

Strengthening the Steering Core as a Pathway to University Transformation: A Case of Private Universities Interacting with Industry

By Kitagaana Zaidi

Kyambogo University

*Corresponding author: Kitagaana Zaidi, Email: kitagaana@yahoo.co.uk

Citation: Zaidi K (2026) Strengthening the Steering Core as a Pathway to University Transformation: A Case of Private Universities Interacting with Industry. *American J Sci Edu Re*: AJSER-319.

Received Date: 10 April, 2026; **Accepted Date:** 20 April, 2026; **Published Date:** 24 April, 2026

Abstract

It is widely acknowledged that strengthening the steering core is a key university priority (Clark, 1998). More recently, the increased recognition of universities as core actors in national innovation systems and the changing complexity of societal needs calls for various stakeholders to work together more strategically. In this vein, I set out to explore how a university can be strengthened through organizational culture; incentive schemes, and improving the internal characteristics. I utilized an interpretivist lens, and purposively selected Muteesa I Royal University (MRU) that explicitly acknowledges UT as one of its core functions. I generated data through qualitative semi-structured face-to-face interviews with 09 participants from the selected University. I focused on the period between 2020 and 2025. Data were analyzed and interpreted thematically and using content analysis. Analysis focused on aspects that are crucial to the three themes. I discovered that commercialization of research at MRU is still low, there are limited facilities for research, there is no appropriate leadership at the departments to steer collaboration. I also discovered that there is poor coordination in the implementation of policies and poor policy mix in connection with the way the institution is managed. I therefore concluded that there is need to improve leadership to enhance collaboration. I recommend that University management should embrace central managerial groups and academic departments. The University ought to set out to construct a widening and deepening portfolio of additional income that stretches from industrial firms to royalty income earned from campus services.

1. Introduction

World over, universities are regarded as key agents of economic and social progress (Giuri et al, 2019). Osabutey and Jin (2016) assert that universities in the contemporary world are required to play multi-faceted roles namely; teaching, research and entrepreneurship. These roles are usually fulfilled through strong internal mechanisms, incentive schemes and organizational culture which can propel research joint ventures, university-based start-ups. These activities can potentially result into financial gains for the university. At the same time, universities also pointed to the possibility that UT can enhance economic growth and development.

In this regard, it has been found that South Africa – Africa's most technology-driven nation, has transformed universities with the enactment of the 'Technology Innovation Agency Act' (Act 26, 2008) as well as the 'Intellectual Property Rights Act (IPR) (Act 51, 2008) (University of Pretoria, 2019). Both Acts have helped in the creation of the Technology Innovation Agency (TIA), an organization saddled with the responsibility of fostering research in the line of groundbreaking inventions capable of further improvement of the nation's economy (Fadeyi et al, 2019). According to Mustapha et al, (2019), about five South African companies succeeded in spinning off 45 start-ups within a six-year period from 2008. This was made possible through government funding which is largely from taxpayers' money.

On the other hand, Egypt does not have effective management practices in place to guide UT (Kirby & Hadidi, 2019). In 2010, with the support of the University of Freie in Germany, new start-ups were created during a three-year cooperation period (Freie University Cairo Office, 2014). The Academy of Scientific Research and Technology (ASRT) is Egypt's UT

management agency, and the body continues to work hard towards building countrywide Technology Innovation with a view of transforming the universities.

Relatedly, Morocco's UT front has several organizations playing a number of intertwined roles. Such organizations include: The Permanent Inter-Ministerial Committee for Scientific Research and Technological Development (PICSRTD); The National Centre for Scientific and Technical Research (NCSTR); The Hassan II Academy of Science and Technology (HIIAST); The Ministry of Commerce, Industry and New Technologies (MCINT); The Ministry of Higher Education, Scientific Research and Professional Training (MHESRPT) (Fadeyi et al., 2019).

For Uganda, UT is at a slow pace, most working as teaching institutions (Bailey et al., 2011). The government has tried to create policies that facilitate the creation of innovation funds to help entrepreneurship and research of technological value. These policies also favour investment by industries (Byaruhanga et al., 2016), promotion of local infrastructure and the networks of external suppliers. Policies are part of the legal framework in which UT take place. In this context, the state is the main actor regarding UT through innovation that try to make universities stand alone institutions with less dependence on government funding and other forms of support. (Republic of Uganda, 2017).

Theoretical Perspective

Several theories/models can be used as lenses to analyse UT (Veugelers & Rey, 2014). However, for this study, I preferred to use the Triple Helix Model (THM) as the lens, this being an innovation study. The THM stresses the role of, and the interplay between, different types of innovation actors with a

purpose of understanding the dynamics behind the establishment of enterprises for the transformation of universities. (Leydesdorff, Porto-Gomez & Comins, 2019). UT is recognised as a core activity in an innovation system (Yao, Li & Weng, 2018). It is also important in Triple Helix systems.

Universities are no longer just a traditional source of human resources and knowledge but are also key innovation stakeholders with ever increasing internal organizational mechanisms and resources allocated to this purpose, rather than placing reliance solely on informal ties.

