate technology transfer [29]. Not only is the IUCs beneficial for universities but also beneficial for industrial firms. For example, IUCs help industrial firms to gain access to knowledge, expertise and techniques that are not available inhouse. These benefits suggest that IUCs are an important mechanism for generating open innovation and also contribute positively to achieving economic growth in today's knowledge-based societies [107], [120].

Prior research on IUCs has been somewhat limited in its focus. In a recent review, [118] identified factors that can enable or inhibit the success of the IUCs process. According to these authors, IUCs success factors can be studied from four distinct categories. The first is the institutional factors, which refer to the participating institutions. The second is the relationship factors, which refer to the linking between those partners. The third is the output factors relating to the desired results of the collaboration. Finally, the fourth is the framework factors referring to environmental aspects. Although research in each of these categories has produced a significant body of knowledge explaining different factors that can enable or inhibit the success of IUCs, the nature of IUCs continues to remain poorly understood in emerging economies. Thus, [84] and [119] have noted that current studies on IUCs in emerging economies, especially in Africa mostly consist of grey literature in the form of reports and conference publications of various national, regional and international organisations, e.g. [1], [78], [139]. Even in the existing literature, studies on IUCs have mainly focused on technologically developed countries, e.g. [47], [101]. Because these linkages usually involve sophisticated research and innovation, universities in emerging

economies, and Africa in particular, are thought to lack the ability to engage more actively with firms [84], [119].

An important motive for universities to link with industrial firms are informed by benefits, such as fostering the commercialisation of research outcomes and technology transfer [72]. This motive underscores what has come to be known as ‘entrepreneurial university’ – a university that is able to translate research results into intellectual property and economic activity [29]. Most universities, especially in the developed world, in their effort to become an entrepreneurial university, shift their research interests and emphasis away from a sole focus on developing knowledge to a dual focus on advancing knowledge and their commercialisation [30]. The Entrepreneurial university has therefore become an especially propitious site for the commercialisation of academic knowledge and technology transfer due to its basic features as a natural incubator, providing a support structure for academics to initiate new ventures through collaborations with industrial firms. In this regard, IUCs can provide a means for universities to become entrepreneurial. While most of the successful commercialisation of academic knowledge has focused on developed countries, little is known about how universities in emerging economies of Africa can successfully commercialise academic knowledge and become entrepreneurial. This gap is worth investigating because of the poorly funded state of most universities, especially in emerging economies of Africa and commercialisation can be a prime example for generating funding.

The primary purpose of this paper is to extend our cumulative understanding of IUCs and how universities in emerging economies, can successfully make a transition to entrepreneurial universities (a process called “entrepreneurial university emergence”). Given the importance of IUCs in emerging economies as well as the current difficulties associated with respect to its adequate understanding, we believe that knowledge about IUCs and entrepreneurial universities emergence stands to gain substantially if researchers import appropriate frameworks, perspectives, and theoretical paradigms from allied fields to suitably inform and enhance their overall

understanding of the phenomenon. In this regard, we seek to understand IUCs and entrepreneurial university emergence in emerging economies of Africa by adopting a ‘legitimacy’ perspective – defined as “a generalised perception or assumption that the actions of an entity are socially desirable, proper or appropriate within some socially constructed system of norms, value, beliefs and definitions” [97, p. 574]. We believe that the absence or lack of legitimacy can be a great hindrance to universities successful collaboration with industrial firms and entrepreneurial university emergence. [119] found that the factors that facilitate or inhibit stronger IUCs emerge from the cultural divide between both sectors, which generates a lack of confidence on the part of an industry on universities as potential partners. This seems to suggest that successful IUCs and entrepreneurial university emergence in African emerging economies are intricately connected to legitimacy. To develop our arguments, we draw upon insights from [134] – personal, consequential, structural, and procedural – typologies of moral legitimacy and [40] (individual, the organisation, the environment and the process) organisational emergence. By doing so, we indicate how each of the four typologies of moral legitimacy and four dimensions of organisation emergence yields insights about the antecedents for successful IUCs in Africa emerging economies and the processes that can lead to the emergence of legitimate entrepreneurial universities. The foremost strength of our approach is that it adopts a legitimacy perspective to IUCs in Africa and organisational emergence perspective to an entrepreneurial university emergence. Within the context of IUCs, it recognises that creating a perception of legitimacy is important in that universities will be considered by the industry to be more meaningful, more predictable, and more trustworthy [134]. We argue that when a university gains legitimacy, it should find it easier to attract and collaborate with industrial firms successfully. In short, legitimacy can provide the means by which IUCs increases and a university becomes entrepreneurial in African emerging economies. Therefore, in using the legitimacy perspective as a theoretical lens, we are able to understand IUCs and how legitimacy can contribute to entrepreneurial university emergence in African emerging economies.

Our conceptual paper contributes and responds to the call by IUCs researchers to identify specific antecedents that contribute to a university's legitimacy and in turn its ability to successfully collaborate with industry [20], [108], [109] and to incorporate context into our understanding [71], [102]. Insights from legitimacy and organisational emergence help us to develop a broader, “understanding” of IUCs and entrepreneurial university emergence in emerging economies. We contend that even though research on IUCs in African emerging economies remains somewhat underdeveloped, a wealth of insight about it may be obtained from the related field of legitimacy. At the same time, legitimacy as a field of research stands to gain immeasurably provided that they give cognisance to some of the dynamic aspects of IUCs recorded in the literature. We, therefore, take our analysis further by attempting to build a bridge between IUCs and legitimacy in this paper by indicating how research insights from one field can suitably enhance our understanding about the other. Overall, our paper bears on one of the main themes of this special issue: Is there a particular nature of industry-university collaboration in emerging economies? What are the challenges of creating entrepreneurial universities in the context of emerging economies?

Our paper is structured as follows: We begin with a brief review of the literature on IUCs. This discussion allows us to summarise insights and indicate where research on this subject provides hints as to how a legitimacy - focused approach to the subject might be developed. Next, we introduce the concept of legitimacy and relate theoretical arguments about legitimacy to the success of IUCs in Africa and entrepreneurial university emergence process. Having established this background, we then use the legitimacy perspective to study IUCs, thus developing conceptual insights for its many attributes noted in the African emerging economies context. This section of the paper enables us to develop several propositions elaborating the nature of the phenomenon, essentially treating it as a series of antecedents that facilitate IUCs in African emerging economies. Finally, the last section of the paper provides a discussion of the lessons learnt, in terms of the paper's contribution to theory building on IUCs and the field of legitimacy, as well as an additional contribution to managerial practice.

## **II. REVIEW OF LITERATURE ON INDUSTRY-UNIVERSITY COLLABORATIONS AND ENTREPRENEURIAL UNIVERSITY**

The literature on IUCs and the entrepreneurial university is vast and has been reviewed in details elsewhere see [77], [118], [130], [131]. The discussion that follows is intended simply to indicate where research on this subject provides hints as to how a legitimacy - focused approach to the subject might be developed within the context of emerging economies.

First, the literature has highlighted the different forms of IUCs ranging from traditional forms of engagement such as internships, and publications of results to more holistic forms of engagement such as Joint Industry Projects (JIP) and research consultancies. In particular, [120] note that IUCs usually encompass four major interrelated components: research support, cooperative research, knowledge transfer, and technology transfer. Similarly, [103] indicate that IUCs is varied and includes collaborative research, contract research, consulting and other forms of knowledge exchange [22]. All these different forms of collaboration point to the fact that universities can serve the various facets of the industry depending on the magnitude of the business involved. The involvement can range from small and medium enterprises (SME) or consultants/turnkey contractors who leverage on the universities' capabilities and facilities in design and execution [22]. Industrial firms, on the other hand, may leverage universities to provide talent pools in operational optimisation while the university can stand to gain tremendously in terms of sharing and strengthening of networking ties [100], [86].

Second, another area of research focus on IUCs is the motives for collaboration. The motives for IUCs perhaps is that individual academic in the universities collaborate for purely financial - e.g. the academic may work for a fee - or non-financial benefits - e.g. access to technology, knowledge and materials or data for academic research projects [6], [9], [100]. Also, individual academics in the university can collaborate with industrial firms to pursue goals that are broader such as offering expertise to provide new ideas on application-oriented issues, solve

problems and develop new products and processes. To corroborate this, research has shown that up to 10 per cent of new products or processes are based on the contribution of academic research [10]. As such, [118] note that universities collaboration with industrial firms has become an inevitable part of university funding and the funds from international organisations and business enterprises for R&D in the higher education sector nowadays represent a ‘significant source’ in many countries [96], [118]. Additionally, industrial firms can benefit from highly qualified human resources such as researchers or students [90].

Third, several scholars have studied the benefits of IUCs, most of which coalesces around the benefits gained by both universities and industrial firms. For example, [72], note that IUCs has provided a significant platform for universities to transfer technology, rejuvenate research and improve the curriculum on top of eventually possibly being a prime avenue for the sustainability of the research faculties. On the industry front, benefits can be derived primarily in the form of business/economic development, market impact, human capital development and even political leveraging [72]. The literature also pointed to the fact that IUCs has also expanded the relevance of research carried out in public institutions, foster the commercialisation of public R&D outcomes, and increase the mobility of labour between public and private sectors [46], [69].

Fourth, the literature on IUCs also offer important insights into the success factors for the implementation of IUCs - see [118] for a more comprehensive review. The literature identified factors such as resources e.g. [17], communication e.g. [20], [52], commitment e.g. [5], [7], trust e.g. [9], [11], culture e.g. [49], geographical distance e.g. [22], [90], [38], support e.g. [31], [54], [141], social capital e.g. [5], [133], quality [32], knowledge and technology transfer e.g. [105], university spinoff e.g. [33], [103]. These studies produce consistent findings on the need to ensure a successful implementation and management of IUCs to realize the advantages on both the university and industrial firms.