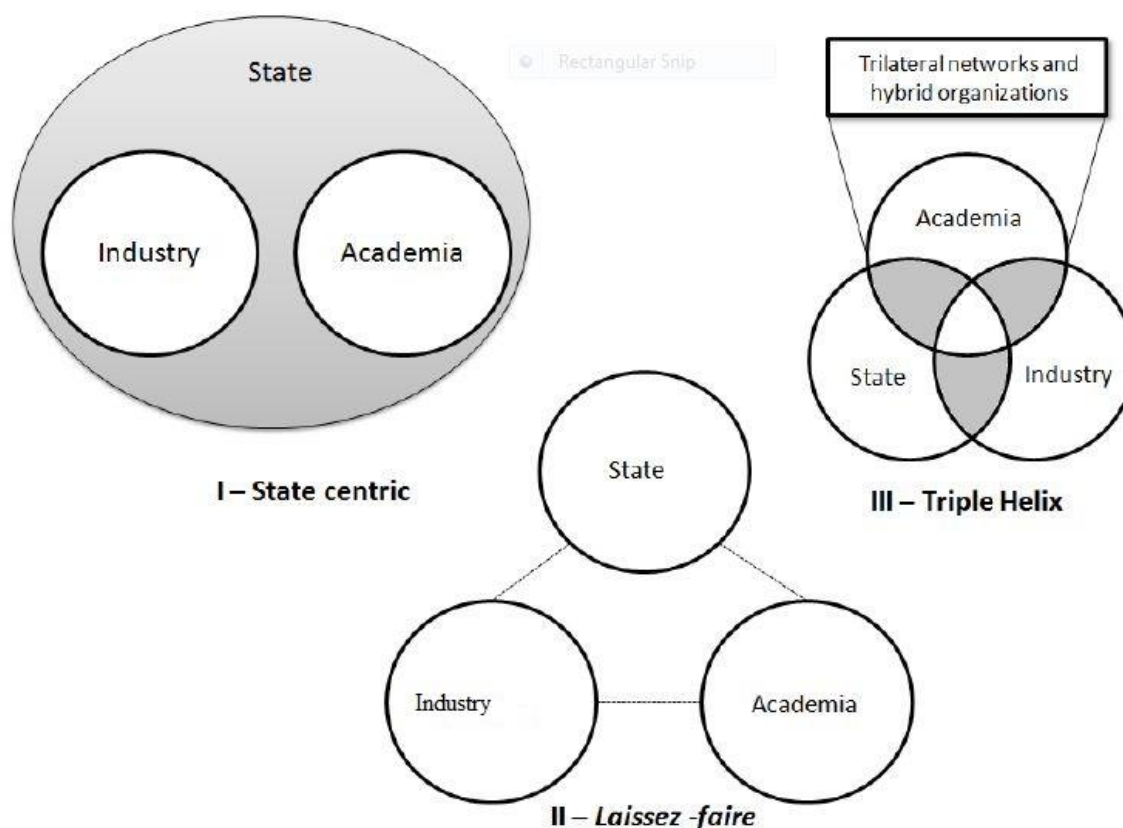


FIGURE 1.1: TRIPLE HELIX DYNAMICS
Source: (Etzkowitz, 2003, p.302)

There are three different kinds of Triple Helix infrastructure. In Triple Helix I, the government overshadows the university and industry infrastructure. The Triple Helix II illustrates the working of university, industry and government as isolated bands and separated by strong borders. This structure represents a limited relation among the three actors. In Triple Helix III, three rings overlap each other. Each institution takes part in the role of the others.

The Triple Helix’s core thesis suggests that the potential for innovation lies in the hybridisation of elements from university, industry, and government to generate new institutional and social forms of knowledge (Ranga & Etzkowitch, 2015). The Triple Helix Model is a useful lens as it accommodates institutional, organizational and individual roles within the knowledge triangle, recognising the importance of organizational and individual actors in creating new types of linkages within the Helix (Doern, Phillips & Castle, 2016). The THM was introduced by Etzkowitz and Leydesdorff (1995) as a framework for further learning on the inter-relationship among university, industry, and government. It was initially aimed at understanding how government policies influence university research output as well as industrial production output in the long-run, and at understanding university–industry–government relations and their further development. In a study by Afzal et al. (2018), it was observed that the THM could support the economic drive of nations if the right resources are channeled into the process.

The THM - a dominant model in Africa, has been widely accepted as an improvement on the linear UT method. Although several other models exist in literature to improve the process of UT in many countries (Maresova et al., 2019), the Triple Helix serves as a foundation to some of these models. Etzkowitz and Leydesdorff (2000) gave specific details on the Triple Helix approach to UT. The duo explained it as a UT model where a university through its technology transfer offices (TTOs’) works hand-in-hand with an industry to bring innovation close to the public. Nonetheless, this relationship is often moderated by the government. The government intervention can either enhance or repress the entrepreneurial intention (Dana, 1987).

According to Robin and Schubert (2013), the Triple Helix dynamic is based upon the range of agreements and partnership networks occurring between the respective institutional triple helix spheres and their potential/ability to better advance new sources of innovation in comparison with any isolated initiative designed to generate such results.

Statement of the Problem

The process of UT which aims at making universities independent and entrepreneurial is an important point of innovation (Cohen et al., 2002; Zhang et al., 2018). Countries that invest significant amounts of resources in research and innovation are able to industrialize faster. Universities have an objective to become independent through the creation of technology developments and research that are useful for

commercialisation (Etzkowitz & Ranga, 2013). Unfortunately, for many private universities in Africa, success in UT has not been achieved (Phan et al., 2006). At Ugandan universities, for example, UT has not been achieved and its coordination remains mysterious (GoU, 2010; NDP II, 2010, p.166). The country is yet to establish any incubation and technology parks to facilitate innovation and technology development (GoU, 2020). A monitoring visit commissioned by NCHE in 2011 found that MRU had no niche in society has no direction and its workers were not interested in transmitting knowledge (Kasozzi, 2016, p.121). The university's research and innovation policy (2014, p.3) advocates for UT.

Study Objectives

The study aimed at exploring how the institutional mechanisms, organizational culture and incentive schemes act as of enhancing university transformation at private universities in Uganda, taking Muteesa I Royal University as the case university.

2. Literature Review

Organizational culture

Lee et al (1996) conducted field interviews with faculty and administrators involved in university–industry relations and a representative survey of university faculty. He received responses from 986 faculties representing all major disciplines and a variety of university types. He found strongest support for a faculty role in technology-based regional economic development and increasing faculty interaction with industry scientists. Faculties were much less enthusiastic about business partnerships with industry than a more market-driven university. Lee (1996) pointed out that university commercial activities usually do not have high yield and often involve considerable risks. This echoes the conclusion of Rosenberg and Nelson (1994, p.346) who found that it is “ill-advised to try to get university researchers to work on specific practical problems of industry. University researchers are insufficiently versed in the particulars of specific product markets to make good decisions about appropriate tradeoffs”. Lee (ibid.) concluded that the chief concern of his academic respondents was trading income and research support for new work norms that threaten academic integrity. Nevertheless, Lee's (1996) and Rosenberg et al (1994)'s studies perspectives of institutional policies are from the European context which cannot be generalized to the African context owing to variations in context and particularly in national culture and levels of economic development.

Guimon, in a study conducted for the World Bank (2013), reviewed ways of enhancing UT. He looked at the three university missions of teaching, research and entrepreneurial university. His findings are that existing collaboration between university and industry in terms of UT tend to be more informal due to historically based cultural and institutional barriers (p.3). The study does not propose an appropriate approach to strengthen UT. Additionally; it does not provide “more empirical evidence on the success of specific policy programs to support UT in developing countries” (p.9).

A similar study conducted by Kaymaz et al. (2011) investigated factors hindering UT from the perception of academicians in the context of the entrepreneurial science paradigm. The main finding of the study was that the academics perceive negative factors in the collaboration process. The study was carried out in Turkey and published scientific studies focus on an industrial viewpoint (p.188). The current study considered the university view point as well to make it possible to define whether the

factors stated by academicians as obstacles to UT are genuinely corroborated by other actors also seen as hindrances by industrialists.

Internal university characteristics

MRU mission is “to provide training, research and technical guidance responsive to social-economic needs. This strategic plan was formulated in light of government policies including NDP II; Vision 2040; The Uganda National Council for Science and Technology Plan (1990) and then National Science, Technology and Innovation Plan (2009). According to this Strategic Plan (2007-2012) with respect UT included: Academic and Research Development; Physical Infrastructure, development collaborative linkage; consultancy, among others.

Under the Academic and Research Development Focus, the main goals included: consolidation, strengthening and developing academic and professional programs; developing capacity and promotion of innovative methods and approaches in research (p.24). The strategy for this would be through building capacity for development of human resources. This would be achieved through formalizing partnerships with the communities in order to transfer and apply created knowledge/ skills to community application.

The university's strategic plan for the period 2012/13 – 2022/23 recognizes the weaknesses of the first strategic plan including “inadequate funding for academic research, inadequate basic research, limited level of entrepreneurship amongst academic staff. While the second strategic plan of the university prioritizes research, innovation and knowledge generation in its strategic focus area 2, it is not known whether this milestone is on course as projected. For instance, target goal (ii) talks of initiating linkage/ partnerships with industry and encouraging joint academic research activities through identification of academic and research institutions with common areas of interest and establish collaborative linkages and establish collaborative linkages and sign MoUs by 2014, it is not known whether this was achieved. This strategic focus targeted creation of research and industrial linkage for science, technology, engineering and innovation by 2014/15 and faculty engagement in projects under STEI linkage by 2017/18 (p.38).

The motives of academics involved in UT were examined by Rahm (1994) in her study of researchers in the top 100 research universities. She received responses from more than 1000 academic researchers and then distinguished between 254 “university-bound researchers”, those not participating in UT, and 759 “spanning researchers”. The spanning researchers tend to initiate communications with firms and were much more likely to have informal links with firms. The findings indicated that 75 percent of the spanning researchers engaged in consulting (26 percent university-bound) and 80 percent of the spanning researchers had students in industry whom they contacted regularly (18 percent for university-bound). Similarly, spanners participate more in research consortia, extension services, incubators, and cooperative R&D. This study specifically targeted enterprises developed at the university and these include incubators and technology laboratories. It was found that the success of a university's licensing programme depended on its institutional policies, organizational capability, and incentive systems to encourage participation by researchers.

Pursuing this line of enquiry, Degroof and Roberts (2004) examined the importance of university policies related to startups in regions where environmental factors like UIC and infrastructure for entrepreneurship are not particularly conducive to entrepreneurial activity. They offered a taxonomy for four types of startup policies: an absence of startup policies, minimal selectivity/support, intermediate selectivity/support, and comprehensive selectivity/support. They found that comprehensive selectivity/support is the optimal policy for generating startups that can exploit ventures with high growth potential. However, while such a policy is ideal, it may not be feasible given the resource constraints faced by private universities. Degroof et al. (2004) conclude that while spinout policies matter in the sense that they affect the growth potential of ventures, it may be more desirable to formulate such policies at a higher level of aggregation than the university.

The entrepreneurial culture among academic staff in universities enhances UT in various ways. Until the beginning of the 19th century, universities predominantly remained teaching-based institutions (Altbach, 2011). Most researchers correlate the incorporation of research into the core function of universities with the major reforms of research introduced at the University of Berlin (Altbach, 2011). Etkowitz (2013) terms the emergence of research as a second pillar of HEIs' first academic revolution. With time, HEI's underwent yet another transition which Etkowitz (2008) terms as the second academic revolution (entrepreneurship). With this stage of academic revolution, universities do not only generate new knowledge through basic research but they also provide technical support and facilities for on-going firm-based R&D activities (Grossman et al., 2001).

Siegel et al. (2003), in their model, licensing activity is treated as the output and invention disclosure. Full-time equivalent employees in the TTO and legal expenditures are considered inputs. They found that the production function model yields a good fit. Based on estimates of their "marginal product," it was concluded that technology-licensing officers add a significant value to the commercialization process. The findings also imply that spending more on lawyers reduces the number of licensing agreements but increases licensing revenue. Licensing revenue is subject to increasing returns while licensing agreements are characterized by constant returns to scale. An implication of increasing returns for licensing revenue is that a university wishing to maximize revenue should spend more on lawyers. This would enable university licensing officers to devote more time to eliciting additional invention disclosures and less time to negotiating with firms.

Based on an empirical analysis of 128 firms that were founded between 1980 and 1996 to commercialize inventions owned by MIT, Nerkar and Shane (2003) analyzed the entrepreneurial dimension of university transformation. They found that there is extensive literature that suggests that new technology firms are more likely to survive if they exploit radical technologies and if they possess patents with a broad scope (Merges & Nelson, 1990). The authors conjecture that the relationships between radicalness and survival, on the one hand, *visa vis* scope and survival on the other hand, are moderated by both the market structure and level of concentration in the industry. Specifically, they asserted that radicalness and patent scope increase the probability of survival more in fragmented industries than in concentrated sectors. They estimated a hazard function model using the MIT database and found empirical support for these

hypotheses. Thus, the effectiveness of the technology strategies of new firms may be dependent on industry conditions.

Incentive schemes

Bercovitz et al. (2001) examined the organizational infrastructure of the TTO and its relationship to the overall university research administration. They note that these infrastructures have different implications for the ability of a university to coordinate activity, facilitate internal and external information flows, and align incentives in a manner that is consistent with its strategic goals with respect to UT. To test these assertions, they examined TTOs at Duke, Johns Hopkins, and Penn State Universities and found evidence of alternative organizational forms at these institutions. They attempted to link these differences in infrastructure to variation in UT performance along three dimensions: transaction output, the ability to coordinate licensing, sponsored research activities, and incentive alignment capability. Their findings imply that organizational form does matter.

Using an agency theoretic approach, Jensen et al. (2003) modelled the process of faculty disclosure and university licensing through a TTO as a game in which the principal is the university administration and the faculty, and TTO is a dual agent who specialize in expected utilities. The game is played when faculty members decide whether to disclose the invention to the TTO and at what stage, namely whether to disclose at the most embryonic stage or wait until it is a lab-scale prototype. When an invention is disclosed, the TTO decides whether to search for a firm to license the technology and then negotiate the terms of the licensing agreement with the licensee. The university administration influences the incentives of the TTO and faculty members by establishing policies for the distribution of licensing income and sponsored research. According to Jensen et al. (2003), the TTO engaged in a "balancing act," in the sense that it can influence the rate of invention disclosures, must evaluate the inventions once they are disclosed, and negotiate licensing agreements with firms as the agent of the administration. The probability that a university scientist discloses an invention, and the stage at which he or she discloses the invention are related to the pecuniary reward from licensing, as well as faculty quality. They also found that faculty quality is positively associated with the rate of invention disclosure at the earliest stage and negatively associated with the share of licensing income allocated to inventors.

3. Methodology

3.1 Research Design

In this study, I employed a descriptive single case study design. This research design facilitates a deep investigation of a real-life phenomenon in its natural context (Creswell, 2014). This study was qualitative. The rationale for this approach in this study is that it is ideal for exploring and understanding the lived experiences of study participants. This research was a systematic inquiry into a set of related events which aim at describing and explaining the dynamics of UT at Ugandan private universities. This means that the product of the research is a rich 'thick' description of the phenomenon under study (Creswell et al., 2007).

Study Population

The target population for this study consisted of staffing in Faculty of Engineering and senior administrative officers of MRU. I assigned each participant a pseudonym to ensure confidentiality and anonymity. M001 means. I selected all

academic heads of department and the dean from the Faculty of Engineering, MRU. I used purposive sampling technique to select administrative staff. Purposive sampling technique is ideal because it enables identification and selection of information-rich participants. Administrators were selected because they are in charge of implementing the university policies. I conducted 09 interviews between February – March 2026 after getting authorization from the Deputy Vice Chancellor. On average, each interview lasted 40 minutes. All interviews were recorded and transcribed. Interviews were referenced using interview codes. The data for this study were generated through documentary checks. This helped me to complement the face-to-face semi-structured interview guide and observation check list. The interview guide afforded me an opportunity to give participants freedom to express their opinion. The interviews were audio recorded. Written data sources included published and unpublished documents.