The link between the antecedents of IUC and entrepreneurial university emergence has also been clearly defined in the literature. From the entrepreneurial university perspective, the

literature attempts to address the antecedents and consequences of entrepreneurial universities and their associated determinants. In this regard, the literature focuses on explaining the roles of the university as a catalyst for regional economic and societal development via exploration and exploitation of entrepreneurial opportunities [15], [19], [45]. This stream of literature also focuses on understanding the nature and key activities of an entrepreneurial university, especially after the inclusion of the *third mission*, to engage in research commercialisation, besides education and research activities [37]. The Entrepreneurial university has now become an especially propitious site for commercialisation of academic knowledge and technology transfer due to its basic features as a natural incubator, providing a support structure for academics to initiate new ventures through collaborations with industrial firms [29], [30]. In this regard, IUCs can provide a means for universities to become entrepreneurial [16]. For example, [126] point to the need for entrepreneurial universities to prioritise the following goals: development of entrepreneurial competencies by attracting and educating human capital, engagement in technology transfer and innovation as well as engagement in social and regional developments. To achieve these goals, [106], [131] note that entrepreneurial universities need to undertake a list of activities, such as research, patenting/licensing, consulting, creation of technology parks, education, contract research activities, industry training, and grant application

Considering the literature on IUCs and entrepreneurial universities in Africa, research has coalesced around the drivers of, and conditions for IUCs. Some studies address the surrounding structural conditions, including science, technology and innovation policies [3], [58], [59], [70], [91] and indicators [79], [80], [98]. Some studies also examine the conditions, drivers and capabilities of universities to engage in IUCs [21], [61], [62]. Some studies address how the characteristics of academics shape IUCs [41], [42], [81]. Some papers have also examined the modes and patterns of interaction between universities and firms [64], [65], [66], [67], [68], [144], and outcomes of interaction [63], [142]. Overall, these studies show that scholars focus on the



internal capabilities of universities and firms in enabling them to foster IUCs and then become entrepreneurial.

In sum, the literature has produced a significant body of knowledge explaining the forms, motives, benefits, and success factors in the IUCs process as well as antecedents and consequences of an entrepreneurial university. However, the literature tends to focus on technologically developed countries (mostly, North American and European countries). It has not systematically developed a strong theoretical foundation for IUCs in other geographical contexts [102]. In a recent review, [150] note that there is still underrepresentation of IUCs in Africa in the global literature. Majority of studies on IUCs in Africa often focus on very few countries where South Africa happens to be the largest researched African country [150]. We note that authors mention this gap in their research articles, but apparently, research is still limited [150]. For example, [84] and [150] note that factors that enable the successful implementation and management of IUCs in emerging economies such as Africa are still under-researched and deserves further examination. Moreover, [131] note that studies that address the processes associated with the development of strategies, structures, and culture that lead to entrepreneurial university emergence are still minimal. Based on the foregoing, we focus on emerging economies, and Africa in particular, and draw on the literature on organisational legitimacy to examine the antecedent factors that are likely to give rise to successful IUCs and entrepreneurial university emergence.

### **III. UNDERSTANDING INDUSTRY-UNIVERSITY COLLABORATIONS IN AFRICA EMERGING ECONOMIES: DOES LEGITIMACY MATTER?**

In this section, we attempt to identify and examine the antecedents of IUCs in emerging economies with a focus on universities. This is because universities are thought to lack the ability to engage more actively with firms [84], [119]. To understand the antecedent factors, we adopt a legitimacy perspective because legitimacy has been suggested to be a great hindrance to universities successful collaboration with industrial firms. For example, [119] found that the

factors that facilitate or inhibit stronger IUCs emerge from the cultural divide between both sectors which generates a lack of confidence on the part of industrial firms on universities as potential partners. This seems to suggest that successful IUCs in African emerging economies is intricately connected to legitimacy. To facilitate such a research agenda, first, we put Africa and its countries into an institutional perspective to justify the geographical delimitation of the pertinence of our proposed legitimacy-building model to strengthen IUCs in African emerging economies. Second, we draw on research in legitimacy to underscore the role of legitimacy in IUCs in emerging economies of Africa. Our goal is to set the stage for our theoretical arguments and propositions that follow.

#### A. *Africa Emerging Economies in Perspective*

When it comes to classifying emerging economies, scholars have proposed a broad array of classification such as GDP, infrastructure, levels of income, quality of financial systems, etc. However, there is still a lack of consensus concerning different aspects of emerging economies contexts [94]. [53] note that emerging economies are not homogeneous, even within the same geographic region. They note that Latin America, East Asia, Africa/Middle East, and Central and Eastern Europe, taken as four groups, have manifestly different starting points, but even within these regions/countries differ markedly.

[53] define emerging economies as countries experiencing rapid economic development that is stimulated by transitioning institutional policies favouring and supporting private enterprise. This definition reflects the pervasive role of institutions in stimulating high economic growth in emerging economies. Institutions refer to “the humanly devised constraints that shape human interaction” [95, p. 3]. Formal institutions refer to economic, legal, and political constraints that define legitimacy within regulations, laws and supporting apparatuses. Informal institutions refer to what is legitimate or socially desirable within the system of rules, norms, values, and beliefs [134]. The extent to which formal and informal institutions are aligned to increases the stability of the overall economic system. However, weak institutions have been the norm in many emerging

economies. The weak institutions have been brought forth as causes of slow economic growth in emerging economies such as Africa.

Africa is a diverse continent with distinct historical evolution and different levels of institutions. The weak institutions in emerging economies such as Africa have significant implications for developing an environment that can facilitate successful IUCs [118]. The environment in which the collaboration is to take place affects the dynamics of IUCs Africa emerging economies. For example, the lack of regional support structures [127] can have a negative impact on collaboration. Research has shown that good institutions (e.g. governmental support) are often necessary to establish a collaboration between universities and industrial firms, e.g., [23], [24], [89], [123]. As such, successful IUCs are marked by interdependencies between IUCs and institutions, which affect other characteristics, such as the nature and structure of IUCs, the degree of IUCs, and the perceptions of universities and industries in IUCs. Hence, we would expect that IUCs will be less constrained in African countries with stronger institutions that have led to high growth in the economy. Indeed, a strong institution is a critical determinant of IUCs as it tends to establish how universities may legitimately facilitate IUCs [49], [115].

To allow for a more fine-grained distinction of the heterogeneity of institutions in African emerging economies, we adopted [140] identification of 28 strong-growth African countries achieving a growth rate of 4% or higher and considered them as African emerging economies.<sup>1</sup> Toh's classification of African emerging economies is similar to those [112] considered as emerging economies, except Senegal. Toh posits that this growth is linked with improved economic fundamentals and sound policies and institutions rather than just the luck of favourable commodity prices and more international aid. Thus, we define African emerging economies as African countries experiencing rapid economic development that is stimulated by strong

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<sup>1</sup> There is one exception. South Africa, with a growth rate of 3.2%, is added to the group of emerging economies because it has already been universally considered an emerging market economy.

institutional policies favouring and supporting private enterprise. We consider the following countries as African emerging economies - Angola, Benin, Botswana, Burkina Faso, Cabo Verde, Chad, Congo, Ethiopia, Equatorial Guinea, Ghana, Kenya, Lesotho, Liberia, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sierra Leone, Sudan, Tanzania, Uganda, Zambia. This classification is suitable for this paper because it groups countries with comparable economic fundamentals and sound policies and institutions [53], [94].

### B. *The Legitimacy Perspective*

[134] defines *legitimacy* as “a generalised perception or assumption that the actions of an entity are socially desirable, proper or appropriate within some socially constructed system of norms, value, beliefs and definitions” (p. 574). According to [153], the environment is comprised of universal understandings and expectations of appropriate organisational form. These understandings are generally taken for granted as connoting legitimacy, a social judgment of acceptance, appropriateness, and desirability [28]. As such, early works on organisational legitimacy, indicate that those organisations that best conformed to such understandings would be deemed legitimate by association [28], [124], [82].

Moral legitimacy offers value to explain the antecedents of IUCs and the emergence of entrepreneurial universities in Africa. Moral legitimacy refers to legitimacy that is normative and based on an evaluation of whether an activity of a focal organisation is the proper one (relative to external norms) rather than whether it specifically benefits those who are making the evaluation [4], [99], [134]. Within the context of IUCs, moral legitimacy refers to a generalised perception or assumption that universities activities are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions. In recent years, emerging economic nations, and in particular Africa, have experienced limited collaboration between universities and industrial firms. We stated earlier that one crucial factor that contributes to this emerges from the cultural divide between both sectors, which generates a lack of confidence in universities as potential partners. The cultural divide indicates that universities in Africa have insufficient ability

to collaborate with industrial firms since they are not conceived as reservoirs of codified knowledge and expertise to be tapped by industrial firms [46], [113], [119]. If industrial firms do not trust and perceive universities in Africa as reservoirs of codified knowledge and expertise and their lack of collaboration with universities has become dominant, then it follows that universities need to gain legitimacy by changing this perception. Thus, the moral legitimacy of universities in Africa can be understood because of the consonance between universities and the perception of universities as non-reservoirs of codified knowledge and expertise, an ideology that has become dominant among the broader industrial firms.