Data Management and Analysis

After collecting data from the field through interviewing, document analysis and field notes, I transcribed the audio-recorded interviews. This involved breaking up data into manageable themes, patterns, trends and relationships (Mouton, 2005).

Thematic Analysis

I used thematic data analysis by looking for themes, connecting themes, clustering themes and generating a complete interpretation. The process of analyzing data using a thematic approach, Howitt and Cramer (2011) observe, involves three conceptually distinct but practically overlapping stages which include the transcription of textual material, analytic effort, and the identification of themes and sub-themes. Contrastingly, Braun and Clarke (2006) note that the process involves six phases: familiarization with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes and producing a report, as in Table 3.1.

TABLE 3.1: THE PHASES OF THEMATIC ANALYSIS.

Phase	Description
Familiarizing oneself with data	Transcribing the data (if necessary), reading and re-reading the data, noting down initial ideas
Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collate data relevant to each [code]
Searching for themes	Collating [codes] into potential themes, gathering all data relevant to each potential theme
Reviewing themes	Checking if the themes work in relation to the coded extracts (level 1) and the entire data set (level 2), generating clear definitions and names for each theme
Defining and naming themes	On-going analysis to refine the specifics of each theme and the overall story the analysis tells, generating clear definitions and names for each theme
Producing the report	The final opportunity for analysis; selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis

Source: (Braun & Clarke, 2006, p.87).

Thematic data analysis involves using an eclectic approach in which data were continually analyzed with a special focus on issues that best matched the research questions. According to Chilisa and Preece (2005, p.172), as soon as the data collection process in qualitative research starts, the data analysis must also start. For this study, as soon as I commenced data collection, I started coding my data into categories and later I reduced them into meaningful components. Coding is an interpretivist technique that organizes the data and provides a means to introduce the interpretations of it into certain qualitative methods which required me to read the data over again to demarcate segments within at different times (Chambliss & Schutt, 2010). Each data set was given a code (a short phrase) which helped me to understand how the associated data set informed the research question.

Trustworthiness of Findings

It is essential to ensure that the findings are true, applicable, consistent and neutral. Qualitative researchers use the terms credibility, transferability, dependability and confirmability (Sherton, 2004) to ensure trustworthiness. Credibility examines the extent to which the findings are in tandem with reality (Merriam, 1988). Here, I paid attention to selecting interviewees that have the required information regarding the phenomenon under investigation, I formulated appropriate interview questions which were semi-structured, I ensured that I made appropriate appointment with my interviewees and ensured that data analysis was done immediately (Sherton, 2004).

With transferability, qualitative researchers address the issue of whether or not findings apply to other situations (Merriam, 1997). For this study, I used a small sample of participants in a specific environment and therefore it is not possible to generalize the research findings to other universities.

With regard to dependability that is, whether the findings of the study are consistent across repeated inquiries in different circumstances with different investigators (Gibbs, 2002). Qualitative researchers as suggested by Yin (2009) need to document the procedure of their case studies and to document as many of the steps of the procedures as possible. There is also need to set up a detailed case study protocol and database to enable others to follow the procedure (Cresswell, 2014).

Confirmability requires taking measures to guarantee that the findings of one's study result from the experiences and ideas of one's participants rather than one's own characteristics and preferences. The key test of the confirmability of a study is the extent to which the researcher admits his inclinations, reflexivity - that is, recognizing that the product of research reflects some of the background of the researcher.

4. Findings

Organizational Culture

The mistrust between the university and the productive sector means that universities are not seen as reliable knowledge suppliers to industry. Trust is even more important as a guarantee for the possibility of future UT. In this sense, trust goes beyond being a form of behavior to being a significant factor in providing psychological comfort to both sides.

According to M003;
Universities should take advantage of their position as academic institutions to exercise the role of public spaces for stimulated debates on local economic, social, and technological challenges. Universities may organize and host events bringing together academics and industrial representatives, along with other relevant stakeholders.

Furthermore, the recognition of the significance of research and innovation in promoting the image of HE institution in its contribution to socio-economic well-being of society. Moreover, research is the yardstick upon which good teaching in universities is measured. However, it is of great concern that much of the university's budget for research is low, which takes less than 3 percent of the entire university budget (MRU, 2019). The implication of this is that the number of articles published in local and international journals by staff is low. Additionally, because of meagre resources, the faculties and indeed departments in the University have hardly identified any community need to which to be attached.

The research and innovation policy of MRU covers four focus areas: research infrastructure, research administration, research resources and management (MRU, 2014). The university has taken strides in the implementation of the research agenda by developing research and innovation manual to guide the implementation of the policy. However, research resources in terms of funding are still low.

To support innovation across universities, URSB is involved in the Technological and Innovation Support Centre's (TISC) project which is an initiative of the WIPO that aims to improve the quality of research by ensuring the researchers have free

access to high quality information mostly available in their patent and non-patent data bases. The TISC project also aims at ensuring that the IP created from research is appropriately projected by their proper licensing, commercialization of management.

The major impediment to UT relates to universities' institutional capacity. Participants indicated that MRU does not have the personnel to engage with Industry. A critical review of the university recruitment and staffing policy reveals that recruitment of new staff is a long and bureaucratic process starting at the directorate of HR, departmental, faculty boards and finally appointments board. This long process of recruitment denies the faculty staff that would work on the UT.

Internal University Characteristics

About the methods the University can use to speed up UT M008 had this to say:

MRU must make a name first before those people can come. But we have some MoU with SME but not big industries. The big companies come with everything in form of MNC's or Direct Foreign Investment (DFI) from their mother countries.

The above assertion contradicts the explanation of M004 who reasoned that his department works with large scale companies which have R&D departments. This controversy comes about probably because most of the large scale industries that work with universities are local, which do not have well developed R&D departments. For the MNC's all technology is developed at the country of origin and then transferred here.

This kind of academic consulting serves as a means through which university academic staff members interact and share knowledge with non-academic professionals in the industrial sector.

Another participant, M005 regretted lack of ethics by academic staff and researchers where some of them do not declare their inventions formally. In the words of this participant:

There is a poor University policy on research and community outreach where teaching is given priority at the expense of research and innovation. The laboratories and workshops do not have the required tools where staff and students could innovate. This means that some of the University innovations remain on paper.

On the issue of whether the university has supportive policies that influence UT, M003 observes that;

There is the research grants and publication committee which is a committee of research and innovation policy. We strive to publish as opposed to commercialization of technology. Through publication, some industries approach us and we work with them.

The major highlight of the National Development Plan NDP I is the emphasis on the creation of a culture of research and innovation through acquisition and application of knowledge. This can be achieved through basic and applied research and the core activities of MRU.

One participant from the faculty of engineering reasoned that research culture in the faculty is low due to the nature of graduate students that faculty gets. Most of them are not after academic advancement but aim at strengthening job security at their respective places of work. Working with industry for technological advancement is not always their priority. The

faculty has therefore not produced enough researchers to fill the research-knowledge gap created by retiring professors the link between postgraduate studies and the industry can make advancement to strengthen national innovation systems. However, at MRU, postgraduate training is plagued with limited incentives. A number of initiatives have been proposed to bring private industries and postgraduate students together. One of such initiatives is to ask companies to sponsor postgraduate research work of such students. However, such sponsored students may not be in position to transfer their findings to users because the sponsor (industry) retains the patent. Additionally, such students are likely to publish findings which are not in direct conflict with their sponsor. This may lower the quality of research, decrease societal perception of research findings and trust in the university may be affected.

Asked about the major barrier to UT, M007 said; *Lack of appropriate leadership at the university departments to initiate, guide and support activities are the main barrier to UT* Review of the Uganda National Council for Science and Technology (UNCST) policy document revealed that the council does not have the mandate to allow private universities interface with the productive sector

The university engages guest speakers to provide innovative advice but there are no resources specifically dedicated to supporting UT activities by faculty. A wide range of other resources and incentives are being employed at a low frequency. Moreover, support for exchange with the private sector, recognition awards for industry related research, monetary bonuses, and promotion based on an industry-related research and entrepreneurial activities is almost non-existent. The bottom line is that access to special funds and access to seed grants for commercialization of outputs are employed on small scale.

When asked about the influence of institutional policies on UT in his department, M005 said; *The biggest challenge we have as a department is under funding. No innovations can come up without research and with no funding, research cannot be advanced. Most of university's work is teaching. We have only 10 masters' students in the department. Not much is done to generate knowledge even by masters' students. There is a staffing challenge.*

M002 adds: *Our masters' programs are not funded. Universities in the developed world have masters' students given even a stipend. Here, the nature of our students is that they come to get their degrees and go. They are a working class intending to strengthen job security at their places of work. So, their minds are not in research.*

The faculty that gets engaged in research and innovation are not paid an extra motivation but only the salary. So, the reward is only for teaching. The level of research and innovation is low because the staff use more of their time to teach than engage in research.

Limited staff also implies that there is a gap in the governance of UT. Industries need evidence of expertise existing in the university. Mutual trust of partners is a focal condition for functional and interactive linkages. When an industry cooperates with a university, the industry can observe a researcher, what he does and how he does it before such a researcher can be trusted with work in an industrial establishment. Mistrust may arise if industries fear that a

university researcher is likely to leak their secrets to competitors.

The faculty members need a favorable incentive and reward structure for engaging with industry. There ought to be greater interaction within the university with academics from other Faculties. The university is already encouraging interdisciplinary research. These are able to solve complex problems by bringing different expertise to solve diverse issues.

Incentives Schemes

Asked whether his department has put in place any measures to motivate his staff to get involved in UT, M005 reasoned that: *UT the way I understand it and the way it should function, is different from what is perceived here at MRU. UT can be conceptualized as a process that consists of agents who work to find resources for the institution as a whole. They seek other patrons instead of waiting passively for support from outside the institution. They work to diversify income and thereby enlarge the pool of discretionary money. They try to link traditional departments with outside establishments especially industrial firms.*

The strengthened steering mechanism is necessary, taxing rich programs to aid less fortunate ones. Agents of the core thereby not only seek to subsidize the new activities but also try to enhance old programs.

Regarding the issue of how scientists in the university are rewarded for their innovative ideas, participant UP003 had this to say:

Students just get their degrees, diplomas and go. For the promotion of academic staff, we follow University policy, we do not just promote outside what is within the University guidelines. The parameters for promotion are as follow: academic and professional qualification which scores a maximum of 25, teaching ability and experience 20, publications in reputable journals or writing a book or book chapter 25, supervision of graduate student's research to completion 15, conduct and ethical behavior 05, other academic activities like exhibition at science fairs 05, and then membership to professional bodies 05. The total is 100.

The current system used by the MoES to allocate research funds to universities is fragmented. This is due to low availability of large scale research grants. Research teams in universities are forced to draw on a number of other sources of funds. These often include participation in conferences. This process may complicate the patenting of research findings as academic researchers have the target of publication of their findings. However, large scale research grants would stimulate interdisciplinary and multi-disciplinary and bring together teams from different disciplines. Additionally, MRU has a long line target of creating a centre of excellence with a view of bringing together the best researchers and scientists. Evidence from already established universities suggest that these centres help to improve the quality and relevance of research by concentrating research efforts.

Unified Theoretical Model for UT

The findings reveal measures that need to be established in the University to enable it to transform into a self-sustaining institution. I compiled these fundamental measures (findings) into a framework of UT. This framework could feed into future strategic plans of MRU in the quest of becoming more responsive to societal development.

In a knowledge society, societal needs face new challenges that force them to change (Poppen et al., 2018). For instance, scientific studies are needed to inform political decisions and companies need strong R&D departments for their technological innovations. Specifically, produced knowledge has become the basis for the decision-making process in politics. Studies show that in the 20th century, scientific organizations became an important factor for industries to invest in specific areas. Therefore, co-operation between industries and universities is viewed as benefiting both. Universities have to initiate their own economic activities, train personnel and start working on the local economy's problems while industries have to take interest in research activities.

According to this new model, all government funded scientific activities for private universities within the confines of UT should end up being useful for societal development.

The university is allocated the role of producing skills, knowledge and technology and supply it to industries and society. It (University) acts as a physical environment for research and teaching on local innovations. It integrates community knowledge into R&D in science and technology. It then provides incentive for academics to interact and cooperate with local communities and industries. The university takes the role of industry in supporting start-up creation in the incubators. Academics seek to relate to the knowledge and innovation from local communities in addition to designing projects.

5. Discussion, Conclusion and Recommendations

Organizational Culture

There is need to bring the two institutions of university and industry closer first. Currently, different work routines make researchers and companies repel each other. Different time horizons ensure that companies work within a time – to market logic, this is incompatible with the longer time frames often employed by university researchers. There is a lack of understanding and a mutually negative perception of each other that hinders UT. Some firms especially the foreign owned ones perceive local universities as out of touch with the real world. Such barriers can be overcome through social interaction leading to a deeper commitment. There are also cultural differences between the academic environment and the industry. Firms originating in a university have more limited access to the competencies needed to start and grow a business. There is a challenge of initiating and developing of transforming science knowledge into a commercial product or service that can be sold to the market.

Since people and institutions are not always interested in getting involved in research & development partnerships, industry-institute interaction can only be achieved by finding out policies to draw relevant stakeholders into systematic and reciprocal interaction to address work place trends and technology emancipation. The implication of this is that collaboration between university and industry is more informal. This is in agreement with the finding of Guimon (2013) thus, collaboration between the two institutions tends to be more informal due to historically based cultural and institutional barriers.

Industries increasingly look to universities, as well as other firms and government laboratories as a potential source of useful knowledge and technology. Cooperative initiatives are emanating from both the academic and industrial spheres, often

encouraged by government. Just as industries seek new ways to collaborate with academia, universities also want to expand their role in economic development. A variety of ways have been created, going well beyond traditional means such as graduation of students and consultation to bridge the gap. The creation of intermediary offices, spin-off firms, science parks and other interface mechanisms has raised a new set of issues about the role of academia in society beyond traditional concerns of community service, on the one hand, and academic freedom on the other. Conflict of interest, intellectual property rights, and limited secrecy are among the new terms of policy debate among academics, government science-policy officials, and industrial laboratory directors.