[139] identify four typology of moral legitimacy – personal, consequential, structural, and procedural. We use Suchman’s typology of moral legitimacy suggesting explanations and implications for successful IUCs and the emergence of entrepreneurial universities. Thus, we argue that universities are likely to obtain legitimacy via these approaches. In particular, we argue that, for industrial firms to collaborate with universities and for entrepreneurial universities to emerge in Africa, universities may need to rely on some combination of characteristics deemed by the industrial firms as typical of a morally legitimate organisation and or behaviour that adhere to or change the expectations of legitimate organisations in the eyes of industrial firms. The next section will develop the relevance of this typology of legitimacy to the success of IUC and the emergence of entrepreneurial universities in emerging economies of Africa.

### C. *Legitimacy, IUCs and Entrepreneurial University Emergence*

In this section, we demonstrate that the use of the moral legitimacy perspective as an analytical lens and relate theoretical arguments about legitimacy to IUCs and entrepreneurial university emergence process. Here, we argue that since moral legitimacy is a perception held by an organisation’s external audience, legitimacy will be inferred on universities through the actions of industrial firms [152]. For example, [99] suggests that legitimacy can be assessed by the existence of economic transactions between organisations. Following this logic, we focus on

personal, consequential, structural, and procedural, that can be derived from a university's most immediate audiences (herein industrial firms) and can be inferred by their engagement in voluntary resource/knowledge exchanges with them [139].

Given this conceptualisation of legitimacy, how might IUCs in emerging economies be successful by way of a personal, consequential, structural, and procedural? And how does legitimacy for IUCs relate to entrepreneurial university emergence? To address the first question, we argue that to identify the characteristics and behaviours that may confer moral legitimacy to universities, we focus on the four dimensions of organisations as outlined by [40]: the individual, the organisation, the environment, and the process. We follow [40] to argue that it is not possible to understand IUCs unless all of these dimensions are analysed. Thus, it is through these dimensions that we will attempt to address how universities might be perceived as legitimate in their quest to foster collaboration with industrial firms. To address the second question, we argue that while legitimacy represents the means to foster collaboration between industrial firms and universities, entrepreneurial university emergence may occur via university entrepreneurship, that is the focus of a university with the objective to commercially exploit a research outcome or patent for financial gains [56], [128]. Thus, we argue that there are important links and overlaps between both types of activity. In fact, entrepreneurial university emergence is often an outcome or follow-on activity, whether intended or unintended, of legitimacy. Gaining legitimacy to collaborate with industrial firms on various projects may provide universities with insights into what ideas may be commercially valuable, and hence the opportunity to develop or co-develop inventions that can be patented, licensed or enable a university start-up. In other words, the legitimacy for IUCs often precedes entrepreneurial university emergence in time and can hence be regarded as an input factor to the latter.

*1) Personal legitimacy and the Individual Academic Researcher:* The moral legitimacy perspective recognises that a critical part of IUCs occurs when academics develop insights based on their characteristics in ascribing legitimacy to universities. In other words, personal legitimacy,

which is the first type of moral legitimacy rests on the charisma of individuals within an organisation. In this regard, we argue that for industrial firms to collaborate with individual academic researchers, they need to exhibit some form of personal legitimacy. The literature offers numerous assertions that individual within an organisation can play a substantial role in disrupting old institutions [146], and in initiating new ones [27]. For example, whether valid or not, the perception that charismatic individual academics can transcend and reorder established ways of collaboration with industrial firms can foster IUCs and allow entrepreneurial universities to emerge.

Two conditions with regards to charisma must be satisfied for industrial firms to collaborate with an academic researcher; first, that the academic researcher has the skills and abilities to accomplish the organising task and, second, that the academic researcher is trustworthy [49], [11]. Recent findings in the organisation studies literature suggest that one such way in which industrial firms evaluate legitimacy in this sense is via the individual's personal characteristics [41], [42], [81]. For example, research has shown that individual academics' scientific productivity is generally positively related to engagement with industrial firms [10]. In addition, some studies have also shown that individual academic researchers' ability to mobilise resources for their research is also positively linked to collaboration with industrial firms [12], [73]. Also, [90] and [119], note that an individual's characteristics, such as PhD training and qualifications, and expertise, were significantly correlated with the likelihood of IUCs in Africa. Thus, we contend that a similar trend exists for universities in Africa; that is, the legitimacy conferred by industrial firms will be at least in part a function of the individual academic's abilities and skills to be productive [25], [116], [145], [148].

Furthermore, many authors note that trust is an important factor in fostering collaboration between industry and universities, e.g., [7], [118]. [9] find in their study that maintaining personal contacts at the beginning of a new partnership and the leadership in IUCs can set an example and send positive signals for building trust. Past experiences in working together, historical

experiences in collaborating, or undertaking smaller projects in order to maintain personal contacts at the beginning of a new partnership have been known in the literature to facilitate trust [9]. [49] find that creating strong ties with industrial firms can help build trust and foster IUCs. Similarly, [88] in their study of IUCs in Ghana find that individual academics characteristics such as trust, and communication help foster collaboration with industrial firms.

Thus, it seems that moral legitimacy ascribed to universities by industrial firms are to some degree attributable to the individual academic's characteristics [11]. This legitimacy is likely increased by the factors outlined above because industrial firms view these attributes as beneficial in overcoming non-anticipated problems and or capitalising on new opportunities during the IUCs process and beyond [39]. Therefore, those individual academics that conform to the institutionalised expectations of industrial firms regarding what level of trust, skills and abilities is legitimate will likely be successful in collaborating with industrial firms and thus leading to the emergence of entrepreneurial universities.

***Proposition 1a:*** *Trust, skills and abilities are associated with personal legitimacy*

***Proposition 1b:*** *Personal legitimacy of individual academics can foster IUCs in emerging economies of Africa*

***Proposition 1c:*** *Entrepreneurial universities emergence is strongly associated with personal legitimacy of individual academics.*

2) *The Organisation and Consequential Legitimacy:* Here, we argue that while individual-level attributes are important in the legitimisation process, they are not sufficient. Because most universities are comprised of multiple individuals, organisational-level characteristics also play an important role in its perceived legitimacy [74]. Concerning IUCs, we contend that one-way universities in Africa can demonstrate desirability is by having legitimacy consequentially. Consequential legitimacy refers to when an organisation is judged by what they accomplish or can accomplish [83], [134]. As such, we argue that universities need to provide evidence of their



objectives in terms of research, competence in terms of knowledge and technology transfer, human resource development, and management team's credentials for industrial firms to perceive them as legitimate [15], [37], [44], [57]. Thus, the charter of universities should centre on outputs that can be seen by industrial firms.

Indeed, there is a growing body of empirical evidence that the composition of universities output is an important legitimating characteristic upon which a university might rely in order to conform to expectations of industrial firms. [119] find in their study of IUCs that a clear objective in terms of scientific productivity has a positive and significant impact on IUCs. Scientific productivity such as publications in the form of scientific literature, scientific texts, prototypes and patents that focus on solving industry problems (e.g. designing a new and innovative product) can help universities gain legitimacy from industrial firms. In support, [114] note that when universities signal their orientation towards the industrial environment by providing solutions and innovative ideas that can be utilised by industrial firms, industrial firms are more willing to collaborate with them. [105] and [51], find that when universities have experience of effective transfer of knowledge and technology, industrial firms will collaborate with them. An intense transfer can help universities gain legitimacy from industrial firms [18], [33], [103]. [6], [44] find that IUCs success was positively correlated with the top management team's education and experience. [43] provide evidence that industrial firms often consider the characteristics of university management when collaborating with universities.

In summary, it seems that a university legitimacy may be at least in part determined by the collective ability of its management team, or its organisational capital. To engage successfully in exchanges with industrial firms, universities in Africa may need to possess management teams with significant educational and professional experience [50]. Without conforming to these institutionalised expectations, a university may find it difficult to get industrial firms to collaborate with them and become entrepreneurial.

***Proposition 2a:*** *Outputs in terms of scientific research, knowledge and technology transfer, and management team's credentials are associated with consequential legitimacy*

***Proposition 2b:*** *Consequential legitimacy of universities can foster IUCs in emerging economies of Africa*

***Proposition 2c:*** *Entrepreneurial universities emergence is strongly associated with their consequential legitimacy.*

3) *The University Environment and Structural Legitimacy:* The context in which IUCs emerge is an important consideration because studies have long established that environment can also have an impact on IUCs [12], [26], [103]. Here we argue that environmental characteristics also play an important role in universities perceived legitimacy by industrial firms [136]. In this regard, we contend that one-way universities in Africa can demonstrate desirability is by having structural legitimacy. Structural legitimacy which is the third type of moral legitimacy refers to when industrial firms see the university as valuable and worthy of support because its structural characteristics locate it within a morally favoured taxonomic category [125]. The structural characteristics could include indicators that a university's socially constructed capacity to identify the market potential and or commercialise research outcomes [124], [125]. [83] assert that institutionally prescribed structures convey the message that an organisation "is acting on collectively valued purposes in a proper and adequate manner." (p. 50)

In this regard, we argue that universities need to have structural legitimacy which focuses on the general university features that arise when entire systems of activity recur consistently over time (e.g., "Does the university have a research institute or centre; can they commercialise research outcomes?). As [134] suggested, structural characteristics can become markers of organisational form, locating the organisation within a larger institutional ecology and thereby determining from whom it will draw support cf. [135]. As such, we contend that a structurally legitimate university can become a repository of industrial firms' confidence because it is "the right organisation for the

job". Universities, for example, can demonstrate that they are "right for the job" by displaying the structural traits of a "modern R&D centre", showing the market potential and commercialisation of research results [6], [9], [71]. This sense of rightness has more to do with symbols of organisational identity than with demonstrations of organisational competence.