UT from MRU is largely influenced by the national research policy. The national STI policy (GoU, 2009) identifies the major hinderances to STI to include fragmentation of powers and responsibilities in various ministries including Ministry of Education and Sports; Ministry of Finance, Planning and Economic Development; Ministry of Industry, Trade and Cooperatives; Ministry of Science, Technology and Innovation. There is lack of coordination of research activities in STI organizations like UNCST and NCHE. There is also lack of funding where Uganda had a Gross Domestic Expenditure in Research and Development (GERD) of 0.17 percent of GDP which is less than half of the African average of 0.42 percent (UNESCO, 2014). There is also limited research infrastructure, low administrative capacity and limited human resources where the country hosts 42 R&D personnel per million inhabitants compared to over 1000 per million in Kenya and 120 per million in Ghana. Furthermore, 46 percent of Uganda's researchers are employed in higher education and an additional 44 percent of researchers are employed to government services, the remaining 10 percent of researchers are employed by industry and business (Fosci, Loffrada, Chamberlain & Naidoo, 2019). The implication of this is that, industries do not have internal R&D to work with universities.

Economic operators have long considered science and technology an academic exercise that has only long-term implications, and is, therefore, of little relevance to their current concerns. This condition is also exacerbated by the scientists' view of their role in society. For many years they were concerned with the imperative to "publish or perish", and had practically no interaction with the economic operators. The science and technology policy they framed was no different from the earlier science policy and was not integrated into the national socio-economic development policies. There is now a growing realization that these policies have to be recast, science and technology policies have to be closely linked to the social, economic, industrial and trade policies of the countries.

Researchers want to do more in terms of research inventions, thereby helping universities to meet the expectations of the public as the society's knowledge-producers. To further improve the existing status of researchers' compensation, ideas can be drawn specifically from TT systems in the developed world with more advanced UT systems. Furthermore, there is a need for MRU to foster effective partnerships with educational arms of bodies. Such bodies, among others, include the Uganda Small Scale Industrial Association (USSIA) which has over 1,200 members countrywide, Uganda Manufacturers Association (UMA) which brings together manufacturers, Uganda Industrial Research Institute (UIRI) for technology

incubation, Private Sector Foundation (PSF), Uganda Chamber of Commerce and Industry for technology acquisition support, and the Uganda Registration Services Bureau (URSB).

6. Conclusion

The study makes the following conclusion

The University strategic plan 2012/2013 – 2020/2023 and MRU Master Plan 2014-2024 have both advocated for UT. These have led to the establishment of a Technology and Innovation Centre, which caters for innovative ideas by staff and students. However, university policies on UT do not work in isolation to build technological capabilities. There are other policy dimensions that also play a key role. Such policy dimensions include industrial policies, trade, education and training, rational, intellectual property, management and entrepreneurship policies.

Contribution to Knowledge

In this study, I explored whether institutional mechanisms, organizational culture and incentive schemes enhance University Transformation.

Research and Innovation contribution

This study has extended the debate of UT and accordingly, its findings and recommendations are relevant to scholars in the area of UT, research and innovation. The study provides an extensive review of literature regarding UT mechanisms and its challenges. By reviewing and subsequently utilizing the existing literature findings and recommendations, the study contributes to university research and innovation by affirming the relevance of the previous studies and filling some of the existing gaps of literature. Most of the previous research is about UTs from regions that have achieved the drive to maturity stage of development and thus, it tends to focus on UT from the developed world (Curi et al., 2012; Lee, 2012; Ecuru, 2011; Mensah & Enu-kwesi, 2018).

Theoretical contribution

In this study, I have generated a framework - the unified theoretical framework of UT incorporating insights from the triple helix model. This framework could feed into the future strategic direction of MRU which has declared UT as a core values and part of the mission statement of the university. The institution could use the framework to plan for UT which is increasingly gaining more attention among researchers and policy makers.

Recommendations

From this study, I recommend that:

There is need for University management to embrace central managerial groups and academic departments. It must operationally reconcile new managerial values with traditional academic ones. The University ought to set out to construct a widening and deepening portfolio of a third stream income sources that stretch from industrial firms, local government, philanthropic foundations to royalty income, from earned income from campus services, student fees and alumni fundraising.

References

1. Afzal, M. I., Rini S. S., Susmita, D., & Datuk, K. (2018). An Investigation on Triple Helix Model and National Innovation Systems: The Case of Malaysia. *Journal of Entrepreneurship Education* 21: 1–15.
2. Altbach, P. G. (2008). The complex role of universities in the period of globalization. In *Global University Network for Innovation (GUNI), Higher education in the world 3: Higher education: New challenges and emerging roles for human and social development*. London: Palgrave Macmillan.
3. Alvarez, C. and Urbano, D. (2011). Environmental factors and entrepreneurial activity in Latin America. *Academia, Revista Latinoamericana de Administrac i3n*, 48, 126–139.
4. technology transfer,” *Technovation* 27(5): 306–318.
5. Ankrah, S. and Al-Tabbaa, O. (2015). Universities-industry collaboration: A systematic review. *Scandinavian Journal of Management*, 31, 387-408.
6. Aranha, J. A. S. (2003). Incubator Models. infoDev Incubator Support Center (iDISC). pp. 1–17). Retrieved from <http://www.incubation.org.np/pdf/idisc/aranha.pdf>
7. Armstrong, P. (2001). Science, enterprise and profit: Ideology in the knowledge-driven economy. *Economy and Society*, 30(4), 524-52
8. Arnkil, R. A. (2010). Exploring Quadruple Helix – outlining user oriented innovation models. University of Tampere, Institute for Social, Research, Work Research Centre
9. Bailey, T., Cloete, N., & Punday, P. (2011). Universities and economic development in Africa. Case study: Uganda and Makerere University. HERANA, CHET.
10. Becker, B. and Gassmann, O. (2006). Corporate Incubators: Industrial R&D and What Universities Can Learn from Them. *Journal of Technology Transfer*, 31, 469-483. <http://dx.doi.org/10.1007/s10961-006-0008-6>
11. Begley, T., Tan, W. L., & Schoch, H. (2005). Politico-economic factors associated with interest in starting a business: A multi-country study. *Entrepreneurship Theory & Practice*, 29(1), 35–55.
12. Bellgardt, F., Gohlke, J., Haase, H., Parzonka, R., & Schicketanz, J. (2014). Triple helix and residential development in a science and technology park: the role of intermediaries. *Triple Helix* 1(1):10
13. Bentley, P. J., Gulbransen, M., & Kyvik, S. (2015). The relationship between basic and applied research in Universities. *High Education*, 70(4), 689-709.
14. Bercovitz, J., Feldman, M., Feller, T., & Burton, R. (2001). ‘Organizational Structure as Determinants of Academic Patent and Licensing Behavior: An Exploratory Study of Duke, Johns Hopkins, and Pennsylvania State Universities’. *Journal of Technology Transfer* 26, 21–35.
15. Boulton, G. and Lucas, C. (2008). League of European Research Universities. LERU. Huis Bethlehem. Belgium.
16. Braun, V. and Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
17. Byaruhanga, J. K., Lubwama, F., & Lating, P.O. (2016). Barriers to Implementation of Uganda’s National Industrial Policy: A Case study of the Iron and Steel Sector. *IJTD* 3,1
18. Chambliss, D. F. and Schutt, R. K. (Eds.) (2010). *Making sense of social world: Methods of investigation* (3rd ed.). Thousand Oaks, CA: Sage.
19. Chilisa, B. and Preece, J. (2005). *Research methods for adult educators in Africa*. Hamburg, DE: UNESCO Institute for Education.
20. Clark, B. R. (1983). *The higher education system: Academic organization in cross-national perspective*. Berkeley: University of California Press.

21. Cohen, W. M., Nelson, R.R., & Walsh, J. P. (2002). 'Who is Selling the Ivory Tower? Sources of Growth in University Licensing'. *Management Science* 48(1), 90–104.
22. Cohen, W., Nelson, R., & Walsh, J. (2002). Links and Impacts: The Influence of Public Research on Industrial R&D. *Management Science*, 48(1), 1-23.
23. Cohen, W.M. and Levinthal, D.A. (1989). Innovation and Learning: the Two Faces of R&D, *Economic Journal*, 99: 569-96
24. Creswell, J. W. (2014). Research Design. Qualitative, Quantitative and Mixed methods approach (4thed). Sage; Thousand Oaks, California.
25. Creswell, J.W. and Clark, P.V.L. (2007). Designing and conducting research in education. Los Angeles: Sage Publication.
26. Creswell, J. W. (2003). Research Design. Qualitative, Quantitative and Mixed methods approaches, (3rd ed). Thousand Oaks, London. New Delhi; Sage Publication.
27. Dana, L. P. (1987). Evaluating policies promoting entrepreneurship - A cross cultural comparison of enterprises case study: Singapore & Malaysia. *Journal of Small Business and Entrepreneurship*, 4(3), 36–41.
28. Degroof, J. J. and Roberts, E.B. (2004). 'Overcoming Weak Entrepreneurial Infrastructure for Academic Spin-off Ventures'. *Journal of Technology Transfer* 29(3–4), 327–357.
29. Doern, G.B., Phillips, P.W., & Castle, D. (2016). Canadian science, technology, and innovation policy: The innovation Economy and Society nexus. McGill-Queen's Press, Montreal and Kingston
30. Doh, P. (2012). The responses of the higher education sector in the poverty reduction strategies in Africa: The case of Cameroon. Tampere University Press.
31. Etzkowitz, H. and Leydesdorff, L. (1997) (Eds.). Universities and the global knowledge economy: A Triple Helix of University-Industry-Government Relations. London: Pinter.
32. Etzkowitz, H. (1983). Entrepreneurial Scientists and Entrepreneurial Universities in American Academic Science. *Minerva* 21(2-3): 198-233.
33. Etzkowitz, H. (2001). The second academic revolution and the rise of entrepreneurial science. *IEEE Technology and Society Magazine*, summer, 18–29.
34. Etzkowitz, H. (2003). Research groups as 'quasi firms': The invention of the entrepreneurial university. *Research Policy*, 32 (1): 109–121.
35. Etzkowitz, H. (2008). *The triple helix: University-Industry-Government innovation in action*. New York: Routledge.
36. Etzkowitz, H. (2013). Can a teaching university be an entrepreneurial university? Civic entrepreneurship and the formation of a cultural cluster in Ashland, Oregon.
37. Etzkowitz, H. and Leydesdorff, L. (1995). The Triple Helix, University-Industry-Government Relations: A Laboratory for Knowledge Based Economic Development. *EASST Review*, 14: 14-19.
38. Etzkowitz, H. and Leydesdorff, L. (2000). The dynamics of innovation from National Systems and Mode 2 to a Triple Helix of University Industry- Government Relations, Science and Technology.
39. Etzkowitz, H., Ranga, M., Benner, M., Guarany, L., Maculan, M., & Kneller, R. (2008). Pathways to the entrepreneurial university: towards a global convergence. *Science and Public Policy*, 35(9), 681–695.
40. Etzkowitz, H., Webster, A., Gebhardt, C., & Terra, B. R. C. (2000). The future of the university and the university of the future: Evolution of ivory tower to entrepreneurial paradigm. *Research Policy*, 29:313-330.
41. Etzkowitz, H.A. (2000) 'The dynamics of innovation: from national systems and 'mode 2' to a triple helix of university-industry-government relations', *Research Policy*, 29(2), 109–123.
42. Fadeyi, O., Maresova, P., Stemberkova, R., Afolayan, M., & Adeoye, F. (2019). Perspectives of University-Industry Technology Transfer in African Emerging Economies: Evaluating the Nigerian Scenario.
43. Gibbons, M. [Ed.]. (1994). The new production of knowledge: The dynamics of science and research in contemporary societies. London: Sage Publications.
44. Giuri, P., Ploner, M., Rullani, F., & Torrisi. S. (2019). Skills, division of labour an performance in collective inventions: Evidence from open source software. *International Journal of Industrial Organization*, 28(1), 54-68.
45. Government of Uganda [GoU]. (2019). National intellectual property policy. Ministry of Justice and Constitutional Affairs. Kampala
46. Government of Uganda [GoU]. (2001). Universities and Other Tertiary Institutions Act, 2001. (Amendment) Act, no. 7, Entebbe: UPPC.
47. Government of Uganda. (2010). National Development Plan 2010/11 – 2014/15. Kampala.
48. Government of Uganda. (2020). National Development Plan 2019/20 – 205/26. National Planning Authority, Kampala.
49. Grossman, J. H., Reid, P. P., & Morgan, R. P. (2001). "Contributions of Academic Research to Industrial Performance in Five Industry Sectors". *Journal of Technology Transfer*. 26 (1-2): 143-152.
50. Guimon, J. (2013). Promoting University-Industry Collaboration in Developing Countries. World Bank Policy Brief.
51. Howitt, D. and Cramer, D. (2011). *Introduction to research methods in psychology* (3rd ed). London: Prentice Hall.
52. Jensen, R. and Thursby, M. (2001). 'Proofs and Prototypes for Sale: The Licensing of University Inventions'. *American Economic Review* 91(1), 240–259.
53. Jensen, R. J. G. and Thursby, M. C. (2003). 'The Disclosure and Licensing of University Inventions: *International Journal of Industrial Organization* 21(9), 1271–1300.
54. Jonker, J. and Pennink, B. (2010). *The Essence of Research Methodology: A Concise Guide for Master and PhD Students in Management Science*, Springer, Heidelberg.
55. Kasozi, A. B. K. (2016). The National Council for Higher Education and the Growth of the University sub-sector in Uganda, 2002-2012. CODESRIA, Dakar
56. Kaymaz, K. and Eryigit, K.Y. (2011). Determining Factors Hindering University-Industry Collaboration: An Analysis from the Perspective of Academicians in the Context of Entrepreneurial Science Paradigm.
57. Kirby, D. A. and Hala, H. E. H. (2019). University Technology Transfer Efficiency in a Factor Driven Economy: The Need for a Coherent Policy in Egypt. *The Journal of Technology Transfer*, 44: 1367–95.
58. Kumar, P. and Gupta, R. (2017). The Roadmap for Enhancing University-Industry Research Collaboration in India. *Indian Journal of Public Administration*. 63 (2) 196-227. SAGE Publications.