To be perceived as legitimate, a university must convince industrial firms that it has identified a market potential of the research result or innovation [18], [149]. In other words, by identifying the market potential of their research result or innovation product, a university may signal to industrial firms that there is an opportunity for the new innovative products to compete successfully in the existing market [13], [46]. Thus, universities may induce potential industrial firms to collaborate with them by merely conveying to them that the characteristics of the university environment are one that fosters the commercialisation of research outcomes, which conform to those that would be expected of an entrepreneurial university by industrial firms [2], [51]. Therefore, we suggest that:

***Proposition 3a:*** *A university's ability to identify the market potential and or commercialise research outcomes is associated with structural legitimacy*

***Proposition 3b:*** *Structural legitimacy of universities can foster IUCs in emerging economies of Africa*

***Proposition 3c:*** *Entrepreneurial universities emergence is strongly associated with their structural legitimacy.*

4) *The Process and Procedural Legitimacy:* Here, we argue that universities can also garner procedural legitimacy by embracing socially accepted techniques and procedures [125]. Procedural legitimacy focuses on routines that can be viewed in isolation (e.g., "Does the university engage in active research?). In particular, procedural legitimacy becomes most significant in the absence of clear outcome measures [124], when "sound practices" may serve to

demonstrate that the organisation is making a reasonable- faith effort to achieve valued, albeit invisible, ends. We see this as reflecting some certain behaviours in entrepreneurial universities that want industrial firms to collaborate with them. Thus, we argue that behaviour can enable the acquisition of legitimacy to the extent that it increases a university's actual or perceived compliance to institutionalised expectations from industrial firms [48], [104].

Universities may strategically attain legitimacy by engaging in at least two types of behaviour. First, universities may acquire legitimacy by engaging in “acting-as-if” behaviour, or behaviour that makes the university seem more like a full research-oriented university that has earned a reputation collaborating with industrial firms. Because the idea of what constitutes a research-oriented university is socially constructed [111], university management can make an effort in such ways that their universities look to industrial firms as if they are entrepreneurial when in fact they may not be. We follow [22] and [128] to note that the engagement in these types of activities, to which they refer as “legitimising behaviours”, will significantly increase the likelihood that industrial firms will collaborate with them. Such legitimising behaviour could include outputs that are more tangible to industrial firms, such as filing patent application [22], going for industry fairs, presenting at conferences, scientific research [67], [139], [143], [151]. Universities may succeed in convincing industrial firms that they are legitimate, in that they are research-oriented and providing seed funding for research and commercialisation which is what industrial firms are looking for to collaborate [134], [137]. The result of these “impression management” tactics is that industrial firms will perceive those universities that engage in such behaviour to be more legitimate and willing to collaborate with them [122].

Second, we argue that universities need to have networking behaviour which can help them in the attainment of legitimacy because it enables universities to actually manipulate the perceptions held by industrial firms [104]. Indeed, [20] suggest that engagement in multi-dimensional exchange relationships with industrial firms is often necessary for IUCs. This argument has gained empirical support recently as [36] and [87] have found that networking with

potential industrial firms, such as informal meetings, engaging the public in setting out research agenda, and by asking for funds for R&D signal potential for collaboration [96], [117], [144], [151]. Therefore, we contend that, to the extent that university management interacts with industrial firms, they may increase their opportunities to convince industrial firms that the university is legitimate and subsequently collaborate with them. Therefore, we suggest that:

***Proposition 4a:***        *Networking and ‘acting-as-if’ behaviour are associated with procedural legitimacy*

***Proposition 4b:***        *Procedural legitimacy of universities can foster IUCs in emerging economies of Africa*

***Proposition 4c:***        *Entrepreneurial universities emergence is strongly associated with their procedural legitimacy.*

#### IV. DISCUSSION

At the outset of this paper, we had noted that prior research on IUCs on African emerging economies has been somewhat limited in its focus. Given the importance of IUCs in emerging economies as well as the current difficulties associated with respect to its adequate understanding, we believe that knowledge about IUCs stand to gain substantially if researchers import appropriate frameworks and theoretical paradigms from allied fields to suitably inform and enhance their overall understanding of the phenomenon. In this paper, we have suggested that the legitimacy perspective offers a useful way in understanding the antecedents to the success of IUCs and the emergence of entrepreneurial universities in African emerging economies. The application of the legitimacy perspective to the IUCs and the emergence of entrepreneurial university have also allowed us to perform a “levels- of-analysis” of the phenomenon and to draw its links to what is noticed in practice. By treating IUCs as a legitimate process that involves the personal, consequential, structural, and procedural legitimacy at multiple levels (e.g., individual, the organisation, the environment and the process), we believe that we have been able to provide a

richer theoretical exposition on IUCs and entrepreneurial university emergence in emerging economies of Africa.

We contribute to the literature in the following ways. First, we contribute to the IUCs literature by identifying specific antecedents associated to a university legitimacy and in turn the willingness for industrial firms to successfully collaborate with them [20], [108], [109], [118]. We show that the moral legitimacy perspective can offer insightful explanations into the success of IUCs and how entrepreneurial university emergence can occur in African emerging economies. IUCs and the emergence of entrepreneurial universities in African emerging economies is rooted in the characteristics and behaviours that may confer legitimacy to universities (across the four dimensions of organisations). The moral legitimacy perspective takes the four dimensions of organisations as being important. In this regard, IUCs and entrepreneurial university emergence have an element of legitimacy associated with it – in being able to create a perception of legitimacy to successfully attract and collaborate with industrial firms successfully. Essentially, the four typologies of moral legitimacy provide a way for universities to gain legitimacy in individual academic, the university organisation, the environment and the process. It thus incorporates within itself a dynamic interplay of legitimacy across these different levels of a university organisation. [153], suggest that an organisational environment is comprised of universal understandings and expectations of appropriate organisational form. These understandings are known to connote legitimacy, a social judgment of acceptance, appropriateness, and desirability [28]. To identify the characteristics and behaviours that may confer legitimacy to universities, the four typologies of moral legitimacy offer useful insights and allows us to recognise the many nuances of successful IUCs in African emerging economies and enable us to provide a more compelling explanation of the phenomenon that had not been possible in prior research.

Second, much of the existing literature on success factors for IUCs have been overly concerned at the level of individual academic departments rather than the level of a school or the entire university [118]. In a recent review of IUCs literature, [118] noted the need to identify

specific factors that can contribute to the success of IUCs at different organisation levels. This is where the application of the four typologies of moral legitimacy provides us with an improved understanding of how successful IUCs transcend the individual academic department to other different organisational levels of the university. In this regard, the typology of moral legitimacy - personal, consequential, structural, and procedural – allows us to explain how universities can gain legitimacy at the organisation, environment and process levels in addition to the individual level. Thus, moral legitimacy provides us with an expanded conceptualisation of IUCs in African emerging economies. It suggests that the development of university legitimacy encompass and depend upon the different organisational dimensions’ synergies. We believe that for industrial firms to collaborate with universities in Africa, universities need to gain legitimacy across different organisational levels within the university [120].

Lastly, while the existing literature on IUCs has mainly focused on technologically developed countries, e.g. [47], [101] and current studies on IUCs in emerging economies of Africa mostly consist of grey literature in the form of reports and conference publications of various national, regional and international organisations [84]. Our paper contributes to the literature by offering theoretical insights on several aspects of IUCs in emerging economies of Africa as a phenomenon, e.g., (1) how different organisational level attributes vis- à-vis personal, consequential, structural, and procedural legitimacy contribute to IUCs; (2) how entrepreneurial universities can emerge; and (3) why is it comparatively more difficult for industrial firms to collaborate with universities in emerging economies of Africa.

## **V. INSIGHTS FOR THEORY: BRIDGING IUC AND ORGANISATIONAL LEGITIMACY RESEARCH**

Our paper also offers a theoretical contribution by bridging the IUCs and legitimacy research. We argue that beyond an application of the legitimacy perspective to the phenomenon of IUCs, there are additional benefits if these fields collaborate and inform each other.

Going beyond the four topologies of moral legitimacy, legitimacy in general offers other useful insights for the theory of IUCs. One consideration relates to the time frame or the duration of the IUCs itself. The IUCs literature does not explicitly address how universities can manage the different dynamics associated with the IUCs life cycle. At the same time, most research on organisational legitimacy suggests that legitimacy has a life cycle associated with them, not only through time but also across different organisational levels [134]. A predominant view is that IUCs in Africa occur when industrial firms see universities as reservoirs of codified knowledge and expertise to be tapped from them. We suggest that if universities do not have a well-developed legitimacy – management strategies throughout the lifecycle of the IUCs and across different organisational levels, the potential for IUCs may be non-existent. This suggests that university legitimacy in IUCs and the resulting courses of action must take into cognisance the different organisation levels and time-dependent nature of the IUCs process. Thus, future research in IUCs must incorporate the time dimension into its models and must explicitly recognise that some of the legitimacy processes and mechanisms will be more short-lived or transitory as compared to others.