59. Kumar, V. (2017). The role of university research centres in promoting research. *Journal of the Acad. Mark.Sci.*
60. Muteesa I Royal University(2025- 2030). Strategic Plan. Mengo
61. Lee, Y. S. (2000). The Sustainability of University-Industry Research Collaboration: An Empirical Assessment. *The Journal of Technology Transfer*, 25, 111-133.
62. Leišytė, L. and Sigl, L. (2018). *Academic institutional entrepreneurs in Germany: navigating and shaping multilevel research commercialization governance*. Centre for Higher Education. TU Dortmund University. Springer Open.
63. Leydesdorff, C.S., Wagner, I., Porto-Gomez, J. A., & Comins, F. (2019). Synergy in the knowledge base of U.S innovation systems at national, state, and regional levels: The contributions of hightech manufacturing and knowledge-intensive services. *J. Assoc. Inf. Sci. Technol.*
64. Miles, M. B. and Huberman, M. A. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage Publications.
65. Mouton, J. (2005). *How to succeed in your Master's and Doctoral studies*. Pretoria: Van Schaik between Academic Research and Economic Development in Ethiopia: Addis Ababa University.
66. Mowery, D. C. and Sampat, B. N. (2004). The Bayh-Dole Act of 1980 and university–industry technology transfer: A model for other OECD governments? *The Journal of Technology Transfer*, 30(1-2), 115-127.
67. Mustapha, N., Firdous, K., & Ralphs, G. (2019). *Technology Transfer in South Africa*. Scientific. Pretoria: Human Sciences Research Council in Collaboration with Southern African Research and Innovation Management Association (SARIMA), the National Intellectual Property Management Office (NIPMO), and the Department of Science and Technology (DST)
68. Mustar, P., Renault, M., Colombo, M. G., Piva, E., Fontes, M., & Lockett, A. (2006). Conceptualising the heterogeneity of research-based spin-offs: A multi-dimensional taxonomy. *Research Policy*, 35:289-308.
69. Nerkar, A. and Shane, S. (2003). When do start-ups that exploit academic knowledge survive? *International Journal of Industrial Organizations*, 21(9), 1391-1410.
70. Paytas, J., Gradeck, R., & Andrews, L. (2004). Universities and the development of industry clusters. Report prepared for the Economic Development Administration of the United States Department of Commerce.
71. Phan, P. H & Siegel, D.S. (2006). The Effectiveness of University Technology Transfer. *Foundations and Trends in Entrepreneurship*, 2(2), 77–144
72. Ranga, M. and Etzkowitz, H. (2013). Triple Helix Systems: An Analytical Framework for Innovation Policy and Practice in the Knowledge Society. *Industry and Higher Education* 27: 237-262.
73. Rany, S. (2012). Establishment of Institutional Policies for Enhancing Education Quality in Cambodian Universities. *International Journal of Higher Education*, 1(1)
74. Rasmussen, E., Mosey, S., & Wright, M. (2015). The transformation of network ties to develop entrepreneurial competencies for university spin-offs. *Entrepreneurship & Regional Development*, 27(7–8), 430–457.
75. Republic of Uganda. (2009). National Science, Technology and Innovation Policy. Ministry of Finance, Planning and Economic Development. Kampala
76. Republic of Uganda. (2017). Science, Technology and Innovation. Ministerial Policy Statement. Ministry of Science, Technology & Innovation. Kampala
77. Robin, S. and Schubert, T. (2013). Cooperation with public research institutions and success in innovation: evidence from France and Germany. *Res Policy*, 42:149–166.
78. Romer, P. (1990). “Human Capital and Growth: Theory and Evidence.” *Carnegie-Rochester Conference Series on Public Policy*, 32 (1): 251–86.
79. Rosenberg, N. (1990). Why do firms do basic research (with their own money)?, *Research Policy* 19, 165-174. Rosenberg, N., and R. Nelson, 1994, American Universities and technical advance in industry, *Research Policy*, 23, 323-348.
80. Rothaermel, F. and Thursby, M. C. (2006). ‘Incubator Firm Failure or Graduation? The Role of University Linkages. *Research Policy* 34(3), 1076–1090.
81. Rothaermel, F. T. and Ku, D. N. (2008). "Intercluster innovation differentials: The role of research universities." *IEEE Transactions on Engineering Management*, 55(1): 9-22.
82. Siegel, D., Wright, M., & Veugelers, R. (2007). University Commercialization of Intellectual Property: Policy Implications. *Oxford Review of Economic Policy*, 23, 4, 640-660.
83. Siegel, D.S. and Wright, M. (2015). Academic entrepreneurship: time for a rethink? *Br J Manag* 26:582–595. <https://doi.org/10.1111/1467-8551.12116>
84. Tan, E. (2014). Human Capital Theory: A Holistic Criticism. Review of Educational
85. United Nations Conference on Trade and Development UNCTAD (2020). Uganda Science, Technology and Innovation Policy Review. United Nations, Geneva
86. University of Pretoria. (2019). Innovation & Technology Transfer. Education & Research. Contracts & Innovation Office.
87. Van Looy, B., Landoni, P., Callaert, J., van Pottelsberghe, B., Sapsalis, E., & Debackere, K. (2011), “Entrepreneurial effectiveness of European universities: An empirical assessment of antecedents and trade-offs, *Research Policy*, 40(4), 553-564.
88. van Stel, A., Storey, D. J., & Thurik, R. (2007). The effect of business regulations on nascent and young business entrepreneurship. *Small Business Economics*, 28(2), 171–186.
89. Veugelers, R., & Rey, E. (2014). The contribution of universities to innovation (regional) growth and employment. EEMEE Analytical Report No 18.
90. World Bank. (2011). Science, technology and innovation in Uganda: Recommendations for Policy and Action, Washington, DC: World Bank.
91. Yao, W., Li, H., & Weng, M. (2018). The role the university could play in inclusive regional innovation system. Zhejiang University, *Springer*.
92. Yin, R. K. (2011). *Qualitative research from start to finish*. New York: The Guildford Press.
93. Zucker, L., Darby, M., & Armstrong, J. (1998). “Geographically localized knowledge: Spillovers or markets?” *Economic Inquiry*, 36(1), 65-86.
94. Zucker, L.G. and Darby, M.R. (1996). Star scientists and institutional transformation: patterns of invention and innovation in the formation of the biotechnology industry. *Proceedings of the National Academy of Sciences*, 93, 709–716.

Copyright: © 2026 Zaidi K. This Open Access Article is licensed under a [Creative Commons Attribution 4.0 International \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.