Similarly, a knowledge of the IUCs research offers highly useful insights that can expand our understanding of legitimacy. To demonstrate this, we draw upon insights from the IUCs literature in two specific areas— communication and trust— and apply them to organisational legitimacy. In identifying the essential factors for industry collaborations with university partners, [147] find that, consistent with individual factors that explain successful IUCs, these traits should not only include management level but must be on the operational level too. Specifically, individual attributes such as communication, and trust on the part of the individual academics increases the chances of successful IUCs. While these individual qualities must be affecting many aspects of the university organisation, it is reasonable to assume that they would guide the legitimacy efforts of individuals within the university as well. For instance, [9] find that leaders can foster trust, conduct an honest communication and have a strong role model effect. At the same time leaders and managers can engage in various tasks such as the provision and allocation of



resources or the establishment of incentives or rules to increase knowledge sharing of staff members [123]. However, staff members are often required to maintain frequent communication using different communication channels such e-mail, telephone, meetings, etc. between the workforce [52], or have to find a mutual language between academic and business staff [8]. This seems to indicate that leaders and staff members have differences in the way that they facilitate successful IUCs. When we apply these insights to the context of organisational legitimacy, we begin to see that the IUCs theory has much to contribute to our current understanding of legitimacy. For instance, gaining legitimacy is not about the characteristics of the organisation only but also involve the characteristics of different members of the organisation [74]. Empirical studies have reinforced the suggestions that organisations indeed approach their legitimacy efforts, incorporating the aspects of management level and individual staff in their legitimacy strategy [129], [152]. Given that legitimacy occurs at multiple levels within the universities and with individual academic staff playing a critical role, it is reasonable to assume that many of the individual characteristics associated with relationship factors will affect the gaining of legitimacy. This has been explicitly recognised in the organisational legitimacy literature.

## **VI. INSIGHTS FOR PRACTICE**

Our paper offers several insights for practitioners. First, it suggests that IUCs may be usefully analysed based on either of the four dimensions of organisations—individual, the organisation, the environment, and the process—provided that we adopt a legitimacy perspective and that we recognise the critical role of legitimacy in the IUCs and emergence of entrepreneurial universities. Analysis of the four dimensions of organisations has continued to exist in prior research, we believe, makes it possible to develop a more expanded understanding of the IUCs and emergence of entrepreneurial universities that is rooted in practice. Second, our paper delineates how gaining legitimacy goes beyond the university to include other dimensions of the organisation. This, we believe, provide universities in Africa with an instrument view of IUCs and

entrepreneurial universities emergence in African emerging economies. We suggest that gaining legitimacy from industrial firms involves the university not only as an organisation but also necessarily as a recognition of the multiple dimensions of the universities and the different moral legitimacy they can exhibit. We suggest that once universities in Africa adopt this expanded view of IUCs that cross multiple levels of analysis, they stand to benefit immensely by engaging in proactive associations with other dimensions of the university organisation. Finally, by developing a set of indicative propositions, our paper is able to offers solutions to how universities can resolve the hindrance for a fruitful collaboration with industrial firms. We believe that this has important implications for universities in African emerging economies to successfully attract and collaborate with industrial firms and offers guidelines on how to become an entrepreneurial university.

## **VII. LIMITATIONS AND FUTURE RESEARCH**

Understanding IUCs and how universities in African emerging economies, can successfully make a transition to entrepreneurial universities using our proposed legitimacy perspective may raise more questions than it answers. However, this is not surprising given the nature of scientific research. Attempting to answer these questions points to the next steps to elucidate the distinct frame of references and the contributions of our legitimacy perspective in understanding IUCs and entrepreneurial university emergence in African emerging economies.

First, our proposed legitimacy perspective does not consider all emerging economies contexts and African countries. Considering other emerging economies, contexts and other African countries can deepen our understanding of the legitimacy perspective concept. A legitimacy-building approach in fostering closer IUCs may differ for different emerging economy contexts and other categories of African countries. Is our legitimacy-building approach exclusively true in an emerging economy context and across all African countries [53]? Different institutional factors in different other emerging economies and African countries can result in unique ways of building legitimacy. In this regard, it is important to acknowledge that the dissimilarities of institutional

factors among countries likely relates to their respective universities approach to legitimacy building. A possible moderator of legitimacy could be the different categories of emerging economies and African countries in any useful classification system, e.g. [14], [55], [75], [85], [92], [112].

Second, our legitimacy perspective does not explore how a legitimacy-building approach can be used in fostering closer IUCs in developed economies. We argue that IUCs have evolved differently between emerging and developed economies, and as such, our legitimacy perspective may not be entirely applicable to developed economies. This is because the majority of emerging economies have experienced rare IUCs until quite recently due to institutional and historical evolution of universities as higher education institutions with limited resources for research [60]. As a result, most universities in emerging economies are still catching up with their rivals from developed economies and just starting to build their research skills. Even with this recent development, universities in emerging economies still struggle to manage IUCs professionally and fully reap their potential benefits due to weak institutions (e.g. ‘low trust’ culture) inherent in emerging economies. However, in developed economies, strong IUCs have emerged much longer compared to emerging economies [86]. For example, in developed economies like the US, IUCs is attributed to be the main driver for the development of high technology clusters such as Silicon Valley [121] or the biotechnology cluster in Massachusetts [97]. Consequently, universities in developed economies like the US commonly have the legitimacy to collaborate successfully with industrial firms due to much stronger institutions. Nevertheless, the question of legitimacy in developed economies still needs a theoretical and empirical study. A promising avenue for future research on legitimacy perspective to IUCs and entrepreneurial university emergence in developed economies could examine the theoretical assumptions of legitimacy as universities construct unique combinations of legitimacy typologies critical to facilitating IUCs.

Third, our legitimacy perspective does not incorporate the roles of government and industry as important actors in fostering IUCs in emerging economies of Africa. Do government and industrial

firms' legitimacy foster IUCs in emerging economies of Africa? The government and industrial firms' legitimacy are an influential power that can either enhance or harm IUCs. On the one hand, legitimacy of strong institutions such as government policies [59], regional innovation initiatives [35], [58], [70], [91], public funding [34], [54], [110] and government support [23], [24], [49], [89], [90], [93], [123], [132] can facilitate IUCs. On the other hand, the legitimacy of industrial firms such as financial support [141], [149], internships [18], [138] can facilitate IUCs. Accordingly, a strong emphasis on the legitimacy of government and industrial firms may increase our knowledge on the importance of these actors in facilitating IUCs in emerging economies. We believe that the legitimacy of government and industrial firms increase universities motivation and willingness to collaborate with industrial firms only to the extent that universities deemed the activities of government and industrial firm as legitimate and consistent with their goal of becoming entrepreneurial.

## VIII. CONCLUSION

In conclusion, our attempt in this paper has been to bring together two streams of literature—IUCs and legitimacy—to understand IUCs and how entrepreneurial universities can emerge through a process of legitimacy involving the different dimensions of the university organisation. In this paper, we demonstrated that the application of the legitimacy perspective as a theoretical lens helps provide an understanding to IUCs, and in particular, explain how universities can successfully collaborate with industrial firms and how they can become entrepreneurial. In other words, applying research insights from the field of legitimacy to IUCs helps us to make the critical leap required to broaden the ambit of IUCs in Africa: to treat collaboration with industrial firms as going beyond the university organisation and to include in the overall process the influence of individual academic researchers, process as well as the environment. We suggested that creating a perception of legitimacy across levels – individual, organisation, the environment, and the process - is vital in that universities will be considered by industrial firms to be more meaningful, more predictable, and more trustworthy, and thus more

likely to collaborate with them. In short, moral legitimacy can provide the means by which IUCs increases and a university becomes entrepreneurial in African emerging economies. This can, in turn, be a powerful engine for open innovation and socio-economic development of African emerging economies.

## REFERENCES

- [1] AAU. *Report on Technology Generation and Uptake in African Universities*, 2012
- [2] I. O. Abereijo, "Transversing the "valley of death": Understanding the determinants to commercialisation of research outputs in Nigeria", *African Journal of Economic and Management Studies*, vol. 6, no. 1, pp. 90-106, 2015.
- [3] E. Albuquerque, W. Suzigan, G. Kruss, and K. Lee, K. (Eds.). *Developing National Systems of Innovation: University-Industry Interactions in the Global South*. Edward Elgar Publishing, 2015.
- [4] H. E. Aldrich and C.M. Fiol, "Fools rush in? The institutional context of industry creation," *Academy of Management Review*, vol. 19, no. 4, 645-670, 1994.
- [5] O. Al-Tabbaa, and S. Ankrah, "Engineered' university-industry collaboration: A social capital perspective," *European Management Review*, vol. 16, no. 3, pp. 543-565, 2019.
- [6] S. Ankrah and A. T. Omar, "Universities–industry collaboration: A systematic review," *Scandinavian Journal of Management*, vol. 31, no. 3, pp. 387-408, 2015
- [7] A. M. Attia, "National innovation systems in developing countries: barriers to university–industry collaboration in Egypt", *International Journal of Technology Management & Sustainable Development*, vol. 14, no. 2, pp. 113-124, 2015.
- [8] Y. Baba, M. Yarime, and N. Shichijo, "Sources of success in advanced materials innovation: the role of" core researchers" in university–industry collaboration in Japan," *International Journal of Innovation Management*, vol. 14, no. 2, pp. 201-219, 2010.
- [9] T. Barnes, I. Pashby and A. Gibbons, "Effective university–industry interaction: A multi-case evaluation of collaborative r&d projects," *European Management Journal*, vol. 20, no 3, pp. 272-285, 2002
- [10] R. Bekkers, and I. M. B. Freitas, "Analysing knowledge transfer channels between universities and industry: To what degree do sectors also matter?", *Research Policy*, vol. 37, no. 10, pp. 1837-1853, 2008.
- [11] E. Bellini, G. Piroli, and L. Pennacchio, "Collaborative know-how and trust in university–industry collaborations: Empirical evidence from ICT firms", *The Journal of Technology Transfer*, vol. 44, no. 6, pp. 1939-1963, 2019.

- [12] J. Bercovitz, and M. Feldman, “Academic entrepreneurs: Organizational change at the individual level,” *Organization Science*, vol. 19, no. 1, pp. 69–89, 2008.
- [13] J. Berman, “Connecting with industry: bridging the divide”, *Journal of Higher Education Policy and Management*, vol. 30, no. 2, pp. 165–174, 2008.
- [14] J. Berman, *Success in Africa: CEO insights from a continent on the rise*. Bibliomotion. Available from <http://www.bibliomotion.com>, 2013
- [15] D. Bienkowska, M. Klofsten, and E. Rasmussen, “PhD students in the entrepreneurial university— perceived support for academic entrepreneurship,” *European Journal of Education*, vol. 51, no. 1, pp. 56–72, 2016.
- [16] M. Bikard, K. Vakili, and F. Teodoridis, “When collaboration bridges institutions: The impact of university–industry collaboration on academic productivity,” *Organization Science*, vol. 30, no. 2, pp. 426-445, 2019.
- [17] C. Boardman and B. Bozeman, “Academic faculty as intellectual property in university-industry research alliances,” *Economics of Innovation and New Technology*, vol. 24, no 5, pp. 403-420, 2015.
- [18] T. J. D. Bothma, “Nine drivers of knowledge transfer between universities and industry RandD partners in South Africa,” *South African Journal of Information Management*, vol. 9, no. 1, pp. 1–22, 2007.
- [19] A. Bramwell and D. A. Wolfe, “Universities and regional economic development: The entrepreneurial university of Waterloo,” *Research Policy*, vol. 37, no. 8, pp. 1175–1187, 2008.
- [20] L. Bstieler, M. Hemmert and G. Barczak, “The changing bases of mutual trust formation in inter-organizational relationships: A dyadic study of university-industry research collaborations,” *Journal of Business Research*, vol. 74, pp. 47-54, 2017.
- [21] N. Cloete, P. Maassen, and T. Bailey, (Eds.), *Knowledge production and contradictory functions in African higher education*. Cape Town: African Minds, 2015.
- [22] W. M. Cohen, R. R. Nelson and J. P. Walsh, “Links and impacts: the influence of public research on industrial R&D,” *Management Science*, vol. 48, no. 1, pp. 1-23, 2002.
- [23] A. Collier, B. J. Gray, and M. J. Ahn, “Enablers and barriers to university and high technology SME partnerships,” *Small Enterprise Research*, vol. 18, no. 1, pp. 2-18, 2011.
- [24] M. de Medeiros Rocha, G. Brito Alves Lima, V. D. J. Lameira, and O. L. Gonçalves Quelhas, “Innovation as a Critical Success Factor: an Exploratory Study about the Partnership among University with Pharmaceutical Industry in Brazil,” *Journal of technology management and innovation*, vol. 7, no. 3, pp. 148-160, 2012.
- [25] P. D’Este, S. Mahdi, A. Neely, and F. Rentocchini, “Inventors and entrepreneurs in academia: What types of skills and experience matter?,” *Technovation*, vol. 32, no. 5, pp. 293–303, 2012.

- [26] P. D'Este and M. Perkmann, "Why do academics engage with industry? The entrepreneurial university and individual motivations," *The Journal of Technology Transfer*, vol. 36, no. 3, pp. 316–339, 2011.
- [27] P. J. DiMaggio, "Interest and Agency in Institutional Theory": In LG Zucker (ed.), *Institutional Patterns and Organisations: Culture and Environment*, Cambridge, MA, De, 1988.
- [28] P. DiMaggio and W. Powel, "Introduction". In: Powell, W., DiMaggio, P. (Eds.), *The New Institutionalism in Organizational Analysis*. University of Chicago Press, Chicago, pp. 1–40, 1991.
- [29] H. Etzkowitz, "Research groups as 'quasi-firms': the invention of the entrepreneurial university," *Research Policy*, vol. 32, no. 1, pp. 109-121, 2003.
- [30] H. Etzkowitz, "The evolution of the entrepreneurial university," *International Journal of Technology and Globalisation*, vol. 1, no. 1, pp. 64-77, 2004.
- [31] G. Fernandes, E. B. Pinto, M. Araújo, and R. J. Machado, "The roles of a Programme and Project Management Office to support collaborative university–industry R&D," *Total Quality Management and Business Excellence*, vol. 31, no. 5-6, pp. 583-608, 2020.
- [32] B. B. Fischer, P. R. Schaeffer, N. S. Vonortas, and S. Queiroz, "Quality comes first: university-industry collaboration as a source of academic entrepreneurship in a developing country," *The Journal of Technology Transfer*, vol. 43, no. 2, pp. 263-284, 2018.
- [33] G. Fisher, S. Kotha, and A. Lahiri, "Changing with the times: An integrated view of identity, legitimacy, and new venture life cycles," *Academy of Management Review*, vol. 41, no. 3, pp. 383–409, 2016.
- [34] M. Flores, C. Boër, C. Huber, A. Plüss, R. Schoch, and M. Pouly, "Universities as key enablers to develop new collaborative environments for innovation: successful experiences from Switzerland and India," *International Journal of Production Research*, vol. 47, no. 17, pp. 4935-4953, 2009.
- [35] I. M. B. Freitas, A. Geuna, and F. Rossi, "Finding the right partners: Institutional and personal modes of governance of university–industry interactions," *Research Policy*, vol. 42, no. 1, pp. 50-62, 2013.
- [36] I. M. B. Freitas and B. Verspagen, "The motivations, institutions and organization of university-industry collaborations in the Netherlands," *Journal of Evolutionary Economics*, vol. 27, no. 3, pp. 379-412, 2017.
- [37] V. Galan-Muros, P. van der Sijde, P. Groenewegen, and T. Baaken, "Nurture over nature: How do European universities support their collaboration with business?," *The Journal of Technology Transfer*, vol. 42, no. 1, pp. 184–205, 2017.
- [38] R. Garcia, V. Araujo, S. Mascarini, E. Gomes Dos Santos, and A. Costa, "Is cognitive proximity a driver of geographical distance of university–industry collaboration?," *Area Development and Policy*, vol. 3, no. 3, pp. 349-367, 2018.

- [39] R. Garcia, V. Araújo, S. Mascarini, E. G. Santos, and A. R. Costa, “How long-term university-industry collaboration shapes the academic productivity of research groups,” *Innovation*, vol. 22, no. 1, pp. 56-70, 2020.
- [40] W. B. Gartner, “A conceptual framework for describing the phenomenon of new venture creation,” *Academy of Management Review*, vol. 10, no. 4, pp. 696-706, 1985.
- [41] E. Giuliani, A. Morrison, C. Pietrobelli, and R. Rabellotti, “Who are the researchers that are collaborating with industry? An analysis of the wine sectors in Chile, South Africa and Italy,” *Research Policy*, vol. 39, no. 6, pp. 748–761, 2010.
- [42] E. Giuliani and R. Rabellotti, “Universities in emerging economies: Bridging local industry with international science—evidence from Chile and South Africa,” *Cambridge Journal of Economics*, vol. 36, no. 3, pp. 679–702, 2012.
- [43] R. K. Goel, D. Göktepe-Hultén and C. Grimpe, “Who instigates university–industry collaborations? University scientists versus firm employees,” *Small Business Economics*, vol. 48, no. 3, pp. 503-524, 2017.
- [44] M. Guerrero, F. Herrera, and D. Urbano, “Strategic knowledge management within subsidised entrepreneurial university-industry partnerships,” *Management Decision*, vol. 57, no. 12, pp. 3280-3300, 2019.
- [45] M. Guerrero and D. Urbano, “The development of an entrepreneurial university,” *The Journal of Technology Transfer*, vol. 37, no. 1, pp. 43–74, 2012.
- [46] J. Guimón, “Promoting university-industry collaboration in developing countries,” *World Bank*, vol. 3, pp. 12-48, 2013.
- [47] P. Hanel and M. St-Pierre, “Industry–university collaboration by Canadian manufacturing firms,” *The Journal of Technology Transfer*, vol. 31, no. 4, pp. 485-499, 2006.
- [48] C. Haase, “The great IP debate: how should South African universities benefit from the research they support?,” *Creamers Media's Engineering News*, 27 February – 4 March 2, pp. 16-17, 2004.
- [49] M. Hemmert, L. Bstieler and H. Okamuro, “Bridging the cultural divide: Trust formation in university–industry research collaborations in the US, Japan, and South Korea,” *Technovation*, vol. 34, no. 10, pp. 605-616, 2014.
- [50] C. Herman, “Industry perceptions of industry–university partnerships related to doctoral education in South Africa,” *Industry and Higher Education*, vol. 27, no. 3, pp. 217-225, 2013.
- [51] Hirko, S. B. and de Beer, J, “Intellectual Property and Knowledge Transfer between Universities and Industries in Africa: The Case of Botswana” (April 30, 2019). les Nouvelles - Journal of the Licensing Executives Society, Vol. LIV, no. 2, June 2019.
- [52] J. Hong, J. Heikkinen and K. Blomqvist, “Culture and knowledge co-creation in R&D collaboration between MNCs and Chinese universities,” *Knowledge and Process Management*, vol. 17, no. 2, pp. 62-73, 2010.



- [53] R. E. Hoskisson, L. Eden, C. M. Lau, and M. Wright, "Strategy in emerging economies," *Academy of Management Journal*, vol. 43, no. 3, pp. 249-267, 2000.
- [54] B. Hou, J. Hong, H. Wang, and C. Zhou, "Academia-industry collaboration, government funding and innovation efficiency in Chinese industrial enterprises," *Technology Analysis and Strategic Management*, vol. 31, no. 6, pp. 692-706, 2019.
- [55] International Monetary Fund, *Regional economic outlook: Sub-Saharan Africa*. Washington, DC, 2015.
- [56] R. Jensen and M. Thursby, "Proofs and prototypes for sale: The licensing of university inventions," *American Economic Review*, vol. 91, no. 1, pp. 240-259, 2001.
- [57] P. P. K'obonyo, J. M. Kilika, and P. M. Ogotu, "Human resource development drivers for university-industry collaboration: Empirical evidence from universities in Kenya", *International journal of education and research*, vol. 1, no. 4, pp. 81-98, 2013.
- [58] M. J. Kahn, "Rhetoric and change in innovation policy: The case of South Africa," *Science Technology and Society*, vol. 18, no. 2, pp. 189-211, 2013.
- [59] M. Kahn, N. Vlotman, C. Steyn, and M. van der Schyff, "Innovation policy and higher education in South Africa: Addressing the challenge," *South African Review of Sociology*, vol. 38, no. 2, pp. 176-190, 2007.
- [60] L. Kim, *Imitation to innovation: The dynamics of Korea's technological learning*. Harvard business press, 1997.
- [61] G. Kruss, "Harnessing innovation potential? Institutional approaches to industry-higher education research partnerships in South Africa," *Industry and Higher Education*, vol. 19, no. 2, pp. 131-142, 2005.
- [62] G. Kruss, "Tensions in facilitating higher education-industry research partnerships in high technology fields in South Africa," *Journal of Higher Education Policy and Management*, vol. 28, no. 1, pp. 31-44, 2006a.
- [63] G. Kruss, "Working partnerships: The challenge of creating mutual benefit for academics and industry," *Perspectives in Education*, vol. 24, no. 3, pp. 1-13, 2006b.
- [64] G. Kruss, "Balancing old and new organisational forms: Changing dynamics of government, industry and university interaction in South Africa," *Technology Analysis and Strategic Management*, vol. 20, no. 6, pp. 667-682, 2008b.
- [65] G. Kruss, "Reconceptualising engagement: A conceptual framework for analysing university interaction with external social partners," *South African Review of Sociology*, vol. 43, no. 2, pp. 5-26, 2012a.
- [66] G. Kruss, "Channels of interaction in health biotechnology networks in South Africa: Who benefits and how?," *International Journal of Technological Learning and Development*, vol. 5, no. 1-2, pp. 204-220, 2012b.

- [67] G. Kruss, J. Adeoti and D. Nabudere, "Universities and knowledge-based development in Sub-Saharan Africa: comparing university-firm interaction in Nigeria, Uganda and South Africa," *The Journal of Development Studies*, vol. 48, no. 4, pp. 516-530, 2012.
- [68] G. Kruss and M. Visser, "Putting university–industry interaction into perspective: a differentiated view from inside South African universities," *The Journal of Technology Transfer*, vol. 42, no. 4, pp. 884-908, 2017.
- [69] K. J. Lee, "From interpersonal networks to inter-organizational alliances for university–industry collaborations in Japan: the case of the Tokyo Institute of Technology," *R&D Management*, vol. 41, no. 2, pp. 190-201, 2011.
- [70] M. Letseka, "Government incentivization of partnerships in South Africa: An audit of THRIP and the innovation fund," *Industry and Higher Education*, vol. 19, no. 2, pp. 161–168, 2005.
- [71] J. Li, "Global R&D alliances in China: Collaborations with universities and research institutes," *IEEE Transactions on Engineering Management*, vol. 57, no. 1, pp. 78-87, 2009.
- [72] M. S. Liew, T. T. Shahdan and E. S. Lim, "Enablers in enhancing the relevancy of university-industry collaboration," *Procedia-Social and Behavioral Sciences*, vol. 93, pp. 1889-1896, 2013.
- [73] A. N. Link, D. S. Siegel and B. Bozeman, "An empirical analysis of the propensity of academics to engage in formal university technology transfer," In *Universities and the Entrepreneurial Ecosystem*. Edward Elgar Publishing, 2017.
- [74] S. Maguire, C. Hardy and T. B. Lawrence, "Institutional entrepreneurship in emerging fields: HIV/AIDS treatment advocacy in Canada," *Academy of Management Journal*, vol. 47, no. 5, pp. 657-679, 2004.
- [75] V. Mahajan, *Africa rising*. Upper Saddle River, NJ: Wharton School Publishing, 2009.
- [76] M. Marhl and A. Pausits, "Third mission indicators for new ranking methodologies," *Evaluation in Higher Education*, vol. 5, no. 1, pp. 43-64, 2011.
- [77] C. Mascarenhas, J. J. Ferreira, and C. Marques, C. "University–industry cooperation: A systematic literature review and research agenda," *Science and Public Policy*, vol. 45, no. 5, pp. 708-718, 2018.
- [78] J. G. M. Massaquoi, "University-Industry Partnership for Cooperative Technology Development in Africa: Opportunities, Challenges, Strategies and Policy Issues. Report on the Meeting of University-Industry Partnerships in Africa," *Meeting of University-Industry Partnerships in Africa*, Harare, Zimbabwe, May 21-24, 2001. Nairobi: United Nations Educational, Scientific and Cultural Organization (UNESCO), 2002.
- [79] E. Megnigbeto, "Triple Helix of university-industry-government relationships in West Africa," *Journal of Scientometric Research*, vol. 2, no. 3, pp. 214, 2013a.
- [80] E. Megnigbeto, "Scientific publishing in West Africa: Comparing Benin with Ghana and Senegal," *Scientometrics*, vol. 95, pp. 1113–1139, 2013b.

- [81] M. Meusburger, and A. J. Antonites, "Assessing antecedents of entrepreneurial activities of academics at South African universities," *International Journal of Innovation Management*, vol. 20, no. 6, pp. 1650058, 2016.
- [82] J. W. Meyer and B. Rowan, "Institutionalized organizations: Formal structure as myth and ceremony," *American journal of sociology*, vol. 83, no. 2, pp. 340-363, 1977.
- [83] J. W. Meyer and B. Rowan, "Institutionalized organizations," and Robert Wuthnow, *Meaning and Moral Order*, 1991.
- [84] C. T. Mgonja, "Enhancing the University-Industry Collaboration in Developing Countries through Best Practices," 2017.
- [85] E. Miguel, *Africa's turn?* Cambridge, MA: MIT Press, 2009.
- [86] D. C. Mowery and N. Rosenberg, "The US national innovation system," *National innovation systems: A comparative analysis*, pp. 29-75, 1993.
- [87] N.K. Mulu, "The Links between Academic Research and Economic Development in Ethiopia: The Case of Addis Ababa University". *European Journal of STEM Education*, vol. 2, no. 2, p.5-14, 2017.
- [88] A. Muparadzi and L. D. Caesar, "Examining the dynamics of industry–university collaborations in Ghana", *Journal of Applied Research in Higher Education*, 2020.
- [89] A. Muscio and G. Vallanti, "Perceived obstacles to university–industry collaboration: Results from a qualitative survey of Italian academic departments," *Industry and Innovation*, vol. 21, no. 5, pp. 410-429, 2014.
- [90] Y. Myoken, "The role of geographical proximity in university and industry collaboration: case study of Japanese companies in the UK," *International Journal of Technology Transfer and Commercialisation*, vol. 12, no. 1-3, pp. 43-61, 2013.
- [91] L. L. Ndabeni, C. M. Rogerson, and I. Booyens, "Innovation and local economic development policy in the global South: New South African perspectives," *Local Economy*, vol. 31, no. 1–2, pp. 299–311, 2016.
- [92] D. Nellor, "The rise of Africa's "frontier" markets," *Finance and Development*, vol. 45, no. 3, pp. 30-33, 2008.
- [93] J. A. Newberg and R. L. Dunn, R. L. "Keeping secrets in the campus lab: Law, values and rules of engagement for Industry-University R&D partnerships," *Am. Bus. LJ*, vol. 39, pp. 187, 2002.
- [94] A. Nölke, T. ten Brink, S. Claar, and C. May, "Domestic structures, foreign economic policies and global economic order: Implications from the rise of large emerging economies," *European Journal of International Relations*, vol. 21, no. 3, pp. 538-567, 2015.
- [95] D. North, *Institutions, institutional change and economic performance*. New York: Cambridge University Press, 1990.

- [96] OECD, Development. Economic Analysis, & Statistics Division. (2003). *OECD science, technology and industry scoreboard 2003*. Canongate US, 2015.
- [97] J. Owen-Smith and W. W. Powell, "Knowledge networks as channels and conduits: The effects of spill-overs in the Boston biotechnology community," *Organization Science*, vol. 15, no. 1, pp. 5-21, 2004.
- [98] F. Owusu-Nimo and N. Boshoff, "Research collaboration in Ghana: Patterns, motives and roles," *Scientometrics*, vol. 110, no. 3, pp. 1099–1121, 2017.
- [99] T. Parsons, *Structure and process in modern societies*. Glencoe, IL: Free Press, 1960.
- [100] M. Perkmann and K. Walsh, "Engaging the scholar: Three types of academic consulting and their impact on universities and industry," *Research Policy*, vol. 37, no. 10, pp. 1884-1891, 2008.
- [101] M. Perkmann, A. Neely and K. Walsh, "How should firms evaluate success in university–industry alliances? A performance measurement system," *R&D Management*, vol. 41, no. 2, pp. 202-216, 2011.
- [102] M. Perkmann and A. Salter, "How to create productive partnerships with universities," *MIT Sloan Management Review*, vol. 53, no. 4, pp. 79-88, 2012.
- [103] M. Perkmann, V. Tartari, M. McKelvey, E. Autio, A. Broström, P. D’Este and S. Krabel, "Academic engagement and commercialisation: A review of the literature on university–industry relations," *Research Policy*, vol 42, no. 2, pp. 423-442, 2013.
- [104] J. Pfeffer and G. R. Salancik, "*The external control of organizations: A resource dependence perspective*," Stanford University Press, 2003.
- [105] S. P. Philbin, "Developing and Managing University-Industry Research Collaborations through a Process Methodology/Industrial Sector Approach," *Journal of Research Administration*, vol. 41, no. 3, pp. 51-68, 2010.
- [106] K. Philpott, L. Dooley, C. O’Reilly, and G. Lupton, "The entrepreneurial university: Examining the underlying academic tensions," *Technovation*, vol. 31, no. 4, pp. 161–170, 2011.
- [107] R. Pinheiro, P. V. Langa, P. V and A. Pausits, "One and two equals three? The third mission of higher education institutions," *European Journal of Higher Education*, vol. 5, no. 3, pp. 233-249, 2015.
- [108] C. Plewa, N. Korff, C. Johnson, G. Macpherson, T. Baaken and G. C. Rampersad, The evolution of university–industry linkages—A framework. *Journal of Engineering and Technology Management*, vol. 30, no. 1, pp. 21-44, 2013.
- [109] C. Plewa, N. Korff, T. Baaken and G. Macpherson, "University–industry linkage evolution: an empirical investigation of relational success factors," *R&D Management*, vol. 43, no. 4, pp. 365-380, 2013.
- [110] A. Pouris and L. Richter, "Investigation into state-funded research journals in South Africa," *South African Journal of Science*, vol. 96, no. 3, pp. 98–104, 2000.

- [111] W. Powell, "Expanding the scope of institutional analysis. *The new institutionalism in organizational analysis*," Chicago, pp. 183-203, 1991.
- [112] S. Radelet, *Emerging Africa*. Washington, DC: Center for Global Development, 2010.
- [113] S. Rajalo and M. Vadi, "University-industry innovation collaboration: Reconceptualization," *Technovation*, vol. 62, pp. 42-54, 2017.
- [114] R. Rajibussalim, T. Sahama and H. Pillay, "Realisation of university-industry collaboration through industry-based learning at Indonesian higher education," *INTED2016 Proceedings*, (2340-1079), pp. 3853-3863, 2016.
- [115] G. C. Rampersad, "Developing university-business cooperation through work-integrated learning," *International Journal of Technology Management*, vol. 68, no. 3-4, pp. 203-227, 2015.
- [116] E. Rasmussen, S. Mosey, and M. Wright, "The evolution of entrepreneurial competencies: A longitudinal study of university spin-off venture emergence," *Journal of Management Studies*, vol. 48, no. 6, pp. 1314–1345, 2011.
- [117] S. J. F. Ren, E. W. T. Ngai and V. Cho, "Managing software outsourcing relationships in emerging economies: An empirical study of the Chinese small-and medium-sized enterprises," *IEEE transactions on Engineering Management*, vol. 58, no. 4, pp. 730-742, 2011.
- [118] R. Rybnicek and R. Königsgruber, "What makes industry–university collaboration succeed? A systematic review of the literature," *Journal of Business Economics*, vol. 89, no. 2, pp. 221-250, 2019.
- [119] C. Sá, "Perspective of Industry's engagement with African Universities," *Draft Report for the Association of African Universities*, 2015.
- [120] M. D. Santoro and A. K. Chakrabarti, "Firm size and technology centrality in industry–university interactions," *Research Policy*, vol. 31, no. 7, pp. 1163-1180, 2002.
- [121] A. Saxenian, *Regional advantage: Culture and competition in Silicon Valley and Route*, Cambridge, MA: Harvard Univ. Press, pp. 128, 1994.
- [122] B. R. Schlenker, *Impression management*. Monterey, CA: Brooks/Cole Publishing Company, 1980.
- [123] T. Schofield, "Critical Success Factors for Knowledge Transfer Collaborations between University and Industry," *Journal of Research Administration*, vol. 44, no. 2, pp. 38-56, 2013.
- [124] W. R. Scott, *Organizations: Rational, natural and open systems* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall, 1992.
- [125] W. R. Scott, "Effectiveness of organizational effectiveness studies," In P. S. Goodman & J.M Pennings (Eds.), *New perspectives on organizational effectiveness*: San Francisco: Jossey-Bass, pp. 63-95. 1977.

- [126] G. Secundo, J. Dumay, G. Schiuma, and G. Passiante, “Managing intellectual capital through a collective intelligence approach,” *Journal of Intellectual Capital*, vol. 17, 2, pp. 298–319, 2016.
- [127] C. Șerbănică, “A Cause and Effect Analysis of University-Business Cooperation for Regional Innovation in Romania,” *Theoretical and Applied Economics*, vol. 18, no. 10, 2011.
- [128] S. A. Shane, *Academic entrepreneurship: University spinoffs and wealth creation*. Edward Elgar Publishing, 2004.
- [129] P. D. Sherer and K. Lee, “Institutional change in large law firms: A resource dependency and institutional perspective,” *Academy of Management Journal*, vol. 45, no. 1, pp. 102-119, 2002.
- [130] K. Sjö, K. and T. Hellström, “University–industry collaboration: A literature review and synthesis,” *Industry and Higher Education*, vol. 33, no. 4, pp. 275-285, 2019.
- [131] I. Skute, “Opening the black box of academic entrepreneurship: a bibliometric analysis,” *Scientometrics*, vol. 120, no. 1, pp. 237-265, 2019.
- [132] A. S. Sohal, “Developing competencies of supply chain professionals in Australia: collaboration between businesses, universities and industry associations,” *Supply Chain Management*, vol. 18, pp. 429–439, 2013.
- [133] M. Steinmo and E. Rasmussen, “The interplay of cognitive and relational social capital dimensions in university-industry collaboration: Overcoming the experience barrier,” *Research Policy*, vol. 47, no. 10, pp. 1964-1974, 2018.
- [134] M. C. Suchman, “Managing legitimacy: Strategic and institutional approaches,” *Academy of Management Review*, vol. 20, no. 3, pp. 571-610, 1995.
- [135] M. C. Suchman, “Constructing an institutional ecology: Notes on the structural dynamics of organizational communities,” Paper presented at the annual meeting of the American Sociological Association, Atlanta, GA, 1988.
- [136] S. Terreberry, “The evolution of organizational environments,” *Administrative Science Quarterly*, pp. 590-613, 1968.
- [137] T. M. Thamae, R. I. Thamae, and L. Z. Thamae, “A process model for university-industry cooperation in sub-Saharan Africa: lessons from Lesotho”, *African Journal of Business and Economic Research*, vol. 11, no. 2-3, pp.103-125, 2016.
- [138] T. Thune, “Doctoral students on the university–industry interface: a review of the literature,” *Higher Education*, vol 58, no 5, pp. 637–651, 2009.
- [139] The World Bank, “Annual World Bank Conference on Development Economics,” The World Bank, 2010.
- [140] K. Toh, “Emerging growth economies in sub-Saharan Africa. *The American Economist*, vol. 61, no. 2, pp. 229-244, 2016.

- [141] F. C. Tseng, M. H. Huang, and D. Z. Chen, "Factors of university–industry collaboration affecting university innovation performance," *The Journal of Technology Transfer*, pp. 1–18, 2018.
- [142] D. W. Tumuti, P. M. Wanderi, and C. Lang’at-Thoruwa, "Benefits of university-industry partnerships: The case of Kenyatta University and Equity Bank," *International Journal of Business and Social Science*, vol. 4, no. 7, n/a, 2013.
- [143] T. I. Vaaland and E. Ishengoma, "University-industry linkages in developing countries: perceived effect on innovation", *Education + Training*, vol. 58, no. 9, pp. 1014-1040, 2016.
- [144] A. O. Vera-Cruz, "What are the university-productive sector links that matter in a small island country? The case of Cabo Verde," *African Journal of Science, Technology, Innovation and Development*, vol. 6, no. 2, pp. 65–73, 2014.
- [145] A. Vohora, M. Wright, and A. Lockett, "Critical junctures in the development of university high-tech spinout companies," *Research Policy*, vol. 33, no. 1, pp. 147–175, 2004.
- [146] M. Weber, "*Economy and society: An outline of interpretive sociology*," Vol. 1, University of California Press, 1978.
- [147] H. Wu, "*The essentiality of sustainability and variety for industry collaborations with university partners*," 2017.
- [148] A.N. Yarmoshuk, D. C. Cole, A. N. Guantai, M. Mwangi, and C. Zarowsky, "The international partner universities of East African health professional programmes: Why do they do it and what do they value?", *Globalization and Health*, vol. 15, no. 1, pp 37-49, 2019.
- [149] N. C. Zavale, "Expansion versus contribution of higher education in Africa: University–industry linkages in Mozambique from companies’ perspective," *Science and Public Policy*, vol. 45, no. 5, pp. 645-660, 2018.
- [150] N. C. Zavale and P. V. Langa, "University-industry linkages’ literature on Sub-Saharan Africa: systematic literature review and bibliometric account," *Scientometrics*, vol. 116, no. 1, pp. 1-49, 2018.
- [151] N.C. Zavale and E. Macamo, "How and what knowledge do universities and academics transfer to industry in African low-income countries? Evidence from the stage of university-industry linkages in Mozambique," *International Journal of Educational Development*, vol. 49, pp.247-261, 2016.
- [152] M. A. Zimmerman and G. J. Zeitz, "Beyond survival: Achieving new venture growth by building legitimacy," *Academy of Management Review*, vol. 27, no. 3, pp. 414-431, 2002.
- [153] L. G. Zucker, "The role of institutionalization in cultural persistence," *American sociological review*, pp. 726-743, 1977.